UNITED STATES OF AMERICA 113 FERC ¶62,186
FEDERAL ENERGY REGULATORY COMMISSION

Portland General Electric Company Project No. 2233-043

ORDER APPROVING SETTLEMENT AND ISSUING NEW LICENSE

December 8, 2005

1. On December 27, 2002, Portland General Electric Company (PGE) and Blue Heron Paper Company (BHPC) filed an application for a new license for continued operation of the Willamette Falls Project No. 2233, a 16.680-megawatt (MW) project, 15.180-MW[1] at PGE's T.W. Sullivan plant and 1.5-MW at the BHPC development, located on the Willamette River near the cities of West Linn and Oregon City, Oregon.[2] The project does not occupy any federal lands. On August 28, 2003, PGE filed with the Commission a Supplement to its application, detailing protection and mitigation measures for a preferred alternative developed in consort with resource agencies and interested parties. The Preferred Alternative was the product of settlement discussions. On October 7, 2003, PGE and BHPC jointly requested Commission approval to transfer the license for the BHPC development to PGE. The Commission approved the transfer on November 17, 2003. The BHPC facility has not operated since December 2003. PGE proposes to decommission the Blue Heron powerhouse. This order approves the decommissioning of the BHPC facility subject to filing for Commission approval a decommissioning plan.

2. On February 2, 2004, PGE filed an Offer of Settlement, which represents the agreement among PGE, five governmental, three tribal and four non-governmental parties. The Commission issued public notice of the Settlement Agreement on February 5, 2004. No entities opposed the agreement. The measures specified in the Settlement Agreement are consistent with those of the Preferred Alternative analyzed in the Final

[1] The application and subsequent filings refer to the project as having a total output of 17.5 MW (16 MW at T.W. Sullivan and 1.5 MW at BHPC). Under normal operating conditions, the T.W. Sullivan development does operate at an output of 16 MW; however, the Commission authorized installed capacity of the T.W. Sullivan development is 15.180 MW based on the lesser of the ratings of the generator or the turbine units as given in Exhibit A of the license application filed December 27, 2002 and defined by the Commission regulations (18 CFR 11.1(i)).

[2] The Willamette River is a navigable waterway of the United States. 29 FPC 474 (1963).

Environmental Assessment issued on October 18, 2004. As discussed below, I approve the Offer of Settlement and issue a new license for the Willamette Falls Project including the decommissioning of the BHPC facility generating units.

BACKGROUND

3. The Commission issued the original license for the project on June 21, 1960, and the license expired on December 31, 2004.[3] Since then, PGE has operated the project under an annual license pending the disposition of its new license application. On March 31, 2003, the Commission issued a public notice accepting PGE's application as ready for environmental analysis and soliciting interventions, comments, terms and conditions, prescriptions, and recommendations. The notice was published in the Federal Register on April 4, 2003. The U.S. Department of the Interior (Interior), the National Marine Fisheries Service (NMFS), the Oregon Hydroelectric Application Review Team, the Confederated Tribes of the Grande Ronde, the Confederated Tribes of the Siletz Indians of Oregon, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Columbia River Inter-Tribal Fish Commission and American Rivers et. al., all timely intervened in the proceeding. None of the intervenors oppose the application.

4. A draft Environmental Assessment (EA) was prepared by Commission staff and issued on January 23, 2004. Comments on the draft EA were filed by the Oregon Hydroelectric Application Review Team, Interior, NMFS, American Rivers et. al., and PGE.

5. On October 18, 2004, the Commission staff issued a final EA that recommended adopting the measures contained in PGE's Preferred Alternative and Offer of Settlement filed February 2, 2004. The EA contains background information, analysis of the potential environmental impacts of continued project operation, support for related license articles, and the basis for a finding that issuance of the license is not a major federal action significantly affecting the quality of the human environment.

6. The motions to intervene and comments received from interested agencies and individuals throughout the proceeding, as well as the provisions of the Settlement Agreement have been fully considered in determining whether, and under what conditions to issue the license.

PROJECT DESCRIPTION

A. Project Facilities

[3] 23 FPC 831 (1960).

7. The Willamette Falls project dam is located at river mile (RM) 26.5 on the Willamette River. Willamette Falls is a horseshoe-shaped, 40-foot-high, natural waterfall that marks the head of the tidally influenced lower Willamette River, a tributary of the Columbia River. The project dam is located along the crest of Willamette Falls and consists of a 600-foot-long, 20-foot-high concrete spillway section with a crest elevation of 55.0 feet above mean sea level (msl) and a 2,300-foot-long, 6 to 20-foot-high concrete dam with a crest elevation of 52.0 feet msl (54.0 feet msl with flashboards). The 600-foot-long spillway section is equipped with stop logs to prevent overflow during normal flow conditions.

8. The project contains two separate hydroelectric generating developments: (1) the 15,180-kilowatt (kW), T.W. Sullivan development located on the west (West Linn) side of the river at Willamette Falls and (2) the 1,500-kW, BHPC development located on the east (Oregon City) side of the river at Willamette Falls. It also includes the West Linn Paper Company's (formerly Simpson Development) grinder rooms number two and three at the north abutment of the dam. [4]

9. The T.W. Sullivan development consists of a forebay and a trashrack-equipped, gated intake along the entire width of the 13 turbine bays in the T.W. Sullivan powerhouse which contains 13 vertical turbine-generators with a combined rated capacity of 15.180 MW. The BHPC development includes a forebay and a trashrack-equipped, gated intake for two short penstocks that provide the flow to drive two horizontal turbine generators with a total capacity of 1.5 MW located in the BHPC powerhouse. The penstock for Unit 1 is 7.25 feet in diameter and the Unit 2 penstock is 8.5 feet in diameter. Both penstocks are constructed of riveted steel plates.

10. Output from the T.W. Sullivan development is fed through a 57/4.16-kilovolt (kV) transformer located on the powerhouse deck. A 900-foot-long, 57-kV, single-circuit transmission line carries the power from the transformer to a non-project switchyard located on the bluff above the plant. Both the transformer and transmission line are part of the project; the switchyard, located outside the project boundary, is not. No project transmission lines are associated with the BHPC development; the output of its generators is fed directly into a 2,300-volt service bus in the paper mill complex.

11. A fish ladder, owned by PGE and Oregon Department of Fish and Wildlife (Oregon DFW) and located within the project boundary, is located near the center of the river at the apex of the horseshoe-shaped waterfall. The ladder was included in the license by the Order Approving "As Built" Exhibits K and L, issued August 29, 1973.

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[4] In 1996, Commission staff approved the decommissioning of the generating facilities of the project's Simpson Development (West Linn Paper Company). However, because the Simpson Development structures and facilities are integral to the project's dam, they remained in the project boundary and under license.

Water that does not flow through one of the project's two powerhouses, through the fish ladder, or through navigation locks operated by the U.S. Corps of Engineers, passes over the dam and the waterfall and continues down river. [5]

12. The project lies entirely within the city limits of Oregon City on the east shore of the Willamette River and the City of West Linn on the west shore. The project boundary of the Willamette Project encompasses 97.23 acres and includes the above described project facilities. The boundary, as shown in the Exhibit G drawings approved in Ordering Paragraph (C) of this order, is delineated by a combination of survey courses and topographic and man-made features. On the west shore of the Willamette River, the boundary includes the T.W. Sullivan Powerhouse, Willamette Falls Dam, and extends up-river approximately four miles to include a portion of Willamette Park, operated by the City of West Linn. On the east shore the boundary includes the BHPC Powerhouse. Three fish stranding pools below the Falls are included within the boundary.

13. A complete description of the Willamette Falls project facilities can be found in Ordering Paragraph (B) of this order.

B. Project Operation

14. The Willamette River flows from southwest to northeast emptying into the Columbia River at Portland. The project operates in a run-of-river mode and does not provide useable water storage or flood control. Under the range of normal operations, the water surface at the dam varies from approximately 54 feet msl during low flow with the flashboards installed to about 58 feet during normal winter flows. Typical water surface elevations are in the range of 55 to 56 ft msl. The Willamette Falls Dam diverts water into the T.W. Sullivan powerhouse forebay on the west side of the river. The water intakes for the turbines are located at the base of the powerhouse. Water diverted through the powerhouses rejoins the main river immediately below the falls. Since the tidal effect of the Pacific Ocean is evident all the way to the base of Willamette Falls, the tidal influence on tailwater elevation has a small effect on hydroelectric generation.

15. The project is operated locally with remote monitoring at the PGE Westside Hydro Control Center, located near Estacada, Oregon. PGE ceased operation of the BHPC development in 2003 and proposes to permanently decommission the development in 2005. Article 301 of the license requires PGE to decommission the BHPC development in accordance with an approved decommissioning plan.

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[5] The U.S. Army Corps of Engineers owns and operates, navigation locks on the West bank of the river next to the T.W. Sullivan development, but the locks are neither part of the project, nor in the project boundary.

SETTLEMENT AGREEMENT

16. The Settlement Agreement filed on February 2, 2004, establishes measures for the protection, mitigation and enhancement of resources affected by the project under a new license, and specifies procedures to be used by the parties to ensure the implementation of the license articles contained in the new license. The parties to the agreement are: Portland General Electric, U.S. Fish & Wildlife Service (FWS), NMFS, Oregon DEQ, Oregon DFW, Oregon Water Resources Department, Confederated Tribes of Warm Springs Reservation of Oregon, Confederated Tribes of Siletz Indians of Oregon, Confederated Tribes of the Grand Ronde Community of Oregon, American Rivers, Oregon Trout, The Native Fish Society, Trout Unlimited, and the Columbia River Inter-Tribal Fish Commission.

A. Contents

17. The Settlement Agreement is divided into eight sections and includes three exhibits and one appendix. The Settlement Agreement focuses on issues and appropriate enhancement measures on five aspects of the Project's impact on fish resources: (1) upstream passage through a fish ladder; (2) downstream passage through the T.W. Sullivan Powerhouse; (3) up-and-downstream passage over Willamette Falls; (4) decommissioning of the BHPC Powerhouse; and (5) research on Pacific lamprey. Implementation of the new license will require the continued involvement of state and federal resource agencies, tribes and other affected parties. The Settlement Agreement provides that representatives from these parties provide technical input for fish issues for license implementation. The Agreement proposes that this group be called the Willamette Falls Fisheries Technical Committee (FTC).

18. Sections 1 through 6 establish general terms and conditions that govern the relationship among the parties and provide for implementation of the Agreement. Section 3, in particular, expresses the parties' intent for the Commission to include the proposed license articles contained in Exhibit A of the Agreement and establishes an Implementation Plan contained in Exhibit B of the Agreement.

19. Section 7 establishes a dispute resolution process for purposes of resolving disputed actions and otherwise keeping the Agreement in effect.

20. Section 8 sets forth the general provisions of the Agreement and lists the parties to the Agreement and their primary contacts.

21. The proposed license articles in Exhibit A of the Agreement, summarized below specify: general license provisions (Proposed Articles 1, 18, 19); operating conditions (Proposed Articles 5, 6, 8, 9, 10); aquatic resource measures (Proposed Articles 2, 3, 4,

12, 13, 14, 15, 16, 17); terrestrial resource measures (Proposed Article 11); and decommissioning of the BHPC facility on the site of the dam (Proposed Article 7).

22. Proposed Article 1 provides for PGE to establish the FTC. The FTC would be responsible for ensuring that the requirements of the Relicensing Implementation Plan are implemented. Within this plan are detailed Implementation Sheets (section IV of the Relicensing Implementation Plan) for each of the Settlement Agreement's fishery measures. The Implementation Sheets provide specific information associated with each measure, including a brief purpose and summary discussion, a schedule for implementing the measure, associated study plan outlines, and specific requirements related to additional required interaction between the parties.

23. Proposed Article 2 provides for performance standards for juvenile salmonid downstream passage at the T.W. Sullivan Powerhouse. The actions required by PGE are categorized into four tiers according to achieving desired performance standards. The performance standards for tiers 1 and 2 must be met. Tiers 3 and 4 measures may or may not be implemented based on the juvenile passage performances achieved by the tier 1 and 2 measures.

24. Proposed Article 3 provides for PGE to file with the Commission a report documenting the completion of Tier 1 measures.

25. Proposed Article 4 provides for PGE to make structural and operational modifications to the T.W. Sullivan Powerhouse as follows: (1) modify the siphon spillway adjacent to the T.W. Sullivan Powerhouse to provide a flow of 500 cfs directly from the forebay to the tailrace during powerhouse operation; (2) develop and implement a multi-year study to evaluate the effectiveness of the modified siphon spillway to pass uninjured, Pacific lamprey, Chinook and steelhead smolts and fry; (3) file with the Commission a passive integrated transponder (PIT) tag interrogator system at T.W. Sullivan generating Unit 13 bypass; (4) install and operate a trashrack cleaning system in the forebay of the T.W. Sullivan Powerhouse; (5) modify the discharges of T.W. Sullivan generating Units 12 and 13 at the tailrace to eliminate potential aquatic predator habitat in slack water areas; (6) provide measures to reduce avian predation in T.W. Sullivan forebay and tailrace; (7) modify the outfall of T.W. Sullivan generating Unit 13 bypass to meet NMFS hydraulic impact velocity criteria; and (8) at the election of PGE, and after filing a license amendment application, construct a new auxiliary water supply system for fish ladder entrance number one.

26. Proposed Article 5 provides for PGE to replace T.W. Sullivan turbine runners in generating Units 1-7 and 10-12 per a schedule established in consultation with the FTC.

27. Proposed Article 6 provides for PGE to file with the Commission an operational plan for the T.W. Sullivan Powerhouse. The plan shall provide for measures to protect

and improve upstream and downstream fish passage associated with the T.W. Sullivan Powerhouse.

28. Proposed Article 7 provides for PGE to file with the Commission a Decommissioning Plan for the generating units of the BHPC Powerhouse.

29. Proposed Article 8 provides for PGE, no later than October 1 of each year prior to the start of construction of the controlled flow structure pursuant to Proposed Article 9, to remove approximately 150 feet of flashboards at the apex of Willamette Falls to provide for an improved downstream passage route for fish going over the falls.

30. Proposed Article 9 provides for PGE to construct a controlled flow structure at the apex of Willamette Falls to pass a flow of 15,000 cfs for fish passage and to implement a multi-year study to evaluate the impact of the controlled flow structure on fish passage. PGE will report the results of the study to the Commission.

31. Proposed Article 10 provides for PGE to file with the Commission an amended T.W. Sullivan Powerhouse Operational Plan within six months of completion of the controlled flow structure. The controlled flow structure is designed to provide for safe, timely and effective downstream passage for the portion of the fish populations that passes over the Willamette Falls, as compared to those that pass through the project powerhouse.

32. Proposed Article 11 provides for PGE to prepare a plan to implement measures to reduce avian (bird) predation on fish passing over Willamette Falls.

33. Proposed Article 12 provides for PGE to make operational and maintenance improvements to the project fish ladder owned by Oregon DFW and assume annual operation and maintenance responsibilities associated with the fish ladder. It requires PGE to file with the Commission a plan to modify the ladder entrance to meet criteria set by NMFS. Such modification would include the passage of Pacific lamprey.

34. Proposed Article 13 provides for PGE to file with the Commission a fish ladder operation and maintenance plan that provides details of how the fish ladder will be operated and maintained. The plan would specify tracking and reporting mechanisms that identify if changes are needed in the ladder's operation.

35. Proposed Article 14 provides for PGE to implement a Stranding Management Plan for the purpose of eliminating areas where adult salmonids and Pacific lamprey become stranded in pools or structures at the Falls, or modifying other project operations that may cause stranding.

36. Proposed Article 15 provides for an adult Pacific Lamprey Program to provide Pacific lamprey passage ramps and flow for upstream Pacific lamprey passage. PGE would fund a research study to evaluate the effectiveness of the adult Pacific lamprey

passage system. PGE would also test upstream passage of adult Pacific lamprey through the project's siphon bypass and controlled flow structure and make modifications to the structures as needed.[6]

37. Proposed Article 16 provides for a Juvenile Pacific Lamprey Program to study guidance effectiveness to pass juvenile lamprey downstream through the T.W. Sullivan Powerhouse – provided the necessary field research technology to allow assessment becomes available and is applicable to conditions at the project. If study results indicate modifications to the project are required to achieve safe passage of juvenile lamprey, a plan for such modification would be included in the study results report to be filed with the Commission for its approval.

38. Proposed Article 17 provides for PGE to file for Commission approval a report that provides an assessment of: (1) the presence and condition of salmonid fry and juvenile Pacific lamprey in the T.W. Sullivan bypass; (2) juvenile Pacific lamprey impingement on the Unit 13 Eicher screen; (3) the impact of existing improvements to the T.W. Sullivan bypass evaluator system on smolt injury, mortality and passage time; and (4) lamprey use of passage ramps at Willamette Falls.

39. Proposed Article 18 provides for PGE to file with the Commission an annual report on the activities of the FTC.

40. Proposed Article 19 provides for a formula for calculating cost escalation for specific project improvements throughout the life of the new license.

B. Discussion

41. The Settlement Agreement addresses the signatories' various environmental concerns while preserving power production at the project. Overall, the terms of the Settlement Agreement achieve an appropriate balance between continued project generation and environmental measures. I commend the parties for their successful efforts to reach consensus on the issues involved in the operation of this project and the development of a sound framework for a continuing collaborative approach to the management of the project and its resources.

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[6] The siphon bypass would work in conjunction with previous forebay modifications to improve forebay hydraulics and guidance of salmonid smolts, fry and juvenile lamprey, as well as adult salmonids and adult lamprey, away from the T.W. Sullivan's turbines. The controlled flow structure ("a slot") would be constructed and operated at the apex of the Falls to focus flow, and downstream migrants, that would otherwise be distributed around the crest of the Falls, to a location more conducive to safe, timely, and effective downstream passage.

42. This order issuing a new license includes all of the measures contained in the Settlement Agreement's proposed license articles. The Settlement Agreement Proposed Articles 2 through 6, 8 through 13, 15, and 16 are contained in Commerce/NMFS's and Interior's Federal Power Act Section 18 Fishway Prescriptions set forth in Appendices B and C to this order. Proposed Article 14 is contained in Oregon DEQ's Section 401 conditions. The measures in Proposed Articles 1, 7, and 17 through 19, are respectively contained in Article 402 (*Fish Technical Committee*), Article 301 (*Decommissioning Plan*), Article 403 (*T.W. Sullivan Powerhouse Assessment Program*), Article 404 (*Annual Reporting*), and Article 408 (*Escalation Costs*). Because the requirements of many of the Articles and mandatory conditions refer to the Relicensing Implementation Plan, I am including the Relicensing Implementation Plan in Appendix E of this license for reference purposes.

43. The Settlement Agreement's Proposed Article 1 provides for the establishment of a FTC consisting of the NMFS, USFWS, and Oregon DFW, which are collectively referred to as the Fish Agencies. The FTC would be responsible for consulting on the development of various plans, reports, and designs, reviewing reports and making decisions, all of which are specified in the Settlement Agreement's Relicensing Implementation Plan. Although the license includes the substance of the proposal as Article 402 of the license, we remind the Settlement Agreement parties that the Commission only has jurisdiction over the licensee, and therefore, can only require that the licensee participate with the FTC.

44. The Settlement Agreement's Proposed Article 17 calls for PGE to file a report of fisheries assessments conducted at the project during 2004. Article 403 requires PGE to file such a report. The report shall be developed in consultation with the FTC pursuant to Article 402.

45. Proposed Article 2(d) calls for PGE to adopt a new Pacific lamprey survival and injury avoidance standard if a technology-based standard is developed and regionally adopted by the FWS during the term of the license. If the studies conducted in Proposed Articles 15 (adult Pacific Lamprey Program) and 16 (juvenile Pacific Lamprey Program) indicate the project does not comply with the newly adopted standard, Proposed Article 2(d) calls for PGE to consult with the Fish Agencies regarding measures needed to comply with the new standard. We are unable to make a public interest determination with regard to the measures that may be required because the measures and their costs have yet to be identified and determined. Article 401 requires PGE to implement such measures only after receiving Commission authorization after the filing of an amendment application. Article 401 also requires PGE to notify the Commission of changes to the standards as adopted by FWS.

46. Proposed Article 12(b) calls for PGE to initiate a program at the project fish ladder. PGE would complete diffuser grate cleaning and removal of debris from diffuser chambers in all the fish ladder legs and pool 48 of the ladder and repair fishway points on

all three fish ladder legs. If Oregon DFW obtains outside funding for these items, PGE would instead contribute up to $100,000 to help fund Pacific lamprey research in the Willamette Basin. I find no clear nexus between the requirement to fund general, basin-wide lamprey research and implement the identified repairs at the project fish ladder; however, because Proposed Article 12(b) is a mandatory section 18 Fishway Prescription, I am requiring PGE to implement its measures.

47. The Settlement Agreement provides that, in the event that consensus among members of the implementation committees with regard to studies, plans, designs, and reports cannot be reached, PGE would delay filing the disputed study, plan, design, or report until the completion of a dispute resolution process specified in section 7 of the Settlement Agreement. Although we are including the Settlement Agreement's dispute resolution provisions, by reference to section 7 of the Settlement Agreement, in Article 402 of the license, we are also including a requirement in Article 402 for PGE to file the disputed material prior to the completion of the dispute resolution process if the Commission directs the licensee to do so. We envision the Commission needing to invoke this reservation as a very rare occurrence; however, we are including this requirement to ensure that the Commission's responsibility to administer the terms of the license and ensure accomplishment of project purposes in a timely fashion is not frustrated by an extraordinarily lengthy dispute resolution process.

48. The Settlement Agreement's Proposed Article 7 provides for the filing of a plan to decommission the Blue Heron powerhouse. BHPC historically provided some protection of anadromous fish migrating downstream by shutting down the powerhouse for 13 weeks during the spring followed by an additional 3 weeks during the fall of some years.[7] Since 2003, the Blue Heron powerhouse has been shut down at all times, resulting in the protection of the entire run from entrainment and turbine mortality at the powerhouse. Continued powerhouse shutdown through decommissioning of the powerhouse would continue to have the beneficial effect of protecting federally listed salmon and steelhead as well as lamprey (a significant tribal resource) from entrainment and turbine mortality. Consistent with the Settlement Agreement, Article 301 requires PGE to file for Commission approval, a decommissioning plan for the BHPC powerhouse.

49. The Settlement Agreement provides for possible modifications to project structures and operations during the license term. For example, Proposed Article 12(e) requires PGE to implement potential fish ladder modifications following the completion of an adult lamprey research study required by Proposed Articles15(c) and (d). Proposed Article 16(b) requires PGE to implement plans to improve juvenile lamprey passage

[7] About 85 percent of all fish pass by the project during the spring shutdown period, and therefore, are protected from turbine mortality. For fish that enter BHPC powerhouse during operational periods, the mortality rate has been estimated to be about 19 percent. *See* Final EA at pp. 11, 65, 114, and 130.

based on the results of a study to be conducted after implementation of tier 2 measures. While such adaptive management provisions are not uncommon in licenses issued in recent years, some of the proposed articles would put project modifications under the direction of entities comprising the implementation committees. It is, however, the licensee's responsibility to obtain the Commission's approval, through appropriate license amendments, for all material amendments to the project and license. The Commission is charged with determining whether amendments will meet the comprehensive development/public interest standards of Federal Power Act (FPA) section 10(a)(1), which continues to govern regulation of a project throughout the term of its license. For this reason, Article 401 of this license provides for Commission review and approval of any material changes to the project.

50. The Settlement Agreement includes specific dollar limitations (*e.g.,* PGE would make egress channel modifications at Willamette Falls at a cost of no more than $5,000 per year). The Commission has stated that it is important for all entities involved in settlements to know that the Commission considers it the licensee's obligation to complete the measures required by license articles, in the absence of authorization from the Commission to the contrary, and that dollar figures agreed to by the parties are not absolute limitations. [8] Therefore, we are including Article 411 to reserve the Commission's authority to require the licensee to fulfill the requirements of this license notwithstanding the limitations on expenditures included in this license.

WATER QUALITY CERTICATION

51. Under Section 401(a)(1) of the Clean Water Act (CWA),[9] the Commission may not issue a license authorizing the construction or operation of a hydroelectric project unless the state water quality certifying agency either has issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed 1 year. Section 401(d) of the CWA provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.[10]

52. On November 21, 2003, PGE filed an application for Water Quality Certification (WQC) with Oregon DEQ for the Willamette Falls Project. Oregon DEQ issued its certification for the Project on November 1, 2004.[11] Oregon DEQ's WQC includes four

[8] *See Virginia Electric Power Co.*, 110 FERC ¶ 61, 251 (2005) (P-2009, Roanoke Rapids and Gaston Hydroelectric Project).

[9] 33 U.S.C. §1341(a)(1).

[10] 33 U.S.C. §1341(d).

[11] PGE originally filed for WQC on December 27, 2002; however, on September

sets of conditions, which are set forth in Appendix A of this order (total dissolved gas; turbidity; protection of beneficial uses; and general provisions). The protection of beneficial use conditions include Proposed Settlement Agreement Articles 4(a), 4(f), 4(g), 4(i), 6, 8, 9(a), 10, 14 and 15(a). All of these conditions are incorporated into the license (*see* ordering paragraph D). The WQC includes requirements for a water quality management and monitoring plan set forth in the WQC Attachment A. Article 401 requires the licensee to file all required plans, for Commission approval, prior to implementing the required measures.

COASTAL ZONE MANAGEMENT ACT

53. Section 307(c)(3) of the Coastal Zone Management Act (CZMA), 16 U.S.C. §1456 (c)(3)(A), requires that all federally licensed and permitted activities be consistent with approved state coastal zone management programs. If a project is located within a coastal zone boundary or if a project affects a resource located in the boundaries of the designated coastal zone, the Applicant must certify that the project is consistent with the state's coastal zone management program.

54. The Oregon Department of Land Conservation Development manages the Coastal Management Program, which was created by the state and approved by the National Oceanic and Atmospheric Administration in the early 1970's, pursuant to the CZMA. Oregon's coastal zone boundary starts at the Coast Range divide and extends from the shoreline three miles to the outer limits of the state's territorial jurisdiction. Lands in the coastal zone include 33 coastal cities, 7 coastal counties, and parts of 5 inland counties. Only those federal actions that affect any land or water use or natural resource in Oregon's coastal zone are subject to federal consistency review.

55. The Willamette Falls Project is located on the Willamette River approximately 40 miles upstream of the confluence with the Columbia River and approximately 100 miles upstream of the Columbia's confluence with the Pacific Ocean in Astoria, Oregon. For the purpose of federal consistency, the coastal zone area along the Columbia River ends at the eastern boundary of Clatsop County, approximately 10 miles upstream of Astoria. We conclude that no coastal zone consistency is needed for this project.

SECTION 18 FISHWAY PRESCRIPTIONS

56. Section 18 of the FPA, 16 U.S.C. ' 811, provides that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as

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3, 2003, Oregon DEQ denied without prejudice PGE's WQC application because some of the additional information requested by Oregon DEQ on April 8, 2003, was still incomplete. Oregon DEQ informed PGE that there was insufficient time remaining before mid-December 2003 for them to obtain the additional information from PGE to complete processing of the section 401 application.

may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate.

57. The U.S. Department of Commerce (Commerce/NMFS) and Interior filed with the Commission preliminary section 18 prescriptions on May 30, 2003. In a letter filed May 7, 2004, Commerce/NMFS modified their prescriptions to include the Settlement Agreement Proposed License Article 2 (Downstream Passage), Article 3 (Implement Tier 1 Measures), Article 4 (T.W. Sullivan Modifications), Article 5 (T.W. Sullivan Powerhouse Runner Replacements), Article 6 (T.W. Sullivan Powerhouse Operational Plan, Article 8 (Willamette Falls Dam Flashboard Removal), Article 9 (Willamette Falls Dam Controlled Flow Structure), Article 10 (Willamette Falls Dam Controlled Flow Structure Operational Plan), Article12 (Fish Ladder Operation and Maintenance), and Article 13 (Fish Ladder Operation and Maintenance Plan). Commerce/NMFS modified prescriptions are set forth in Appendix B of this order and incorporated into the license (*see* ordering paragraph E).

58. In a letter filed May 10, 2004, Interior modified their prescriptions to be consistent with the Settlement Agreement filed on February 2, 2004. In addition to Commerce/NMFS's prescriptions, Interior's modified prescriptions include the Settlement Agreement Proposed License Article 11 (Avian Predation Deterrents), Article 15 (Adult Pacific Lamprey Program) and Article 16 (Juvenile Pacific Lamprey Program), which are set forth in Appendix C of this order and incorporated into the license (*see* ordering paragraph F).

59. With their filing of the modified fishway prescriptions, both Interior and Commerce requested reservation of authority to prescribe fish passage for the project. Consistent with Commission policy, Article 405 of this license reserves the Commission's authority to require fishways that may be prescribed by Commerce/NMFS or Interior for the Willamette Falls Project.

ESSENTIAL FISH HABITAT

60. Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act[12] requires federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) identified under the Act. Under section 305(b)(4)(A)[13]of the Magnuson-Stevens Act, NMFS is required to provide EFH Conservation Recommendations for actions that would adversely affect EFH. Under section 305(b)(4)(B) of the Act,[14] an agency must, within 30 days after receiving

[12] 16 U.S.C. §855(b)(2).

[13] 16 U.S.C. §1855(b)(4)(A).

recommended conservation measures from NMFS or a Regional Fishery Management Council, describe the measures proposed by the agency for avoiding, mitigating, or offsetting the effects of the agency's activity on the EFH.[15]

61. The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: coho, Chinook, and Puget Sound pink salmon.[16] Essential Fish Habitat includes all those streams, ponds, lakes, wetlands, and other waterbodies currently or historically accessible to coho and Chinook salmon in Oregon, Washington, Idaho, and California, except upstream of impassable barriers identified by the PFMC.

62. On February 4, 2004, Commission staff sent NMFS a Biological Assessment addressing project effects on among other things, EFH, and concluded that the effects of the proposed actions would not result in substantial adverse effects to EFH. On June 30, 2005, NMFS filed a response concluding that the project, as proposed in the Settlement Agreement, may adversely affect designated EFH for Chinook and coho salmon. NMFS adopted the conservation measures that Commission staff included in the proposed action and all of the terms and conditions in NMFS's incidental take statement as its EFH conservation recommendations.

63. The reasonable and prudent measures and terms and conditions from NMFS's June 30, 2005, BO are attached to this license as Appendix D for reference. These measures are required as part of the Threatened and Endangered Species Plan (Article 407).

THREATENED AND ENDANGERED SPECIES ACT ISSUES

64. Section 7(a)(2) of the Endangered Species Act (ESA) of 1973[17] requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of their designated critical habitat.

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[14] 16 U.S.C. §1855(b)(4)(B).

[15] The measures recommended by the Secretary of Commerce are advisory, not prescriptive. However, if the federal agency does not agree with the recommendations of the Secretary of Commerce, the agency must explain its reasons for not following the recommendations.

[16] *See* Pacific Fishery Management Council. 1999. Amendment 14 to the Pacific salmon plan. Appendix A: Description and identification of essential fish habitat, adverse impacts and recommended conservation measures of salmon, Portland, Oregon.

[17] 16 U.S.C. §1536(a).

65. The bald eagle and five fish species native to the Willamette River and located near the project are federally listed under the ESA: Upper Willamette River (UWR) Chinook salmon, UWR steelhead, Lower Columbia River (LCR) Chinook salmon, LCR steelhead, and LCR coho salmon.

66. Commission staff issued a draft EA and biological assessment (BA) for the relicensing of the project on January 23, 2004. The BA determined that the proposed action with recommended measures is not likely to adversely affect UWR Chinook salmon, UWR steelhead, bald eagle, LCR Chinook salmon, and LCR steelhead. Commission staff sent a copy of its draft EA and BA to NMFS on February 4, 2004. In a letter filed March 12, 2004, NMFS explained that on January 29, 2004, PGE and twelve other parties, including NMFS, had completed execution of a Settlement Agreement for the relicensing of the project. NMFS determined that the Settlement Agreement would provide greater protection to listed Chinook salmon and steelhead than that described in the BA and said that until FERC determines whether or not to adopt the Settlement Agreement as part of its preferred alternative in the final EA, they would hold in abeyance their response to the Commission's February 4, 2004 letter. In a letter filed June 1, 2004, Interior concurred with the determination in the draft EA and BA that the proposed action is not likely to adversely affect bald eagles.

67. On June 14, 2004, NMFS issued a notice proposing to list the LCR coho salmon. Subsequently, on December 15, 2004, they issued a conference opinion to include LCR coho salmon in the biological opinion (BO). On June 27, 2005[18], NMFS issued its biological and conference opinions on relicensing the Willamette Falls Project, which found that relicensing the project with staff's recommended measures would not likely jeopardize the continued existence of UWR Chinook salmon, UWR steelhead, LCR Chinook salmon, LCR steelhead, and LCR coho.

68. The LCR coho was listed as a threatened species on June 28, 2005, and in a letter filed August 5, 2005, NMFS adopted the conference opinion as the BO for the LCR coho. NMFS's BO includes an incidental take statement with four reasonable and prudent measures to minimize take of the listed salmon and steelhead: (1) avoid or minimize construction activities that have adverse effects to aquatic systems; (2) monitor and report effectiveness of construction activities; (3) avoid or minimize the frequency of salvage of stranded fish below Willamette Falls; and (4) avoid or minimize fish handling during monitoring and evaluation. The terms and conditions are attached to this license as Appendix D and Article 407 of this license requires the licensee to develop a plan, for Commission approval, to comply with the terms and conditions of the incidental take statement.

[18] Filed on June 30, 2005.

RECOMMENDATIONS OF FEDERAL AND STATE FISH AND WILDLIFE AGENCIES (SECTION 10(J))

69. Section 10(j)(1) of the FPA,[19] requires the Commission, when issuing a license, to include conditions based on recommendations by federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act,[20] to "adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)" affected by the project.

70. NMFS and Interior filed preliminary recommendations under section 10(j) by letters filed May 30, 2003. ODFW filed their preliminary section 10(j) recommendations on May 29, 2003. After PGE filed the Settlement Agreement on February 2, 2004, NMFS and ODFW modified their section 10(j) recommendations by letters filed May 7, 2004, and March 1, 2004, respectively. NMFS's modified section 10(j) recommendations include the Settlement Agreement's Proposed Article 1 (PGE to establish a FTC), Article 11 (Avian Predation Deterrents), Article 14 (Stranding Management Plan), Article 17 (Assessment Program), Article 18 (Annual Report), and Article 19 (Escalation). Oregon DFW's modified section 10(j) recommendations include all of the 19 proposed license articles included in the Settlement Agreement. Although Interior did not file modified section 10(j) recommendations subsequent to signing the Agreement, we assume the terms of the Settlement Agreement supersede their preliminary section 10(j) recommendations.

71. Because the measures included in the Agreement are included in the license, this license is consistent with the recommendations of the fish and wildlife agencies.

COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM

72. Under section 4(h) of the Pacific Northwest Power Planning and Conservation Act, 16 U.S.C. § 839(h), the Northwest Power Planning Council (Council) developed the Columbia River Basin Fish and Wildlife Program (Program) to protect, mitigate, and enhance the fish and wildlife resources associated with development and operation of hydroelectric projects within the Columbia River Basin. Section 4(h) states that responsible federal and state agencies should provide equitable treatment for fish and wildlife resources, in addition to other purposes for which hydropower is developed, and that these agencies should take into account, to the fullest extent practicable, the program adopted under the Pacific Northwest Power Planning and Conservation Act. Specific provisions affecting non-federal hydropower projects are outlined in Appendix B of the Program.

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[19] 16 U.S.C. §803(j)(l).

[20] 16 U.S.C. §661, et seq.

73. The license, which among other things, includes fish passage requirements (ordering paragraphs B and C); supplemental requirements to mandatory conditions (Article 401); FTC (Article 402); T.W. Sullivan powerhouse assessment program (Article 403); and threatened and endangered species protection (Article 407), is consistent with the applicable provisions of the Program. Article 406 reserves to the Commission the authority to require future alterations in project structures and operations to take into account, to the fullest extent practicable, the applicable provisions of the Program.

NATIONAL HISTORIC PRESERVATION ACT

74. On December 23, 2004, the Oregon State Historic Preservation Officer and the Commission's Office of Energy Projects executed a programmatic agreement for managing historic properties that may be affected by the relicensing and continued operation of the Willamette Falls Project. Article 409 of the new license requires the licensee to implement the agreement, including but not limited to the associated historic properties management plan for the project. The agreement serves to satisfy the Commission's responsibilities under section 106 of the National Historic Preservation Act.[21]

OTHER ISSUES

A. Recreation Trails

75. PGE proposed to grant easements on project lands to the City of West Linn for recreation trail development and assist the City in the development of a Recreation Trail(s) Plan. Trail development received stakeholder support as an appropriate enhancement to recreation, and the EA recommends that PGE grant the easements to the City as a recreation enhancement measure.

76. Simply granting the easement to the City would not ensure the construction and maintenance of the trails. Given the conclusion in the EA that the trails are necessary for the project purpose of recreation, Article 410 requires PGE, within one year of license issuance, to develop in consultation with the City of West Linn and file for Commission approval a Recreation Trails Implementation Plan to provide for the recreation trails.

B. Interpretation and Education

77. PGE proposed to assist the Museum of Oregon Territory in the development of Interpretation and Education (I&E) themes for the purpose of informing the public about resource use and project features in the project area. The I&E themes would include: hydropower development at Willamette Falls; fish passage; and Native American use of the falls. The EA recommends PGE implement the Historic Properties Management Plan

[21] 16 U.S.C. §470s.

which includes the proposed I&E themes and develop the I&E themes in consultation with Willamette Falls Cultural and Heritage Committee, the Museum of the Oregon Territory, U.S. Army Corps of Engineers, SHPO, the West Linn City Parks and Recreation Department, the Confederated Tribes of the Warm Springs Reservation of Oregon, Confederated Tribes of the Siletz Indians of Oregon, and the Confederated Tribes of the Grand Ronde of Oregon. Article 409 requires PGE to implement the Historic Properties Management Plan.

C. Facilities Maintenance Plan

78. In 1996, Commission staff approved the decommissioning of the generating facilities of the project's Simpson Development. [22] However, because the Simpson Development structures and facilities are integral to the project's dam, they remained in the project boundary and under license, and in 1998 Commission staff approved a plan for providing continuing maintenance of grinder rooms number two and three, and structures and facilities that were part of the abandoned Simpson Development. These structures remain as licensed project works in this new license. Article 303 therefore requires PGE to file a plan providing for the continued maintenance of the Simpson Development facilities. PGE shall also identify and plan for continued maintenance of, structures and facilities that function as an integral part of the project dam or water conveyance facilities. Because some of these facilities are, or may be eligible for listing as historic properties under section 106 of the National Historic Preservation Act, Article 302 requires the licensee to consult with the State Historic Preservation Officer in the preparation of this plan.

D. Annual Charges

79. The Commission collects annual charges from licensees for administration of the FPA. Article 201 provides for the collection of funds for administration of the FPA.

E. Amortization Reserve

80. The Commission requires that for new major licenses, licensees must set up and maintain an amortization reserve account upon license issuance. Article 202 requires the establishment of the account.

F. Exhibit Drawings

81. The Commission requires licensees to file sets of approved project drawings on microfilm and in electronic file format. Article 203 requires the filing of these drawings.

G. Headwater Benefits

[22] See 77 FERC ¶ 62,058.

82. Some projects directly benefit from headwater improvements that were constructed by other licensees, the United States, or permittees. Article 204 requires PGE to reimburse such entities for these benefits if they were not previously assessed and reimbursed.

H. Use and Occupancy of Project Lands and Waters

83. Requiring a licensee to obtain prior Commission approval for every use or occupancy of project land would be unduly burdensome. Therefore, Article 412 allows PGE to grant permission, without prior Commission approval, for the use and occupancy of project lands for such minor activities as landscape planting. Such uses must be consistent with the purposes of protecting and enhancing the scenic, recreational, and environmental values of the project.

I. Revised Exhibits

84. Where new construction or modifications to the project are involved, the Commission requires licensees to file revised drawings of project features as-built. Article 303 provides for the filing of these drawings.

J. Cofferdam Construction Drawings

85. Where new construction may involve the use of cofferdams for dewatering the work area, the Commission requires licensees to review and approve contractor designed cofferdams and to file approved designs with the Commission. Article 304 provides for this review and approval.

K. Contract Plans and Specifications

86. Article 305 requires the licensee to provide the Commission's Division of Dam Safety and Inspections Portland Regional Office with final contract plans and specifications for any project modifications and as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan.

STATE AND FEDERAL COMPREHENSIVE PLANS

87. Section l0(a)(2)(A) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.[23] Under Section 10(a)(2)(A), federal and state agencies filed 115 comprehensive plans that address various resources in Oregon. Of these, the staff

[23] Comprehensive plans for this purpose are defined at 18 C.F.R. §2.19.

identified and reviewed 16 comprehensive plans that are relevant to this project.[24] No conflicts were found.

APPLICANTS PLANS AND CAPABILITIES

88. In accordance with sections 10(a)(2)(c)and 15(a) of the FPA, staff have evaluated PGE's record as a licensee with respect to the following: (A) conservation efforts; (B) compliance history and ability to comply with the new license; (C) safe management, operation, and maintenance of the project; (D) ability to provide efficient and reliable electric service; (E) need for power; (F) transmission service; (G) cost effectiveness of plans; and (H) actions affecting the public. I accept the staff's findings in each of the following areas.

A. Conservation Efforts

89. FPA section 10(a)(2)(C) requires the Commission to consider the extent of electric consumption efficiency programs in the case of license applicants primarily engaged in the generation or sale of electric power. PGE is such an applicant. PGE has engaged in energy efficiency programs since 1970 and continues to offer programs that promote the use of energy efficient lighting and appliances. PGE's integrated resource planning proposes other demand side energy consumption efficiency measures such as time-of-use metering and direct load control to better manage peak demand by its customers. Through these programs, PGE is making satisfactory efforts to conserve electricity and reduce peak hour demands, and thereby, comply with section 10(a)(2)(c) of the FPA.

B. Compliance History and Ability to Comply with the New License

90. Based on a review of PGE's compliance with the terms and conditions of the existing license, we find that PGE's overall record of making timely filings and compliance with its license is satisfactory. Therefore, we believe PGE can satisfy the conditions of a new license.

C. Safe Management, Operation, and Maintenance of the Project

91. Staff reviewed PGE's management, operation, and maintenance of the Willamette Falls Project pursuant to the requirements of 18 C.F.R. Part 12 and the Commission's Engineering Guidelines and periodic Independent Consultant's Safety Inspection Reports. The project dam has a low hazard potential classification. We conclude that the dam and other project works are safe, and that there is no reason to believe that PGE cannot continue to safely manage, operate, and maintain these facilities under a new license.

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[24] *See* Final EA, Section IX for a list of the applicable plans.

D. Ability to Provide Efficient and Reliable Electric Service

92. Staff reviewed PGE's plans and its ability to operate and maintain the project in a manner most likely to provide efficient and reliable electric service. We find that PGE has been operating the project in an efficient manner within the constraints of the existing license and is likely to continue to do so under a new license.

E. Need for Power

93. The power generated at the 15.180-MW T.W. Sullivan Development is fed into PGE's electrical transmission and distribution system for use within its service area to help serve its customers. T.W. Sullivan comprises about 3.1% of PGE-owned generating capacity, but approximately 6.2% of PGE's energy generation is due to the T.W. Sullivan's high capacity factor. PGE is part of the Western Electricity Coordinating Council (WECC), which is composed of generators and suppliers in 12 western states, Canada, and Mexico. PGE and its resources are located within the northwest subregion of the WECC.

94. In its 10-year Coordinated Plan Summary for the period 2005-2013, the WECC estimates that its peak summer demand will increase by an average annual compound rate of 2.5 percent to about 181,000 MW by 2014. For the 10-year period, the region projects the addition of a net amount of about 25,000 MW of new resources, 88.3 percent of which is combustion turbine capacity fueled by natural gas. With these additions, WECC projects adequate capacity to meet its estimated summer load, including a 15-percent reserve margin, through 2014.

95. In summary, the electric power provided by the Willamette Falls Hydroelectric Project supplies part of the current need for power by PGE's customers and the region, and can continue to contribute to meeting those needs with a clean source of energy, thereby avoiding the use of a like amount of fossil-fueled generation and its associated atmospheric emissions.

F. Transmission Services

96. The project's transmission facilities that are required to be licensed include the T.W. Sullivan generator leads, the station transformer, buses and the 900-foot-long, 57-kilovolt, single-circuit transmission line to PGE's non-project switchyard on the bluff above the project. PGE proposes no changes that would affect transmission facilities.

G. Cost Effectiveness of Plans

97. PGE proposes to decommission the Blue Heron Paper Company development, reducing the project capacity from 16,680 kW to 15,180 kW. In addition, PGE is proposing and this license requires several modifications to project facilities for the

protection and enhancement of fish. PGE's past record as a licensee indicates it is likely to carry out these measures in a cost-effective manner.

H. Actions Affecting the Public

98. In its license application, PGE cited numerous examples of actions it has taken that affect the public including: providing extensive opportunity for public involvement in the development of the license application; working cooperatively with fish and wildlife agencies on research related to downstream fish migration; work related to improving upstream fish passage at the Oregon DFW fish ladder; and providing recreational opportunities to local communities. PGE uses the project to help meet local power needs and pays taxes that contribute to the cost of public services provided by local government.

PROJECT ECONOMICS

99. In determining whether to issue a new license for an existing hydroelectric project, the Commission considers a number of public interest factors, including the economic benefit of the project power. Under the Commission's approach to evaluating the economics of hydropower projects, as was articulated in Mead Corp.,[25] the Commission uses current costs to compare the costs of the project and likely alternative power, with no forecasts concerning potential future inflation, escalation, or deflation beyond the license issuance date. The basic purpose of the Commission's economic analysis is to provide general estimates of the potential power benefits and costs of a project, and reasonable alternatives to project power. The estimate helps to support an informed decision concerning what is in the public interest with respect to the proposed license.

100. Under the terms of the Settlement Agreement as proposed by PGE and as required by this license, the Willamette Falls Hydroelectric Project will generate an average of 121,471 megawatt hours (MWh) of electricity a year at a total annual cost of $2,662,000 (about $22/MWh). Based on the current cost of alternative power using combined cycle combustion turbine technology, the annual value of the project power would be $5,273,000 (about $43/MWh). Therefore, in the first year of operation, the project would cost $2,611,000 (about $21/MWh) less than the likely alternative cost of power.[26]

101. In analyzing public interest factors, the Commission takes into account that hydroelectric projects offer unique operational benefits to the electric utility system (ancillary benefits). For projects with useable water storage, these benefits include their value as almost instantaneous load-following response to dampen voltage and frequency

[25] 72 FERC ¶ 61,027 (1995).

[26] All generation and cost information is taken from the Commission's October, 2004 Final EA.

instability on the transmission system, system-power-factor-correction through condensing operations, and a source of power available to help in quickly putting fossil-fuel based generating stations back on line following a major utility system or regional blackout. Because the Willamette Falls Project operates run-of-river, it does not provide load-following benefits but will retain other ancillary benefits PGE may require.

COMPREHENSIVE DEVELOPMENT

102. Sections 4(e) and 10(a)(1) of the FPA,[27] respectively, require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. The decision to license this project, and the terms and conditions included herein, reflect such consideration.

103. The EA for the Willamette Falls Project contains background information, analysis of effects, support for related license articles, and the basis for a finding that the project will not result in any major, long-term adverse environmental effects. The project would be safe if operated and maintained in accordance with the requirements of this license.

104. Based on our independent review and evaluation of the Willamette Falls Project, recommendations from the resource agencies and other stakeholders, and the no-action alternative, as documented in the EA, I have selected the proposed Willamette Falls Project, with the staff-recommended measures as the preferred alternative, and find that it is best adapted to a comprehensive plan for improving or developing the Willamette River.

105. I selected this alternative because: (1) issuance of a new license would serve to maintain a beneficial, dependable, and an inexpensive source of electric energy; (2) the required environmental measures would protect and enhance fish and wildlife resources, water quality, recreational resources and historic properties; and (3) an average of 121,471 MWh of electric energy generated annually from a renewable resource would continue to offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution.

106. The preferred alternative includes implementation of all 19 proposed articles in the Settlement Agreement as listed in this order, beginning with Article 1 of ordering

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[27] 16 U.S.C. §797(e) and 803(a)(1).

paragraph 22. The preferred alternative also includes: (1) reserved authority to prescribe fishways in the future; (2) reserved authority to prescribe additional measures as may be provided under the Pacific Northwest Electric Power Planning Act; (3) filing of a Threatened & Endangered Species Protection Plan for implementing NMFS reasonable and prudent measures contained in its incidental take statement of its Biological Opinion; (4) implementation of the Historic Properties Management Plan which includes provision for developing interpretation and education themes; and (5) development of a Recreation Trails Implementation Plan.

107. The decommissioning of the 1.5-MW Blue Heron powerhouse, which has not operated since 2003, would ensure the continued protection of federally listed salmon and steelhead as well as lamprey, a significant tribal resource. I find that the benefits of continuing to protect federally listed salmon and steelhead and lamprey through decommissioning of the powerhouse outweighs the benefits that would be gained by alternatively issuing a new license that requires PGE to resume generating at the powerhouse.

LICENSE TERM

108. Section 15(e) of the FPA,[28] provides that any new license issued shall be for a term that the Commission determines to be in the public interest, but not less than 30 years or more than 50 years. The Commission's general policy is to establish 30-year terms for projects with little or no redevelopment, new construction, new capacity, or environmental mitigation and enhancement measures; 40-year terms for projects with a moderate amount of such activities; and 50-year terms for projects with extensive measures.

109. The amount of proposed new investment in environmental measures for this project is relatively moderate; however, as part of the Settlement Agreement, the signatories agree to a new 30-year license term. Because the term of the license was likely an important element in the negotiations that led to the Settlement Agreement, I am issuing the new license for 30 years.

The Director orders:

(A) This license is issued to Portland General Electric (licensee) to operate and maintain the Willamette Falls Project, for a period of 30 years, effective the first day of the month in which this order is issued. The license is subject to the terms and conditions of the Federal Power Act (FPA), which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the FPA.

[28] 16 U.S.C. ' 808(e).

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown by Exhibit G included in the application for new license, filed on December 27, 2002, to the Commission Secretary and Revised Exhibit G drawings filed with the Commission Secretary on June 16, 2003, which show within the project boundary, the lands occupied by the project's transmission lines.

Exhibit G-	FERC Drawing No. 2233-	Showing
1	1013	Project Area
2	1014	Project Area

(2) Project works consisting of:

(1) a 6- to 20-foot-high by 2,300-foot-long concrete gravity dam, equipped for 2- or 3-foot-high flashboards; (2) a 20-foot-high by 600-foot-long concrete gravity spillway with stop logs; (3) a reservoir with no useable storage; (4) a forebay, trashrack and gated intake to the T.W. Sullivan powerhouse containing 13 vertical turbine generator units with a total installed capacity of 15,180 kilowatts; (5) a forebay and two intakes equipped with 16-foot-high trashracks and headgates for each of the two Blue Heron Paper Company Development's 750-kilowatt, Francis-type turbine generators; (6) the Blue Heron Paper Company Powerhouse; (7) a fish ladder within the project boundary at the apex of Willamette Falls; (8) a 900-foot-long, 57-kilovolt single circuit transmission line from the T.W. Sullivan powerhouse to PGE's non-project switchyard located on the bluff outside the project; and (9) appurtenant facilities.

The following parts of exhibit A and the following exhibit F drawings conform to the Commission's rules and regulations and are to be approved and made a part of the license:

The following sections of Exhibit-A filed on December 27, 2002:

Sections 1.0, 2.0, 3.0, and 9.0

The following sections of Exhibit-F filed on December 27, 2002:

Exhibit F-	FERC Drawing No. 2233-	Showing
1	1001	General Plan, Dam and Powerhouse
2	1002	General Plan, Sections Left Side of River
3	1003	General Plans, Fish Ladder Plan Left Side of River

Exhibit F-	FERC Drawing No. 2233-	Showing
4	1004	General Plan, Sections Center of River
5	1005	General Plans, Sections Right Side of River
6	1006	T.W. Sullivan Powerhouse Generator Floor Plan
7	1007	T.W. Sullivan Hydroelectric Plant Section
8	1008	No. 2 Grinder Room, West Linn Paper Company*
9	1009	Generator Room & No. 3 Grinder Room, West Linn Paper Company*
10	1010	Mill "H" Blue Heron Paper Company*
11	1011	Site of Mill "A" and Hydro Plant, Blue Heron Paper Company*
12	1012	Hydro Plant, Blue Heron Paper Company**

* Portions of these structures are elements of the project dam.
** License approves the decommissioning of this hydropower development.

(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Exhibit A, F, and G, as designated in ordering paragraph (B) above, are approved and made a part of this license. Exhibits F and G shall be refiled in the Commission's electronic file format as specified in Article 203.

(D) This license is subject to the conditions submitted by the Oregon Department of Environmental Quality under section 401 of the Clean Water Act 33 U.S.C §1431(a)(1), as those conditions are set forth in Appendix A to this order.

(E) This license is subject to the conditions submitted by the Secretary of the U.S. Department of Commerce under section 18 of the FPA, as set forth in Appendix B to this order.

(F) This license is subject to the conditions submitted by the Secretary of the U.S. Department of the Interior under section 18 of the FPA, as set forth in Appendix C to this order.

(G) This license is subject to articles set forth in Form L-3 (October 1975), entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States," and the following additional articles.

Article 201. ***Administrative Annual Charges***. The licensee shall pay the United States the following annual charges, effective as of the first day of the month in which this license is issued:

> For the purposes of reimbursing the United States for the Commission's administrative costs, pursuant to Part I of the Federal Power Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 16,680 kilowatts. Upon satisfactorily completing implementation of the decommissioning plan required by Article 301, the Commission will issue an order revising this article of the license to change the authorized installed capacity of the project to 15,180 kilowatts, or other such capacity as is determined at that time.

Article 202. ***Amortization Reserves***. Pursuant to section 10(d) of the Federal Power Act, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee shall set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year, the licensee shall deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee shall set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee shall maintain the amounts established in the project amortization reserve account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves shall be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 203. ***Exhibit Drawings***. Within 45 days of the date of issuance of this license, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats.

(a) Three sets of the approved exhibit drawings shall be reproduced on silver or

gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" X 7-3/8") aperture cards. Prior to microfilming, the FERC Drawing Number (i.e., P-1234-### through P-1234-###) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., F-1, G-1, etc.), Drawing Title, and date of this license shall be typed on the upper left corner of each aperture card.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office.

(b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office. Exhibit F drawings must be identified as (CEII) material under 18 CFR §388.113(c). Exhibit G drawings must be identified as (NIP) material under 18 CFR §388.112. Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this license, and file extension in the following format [P-1234-####, G-1, Project Boundary, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
RESOLUTION – 300 dpi desired, (200 dpi min)
DRAWING SIZE FORMAT – 24” X 36” (min), 28” X 40” (max)
FILE SIZE – less than 1 MB desired

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points, arranged in a triangular format for GIS geo-referencing to vector data. The latitude and longitude coordinates, or state plane coordinates, of each reference point must be shown and identified on the drawing. In addition, each project boundary drawing must be stamped by a registered land surveyor.

(c) The licensee shall file two separate sets of the project boundary data in a geo-referenced vector electronic file format (such as ArcView shape files, GeoMedia files, MapInfo files, or any similar GIS format) with the Secretary of the Commission, ATTN: OEP/DHAC. The file name shall include: FERC Project Number, data description, date of this license, and file extension in the following format [P-1234, boundary vector data, MM-DD-YYYY.SHP]. The geo-referenced electronic boundary data file must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. A single electronic boundary data file is

preferred and must contain all reference points shown on the individual project boundary drawings. The latitude and longitude coordinates, or state plane coordinates, of each reference point must be shown. The data must be accompanied by a separate text file describing the map projection used (i.e., UTM, State Plane, Decimal Degrees, etc), the map datum (i.e., North American 27, North American 83, etc.), and the units of measurement (i.e., feet, meters, miles, etc.). The text file name shall include: FERC Project Number, data description, date of this license, and file extension in the following format [P-1234, project boundary metadata, MM-DD-YYYY.TXT].

Article 204. ***Headwater Benefits***. If the licensee's project was directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement during the term of the original license (including extensions of that term by annual licenses), and if those headwater benefits were not previously assessed and reimbursed to the owner of the headwater improvement, the licensee shall reimburse the owner of the headwater improvement for those benefits, at such time as they are assessed, in the same manner as for benefits received during the term of this new license. The benefits will be assessed in accordance with Part 11, Subpart B, of the Commission's regulations.

Article 301. ***Decommissioning Plan.*** Within 60 days of the effective date of this license, the licensee shall file with the Commission a Decommissioning Plan providing for the permanent, in-place decommissioning of the generating units in the Blue Heron Paper Company Powerhouse. The Decommissioning Plan will provide for consultation under Section 106 of the National Historic Preservation Act. The Decommissioning Plan shall be developed in consultation with the fish technical committee established by the Settlement Agreement filed on February 2, 2004. The licensee shall submit to the Commission documentation of its consultation, copies of comments and recommendations made in connection with the plan, and a description of how the plan accommodates the comments and recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan.

The licensee shall submit six copies of the plan to the Commission, one copy to the Commission's Portland Regional Director, and one to the Director, Division of Hydropower Administration and Compliance. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 302. ***Facilities Maintenance Plan***. Within 60 days of the effective date of this license, the licensee shall file with the Commission a plan that identifies, and provides for the maintenance and structural integrity of buildings, structures and equipment that are integral with the project dam and must, therefore, remain as project features even though their original use for generating purposes has been discontinued. In

preparing the plan, the licensee shall consult with the State Historic Properties Officer and shall include in the plan provisions for ensuring the protection and preservation of historic properties. The licensee shall submit to the Commission documentation of its consultation, copies of comments and recommendations made in connection with the plan, and a description of how the plan accommodates the comments and recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan.

The licensee shall submit six copies of the plan to the Commission, one copy to the Commission's Portland Regional Director, and one to the Director, Division of Hydropower Administration and Compliance. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 303. ***Revised Exhibits***. Within 90 days of the completion of any construction or removal of facilities directed by any article, condition or term of this license (decommissioning of Blue Heron Paper Company development, modification of forebay trash racks, construction of controlled flow structure, construction of recreation trails, etc.), the licensee shall file for Commission approval revised Exhibits A, F, and G, as appropriate, to show those project facilities as built. The exhibits shall have sufficient detail to adequately delineate the relative location of project features. Exhibit G shall clearly show all project facilities, including the primary transmission line, enclosed within the project boundary and shall conform with Article 203. The licensee shall submit six copies of the exhibits to the Commission, one copy to the Commission's Portland Regional Director, and one to the Director, Division of Hydropower Administration and Compliance.

Article 304. ***Cofferdam Construction Drawings***. Before starting construction, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations and shall make sure construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit one copy to the Commission's Portland Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, Division of Dam Safety and Inspections), of the approved cofferdam construction drawings and specifications and the letters of approval.

Article 305. ***Contract Plans and Specifications***. At least 60 days prior to the start of any construction, the licensee shall submit one copy of its plans and specifications to the Commission's Portland Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, Division of Dam Safety and Inspections). The licensee may not begin construction until the Regional Engineer has approved in writing the plans and specifications and determined that all preconstruction

requirements have been satisfied. The submittal to the Regional Engineer must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan.

Article 401. ***Supplemental Requirements to Mandatory Conditions.***

(a) Requirement to File Revised Implementation Schedules

Within 90 days of license issuance, the licensee shall file for Commission approval a revised plan that includes an updated schedule for implementing the measures contained in the Relicensing Implementation Plan (Appendix E).

(b) Requirement to File Plans for Commission Approval

Various conditions of this license found in the Appendices require the licensee to prepare plans for approval by Oregon Department of Environmental Quality and Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service ("Fish Agencies"). Each such plan shall also be submitted to the Commission for approval. These plans are listed below.

Appendix	Condition No.	Plans for Commission Approval
Appendix A	1a	Design plans for the project's flow control structure and siphon spillway modifications to minimize contributions of total dissolved gas (TDG).
Appendix A	1b	Any necessary modifications to the Water Quality Monitoring and Management Plan prior to construction of the flow control structure and siphon spillway modifications.
Appendix A	3a, items (1) through (5) and (7) through (10)	Plans to construct, renovate, design, develop, remove, install, and implement various fish facilities, measures, and plans.
Appendix B	1(b)(iii) - (iv), 1(d), 3, 4, 5, 7(b) - (c), 8, 9, and 10	Plans for NMFS's Section 18 prescriptions.
Appendix C	1, 2(c) – (d), and 3(a)	Plans for USFWS's Section 18 prescriptions.

The licensee shall submit to the Commission documentation of its consultation, copies of comments and recommendations made in connection with the plans in the following table, and a description of how the plans accommodate the comments and

recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plans. Implementation of the plans shall not begin until each plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plans, including any changes required by the Commission.

(c) Requirement to File Amendment Applications

Certain plans and measures in Appendices A, B and C contemplate unspecified, long-term changes to project operations or facilities for the purpose of mitigating environmental effects. These changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license. The conditions are listed below.

Appendix	Condition	Modification
Appendix A	4a. (5)	Changes in the project or its operations that might affect water quality or designated uses.
Appendix B	1(a) – 1(b)	Major operational and structural changes and tiers 3 and 4 measures.
Appendix B	1(d)	Adoption of future FWS Pacific lamprey survival and injury avoidance standards.
Appendix B	3(c)	Additional tier 2 and 3 measures.
Appendix B	3(j)	New auxiliary water supply.
Appendix B	5	Changes to the T.W. Sullivan powerhouse operations plan.
Appendix B	7(c)	Improvements or modifications to the controlled flow structure.
Appendix C	2(d)	Modifications to dam, flashboards, siphon bypass, fish ladder, or controlled flow structure.
Appendix C	3(b)	Improvements that PGE may be required to implement based on the

Appendix	Condition	Modification
		findings from the juvenile Pacific lamprey study program.

Article 402. ***Fish Technical Committee.***

(a) The licensee shall establish a Fish Technical Committee (FTC) as provided by Proposed Article 1 in the Settlement Agreement filed on February 2, 2004, in order to ensure that the requirements of the Relicensing Implementation Plan in the Settlement Agreement, except as modified by this license, are incorporated into the licensee's implementation of the terms and conditions of this license. The licensee's development and implementation of study plans, reports, facility designs, and operating and implementation plans submitted to the FTC shall comply with the requirements of the Relicensing Implementation Plan, to the extent such provisions are required by this license.

(b) Unless a different time period is specifically established pursuant to another provision of this license, the licensee shall, where consultation with the FTC is stipulated in the Settlement Agreement filed on February 2, 2004, allow a minimum of 30 days for the FTC members to comment and to make recommendations before filing any study plan, report, or facility design with the Commission. If the licensee does not adopt a recommendation, the filing with the Commission shall include the licensee's reasons, based on project-specific information for not adopting such recommendation.

(c) The National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and the Oregon Department of Fish and Wildlife (Oregon DFW) are collectively referred to as the Fish Agencies. In addition to the licensee, the Fish Agencies, to the extent of their interests in participating, comprise the FTC. Where consultation with the FTC and approval by the appropriate (i.e., mandatory conditioning) Fish Agencies is required, the licensee shall also submit the final study plan, report, facility design, or operating or implementation plan to the appropriate Fish Agencies for approval prior to filing with the Commission. The licensee's implementation of measures pursuant to this license shall be reported to the FTC as provided in the Relicensing Implementation Plan.

(d) The licensee shall comply with the provisions of Section 7 (Implementation of Agreement) of the Settlement Agreement filed on February 2, 2004, except as modified by this license. Should a dispute resolution process specified in section 7 of the Settlement Agreement be requested by any party, the licensee shall notify the Commission of the dispute prior to the commencement of the dispute resolution process. If so directed by the Commission, the licensee shall file with the Commission any material in dispute prior to the completion of the dispute resolution process specified in

the Relicensing Implementation Plan, for resolution.

Article 403. ***T.W. Sullivan Powerhouse Assessment Program.*** Within six months of license issuance, the licensee shall file a report of assessments conducted to: (1) determine the presence and condition of salmonid fry and juvenile Pacific lamprey in the T.W. Sullivan bypass; (2) determine juvenile Pacific lamprey impingement on the Unit 13 Eicher screen; (3) evaluate the impact of existing improvements to the T.W. Sullivan bypass evaluator system on smolt injury, mortality and passage time; and (4) conduct a preliminary assessment of use of lamprey ramps at the Falls. The report shall be developed in consultation with the FTC pursuant to Article 402.

Article 404. ***Annual Reporting.*** The licensee shall file with the Commission a detailed annual report on the activities of the Fish Technical Committee and on the implementation of the New License and the Relicensing Implementation Plan during the previous year. The licensee shall prepare the report in consultation with the FTC pursuant to Article 402. The licensee shall file the annual report by March 31 of the year following the calendar year which is the subject of the report. The initial report shall be filed by March 31, 2006.

Article 405. ***Reservation of Authority-Fishways.*** Pursuant to section 18 of the Federal Power Act, authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of such fishways as may be prescribed by either the Secretary of the Interior or the Secretary of Commerce.

Article 406. ***Columbia River Basin Fish and Wildlife Program.*** The Commission reserves the authority to order, upon its own motion or upon the recommendation of federal and state fish and wildlife agencies, affected Indian Tribes, and the Northwest Power Planning Council, alterations of project structures and operations to take into account to the fullest extent practicable the regional fish and wildlife program developed and amended pursuant to the Pacific Northwest Electric Power Planning and Conservation Act.

Article 407. ***Threatened and Endangered Species Protection Plan.*** Within six months of license issuance, the licensee shall file for Commission approval a Threatened and Endangered Species Protection Plan. The plan shall include: (1) provisions for all measures stipulated in the terms and conditions implementing the reasonable and prudent measures filed by the National Marine Fisheries Service on June 30, 2005 and (2) an implementation schedule. The reasonable and prudent measures and terms and conditions are attached to this license as Appendix D for reference.

As part of the plan, the licensee may reference measures implemented under other articles and ordering paragraphs of this license, as applicable, in lieu of including the

measures as provisions of the plan.

The licensee shall prepare the plan after consultation with the Fish Technical Committee established pursuant to Article 402. The licensee shall include with the plan, an implementation schedule, documentation of consultation, copies of comments and recommendations of the plan after it has been prepared and provided to the consulted entities, and specific descriptions of how the consulted entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the consulted entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project–specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 408. ***Escalation of Costs.***

(a) The licensee shall escalate the sums identified in this Article as of January 1 of each year after the date of the January 2004 Settlement Agreement according to the following formula:

$$AD = D \times \frac{NGDP}{IGDP}$$

WHERE:

AD = Adjusted dollar amount as of January 1 of the year in which the adjustment is made.
D = Dollar amount prior to adjustment.
IGDP = GDP-IPD for the third quarter of the year before the previous adjustment date (or, in the case of the first adjustment, the third quarter of the year before the Effective Date).
NGDP = GDP-IPD for the third quarter of the year before the adjustment date.

"GDP-IPD" is the value published for the Gross Domestic Product Implicit Price Deflator by the U.S. Department of Commerce, Bureau of Economic Analysis in the publication Survey of Current Business, Table 7.1 (being on the basis of 1987 = 100), in the third month following the end of the applicable quarter. If that index ceases to be published, any reasonably equivalent index published by the Bureau of Economic Analysis may be substituted by the agreement of the Parties and the licensee. If the base year for GDP-

IPD is changed or if publication of the index is discontinued, the licensee shall promptly make adjustments or, if necessary, select an appropriate alternative index acceptable to the Parties to achieve the same economic effect.

(b) Specific costs and payments subject to escalation as provided in this Article are:

1. The $5,000 per year accrued for egress channel physical modifications at Willamette Falls, pursuant to the Fish Stranding Management Plan, required by measure 3a.(10) set forth in Appendix A of this order and incorporated into the license (*see* ordering paragraph D).

2. The $80,000 for the correction of the Wet Hole stranding/egress problem at Willamette Falls, pursuant to the Fish Stranding Management Plan, required by measure 3a.(10) set forth in Appendix A of this order and incorporated into the license (*see* ordering paragraph D).

3. The $100,000 in matching funds to conduct lamprey research pursuant to paragraph (b) Fish Ladder Operation and Maintenance, required by measure 9(b) set forth in Appendix B of this order and incorporated into the license (*see* ordering paragraph E).

Article 409. ***Historic Properties.*** The licensee shall submit to the Commission documentation of its consultation, copies of comments and recommendations made in connection with the plan, and a description of how the plan accommodates the comments and recommendations. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to require changes to the plan.

The licensee shall submit six copies of the plan to the Commission, one copy to the Commission's Portland Regional Director, and one to the Director, Division of Hydropower Administration and Compliance. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The licensee shall implement the "Programmatic Agreement" among the Federal Energy Regulatory Commission and the Oregon State Historic Preservation Officer for Managing Historic Properties that may be Affected by a License Issuing to Portland General Electric for the Continued Operation of the Willamette Falls Hydroelectric Project in Clackamas County, Oregon (FERC No. 2233-043), executed on December 23, 2004, including but not limited to the Historic Properties Management Plan (HPMP) for the Project. In the event that the Programmatic Agreement is terminated, the licensee

shall continue to implement the provisions of its approved HPMP. The Commission reserves the authority to require changes to the HPMP at any time during the term of the license. If the Programmatic Agreement is terminated, the licensee shall obtain approvals from or make notifications of the Commission and the Oregon State Historic Preservation Office where the HPMP calls upon the Licensee to do so.

Article 410. ***Recreation Trail(s) Implementation Plan.*** Within one year of license issuance, the licensee shall file with the Commission, for approval, a Recreation Trail(s) Implementation Plan (RTIP) to provide for recreation trails along the City of West Linn's side of the Willamette River, upstream of Willamette Falls.

The licensee shall construct, operate, and maintain, or provide for construction, operation and maintenance on Project lands for trail development. The licensee shall prepare the plan after consultation with the City of West Linn's Parks and Recreation Department.

The RTIP shall include the following objectives:

(1) Provide adequate and safe public access to the project lands and waters;

(2) Avoid or minimize recreation related impacts on sensitive resources; and

(3) Consider the needs of the disabled in the location and design of the recreation trail(s).

The licensee shall include with the plan documentation of consultation with the West Linn Department of Parks and Recreation, copies of comments and recommendations on the completed plan after it has been prepared, and specific descriptions of how comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for comment before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the licensee shall grant the necessary easements and implement the plan, including any changes required by the Commission.

Article 411. ***Expenditures.*** Notwithstanding the limitation on expenditures included in this license, the Commission reserves the right to require the licensee to undertake such measures as may be appropriate and reasonable to implement approved plans and other requirements in this license.

Article 412. ***Use and Occupancy.***

(a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

(H) The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(I) This order is final unless a request for rehearing is filed within 30 days of the date of its issuance, as provided in section 313 of the FPA. The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order, except as specifically ordered by the Commission. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

J. Mark Robinson
Director
Office of Energy Projects

APPENDIX A

Oregon Division of Environmental Quality
Section 401 of the Clean Water Act
Terms and Conditions

1. Total Dissolved Gas; Antidegradation

a. Portland General Electric (PGE) shall consult with DEQ during PGE's development of design plans for the Project's flow control structure and siphon spillway modifications, in order to prevent or minimize contributions of total dissolved gas (TDG) from operation of these Project features. PGE shall submit to DEQ the final proposed design plans for the flow control structure and siphon spillway modifications for DEQ review and approval, before construction of these Project features.

b. PGE shall implement the TDG Water Quality Monitoring and Management Plan (WQMMP), attached to and incorporated by reference into this Certification as Attachment A. The TDG WQMMP specifies steps and schedule for monitoring of TDG at the Project, reporting of monitoring results, and responses to be taken to correct TDG exceedences, if any, resulting from the operation of the flow control structure and siphon spillway. PGE shall modify the WQMMP as necessary to incorporate specific steps or schedules set out in the design plans for the flow control structure and siphon spillway modifications, and submit such WQMMP modifications to DEQ for DEQ review and approval, before construction of these Project features.

2. Turbidity

Upon applying for any federal permit for construction activities at the Project that might disturb river sediments, PGE shall provide DEQ written notice of such application and of any proposed changes to or new specifications for the construction activities developed since issuance of this Certification. DEQ will notify PGE and the federal agency either that (i) this Certification is sufficient for purposes of the federal permit, or (ii) in light of new information related to the water quality impacts of the construction activities, there is no longer reasonable assurance of compliance with state water quality standards. In the latter event, DEQ will consider the new information, solicit and consider public and agency comment as required by law, and issue a § 401 Certification determination for purposes of the federal permit activities.

3. Protection of Beneficial Uses; Other Appropriate Requirements of State Law

a. Fish. PGE shall perform the following measures, which will be developed and implemented in consultation with a Fish Committee and with approval of Fish Agencies, including ODFW, as specified in the January 29, 2004 Settlement Agreement and Proposed

License Articles:

(1) Construct a siphon bypass system at T.W. Sullivan Powerhouse that will accommodate 500 cfs flow (Proposed License Article 4(a));

(2) Renovate the trash rack in the forebay to allow adult fish passage through the rack (Proposed License Article 4(f));

(3) Design and construct an improved discharge for turbine units 12 and 13 (Proposed License Article 4(g));

(4) Design and construct the Unit 13 bypass discharge to decrease velocities so they comply with NMFS fish passage criteria (Proposed License Article 4(i));

(5) Develop an Operational Plan for the T.W. Sullivan Powerhouse that describes how flow will be routed through the powerhouse, the siphon bypass, and the fish ladder (Proposed License Article 6) ;

(6) Prior to construction of the flow-control structure at Willamette Falls, remove flashboards during fall low flow periods (Proposed License Article 8);

(7) Design and construct a flow control structure (Proposed License Article 9(a));

(8) Develop and implement an operation plan for the flow-control structure (Proposed License Article 10);

(9) Install and provide flows at lamprey passage ramps (Proposed License Article 15(a));

(10) Implement a Stranding Management Plan (Proposed License Article 14).

b. State Permits. Before commencing any construction activity, PGE shall obtain all necessary state permits and authorizations.

c. Spill Management. PGE shall maintain and implement current Spill Prevention, Control, and Countermeasure (SPCC) plans for oil and hazardous materials prepared in accordance with the Clean Water Act requirements of 40 CFR 112. These plans shall address all locations at the Project where Project operations may potentially result in a spill or release or threatened spill or release to the Willamette River. In the event of a spill or release or threatened spill or release to Project waters or to the Willamette River, PGE shall immediately implement the site's SPCC plans and notify the Oregon Emergency Response System (OERS) at 1-800-452-0311.

4. General

a. Certification Modification. DEQ, in accordance with OAR Chapter 340 Division 48 and, as applicable, 33 USC 1341, may reconsider this Certification and add, delete, or modify certification conditions as necessary to address:

(1) Adverse or potentially adverse Project effects on water quality or designated beneficial uses that did not exist or were not reasonably apparent when this Certification was issued;

(2) TMDLs;

(3) Changes in water quality standards;

(4) Any failure of Certification conditions to protect water quality or designated beneficial uses as expected when the Certification was issued; or

(5) Any change in the Project or its operations that was not contemplated by the Certification that might adversely affect water quality or designated beneficial uses.

b. Other Federal Permits. Upon applying for any federal permit for construction activities at the Project that might disturb river sediments, PGE shall provide DEQ written notice of such application and of any proposed changes to or new specifications for the construction activities since issuance of this Certification. DEQ will notify PGE and the federal agency either that (i) this Certification is sufficient for purposes of the federal permit, or (ii) in light of new information related to the water quality impacts of the construction activities, there is no longer reasonable assurance of compliance with state water quality standards. In the latter event, DEQ will consider the new information, solicit and consider public and agency comment as required by law, and issue a § 401 Certification determination for purposes of the federal permit activities.

c. Project Changes. PGE shall obtain DEQ review and approval before undertaking any change to the Project that might significantly affect water quality, including changes to Project structures, operations, and flows.

d. Project Repair or Maintenance. PGE shall obtain DEQ review and approval before undertaking Project repair or maintenance activities that might significantly affect water quality (other than project changes required by or considered in this Certification).

e. Access. PGE shall allow DEQ such access as necessary to the Project area and Project records at reasonable times as necessary to monitor compliance with these Certification conditions.

f. Posting of Certification. PGE shall post a copy of these Certification conditions in a prominent location at the T.W. Sullivan Powerhouse.

g. Project- Specific Fees. In accordance with ORS 543.080, PGE shall pay a project-specific fee for DEQ's costs of overseeing implementation of the adaptive management conditions of this Certification. The fee shall be $12,000 annually (2005 dollars, escalated as described in Proposed License Article 19), made payable to "State of Oregon, Department of Environmental Quality", and due on July 1 of each year after issuance of this Certification. DEQ shall credit against this amount any fee or other compensation paid or payable to DEQ, directly or through other agencies of the State of Oregon, during the preceding year (July 1 to June 30) for ODEQ's cost of oversight of adaptive management. ODEQ and PGE shall review the need, if any, to modify, extend, or terminate the fee, in accordance with ORS 543.080. PGE shall continue to pay any project-specific fee required after such review.

Attachment A (to Appendix A)

Water Quality Monitoring and Management Plan

1.0 Introduction

This Water Quality Monitoring and Management Plan (WQMMP) describes procedures that will be employed by Portland General Electric Company (PGE) to satisfy the requirements of the § 401 Water Quality Certification for the Willamette Falls Hydroelectric Project (FERC # 2233). The Willamette Falls Hydroelectric Project consists of a powerhouse and associated dam structures. A navigation lock, an upstream fish passage facility, and two paper mill complexes are also located at Willamette Falls and affect river flow at the Falls. A description of the Project is available in section 3 of the § 401 Water Quality Certification application.

This monitoring plan, in combination with information contained in PGE's application for § 401 certification, provide the water quality certification agencies (i.e., the Oregon Department of Environmental Quality (ODEQ)) reasonable assurance that the Project will not contribute measurably to the violation of applicable water quality standards and criteria, that the waters potentially affected by the Project will not be degraded from existing conditions, that future Project operations will offset any ongoing contributions to non-attainment of water quality standard numeric or narrative criteria, and that such operations will also mitigate adverse impact to designated beneficial uses.

As a major mitigation measure for the new license period, PGE proposes to construct a

controlled flow structure at the apex of Willamette Falls and a new fish bypass route through the powerhouse siphon spillway. The controlled flow structure would consist of a gated opening in the dam at the apex of the Falls to focus flow through a natural channel at the upstream point (apex) of the horseshoe shaped Falls. Within the opening would be an adjustable weir that would control the amount of flow through this location while maintaining upstream river elevation. Focusing river flow over the Falls at the apex location would improve passage conditions for downstream migrating fish, especially under low flow conditions when landing conditions below the Falls are not optimal. A controlled flow structure would take into account many design considerations, including maintaining upstream river elevation above 52.5 feet mean sea level, minimizing adult migrant attraction away from the ODFW Willamette Falls Fish Ladder entrances, avoiding damaging hydraulic impacts to fish ladder structures, avoid creating total dissolved gas (TDG) water quality problems downstream, avoiding creating a hazard to upstream boaters, and possibly enhancing upstream passage opportunities for adult lamprey. Although the final design for this structure has not been completed, the controlled flow structure would be on the order of 150 feet wide and 10 feet deep, with multiple weir segments, designed for a capacity up to 15,000 cfs (actual capacity will be determined through the design process). Based on performance of the initial structure, minor modifications to the landing area downstream of the control structure would be included to minimize injury to juvenile fish at this location.

The siphon bypass will modify a portion of an existing siphon spillway. An opening will be created within the siphon structure and a control gate will be installed to provide a continuous flow of water directly from the forebay to the tailrace. Flows up to 500 cfs through this route are anticipated. Bypassed flows will be released into the tailrace via a "surface skimming" outfall to minimize plunging of the outfall flow and to better direct bypassed fish into the main river channel.

Final design of both the controlled flow structure and the siphon bypass will be aided by physical modeling. Physical modeling will also aid in minimizing, or completely eliminating, any potential impacts to water quality parameters, specifically TDG.

The following plan provides information regarding ODEQ standards and goals, application of these standards and goals to the Project facilities for compliance, the approach to monitoring, and the reporting of monitoring results and management operations. The schedule of this plan has been determined with reference to the completion of construction of the controlled flow structure and siphon bypass, and operation of the Project with these new structures in place. Construction-related schedule information can be found in the Willamette Falls Implementation Plan, which is Exhibit B to the Willamette Falls Settlement Agreement submitted to FERC in January, 2004.

Various management activities that will be conducted pursuant to this plan, or pursuant to the terms and conditions of the new FERC license, may require PGE to conduct instream

work. PGE will obtain any permits, such as a Corps of Engineers 404 permit and associated § 401 certification, that may be required prior to conducting such activities.

2.0 Background

2.1 Biological Need for Siphon Bypass Structure

It has been estimated that Fish Guidance Efficiency (FGE) will increase to 95% or greater at the T.W. Sullivan plant with a new siphon spillway bypass system operating in conjunction with improved forebay hydraulics moving fish past the turbine units to the bypass routes. The siphon bypass will provide a new passage route directly from the T.W. Sullivan forebay into the tailrace, bypassing the powerhouse, and improving the safe bypass of downstream migrants beyond what would be achieved with the forebay hydraulic modifications and the existing unit 13 bypass system alone. The new siphon bypass is expected to pass up to an additional 500 cfs. As a result, T.W. Sullivan forebay flow would increase from 5,850 cfs to 6,350 cfs under most river flow conditions, or from 6,850 cfs to 7,350 cfs under maximum flow conditions, or an increase of 8.6% or 7.3% respectively.

The siphon bypass option also includes changes to the T. W. Sullivan tailrace north shoreline and area between the unit 12 and 13 discharges. Such modifications would eliminate low-flow and eddy conditions conducive to ambush predators. Increasing discharge flow into the tailrace and improving hydraulics would reduce tailrace predation.

Enhanced forebay flows and a second bypass route also should improve Pacific lamprey, steelhead kelt, and adult salmonid fallback passage through T.W. Sullivan. For all species, the higher forebay velocities should increase sweeping velocities across the louver array. Higher sweep velocity may assist transporting these fish to the existing Unit 13 bypass or the new siphon spillway by increasing warning stimuli (e.g. faster flows and perhaps sound from entrained air; Kynard and Horgan 2001) detectable by fishes near the louvers.

Installation of a new bypass route through the siphon spillway would enhance fish passage at the T.W. Sullivan Development. This measure is expected to benefit threatened Upper Willamette River spring Chinook and winter steelhead ESUs. The measure should also benefit juvenile Pacific lamprey, Lower Columbia River Chinook salmon, Lower Columbia River steelhead, Lower Columbia River/Southwest Washington Coast coho salmon, and Upper Willamette River coastal cutthroat trout.

Contribution of the proposed siphon bypass to TDG below the Falls will likely be negligible. The design and modeling process used by PGE to determine the final outfall configuration will provide additional information on any TDG impacts, and operational

guidelines that develop out of the modeling and design process will be employed adaptively to minimize TDG impacts. This WQMMP provides for a means of monitoring for TDG impacts from the siphon bypass.

2.2 Biological Need for Control Flow Structure

The presence of the dam around the crest of the Falls modifies flow patterns around and over Willamette Falls by spreading the flow around the entire Falls. This is most noticeable at lower flows where much of the flow may have been guided over the Falls through natural channels between and over Moore and Abernathy Islands. By spreading flow around the entire dam along the crest of the Falls, some downstream migrants may be deterred from passing over the Falls due to a shallow veil of water passing over the dam/flashboards, or they pass over the Falls at locations that may result in injury from rock outcroppings or by landing on rocks at the base of the Falls. This concern is applicable to not only juvenile downstream migrants but also for kelts and for upstream migrant fallback.

Downstream migration of fish past the Project occurs year round, although 85% of downstream passage occurs from March through June. Most fish that migrate through the Project area pass over Willamette Falls directly. A main concern for fish is potential mortality and injury as the fish migrate over the Falls. This concern of fish mortality or injury at lower flows is heightened due to adverse passage conditions such as rock outcroppings and landing areas, and predation.

To address concerns related to downstream fish passage and understand behavior of downstream migrants, several radio-telemetry studies were conducted with juvenile Chinook salmon and steelhead. Data from these studies were analyzed to determine if focusing flow at the Falls apex could influence the passage of downstream migrants (NAI 2001a) or if the spreading of flow around the Falls caused downstream migrating smolts to hold or move appreciably above the Falls (NAI 2002).

A radio-tag study conducted in the fall 2000 helped determine if smolts could be attracted to a 300-ft open section of the flashboards made at the apex of the falls. This study was conducted in October 2000 when flows over the falls were approximately 12,500 cfs. Of the fish that passed over the Falls, the proportion that passed at the slot location increased from 37.5% to 80.6% from pre-slot to post-slot conditions (NAI 2001a).

The downstream passage radio-tag study in the Spring 2002 was conducted at flows on the order of 15-20,000 cfs with virtually all flashboards removed due to the high winter flows (NAI 2002). Analysis of radio-telemetry data from this study indicated that the smolts moved downstream very quickly and did not exhibit appreciable movement or delay above the Falls as they passed downstream. Approximately 82% of the tagged fish passed over the Falls in the vicinity of the apex in this study. Survival performance of

migrants over the Falls was not an intended product of either study.

2.3 Historical Measurements of TDG at Willamette Falls

TDG was monitored at the Willamette Falls Project during 2000-2002 to better understand whether the flow that occurs over the dam and the Falls contributes to total dissolved gas levels downstream of the Falls. The TDG values recorded during the 2000/2001 monitoring period (late June - early November of 2000 and May – August of 2001) remained below 110 % at all of the monitored sites with the exception of sites immediately within the horseshoe of the Falls. Nine (22%) of the 41 measurements taken exceeded 110 %. Measured values ranged from 111 to 115 % and usually occurred when river flows exceeded 7,000 cfs and flows over the Falls were small (i.e. 500 cfs). TDG levels were less than 110% just downstream of the Falls at the location where the T.W. Sullivan tailrace and BHPC powerhouse discharges enter the main river channel. TDG levels recorded for the T.W. Sullivan forebay, T.W. Sullivan tailrace, and BHPC tailrace indicate that TDG levels are generally reduced as water passed through the Project's generators. The lower TDG of water discharged from the powerhouses tended to reduce TDG levels in the main river channel below the Project by dilution in the range of flows measured (approx. 6,000 to 15,000 cfs).

Additional TDG measurements were obtained at several sites below the Falls at much higher flows during the winter of 2001/2002. As flows increased at the Falls, water surface elevation at the base of the Falls increased proportionately more than above the Falls (approximately 3-ft of downstream elevation increase for every 1-ft of upstream elevation increase), thereby increasing the available plunge depth of water flow over the Falls. The plunge depth within the Falls is determined by geologic constraints approximately one-half mile downstream of the Falls. TDG measurements were obtained at 100,000 cfs, 56,000 cfs, 40,000 cfs and 28,000 cfs. As expected, TDG levels were much higher (120%, 118%, 114%, and 110% respectively) and persisted at sampling sites for several miles downstream.

3.0 Total Dissolved Gas Monitoring

3.1 ODEQ Total Dissolved Gas Standards

The applicable ODEQ standard for total dissolved gas states, "The concentration of TDG relative to atmospheric pressure at the point of sample collection shall not exceed 110% of saturation, except when stream flow exceeds the ten-year, seven-day average flood. However, for Hatchery receiving waters and waters of less than two feet in depth, the concentration of TDG relative to atmospheric pressure at the point of sample collection shall not exceed 105% of saturation (OAR 340-041-0031)."

3.2 Application of Standard to Willamette Falls Project

The super-saturation of atmospheric gases in water may cause crippling or lethal gas bubbles (Gas Bubble Trauma or GBT) to form in the tissues of fish. The standard is designed to prohibit discharges or activities that will result in atmospheric gases reaching known harmful concentrations in the water column.

TDG levels sometimes exceed 110% of saturation either just within the horseshoe area of Willamette Falls during low flow, or for several miles downstream at high flow. These high TDG levels coincide with water spilling over the Falls, which is a natural source of high TDG. Monitoring TDG values downstream of the Falls following construction of a controlled flow structure would indicate whether the structure was contributing to conditions where high TDG levels may be present naturally.

3.3 Facilities for Compliance

A controlled flow structure, consisting of an opening in the dam and an adjustable weir at the apex of the Falls, will be constructed to focus river flow over the Falls and improve passage conditions for downstream migrating fish. Additionally, the siphon bypass outfall will be constructed to direct flows from the proposed siphon bypass structure in such a manner so as to optimize hydraulic conditions in the tailrace for safe downstream migrant egress from the tailrace. Both structures will be designed to minimize contributions to TDG levels in the Willamette River.

3.4 Monitoring Objectives

There are three primary objectives of this WQMMP. These objectives include:

- To determine whether the Project is in compliance with the ODEQ TDG standards and the § 401 certification with new project structures in place that modify flows paths at Willamette Falls.
- To collect TDG data to aid in the identification and/or implementation of adaptive management measures needed to ensure compliance with the ODEQ water quality standards and the § 401 certification.

3.5 Approach to Total Dissolved Gas Monitoring

PGE proposes to monitor TDG at incremental river flows with the controlled flow structure and the siphon bypass in both operating and non-operating modes. If possible, TDG monitoring will begin prior to the installation of these structures; however, if this is not possible, TDG measurements obtained with the structures in place but not operating will be similar, if not identical, to measurements without the structures. PGE will submit draft data and progress reports on a monthly and quarterly basis, respectively, to ODEQ.

A draft report will be submitted to ODEQ within three months of completing the planned TDG monitoring. A continuous TDG recording device will be employed downstream of the Falls to enable collection of TDG data, either through data downloads or remote access. Such a device will allow PGE and ODEQ to closely monitor TDG during the migration periods for salmonids and at various levels of river discharge and controlled flow structure and siphon bypass operation. PGE will study the relationship between TDG and various combinations of river discharge and operation of the controlled flow structure and the siphon bypass.

PGE also proposes to compare monitoring results with previous TDG measurements at Willamette Falls under various levels of river discharge. Based upon the study results, PGE may develop operating criteria, or other measures, associated with operation of the controlled flow structure or siphon bypass (see Section 3.7 below). The proposed water quality monitoring in this proposal is intended to provide reasonable assurance that installation and operation of the new Project structures do not contribute to high TDG conditions in the river.

3.6 Detailed Plan for Total Dissolved Gas Monitoring

TDG data will be collected using continuous monitoring equipment and techniques developed by the United States Geological Survey (USGS) for monitoring TDG at other hydropower facilities in the Columbia Basin (Tanner, 2001). TDG data will be collected continuously at a single location downstream of Willamette Falls utilizing quality assurance / quality control measures described in Tanner (2001). If needed, TDG will be measured above the Falls in the T.W. Sullivan forebay utilizing a discreet grab-sample approach should PGE or ODEQ determine such data is necessary to adequately assess the controlled flow structure affect on TDG. Measurements in the forebay are assumed representative of ambient (inflow) concentrations. Downstream of the Falls, TDG will be measured at a location which will be determined in consultation with ODEQ, and with assistance of the United States Geological Survey (USGS).

One sampling site downstream of the falls is appropriate for the proposed monitoring program; little evidence of horizontal or vertical TDG stratification in the Willamette River was observed from previous TDG monitoring at Willamette Falls (NAI 2001b). Even at sites immediately downstream of the Falls, stratification was not strong and varied in direction; at times, surface values were higher than those at deeper depths, at other times surface values were slightly lower.

In order to provide additional tools for interpreting results of TDG monitoring, PGE will collect ancillary data including but not limited to barometric pressure, air and water temperature, water elevation above and below Falls, river discharge, operational status of the powerhouse, and operational status of the controlled flow and siphon bypass

structures. Some of this data, such as barometric pressure, temperature, and water elevation will be recorded at the same time as TDG data where daily averages are not sufficient for correlating with the TDG measurements.

TDG assessment will be conducted under the flow and operating conditions shown in Table 1. Operating conditions will be subject to fish passage testing that is anticipated to be occurring during the same timeframe. Additionally, since flow in the river is not controllable, sampling will occur when the desired flow condition occurs. Flows within a reasonable range of the desired flow (ie, $\pm$10%), will be considered acceptable. Each monitoring condition will be held for a 24-hr period to allow equilibrium to occur prior to collecting data. Any significant changes in environmental (ie, outside the $\pm$10% range) or operating conditions during the data collection period will be recorded to help assess TDG results.

Table 1. TDG Monitoring Conditions

Flow (in CFS) Read at USGS gage 14191000 (SLM03)	Operating Conditions*		Remarks
	Siphon Bypass	Controlled Flow Structure	
Summer low flow (6-7,000)	Off	Off	Any impact to TDG from Siphon Bypass should be evident at these lower flow conditions. If TDG impact observed, additional testing will be performed at less than full Siphon Bypass capacity.
	On	Off	
10,000	On	Off	
	Off	Off	
	Off	On	
	On	On	
20,000	N/A	On and Off	If TDG impact observed, an additional measurement will be obtained with structure in interim position if feasible based on design. If TDG impact persists, TDG monitoring will be repeated following any identified and implemented adaptive management measures.
30,000		On and Off	
40,000		On and Off	
50,000		On and Off	
60,000		On and Off	
70,000		On and Off	
80.000		On and Off	
90,000		On and Off	
100,000		On and Off	

* "On" indicates the structure is in operation. For the controlled flow structure, the gate(s) are lowered and water is passing through it and over the apex of the Falls. For the siphon bypass, the gate is open and flow is passing down the outfall and into the tailrace. "Off" indicates the structures are not operating; all gates are up and water is not being passed. Where "On and Off" is shown, this indicates two separate monitoring conditions.

3.7 Adaptive Management and Endpoint

PGE will employ principles of adaptive management to the operations of the Project, including reasonable changes to the operation or additional modifications to the flow control structure and siphon bypass. This approach will implement and assess operational and/or structural modification steps identified during the design process, or possibly during the monitoring period, to further decrease TDG generated from these structures. Operational and/or structural modifications as part of this adaptive management approach are envisioned to be minor in nature and consistent with the structures' purpose to safely pass migrating fish downstream past the Project. This WQMMP will be modified to include the revised management plan once the design for the two structures is adopted.

As design, construction and operation of these structures commences under the terms of the new FERC license and §401 permit from ODEQ, additional management and monitoring measures will be detailed under this adaptive management section, as necessary, to respond to new information and experiences with TDG below the falls and in the tailrace.

While the exact TDG response to the new structures, specifically the controlled flow structure at the Falls apex, is not known at this time, an endpoint to this WQMMP would be characterized by the collection of sufficient TDG data at adequate environmental and operation conditions (Table 1) that demonstrate: 1- TDG violations do not occur; or 2- if TDG violations occur, that the new structures do not contribute to the high TDG levels; or 3- agreed upon adaptive management efforts have been implemented to the satisfaction of ODEQ.

3.8 Reporting

PGE will submit and review with ODEQ draft data collected on a monthly basis during data collection periods. Quarterly progress reports will be produced that summarizes TDG monitoring data for the current reporting period. A brief discussion of all data collected to that point will also be included. These quarterly reports will be submitted to the ODEQ and distributed to the Fish Technical Committee (FTC).

A draft and final report will be produced at the conclusion of the above proposed monitoring. A draft report will be submitted to the ODEQ and distributed to the FTC

within 90 days of data collection completion. After a 45-day review and comment period, a Final report will be submitted within 45-days after the end of the comment period. The draft and final report will include conclusions as well as any recommendations for additional modifications and/or monitoring, if appropriate.

3.9 Schedule

If possible, data collection will be initiated in 2005 prior to the construction and operation of the bypass structures. Siphon bypass construction is planned for 2005 and the controlled flow structure in 2006. It is anticipated data collection will occur as flows allow in 2005 and 2006 until construction is initiated on the controlled flow structure. Data collection will resume after the controlled flow structure is operational. Additional sampling needs will be assessed and discussed as part of the reporting and periodic meetings of the FTC with additional sample scheduling done as needed.

4.0 Quality Assurance/Quality Control

4.1 Approach to Quality Assurance/Quality Control

PGE will develop and submit for approval to the ODEQ a comprehensive Quality Assurance (QA) and Quality Control (QC) plan. All measures outlined in the QA/QC plan would be Project specific, with explanations of how data collection conducted at all sites will comply with guidelines. PGE's plan will include regular evaluation of the TDG fixed station performance. Getting the continuous monitoring station in place prior to the installation of the controlled flow structure is important to establish a baseline dataset. The following sections provide a brief outline of expected QA/QC measures for TDG measurements. PGE will implement this Water Quality Monitoring Plan in accordance with the approved QA/QC plan.

4.2 Equipment Calibration and Maintenance

Routine calibration and maintenance of field and lab equipment will be done in accordance with manufacturer's guidelines, and in compliance with the methods and protocols described by Tanner (2001). PGE or its contractor will perform these equipment calibration checks at a bi-weekly interval. At the conclusion of the field sampling, the TDG equipment will be recalibrated to check for deviations from baseline calibration points. Differences between start and ending calibration points will be presented in the final report and will be considered prior to data analysis.

4.3 Audits and Replicates

The senior aquatic scientist/project manager for this project will perform audits of TDG measurements, or ensure that contractors are conducting and reporting results of regular

audits.

4.4 Data Quality

Data quality will be assured by the implementation of an ODEQ-approved comprehensive Quality Assurance (QA) and Quality Control (QC) plan.

4.5 Reporting

A report will be produced within six months after data collection that summarizes relevant water quality data and establishes compliance with approved QA/QC procedures. The report will be submitted to the ODEQ and distributed to appropriate parties within the Willamette Falls FTC.

APPENDIX B

National Marine Fisheries Service
Section 18 Fishway Prescriptions

The fishway prescriptions are identical to Proposed Articles 2 through 6, Proposed Articles 8 through 10, and Proposed Articles 12 and 13 of Exhibit A of the Settlement Agreement. For ease of reference, we include the numbering system used in the Settlement Agreement.

1. Downstream Fish Passage (Proposed Article 2)

(a) The Licensee shall achieve the downstream passage performance standards specified in Table 1 of this Article for downstream passage of juvenile salmonids at the T. W. Sullivan Powerhouse, within the time limits specified in Articles 3 and 4.

Table 1. Performance standards for juvenile salmonid downstream passage at the T.W. Sullivan Powerhouse.*

Smolts > 60 mm in Length		**Fry < 60 mm in Length**		**Action required pursuant to paragraph (b) of Article 1**
Mortality	**Injury**	**Mortality**	**Injury**	
Design performance objective ≤0.5 % mortality	Design performance objective ≤2 % injury	Design performance objective ≤2 % mortality	Design performance objective ≤4 % injury	Objective met. No further measures required
Actual mortality > 0.5 % but ≤2 % would require additional work to lessen mortality	Actual injury > 2 % but ≤4 % would require additional work to lessen injuries	Actual mortality > 2 % but ≤4 % would require additional work to lessen mortality	Actual injury > 4 % but ≤6 % would require additional work to lessen injuries	• Tier 1 and Tier 2 actions implemented per schedule.

Smolts > 60 mm in Length		Fry < 60 mm in Length		Action required pursuant to paragraph (b) of Article 1
Mortality	**Injury**	**Mortality**	**Injury**	
Actual mortality > 2 % would require major operational or structural changes	Actual injury > 4 % would require major operational or structural changes	Actual mortality > 4 % would require major operational or structural changes	Actual injury > 6 % would require major operational or structural changes	• Tier 3 actions implemented as needed and meaningful to improve performance. • Tier 4 actions implemented if performance after Tier 3 items is not satisfactory.

* The top row of Table 1 provides downstream passage performance standards that, if met, mean that no further measures are required by the Licensee. The second row provides mortality/injury ranges that mean that additional work provided in Tier 2 is needed to reduce mortality/injury pursuant to paragraph (b) of Article 1. The third row provides mortality/injury ranges that, if exceeded, mean actions listed in Tiers 3 and 4 are needed, as appropriate pursuant to paragraph (b) of Article 1.

(b) The "Actions" listed in Table 1 are categorized into four tiers according to planned timing of implementation and which level of performance standard is being addressed. The components of each Tier are specified in Appendix 5 of the Relicensing Implementation Plan attached to the January 2004 Settlement Agreement.

(i) As reported pursuant to Article 3, the Licensee shall have completed Tier 1 measures prior to issuance of the License.

(ii) As provided in Article 4, the Licensee shall undertake Tier 2 measures after issuance of the License and shall initiate evaluation of downstream passage performance at the T.W. Sullivan Powerhouse using the standards listed in Table 1 after completion of the siphon bypass. If necessary to achieve the performance standards in Table 1 based on the results of performance evaluations, the Licensee will implement remaining Tier 2 measures according to the timeline in the Relicensing Implementation Plan, provided that, if measured performance meets the second level of performance standards specified in Table 1 after Tier 2 items are implemented, the Licensee is not required to implement Tier 3 or Tier 4 measures. If necessary based on the results of performance evaluations and consultation with the FTC and with the approval of the appropriate Fish Agencies pursuant to Article 1, the Licensee will undertake additional modifications not specified

in the Relicensing Implementation Plan to achieve further measurable mortality reduction.

(iii) Not later than December 31, 2009, unless such deadline is extended with the agreement of the FTC pursuant to Article 1, the Licensee shall complete performance testing to determine if measured performance meets the second level of performance standards specified in the Table 1. If measured performance does not meet the second level of performance standards specified in the Table 1, the Licensee shall file with the Commission a plan to implement Tier 3 measures and performance testing. The plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval of the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the plan.

(iv) Not later than December 31, 2015, unless such deadline shall be extended with the agreement of the FTC pursuant to Article 1, the Licensee shall complete performance testing to determine if measured performance meets the second level of performance standards specified in the Table 1. If measured performance does not meet the second level of performance standards specified in the Table 1 after Tier 3 implementation, the Licensee shall file with the Commission a plan to implement Tier 4 measures and performance testing. The plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval of the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the plan.

(c) The licensee shall achieve the downstream passage performance standard of at least 97% survival for downstream passage of juvenile salmonid smolts at the controlled flow structure to be constructed at Willamette Falls as provided in Article 9.

(d) If a technology-based standard for Pacific lamprey survival and injury avoidance is developed and regionally adopted by the U.S. Fish and Wildlife Service during the term of the new license, the Licensee shall adopt such standard, which shall supersede the performance goal set forth in Table 2. If the studies conducted pursuant to Articles 15 and 16 indicate that the T.W. Sullivan Powerhouse does not comply with the newly-adopted technology-based standard, the Licensee shall consult with the FTC pursuant to Article 1 regarding measures, subject to Fish Agency approval, needed to comply with the standard at the T.W. Sullivan Powerhouse. Within twelve months of the adoptions of such standard, the Licensee shall file with the Commission a plan describing the measures that will be instituted to achieve the lamprey survival and injury standard at the T.W. Sullivan Powerhouse. The plan shall be prepared after consultation with the FTC pursuant to Article 1. Upon approvals by the appropriate Fish Agencies, the Licensee shall implement the plan. Upon Commission approval, the plan shall become a requirement of the License.

(e) The Licensee shall achieve the performance goals in Table 2 for upstream and

downstream passage of Pacific Lamprey and adult salmonid migrants at the Willamette Falls Project:

Table 2. Performance Goals for the passage of Pacific lamprey and adult salmonids at the Willamette Falls Project.

Fish species/lifestage	Type of passage	Performance Goal
Juvenile lamprey	Downstream through the powerhouses	"safe, timely, and effective" qualitative goal without serious injury or mortality
Juvenile lamprey	Downstream over the spillway (cap/falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality: Assumed adequate when the standard for juvenile salmonids is met at the spillway (≥97% survival), until appropriate technology is developed to assess juvenile lamprey survival over the controlled flow structure.
Adult lamprey	Upstream through the Project area	"safe, timely, and effective" qualitative goal without serious injury or mortality: Goal to be further developed through PGE funded study described in Section V.C and Appendix 4 of the Relicensing Implementation Plan
Adult lamprey	Downstream at the T.W. Sullivan Powerhouse and at the spillway (cap/falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality
Adult salmonids	Upstream through the Project area	"safe, timely, and effective" qualitative goal without serious injury or mortality
Steelhead kelts (i.e., post-spawning adults) and fallback (adult salmonids)	Downstream at the T.W. Sullivan Powerhouse and at the spillway (cap/falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality

2. Implementation of Tier 1 Measures (Proposed Article 3)

Within six months of the effective date of the License, the Licensee shall file with the Commission a report, including as-built drawings, documenting the completion of the Tier 1 Measures described in Appendices 5 and 6 of the Relicensing Implementation

Plan. The report shall be prepared after consultation with the FTC pursuant to Proposed Article 1.

3. T.W. Sullivan Modifications (Proposed Article 4)

(a) Within twelve months of the effective date of the License, the Licensee shall modify the siphon spillway adjacent to the T.W. Sullivan Powerhouse to bypass a design flow of 500 cfs directly from the forebay to the tailrace during powerhouse operation. Within two months of the effective date of the License, the Licensee shall file with the Commission a plan to modify the siphon spillway. The plan shall include, but not be limited to: (1) functional design drawings; (2) an installation and implementation schedule providing for completion of construction by December 31, 2005; and (3) if feasible, new passive integrated transponder (PIT) tag interrogator detector systems or an equivalent system to ensure that fish passage efficiency and survival can be effectively measured. The design of the siphon bypass shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and the Commission, the Licensee shall implement the siphon bypass design.

(b) The Licensee shall develop and implement a multi-year study to evaluate fish guidance efficiency and mortality and injury to spring Chinook and steelhead smolts, and to the extent technically feasible, spring Chinook and steelhead fry and juvenile Pacific lamprey, passing through the T.W. Sullivan Powerhouse and siphon bypass. The Licensee shall file a study plan with the Commission within six months of the effective date of the License. The study plan, which shall be initiated upon completion of the siphon bypass pursuant to paragraph (a) of this Article, shall include, but not be limited to evaluating (i) fish guidance efficiency; (ii) mortality and injury to spring Chinook and steelhead smolts passing through the T.W. Sullivan Powerhouse and siphon bypass; (iii) the effects of turbine passage and turbine shutdown sequencing on fish guidance; (iv) if the field research technology becomes available and is applicable to conditions existing at the Project, mortality and injury to spring Chinook and steelhead fry passing through the T.W. Sullivan Powerhouse and siphon bypass; (v) if the field research technology becomes available and is applicable to conditions existing at the Project, impacts on juvenile Pacific lamprey as specified in Article 16; and (vi) injury and mortality to fish caused by the 2-inch spaced trashracks. The effectiveness of behavioral deterrent devices, if appropriate, should be included for evaluation in Tier 2. An extensive monitoring and evaluation program will assess the effectiveness of all modifications to the T.W. Sullivan Powerhouse and siphon bypass by 2009. The study plan shall provide for the filing of a final report with the Commission upon completion of at least three years of study, as well as the filing of interim reports summarizing the results of each year's study. The study plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the study plan.

(c) The Licensee shall file reports with the Commission of the results of the study, approved pursuant to paragraph (b) of this Article, on fish guidance efficiency and mortality and injury, relative to the standards contained in Table 1, to spring Chinook and steelhead smolts and fry passing through the T.W. Sullivan Powerhouse and siphon bypass. Results of juvenile lamprey testing will be reported relative to goals in Table 2. The Licensee shall file a final report not later than December 31, 2008, and interim reports by December 31 of each year during the study. If the downstream smolt and fry passage survival rates have not achieved the standards specified in Table 1 of Article 2, each interim report shall include plans to further improve the effectiveness of the facilities by implementing additional Tier 2 measures. If downstream fish passage survival rates have not achieved the standards specified in Table 1 of Article 2, the final report shall include plans to further improve the effectiveness of the facilities by implementing additional Tier 2 and Tier 3 measures as specified in Table 1. The report shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the recommendations in the report

(d) Not later than December 31, 2005, the Licensee shall file with the Commission a PIT tag interrogator plan to install new passive integrated transponder ("PIT") tag interrogator system at the Unit 13 bypass. Within two months of the effective date of the license, the Licensee shall file with the Commission a plan for installation of the PIT tag interrogator system. The PIT tag interrogator plan, which shall include, but not be limited to: (1) functional design drawings; and (2) an installation and implementation schedule providing for completion of construction by December 31, 2005, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the pit detector plan. If it is determined through consultation with the FTC that installation in 2005 would not be consistent with modification of the Unit 13 bypass outfall scheduled in 2006, then installation of the PIT tag interrogator system shall be implemented in conjunction with the Unit 13 bypass outfall modification.

(e) The Licensee shall periodically review the feasibility of installing a PIT tag interrogator system (or equivalent system) at the siphon bypass if the installation of such technology is not feasible when the design for that bypass is filed pursuant to paragraph (a) of this Article. Within six months of determining that it has become feasible to install such technology at the siphon bypass, the Licensee shall file with the Commission a plan to install a PIT tag interrogator system (or equivalent system) at the siphon bypass. The PIT tag interrogator plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the plan.

(f) The Licensee shall install and operate a trashrack cleaning system in the forebay of the T.W. Sullivan Powerhouse to ensure that the forebay trashracks remain free of

debris that could adversely affect fish guidance efficiency and downstream migrant survival. Within two months of the effective date of the License, the Licensee shall file with the Commission a plan to install and operate the trashrack cleaning system. The plan, which shall include, but not be limited to: (1) functional design drawings; and (2) an installation and implementation schedule providing for completion of construction by December 31, 2005, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the trashrack cleaning system plan.

(g) The Licensee shall modify the discharges of Units 12 and 13 at the T.W. Sullivan Powerhouse tailrace to eliminate potential aquatic predator habitat in existing slack water areas between the Unit 12 and 13 discharges. Not later than March 1, 2006, the Licensee shall file with the Commission a plan to modify the discharges of Units 12 and 13. The discharge modification plan, which shall include, but not be limited to: (1) functional design drawings; and (2) an installation and implementation schedule providing for completion of construction by October 31, 2006, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the discharge modification plan.

(h) The Licensee shall take measures to reduce the potential for avian predation on downstream migrants that pass the Project through the T.W. Sullivan Powerhouse. Not later than March 1, 2007, the Licensee shall file with the Commission a plan for reducing the potential for avian predation. The plan, which shall include, but not be limited to: (1) functional design drawings; (2) an installation and implementation schedule providing for completion of construction by December 31, 2007, and (3) addition or increase of wire or other equally effective avian deterrent technology in the forebay and tailrace in areas where avian predation activity has been observed, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the plan.

(i) The Licensee shall modify the outfall of the Unit 13 bypass to meet NMFS hydraulic impact velocity criteria. Not later than March 1, 2006, the Licensee shall file with the Commission a plan to modify the outfall of the Unit 13 bypass. The plan, which shall include, but not be limited to: (1) functional design drawings; (2) an installation and implementation schedule providing for completion of construction by October 31, 2006; and (3) installation of a PIT tag interrogator system on the outfall if not previously installed in 2005, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the outfall modification plan.

(j) If the Licensee elects to develop a new auxiliary water supply system for fish ladder entrance #1, it shall file with the Commission a plan for implementing the new

water supply system. The plan, which shall include, but not be limited to: (1) functional design drawings; (2) an installation and implementation schedule, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and the Commission, the Licensee shall implement the auxiliary water supply modification plan.

4. T.W. Sullivan Powerhouse Runner Replacements (Proposed Article 5)

The Licensee shall replace runners in Units 1-7 and 10-12 at the T.W. Sullivan Powerhouse at a rate of two per year, unless otherwise agreed to after consultation with the FTC and with the approval of the appropriate Fish Agencies pursuant to Article 1. The Licensee shall index/efficiency test replaced runners. If the Licensee installs a runner design of significantly different design than that installed in Unit 8, Licensee shall, after consultation with the FTC pursuant to Article 1, conduct mortality testing, within 1 year of replacement and prior to additional unit replacements using such runner design.

5. T. W. Sullivan Powerhouse Operational Plan (Proposed Article 6)

Within six months of the effective date of the License, the Licensee shall implement an operational plan for the T.W. Sullivan Powerhouse. Within three months of the effective date of the License, the Licensee shall file a T.W. Sullivan Powerhouse operational plan with the Commission. The plan shall provide for: (1) accomplishing necessary unit shutdowns to minimize adverse effects on forebay hydraulics; (2) procedures governing maintenance shutdowns of Unit 13 and of the T.W. Sullivan Powerhouse when fish protection devices are not functioning or if Unit 1 is offline for more than 24 hours during salmonid upstream migration periods; (3) operation of the auxiliary water supply for entrance #1 of the fish ladder; (4) operating units with replacement runners within 1% of peak efficiency based on index/efficiency testing provided, however, that when forebay fish guidance efficiency is at least 95% for salmonid smolts, the Licensee may request a change or end to this operating condition, subject to consultation with the FTC and with the approval of the appropriate Fish Agencies; (5) operating existing runners within 1% of peak efficiency based on manufacturers' curves for the existing units, provided, however, that when forebay fish guidance efficiency is at least 95% for salmonid smolts, the Licensee may request a change or end to this operating condition, subject to consultation with the FTC and with the approval of the appropriate Fish Agencies. Consultation pursuant to items (4) and (5) of this Article will consider available information on smolts, fry, and juvenile Pacific lamprey, including necessary levels of protection, in addition to runner operation and performance information. The plan will be amended to include: (1) operating the siphon bypass to provide a flow of up to 500 cfs; and (2) coordination of T.W. Sullivan Powerhouse and siphon bypass operation with operation of the controlled flow structure at the apex of the falls in accordance with the concepts described in Appendix C of the Relicensing Implementation Plan, when these facilities have been completed. The operational plan, and any amendments, shall be

developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and the Commission, the Licensee shall implement the operational plan.

6. Willamette Falls Dam Flashboard Removal (Proposed Article 8)

No later than October 1 of each year prior to the start of construction of the controlled flow structure pursuant to Article 9, the Licensee shall remove approximately 150 feet of flashboards at the apex of Willamette Falls to focus flow there and provide a better downstream passage route for fish passing over the falls.

7. Willamette Falls Dam Controlled Flow Structure (Proposed Article 9)

(a) The Licensee shall construct and operate a controlled flow structure at the apex of Willamette Falls to pass a flow of up to 15,000 cfs. Not later than March 1, 2006, the Licensee shall file with the Commission a plan for a controlled flow structure designed to pass a flow of up to 15,000 cfs, unless final design evaluations require a modification of this flow. The design of the controlled flow structure, which shall include, but not be limited to: (1) functional design drawings; (2) an installation and implementation schedule providing for completion by October 31, 2007, shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and the Commission, the Licensee shall construct the controlled flow structure design.

(b) The Licensee shall develop and implement a multi-year study to evaluate impact of the controlled flow structure on fish passage. The study, which shall be initiated upon completion of the controlled flow structure pursuant to paragraph (a) of this Article, shall evaluate (i) mortality and injury to spring Chinook and steelhead smolts and, to the extent technically feasible, juvenile Pacific lamprey, passing through the controlled flow structure; (ii) the condition of downstream migrant steelhead kelts, adult salmonids classified as fallback, and adult Pacific lamprey at the controlled flow structure; (iii) whether the controlled flow structure is adversely affecting adult salmonid attraction to the fish ladder entrances; and (iv) the impacts on water quality from the operation of the controlled flow structure. The study plan shall provide for the filing of a final report with the Commission upon completion of at least three years of study, as well as the filing of interim reports summarizing the results of each year's study. Not less than six months prior to the scheduled completion date of the controlled flow structure, the Licensee shall file the study plan for this study with the Commission. The study plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the study plan.

(c) The Licensee shall file reports with the Commission of the results of the study,

approved pursuant to paragraph (b) of this Article, on the impact of the controlled flow structure on fish passage. The Licensee shall file a final report not later than December 31, 2010, and interim reports by December 31 of each year during the conduct of the study. The reports shall be developed in consultation with the FTC pursuant to Article 1. If downstream smolt passage survival has not achieved the standard of at least 97% provided in Article 2(c), the interim report shall include plans to further improve the downstream landing area of the controlled flow structure. If the downstream fish passage survival rate has not achieved the standards specified in Article 2(c) and Table 2 of Article 2, the final report shall include plans to further improve the effectiveness of the controlled flow structure by implementing additional measures as agreed upon in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the recommendations in the report

8. Willamette Falls Dam Controlled Flow Structure Operational Plan (Proposed Article 10)

The Licensee shall operate the controlled flow structure to focus flow not passing through the T.W. Sullivan Powerhouse consistently with Appendix 3 of the Relicensing Implementation Plan to provide safe, timely and effective downstream passage for fish passing over the falls. Within six months of completion of the controlled flow structure, the Licensee shall file with the Commission an amendment to the T.W. Sullivan Powerhouse Operational Plan. The amended operational plan shall provide for operating the controlled flow structure to focus flow that does not pass through the T.W. Sullivan Powerhouse through the controlled flow structure consistently with Appendix 3 of the Relicensing Implementation Plan to provide safe, timely and effective downstream passage for fish passing over the falls. The plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the controlled flow structure operating plan.

9. Fish Ladder Operation and Maintenance (Proposed Article 12)

(a) Within six months of the effective date of the License, taking into account appropriate in-water work periods, the Licensee shall complete the following O&M backlog items on the fish ladder owned by the ODFW at Willamette Falls: (i) repair or replace the forebay level transducer; (ii) replace the weir support on the Obermeyer weir that has broken off; (iii) replace side seals on the Obermeyer weir and reattach restraining straps; and (iv) install a new heater on the Obermeyer weir to prevent freezing on the end plates. Within six months of completion of these items, the Licensee shall file a report with the Commission documenting such completion. The report shall be prepared after consultation with the FTC pursuant to Article 1.

(b) Within twelve months of the effective date of the License, taking into account appropriate in-water work periods, Licensee shall initiate a program to complete, within three years of the effective date of the License, diffuser grate cleaning and removal of debris from diffuser chambers in all the fish ladder legs and pool 48 of the fish ladder and repair fishway joints on all three fish ladder legs, unless ODFW has obtained outside funding for these items, in which case Licensee shall have no obligation to perform these items, but shall instead contribute $100,000 as a matching grant to conduct Pacific lamprey research in the Willamette River Basin. This amount shall be subject to escalation from the Effective date of the January 2004 Settlement Agreement as provided in Section II.B.4 of the Relicensing Implementation Plan. In the case of partial agency funding for these two items, PGE will be responsible to perform or fund the remaining tasks, and contribute $0.50 in matching funds, not to exceed $100,000, for the Pacific lamprey research for every dollar that the agencies put toward these backlog items.

(c) Within six months of the effective date of the License, the Licensee shall assume responsibility for labor and necessary repair or replacement of equipment, to perform (i) all annual O&M tasks directly associated with fish ladder operation, other than those tasks specifically identified in Appendix 2 of the Relicensing Implementation Plan as the responsibility of ODFW, (ii) debris removal at the fish ladder sluiceway adjacent to the Willamette Falls fish ladder, (iii) lubricating the gate stem for auxiliary water discharge at ladder entrance #1 and gate stems for the two exit gates on the 67-foot deck; (iv) cleaning out the level sensor stilling wells at entrances #2 and #3; (v) cleaning out debris at the auxiliary water channels at all three entrances; and (vi) exercising all equipment each month as listed on the exercise log.

(d) If feasible, the Licensee shall extend the log boom upstream of the T.W. Sullivan Powerhouse to reduce the amount of debris near the fish ladder exit. Within two months of the effective date of the License, the Licensee shall (i) determine if it is feasible to extend the log boom in the T.W. Sullivan Powerhouse pre-forebay to reduce the amount of debris that accumulates at the fish ladder sluiceway, and (ii) if such extension of the log boom is feasible, file a plan to extend the log boom with the Commission. The plan, which shall include (1) functional design drawings; and (2) an installation and implementation schedule providing for completion by December 31, 2005, shall be prepared after consultation with the FTC pursuant to Article 1.

(e) Within six months of completion of the report filed pursuant to paragraph (d) of Article 15, the Licensee shall file with the Commission a plan to modify the Willamette Falls fishway as recommended in results provided by the lamprey research expert pursuant to paragraphs (c) and (d) of Article 15. If a plan is required, it shall include (1) functional design drawings; and (2) an installation and implementation schedule and shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the fish ladder modification plan.

(f) Within six months of the effective date of the License, the Licensee shall file with the Commission a plan to modify entrance # 1 of the Willamette Falls fish ladder, based on the ability of the entrance to meet NMFS criteria for ladder entrances, including but not limited to: (i) fishway entrance head; (ii) entrance width; (iii) installation of staff gages; (iv) use of non-corrosive, vertically-oriented flat-bar grate diffusers with maximum 1-inch clear opening; and (v) a maximum auxiliary water supply velocity less than 1 fps for vertical diffusers and 0.5 fps for horizontal diffusers. The plan shall include (1) functional design drawings; and (2) an installation and implementation schedule and shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the fishway entrance modification plan.

10. <u>Fish Ladder Operation and Maintenance Plan (Proposed Article 13)</u>

Within six months of the effective date of the License, the Licensee shall file a fish ladder operating plan with the Commission. The plan (i) shall provide for the Licensee to operate the fish ladder at Willamette Falls as provided in Article 12, and (ii) shall contain appropriate tracking and reporting mechanisms to determine if specific changes are needed in the annual operating plan to ensure proper fish ladder operation. The plan shall also provide that debris removal at the sluiceway adjacent to the Willamette Falls Fish Ladder shall be consistent with an operational plan that takes into account debris loading in the river, PGE debris removal activities at T.W. Sullivan Powerhouse, and downstream migrant behavior, abundance and timing. The plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the plan.

APPENDIX C

U.S. Fish and Wildlife Service
Section 18 Fishway Prescriptions

The fishway prescriptions are identical to Proposed Articles 2 through 6, Proposed Articles 8 through 13, and Proposed Articles 15 and 16 of Exhibit A of the Settlement Agreement. These Proposed Articles are the same as those prescribed by NMFS (Appendix B) with the addition of Proposed Articles 11, 15, and 16. For ease of reference, we include the numbering system used in the Settlement Agreement.

1. Avian Predation Deterrents (Proposed Article 11)

The Licensee shall implement measures to reduce the potential for avian predation on downstream migrants that pass the Project over the Falls. Not later than March 1, 2006, the Licensee shall file with the Commission a plan for reducing the potential for avian predation on downstream migrants that pass the Project over the Falls. The plan shall include (1) provisions for wire or other effective avian deterrent technology at the downstream end of the horseshoe of the Falls in areas where avian predation activity has been observed, (2) functional design drawings; and (3) an installation and implementation schedule providing for completion by December 31, 2006. The plan shall be developed in consultation with the FTC pursuant to Article 1. Upon approval by the appropriate Fish Agencies and filing with the Commission, the Licensee shall implement the avian deterrent plan.

2. Adult Pacific Lamprey Program (Proposed Article 15)

(a) When flashboards are installed at the Falls, the Licensee shall initially install a minimum of two lamprey passage ramps, and notch the flashboards, to provide flows for upstream lamprey passage in those areas where lamprey are known to congregate. The Licensee shall assess the effectiveness of the lamprey ramps during the Pacific lamprey research project conducted pursuant to paragraph (c) of this Article, and shall, in consultation with the FTC and with the approval of the appropriate Fish Agencies pursuant to Article 1, modify the number, placement and design of the lamprey ramps, if the results of the research project indicate that such actions are appropriate.

(b) The Licensee shall salvage stranded Pacific lamprey in accordance with the Standing Management Plan, and shall release salvaged adult Pacific lamprey above or below the Falls as directed by ODFW and USFWS, after consultation with the FTC pursuant to Article 1.

(c) Within six months of the effective date of the License, the Licensee shall fund a research study of at least two years duration on Pacific lamprey passage and behavior

consistent with the scope and objectives identified in Appendix 4 to the Relicensing Implementation Plan. General research objectives and approaches will be developed in consultation with the FTC, and the research program will be conducted by a lamprey expert mutually acceptable to the Licensee and the FTC. The specific scope of work for the lamprey research study will be developed by the Licensee and lamprey expert, in consultation with the FTC pursuant to Article 1, and shall be filed with the Commission before the research study is initiated. Upon approvals by the appropriate Fish Agencies, the Licensee shall implement the study plan. Upon Commission approval, the plan shall become a requirement of the License.

(d) Within six months of completion of the lamprey research study conducted pursuant to paragraph (c) of this Article, the Licensee shall file with the Commission a report which discusses whether there is a need for modifications to the dam, flashboards, siphon bypass, fish ladder, and controlled flow structure. The report, which shall include (1) functional design drawings; and (2) an installation and implementation schedule, if there is a need for such modifications, shall be prepared in consultation with the FTC pursuant to Article 1. Upon approvals by the appropriate Fish Agencies, the Licensee shall implement the report. Upon Commission approval, the report shall become a requirement of the License.

3. Juvenile Pacific Lamprey Program (Proposed Article 16)

(a) If the necessary field research technology becomes available and is applicable to conditions existing at the Project, the Licensee shall develop and implement a juvenile Pacific lamprey study program (i) to estimate Pacific lamprey guidance efficiency through the T.W. Sullivan Powerhouse after implementation of the Tier 2 siphon bypass measure; (ii) to estimate the potential impact of the T.W. Sullivan Powerhouse to juvenile Pacific lamprey based on guidance efficiency and turbine mortality estimates after implementation of Tier 2 measures; and (iii) to determine additional improvements to passage conditions using the information gained through the above estimates and other relevant information. The study plan, which may be part of the study of fish guidance efficiency, mortality and injury conducted pursuant to paragraph (b) of Article 4, shall be developed in consultation with the FTC and with the approval of the appropriate Fish Agencies. Upon approvals by the appropriate Fish Agencies, the Licensee shall implement the plan. Upon Commission approval, the plan shall become a requirement of the License.

(b) Within six months of the completion of the study conducted pursuant to paragraph (a) of this Article, the Licensee shall file with the Commission a report of the study results. If the study indicates that modifications to the Project are required to achieve safe passage of juvenile Pacific lamprey through the Project, the report shall include plans to modify the Project accordingly. The report shall be developed in consultation with the FTC pursuant to Article 1. Upon approvals by the appropriate Fish Agencies,

the Licensee shall implement the plan. Upon Commission approval, the plan shall become a requirement of the License.

APPENDIX D

National Marine Fisheries Service
Endangered Species Act
Reasonable and Prudent Measures and Terms and Conditions

Filed June 30, 2005

Reasonable and Prudent Measures (Section 9.2 of the Biological Opinion)

1. Minimize the likelihood of incidental take from construction activities by applying conditions that avoid or minimize adverse effects to aquatic systems.

2. Minimize the likelihood of incidental take from construction activities by monitoring and reporting on the effectiveness of construction conditions required by RPM #1 to NMFS.

3. Minimize the likelihood of incidental take from salvage of fish stranded below the Falls by applying conditions that avoid or minimize the frequency of salvage and the stress caused by salvage operations.

4. Minimize the likelihood of incidental take from fish monitoring and evaluation by applying conditions that avoid or minimize fish handling stress and losses.

Terms and Conditions (Section 9.3 of the Biological Opinion)

1. To implement RPM #1 (general conditions for construction, operation and maintenance), FERC must ensure that PGE comply with the following:

    a. Pollution and Erosion Control Plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by construction operations. The plan should include the following provisions. Submit an electronic copy of this plan to NMFS for review and approval at least 30 days prior to initiation of construction activities.

        i. Goal. The goal is to avoid or minimize the adverse effects of pollution and erosion by scheduling work when the fewest number of fish are likely to be present, managing likely pollutants, and limiting the harm that may be caused by accidental discharges of pollutants and sediment.
        ii. Responsible party. The name, address, and telephone number of the person responsible for accomplishment of the pollution and erosion control plan.

iii. Minimize sedimentation. Practices that will be used to prevent erosion and sedimentation associated with construction sites, equipment and material storage sites, fueling operations, and staging areas.

iv. In-water work timing. Identify an in-water work schedule during the preferred in-water work period (ODFW 2000), unless otherwise approved in writing by NMFS. For work above the Falls and powerhouse, in-water work is permitted from June 1 through October 31, and from December 1 through January 31. For work below the Falls and in the tailrace, in-water work is permitted from July 1 through October 31, and from December 1 through January 31.

v. Cease work during high flows. Cease project operations under high flow conditions that may inundate the project or construction area, except for efforts to avoid or minimize resource damage.

vi. Concrete, cement, and grout. Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

vii. Construction discharge water. Provide treatment of construction discharge water to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present. 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 within the 2-year floodplain.

viii. Construction debris. Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ix. Hazardous materials. A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

x. Spill containment. A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, a description of quick response containment and cleanup supplies that will be available on the site, including an oil-absorbing, floating boom whenever surface water is present, proposed methods for disposal of spilled materials, and employee training for spill containment.

b. Work area isolation plan. Except for piling installation and construction, including the construction work-island, of the new tailrace hydraulic training wall,[29] completed in compliance with all other relevant terms and conditions, a

[29] These specified construction activities may occur without work area isolation, provided all other relevant terms and conditions are met.

work area isolation plan must be prepared and carried out for any construction activity that requires work below ordinary high water where adult or juvenile fish are reasonably certain to be present, unless otherwise approved in writing by NMFS. The work area isolation plan must contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations. Submit an electronic copy of this plan for review by NMFS at least 30 days prior to initiating construction activities.

i. Goal. The goal is to minimize the adverse effects of erosion and other types of pollution by removing flowing water and fish from the work area.
ii. Responsible party. The name and address of the person responsible for meeting each component of the work area isolation plan, including a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish that will be responsible for the capture and release operation.
iii. Flow conditions. An estimate of the range of flows likely to occur during isolation.
iv. Plan view. A plan view of all isolation elements and fish release areas.
v. Equipment and materials list. A list of equipment and materials that are necessary to complete work area isolation, including a fish screen for any pump used to dewater the isolation area, and that will be available on site to provide appropriate redundancy of key plan functions (e.g., operational, properly-sized, back-up pumps and generators).
vi. Sequence and schedule. The sequence and schedule of dewatering and rewatering activities.

c. Capture and release. Before and 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.

i. Do not use electrofishing if water temperatures exceed 18°C, or are expected to rise above 18°C, unless no other method of capture is available.
ii. If electrofishing equipment is used to capture fish, comply with NMFS's electrofishing guidelines.[30]

[30] NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act (June 2000) (http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf).

iii. Handle ESA-listed fish 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.
iv. Ensure water quality conditions are adequate in buckets or tanks used to transport fish by providing circulation of clean, cold water, using aerators to provide dissolved oxygen, and minimizing holding times.
v. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.
vi. Do not transfer ESA-listed fish to anyone except NMFS personnel, unless otherwise approved in writing by NMFS.
vii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.
viii. Allow NMFS or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.
ix. Submit an electronic copy of the capture and release records to NMFS within 10 calendar days of completion of the salvage operation.

d. Heavy equipment and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows:

i. 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.
ii. Vehicle maintenance and cleaning, refueling of vehicles, and storage of fuels shall be done at least 150 ft from the waterway, provided, however, that cranes and other semi-mobile equipment may be refueled in place.
iii. Inspect all vehicles and other stationary power equipment operated within 150 ft of any stream, waterbody 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.
iv. Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.
v. Diaper all stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 ft of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

vi. All equipment and material that is held on barges or on-site within 150 ft of any stream, waterbody or wetland must be handled, transported, and maintained according to procedures in the Pollution and Erosion Control Plan required in RPM #1a, as described above.

e. Piling installation. Hollow steel piling 24 inches in diameter or smaller and H-pile designated as HP24 or smaller may be installed below ordinary high water as follows.

i. Minimize the number and diameter of pilings, as feasible.
ii. Repairs, upgrades, and replacement of existing pilings consistent with these terms and conditions are allowed. In addition, up to five single pilings or one dolphin consisting of three to five pilings may be added to an existing facility per in-water construction period.
iii. Use of an auger for piling installation requires a casing to prevent augered material from entering river. The augered sediments must be brought to the surface and placed on the barge, and the water from within the casing must be pumped to tanks on the barge for sedimentation and pollution control. Steel columns must be grouted in place prior to removing casing.

f. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer, whenever feasible.
ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.
iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3-ft below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.
iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

g. Fish passage. Safe passage around or through the construction area must be provided for any adult and juvenile salmon or steelhead species present during construction, or as otherwise approved in writing by NMFS. Activities which would not permit safe passage around or through the construction area must be identified in the design package, work area isolation plan, or Pollution and Erosion Control Plan, all of which must be submitted to NMFS for approval.

2. To implement RPM #2 (construction monitoring), FERC must ensure that PGE comply with the following:

    a. Implementation monitoring. In years when in-water construction activities occur, submit a year-end monitoring report to confirm that the objective of minimizing take from construction activities is met. Each annual monitoring report will include the following information.

        i. Project identification
            (1) Applicant name, permit number, and project name.
            (2) Type of activity.
            (3) Project location, by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
            (4) Starting and ending dates for work completed.
        ii. Photo documentation. Photos of the construction sites, before, during, and after construction completion.
            (1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
            (2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

    b. NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NMFS Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

3. To implement RPM #3 (fish salvage operations), FERC must ensure that PGE comply with the following:

    a. PGE must obtain NMFS' review and approval of each salvage plan through the FTC process prior to initiating any salvage-related activities below the Falls covered by this Incidental Take Statement. The plans must identify annual anticipated take levels.
    b. PGE must follow procedures and requirements of the Stranding Management Program, described in Section V.B. of Exhibit B, "Relicensing Implementation Plan," of the Settlement Agreement (PGE 2004a).

4. To implement RPM #4 (research-related activities), FERC must ensure that PGE

comply with the following:

a. PGE must obtain NMFS' review and approval of monitoring and evaluation plans through the FTC process prior to initiating any research-related activities covered by this Incidental Take Statement. The plans must identify annual anticipated take levels.
b. Listed species must be taken only at the levels, by the means, in the areas, and for the purposes stated in each specific monitoring or evaluation proposal, approved by NMFS, and according to the terms and conditions of this RPM.
c. Workers must not intentionally kill or cause to be killed any listed species unless a specific monitoring or evaluation proposal, approved by NMFS, specifically allows intentional lethal take.
d. Workers must handle listed fish with extreme care and keep them in cold water to the maximum extent possible during sampling and processing procedures. When fish are transferred or held, a healthy environment must be provided; e.g., the holding units must contain adequate amounts of well-circulated water. When using gear that captures a mix of species, the permit holder must process listed fish first to minimize handling stress.
e. Workers must stop handling listed juvenile fish if the water temperature exceeds 70 degrees Fahrenheit at the capture site. Under these conditions, listed fish may only be visually identified and counted.
f. If workers anesthetize listed fish to avoid injuring or killing them during handling, the fish must be allowed to recover before being released. Fish that are only counted must remain in water and not be anesthetized.
g. Workers must use a sterilized needle for each individual injection when PIT-tags are inserted into listed fish.
h. If workers incidentally capture any listed adult fish while sampling for juveniles, the adult fish must be released without further handling and such take must be reported.
i. If backpack electrofishing methods are used, workers must comply with NMFS' Guidelines for Electrofishing (NMFS 2000c) available at http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf
j. PGE must obtain approval from NMFS before changing sampling locations or research protocols.
k. PGE must notify NMFS as soon as possible but no later than two days after any authorized level of take is exceeded or if such an event is likely. The permit holder must submit a written report detailing why the authorized take level was exceeded or is likely to be exceeded.
l. PGE is responsible for any biological samples collected from listed species as long as they are used for research purposes. PGE may not transfer biological samples to anyone not listed in the application without prior written approval from NMFS.
m. The person(s) actually doing the research must have a copy of this Incidental

Take Statement while conducting the authorized activities.

n. PGE must allow any NMFS employee or representative to accompany field personnel while they conduct the research activities.
o. PGE must allow any NMFS employee or representative to inspect any records or facilities related to the permit activities.
p. PGE may not transfer or assign this Incidental Take Statement to any other person as defined in Section 3(12) of the ESA. This Statement ceases to be in effect if transferred or assigned to any other person without NMFS' authorization.
q. NMFS may amend the research provisions of this Incidental Take Statement after giving PGE reasonable notice of the amendment.
r. PGE must obtain all other Federal, state, and local permits/authorizations needed for the research activities.
s. On or before January 31 of every year, PGE must submit to NMFS a post-season report in the attached form describing the research activities, the number of listed fish taken and the location, the type of take, the number of fish intentionally killed and unintentionally killed, the take dates, and a brief summary of the research results. Falsifying annual reports or records is a violation of this Incidental Take Statement. NMFS will monitor the actual number of listed fish taken annually in research activities and shall adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels rise to the point where they are detrimental to the listed species.
t. If PGE violates any permit term or condition they will be subject to any and all penalties provided by the ESA. NMFS may revoke this Incidental Take Statement if the authorized activities are not conducted in compliance with the RPMs and the requirements of the ESA or if NMFS determines that its ESA Section 10(d) findings are no longer valid.

APPENDIX E

Relicensing Implementation Plan

Attached to the Settlement Agreement
As Exhibit B

Filed February 2, 2004

TABLE OF CONTENTS

Attachments:

1. Evaluation Summaries
2. O&M Task List at Willamette Falls Fish Ladder
3. Willamette Falls Controlled Flow Structure Design Process and Proposed Operation
4. Adult Pacific Lamprey Passage Plan
5. Comprehensive List of Fishery Resource Measures by Structure
6. Implementation Timeline

I. Introduction and Purpose

Portland General Electric Company ("PGE" or "Licensee"), the licensee for the Willamette Falls Hydroelectric Project, FERC Project No. 2233 (the "Project"), is applying to the Federal Energy Regulatory Commission ("FERC") for a new license for the Project. The current license for the Project will expire on December 31, 2004.

PGE and licensing participants have been engaged in settlement discussions related to the package of measures to be implemented at PGE's Willamette Falls Hydroelectric Project (FERC No. 2233) for fishery resources. PGE made a supplemental filing to FERC on August 28, 2003, submitting a description of the preferred alternative resulting from the settlement discussions. In that filing, PGE noted that the development of an implementation plan was an important next step to complete, and that the implementation plan would be part of the eventual offer of settlement to be submitted to FERC by the end of 2003.

These efforts were successful, and this Relicensing Implementation Plan (Implementation Plan) has been developed pursuant to the Settlement Agreement and attachments, which has been signed by 13 parties ("Parties"). The Settlement Agreement describes the legal context and regulatory authorities and related obligations of each of the Parties. The Settlement Agreement establishes PGE's obligation to file the Settlement Agreement and other associated documents with FERC, and requires that PGE shall implement the Settlement Agreement according to the specific methodology contained in this Implementation Plan and New License. This Appendix is the implementation plan for the Settlement Agreement regarding relicensing of the Willamette Falls Hydroelectric Project.

This Implementation Plan has been approved by each of the parties to the Settlement Agreement. Unless otherwise noted herein, all of the actions identified in this Implementation Plan will be undertaken by PGE at its sole expense and responsibility. Unless otherwise noted, PGE shall fund and implement all aspects of Project operation and implementation, including but not limited to, all engineering, environmental assessment, permitting, construction, and mitigation activities in accordance with this Implementation Plan, the Settlement Agreement, and the New License.

The implementation sheets for each of the fishery measures provide specific implementation information associated with each measure, including a brief purpose and summary discussion, a schedule for implementation, associated study plan outlines, and specific requirements related to additional interaction with the Parties.

Implementation sheets are grouped by project structure (T.W. Sullivan Powerhouse, BHPC Powerhouse, and Dam at Willamette Falls). The implementation sheets describe

how each measure will be implemented. Implementation sheets are provided for measures involving a specific, one time action (i.e., installation of a new structure) as well as for measures involving an ongoing or multi-year program (i.e., an evaluation/research effort, operating plans, etc).]

II. Definitions and General Provisions

A. Definitions

Throughout this Appendix, the following terms and their meaning apply:

TERM	MEANING
Licensee or PGE	Portland General Electric Company (PGE)
Parties	Signatories to the Settlement Agreement
Fish Agencies	ODFW, NOAA Fisheries (NMFS), and USFWS
FTC	Fish Technical Committee

B. General Provisions

The following provisions apply to all aspects of the Implementation Plan.

1. Consultation

The Settlement Agreement and the New License will be implemented on an ongoing basis in consultation with the Fish Technical Committee. Through this consultation, PGE and the FTC will make a good faith effort to reach consensus on decisions that need to be made associated with the measures contained in this Implementation Plan. Some decisions may require more formal approval by specific members of the committee (e.g., review and approval of facility design drawings by the USFWS and NOAA Fisheries). Specific notice, reporting, consultation, and approval requirements are identified throughout this Implementation Plan. As described in more detail below, this Implementation Plan incorporates four types of consultation: reporting, consultation with the FTC, consultation with the FTC and approval by the Fish Agencies, and Time-Critical Consultation. Approval by the Fish Agencies may include all or some of the Fish Agencies listed above depending upon state and federal laws and regulations. Additionally, nothing in this Implementation Plan is intended or shall be construed to (i) affect or limit any agency or tribe from complying with its obligations under applicable laws and regulations or from considering comments received in any environmental review or regulatory process related to the process; or (ii) expand the authority of any agency or tribe to confer any authority or jurisdiction where such authority or jurisdiction does not already exist under applicable law and regulations.

Report to FTC. Where "Report to FTC" is specified, PGE shall describe its agreed-upon implementation of the requirements of the new license or the Implementation Plan. In most cases, this will involve reports of construction progress or interim reports on study progress. PGE shall prepare a quarterly report to be provided to the FTC 30 days in advance of its next regularly scheduled quarterly meeting. The FTC will review the report and discuss it at that quarterly meeting. If a FTC member believes that the report indicates that PGE is not complying with the requirements of the new license or Implementation Plan, it can refer the matter to dispute resolution in accordance with the Settlement Agreement.

Consultation with the FTC. Where "Consultation with the FTC" is specified, PGE shall prepare written draft materials for formal review and comment by the FTC. FTC members will have at least 30 days to provide written comments, and PGE shall incorporate those comments into the written materials, modifying them to respond to the comments, or indicating why the comments were not accepted. A final version of the materials will be provided to the FTC and, where required by the terms of the new license, to FERC for its approval. If a FTC member believes that the report, as filed, does not satisfy the requirements of the new license or the Implementation Plan, it can refer the matter to dispute resolution in accordance with the Settlement Agreement.

Consultation with the FTC and Approval by the Fish Agencies. Where "Consultation with the FTC and Approval by the Fish Agencies" is specified, PGE shall prepare written draft materials for formal review and comment by the FTC. FTC members – other than the Fish Agencies – will have at least 30 days to provide written comments, and PGE shall incorporate those comments into the written materials, modifying them to respond to the comments, or indicating why the comments were not accepted. In addition, the Fish Agencies will have an opportunity to provide a formal approval (or disapproval) of the materials submitted. A final version of the materials will be provided to the FTC and, where required by the terms of the new license, to FERC for its approval. If PGE, or another FTC member, believes that an agency approval or lack thereof, is inconsistent with the requirements of the new license or the Implementation Plan, it can refer the matter to dispute resolution in accordance with the Settlement Agreement.

Time-Critical Consultation. Where "Time-Critical Consultation" is specified, PGE shall provide email, or phone, notice to the FTC that a particular matter requires an immediate decision by the Fish Agencies. The notice will indicate when and where the consultation will take place and the nature of the approval PGE shall seek from the Fish Agencies. PGE shall implement the action approved by the Fish Agencies. In the event that no Fish Agency is able to participate in the consultation, PGE shall take such action, as it deems appropriate. Due to the time-critical nature of the action being implemented, there will be no opportunity to seek dispute resolution prior to implementation of the specific action that is the subject of the time-critical consultation. However, if an FTC

member believes that the action being implemented does not satisfy the requirements of the new license or the Implementation Plan, it can refer the matter to dispute resolution in accordance with the Settlement Agreement, the result of which may be applied if another time-critical consultation on this matter is required.

2. FERC Reporting Requirements

FERC Part 12 safety regulations impose reporting and approval requirements on licensees undertaking construction projects at licensed projects. These would be in addition to the consultation required pursuant to the new license and Implementation Plan.

3. Study Plans

The Evaluation summaries contained in Attachment 1 of this Appendix, and referenced in the individual implementation sheets, are intended to provide guidance to PGE and the FTC in the development of study plans. Study outlines and plans will include reporting requirements, consistent with section B.4. below, unless FTC consultation determines otherwise.

- PGE shall issue a study plan outline to the FTC no later than 180 days prior to the scheduled start of the study. The FTC will have 45 days to provide comments on the outline.

- PGE shall issue a draft study plan to the FTC for review within 30 days of the close of comments on the study plan outline.

- The FTC will have 45 days to provide comments on the draft study plan.

- PGE shall issue a final study plan not less than 30 days before the expected start of the study.

- Any FTC member that believes a final study plan is inconsistent with the new license or the Implementation Plan may initiate dispute resolution in accordance with the Settlement Agreement within 30 days of receipt of the final study plan.

4. Reports

- PGE shall distribute draft reports to the FTC for review and comment within 90 days of data collection completion. For studies involving multiple years of data collection, an interim report will be issued within 90 days of completion of data collection each year. Upon conclusion of the final year of data collection, a draft

report will be prepared synthesizing the interim reports and any final data collection.

- The FTC will have 45 days to provide comments on the draft report.

- PGE shall issue a final report within 30 days after the comment period. If further discussion or field activity is necessary based upon the comments, the FTC may extend this 30 day period. The final report will respond to any comments provided by the FTC.

5. Meetings and Notices

- The FTC will meet at least every quarter, with monthly meetings being appropriate during early stages of the implementation plan (i.e., through completion of Tier 2 measures).

- Meetings will be scheduled at least 30-days in advance with notice and an agenda provided to FTC members by PGE, provided however, that monthly meetings may be scheduled with at least 2 weeks notice.

- A meeting of the FTC can be scheduled with less than 30-days notice if necessary to deal with an emergency or a rapidly developing situation that requires more immediate discussion.

6. Cost Adjustments

The costs or payment amounts specified in dollars, listed below, shall be deemed to be stated as of the Effective Date of the Settlement Agreement, and the Licensee shall escalate such sums as of January 1 of each year following the Effective Date of the Settlement Agreement according to the following formula:

$$AD = D \times \frac{NGDP}{IGDP}$$

WHERE:

AD = Adjusted dollar amount as of January 1 of the year in which the adjustment is made.

D = Dollar amount prior to adjustment.

IGDP = GDP-IPD for the third quarter of the year before the previous adjustment date (or, in the case of the first adjustment, the third quarter of the year before the Effective Date).

NGDP= GDP-IPD for the third quarter of the year before the adjustment date.

"GDP-IPD" is the value published for the Gross Domestic Product Implicit Price Deflator by the U.S. Department of Commerce, Bureau of Economic Analysis in the publication Survey of Current Business, Table 7.1 (being on the basis of 1987 = 100), in the third month following the end of the applicable quarter. If that index ceases to be published, any reasonably equivalent index published by the Bureau of Economic Analysis may be substituted by the agreement of the Parties and the Licensee. If the base year for GDP-IPD is changed or if publication of the index is discontinued, the Licensees shall promptly make adjustments or, if necessary, select an appropriate alternative index acceptable to the Parties to achieve the same economic effect.

Specific costs and payments subject to the above are:

4. The "$5,000 per year" accrued for egress channel physical modifications at Willamette Falls, per section V.B. Action 2.1 below;

5. The "up to $80,000" for the correction of the Wet Hole stranding/egress problem at Willamette Falls, per section IV.C.4 below; and

6. The $100,000 in matching funds to conduct lamprey research per section V.A.1.(3) below.

III. Performance Standards and Goals

A. Performance Standards

1. Downstream Passage of Salmonids

a. Juvenile Salmonid Passage through the T.W. Sullivan Powerhouse

Table 1 sets out the performance standard levels for downstream passage of juvenile salmonids at the T.W. Sullivan powerhouse within the Willamette Falls Project. Also listed in Table 1 is the corresponding tier of management actions to be taken as determined by the level of performance standard achieved. A comprehensive list of measures referred to in Table 1 is provided in Attachment 5 of this Appendix.

Table 3. Performance standards for juvenile salmonid downstream passage at the T.W. Sullivan powerhouse.[31]

[31] The top row of Table 1 provides downstream passage performance standards that, if met, mean that no further measures are required by the licensee. The second row provides mortality/injury ranges that mean additional work provided in tier 2 is needed to reduce injury/mortality. The third row provides mortality/injury ranges that, if exceeded, mean actions listed in Tiers 3 and 4 are needed, as appropriate.

Smolts > 60 mm in Length		Fry < 60 mm in Length		Actions, to include both PM&E Measures and Monitoring and Evaluation listed in Section IV.
Mortality	**Injury**	**Mortality**	**Injury**	
Design performance objective ≤ 0.5 % mortality	Design performance objective ≤ 2 % injury	Design performance objective ≤ 2 % mortality	Design performance objective ≤ 4 % injury	Objective met. No further measures required
Actual mortality > 0.5 % but ≤ 2 % would require additional work to lessen mortality	Actual injury > 2 % but ≤ 4 % would require additional work to lessen injuries	Actual mortality > 2 % but ≤ 4 % would require additional work to lessen mortality	Actual injury > 4 % but ≤ 6 % would require additional work to lessen injuries	• Tier 1 and Tier 2 actions implemented per schedule.
Actual mortality > 2 % would require major operational or structural changes	Actual injury > 4 % would require major operational or structural changes	Actual mortality > 4 % would require major operational or structural changes	Actual injury > 6 % would require major operational or structural changes	• Tier 3 actions implemented as needed and meaningful to improve performance. • Tier 4 actions implemented if performance after Tier 3 items is not satisfactory.

The measures listed in Attachment 5 are categorized into four tiers according to planned timing of implementation and which level of performance standard is being addressed. Tier 1 measures are to be completed prior to new license issuance. No performance testing is planned after Tier 1 measures.

Tier 2 measures are to be completed after new license issuance. At the T.W. Sullivan powerhouse, measurement of downstream passage performance for evaluation using the standards listed in Table 1 will be initiated after installation of the bypass siphon, the earliest Tier 2 measure (see Attachment 5). Remaining Tier 2 items will be implemented with associated performance measurement according to the timeline in Attachment 6. If

measured performance meets the second level of performance standards specified in Table 1 after Tier 2 items are implemented, no Tier 3 measures are required. Additional minor improvements, designed to achieve further measurable mortality reduction, will still be pursued while the second level of performance standards continues to be met.

If measured performance does not meet the second level of performance standards specified in the Table 1 after Tier 2 measures performance testing is completed (no later than 2009 unless agreed to by the FTC), Tier 3 measures will be initiated with appropriate and agreed-to performance testing. Performance of Tier 2 measures will guide the Tier 3 implementation (for example, if no fish are passing Unit 12 after Tier 2 measures, installing an Eicher screen in Unit 12 would not improve downstream survival).

If measured performance still does not meet the second-level performance standards specified in Table 1 after Tier 3 implementation, Tier 4 would be initiated (no later than 2015 unless agreed to by the FTC) depending on measures identified and implemented under Tier 3.

b. Juvenile Salmonid Smolt Passage through the Controlled Flow Structure

PGE shall design and operate the controlled flow structure to achieve at least a 97% survival standard for juvenile salmonid smolts passing the Project via the controlled flow structure. This standard is based on results of juvenile fish survival studies conducted at spillways at mainstem Columbia River dams.

2. <u>Downstream Passage Standards for Juvenile Pacific Lamprey</u>

If a technology-based standard for Pacific lamprey survival and injury avoidance is developed and regionally adopted by the U.S. Fish and Wildlife Service (USFWS) during the term of the new license, PGE shall adopt the standard at the T.W. Sullivan powerhouse and consult with the FTC regarding measures, subject to Fish Agency approval, needed to comply with the standard. When adopted, this standard will supercede the goal set forth in Table 2.

B. Performance Goals

Table 2 sets out the performance goals for upstream and downstream passage of Pacific lamprey and adult salmonid migrants at the Willamette Falls Project.

Table 4. Performance Goals for the passage of Pacific lamprey and adult salmonids at the Willamette Falls Project.

Fish species/lifestage	Type of passage	Performance Goal
Juvenile lamprey	Downstream through the powerhouses	"safe, timely, and effective" qualitative goal without serious injury or mortality
Juvenile lamprey	Downstream over the spillway (cap/Falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality: Assumed adequate when the standard for juvenile salmonid smolts is met at the spillway (≥97% survival), until appropriate technology is developed to assess juvenile lamprey survival over the controlled flow structure.
Adult lamprey	Upstream through the Project area	"safe, timely, and effective" qualitative goal without serious injury or mortality Goal to be further developed through PGE funded study described in Section V.C and Attachment 4
Adult lamprey	Downstream at the T.W. Sullivan powerhouse and at the spillway (cap/Falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality
Adult salmonids	Upstream through the Project area	"safe, timely, and effective" qualitative goal without serious injury or mortality
Steelhead kelts (i.e., post-spawning adults) and fallback (adult salmonids)	Downstream at the T.W. Sullivan powerhouse and at the spillway (cap/Falls)	"safe, timely, and effective" qualitative goal without serious injury or mortality

IV. Implementation Sheets

The following measures, in addition to those described in Sections V. and VI., are Tier 1 and Tier 2 measures directly associated with section III. Performance Standards and Goals. Measurement of performance after these measures are implemented will inform the FTC concerning Tier 3 implementation.

A. TW Sullivan Powerhouse

1. Forebay rack and guidewall hydraulic modifications

Purpose:
Forebay hydraulics will be improved to increase guidance of salmonid smolts, fry and juvenile lamprey to the Unit 13 bypass system, and siphon bypass (when installed)

Summary of Measure:
PGE shall make necessary modifications to Unit 1, 2, 3 forebay trashracks and forebay guidewall, as identified through physical forebay modeling already completed, to improve forebay hydraulic characteristics

PGE shall modify racks and the guidewall in the T.W. Sullivan forebay in accordance with physical forebay modeling done by ENSR in 2002 and 2003. Modifications involve eliminating areas of swirl or velocity changes along the forebay through physical rack changes, additions, and guidewall relocation and extension.

Consultation:
Design: Consultation with FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003	12/31	-Finalize ENSR physical forebay modeling report.
	12/31	-Preliminary designs
	12/31	-Initiate necessary permitting
2004	6/1	-Design, fabrication and permitting completed.
	6/1-12/31	-Construction (In-water work completed by 10/31)
2005	7/1	-File with FERC report of accomplishment/drawings

Post construction study:
None specific to these modifications (Study will be done after siphon bypass installation that will include testing of multiple T.W. Sullivan measures)

2 T.W. Sullivan Siphon Bypass

Purpose:
An additional bypass route will be provided for fish entering the T.W. Sullivan forebay. The siphon bypass will work in conjunction with previous forebay modifications to improve forebay hydraulics and guidance of salmonid smolts, fry and juvenile lamprey, as well as adult salmonids (kelts and fallback) and adult lamprey, away from T.W. Sullivan's turbines. Discharge of the siphon bypass in the tailrace will also eliminate potential aquatic predator habitat along the north tailrace shoreline

Summary of Measure:
PGE shall install and operate an additional downstream migrant bypass route through the siphon spillway, located adjacent to Unit 13, to pass a designed flow of 500 cfs directly from the forebay to the tailrace during powerhouse operation. Actual capacity will be determined through physical modeling in 2004 and associated hydraulic analysis.

Consultation:
Modeling: Consultation with the FTC.
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.
Operational Plan (see item 10.f.)

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Small scale model
-Preliminary design
-Initiate necessary permitting

2005	1/1-3/1	-Design completed
	3/1	-Final design filed with FERC
	3/1-6/1	-Fabrication and permitting completed
	6/1-12/31	-Construction- (In water work completed by 10/31.)

Post-construction study:
See evaluation summary:

1- Downstream Passage Effectiveness of Salmonid Smolts through T.W. Sullivan
2- Downstream Passage Effectiveness of Fry (≤60 mm) through T.W. Sullivan
3- Downstream Passage Effectiveness of Juvenile Pacific lamprey through T.W. Sullivan
4- Downstream Passage Effectiveness for Out-migrant Kelts and Fallback Salmon, Steelhead, and Adult Pacific Lamprey through T.W. Sullivan

3. PIT Tag Interrogator System

Purpose:
Newer technology, and higher flow volume PIT tag interrogator systems on both the Unit 13 bypass outfall chute and the siphon bypass will improve the ability to monitor bypass system performance and out migration fish passage.

Summary of Measure:
PGE shall install new PIT tag interrogator systems at the Unit 13 bypass and siphon bypass to ensure fish passage efficiency can be effectively measured and to guide decisions consistent with the tiered management approach.

For the Unit 13 bypass system, PGE shall add a large area/flow volume PIT tag interrogator to the bypass flow outfall chute. This detection system will be in addition to the PIT detector system currently installed in the bypass system evaluation flow route, allowing detection of PIT-tagged fish in either bypass system mode.

For the siphon bypass, PGE shall install a large area/flow volume PIT tag interrogator (or equivalent technology) in the siphon bypass flow route to allow detection of PIT-tagged fish passing the project via this route.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

Unit 13 Bypass system:

2004	-Preliminary design	
2005	1/1-3/1	-Design completed
	3/1	-Final design filed with FERC
	3/1-6/1	-Fabrication and permitting completed
	6/1-12/31	-Construction/Installation

NOTE: Installation in 2005 based upon a design and technology that will not conflict with the Unit 13 Bypass Outfall Modification (see Implementation Sheet IV.A.7), otherwise it will be installed with the Unit 13 Bypass Outfall Modification in 2006.

Siphon bypass:

2005 -Install with siphon bypass installation if technologically feasible, otherwise when technology allows (need to consult with FTC). (Implementation Sheet IV.A.2).

Post-construction study:
No specific study. Functional and acceptance testing.

4. Forebay Trash Rack Cleaning System

Purpose:
Routinely removing river debris from trashracks within the T.W. Sullivan forebay will help maintain good hydraulic conditions conducive to guidance of fish to the Unit 13 and siphon bypass systems, and reduce potential for adverse effects (i.e. mortality and injury) due to dirty/clogged racks.

Summary of Measure:
PGE shall install and operate a forebay trashrack cleaning system to ensure the forebay trashracks remain free of debris build-up that could adversely affect fish guidance efficiency (FGE) and downstream migrant survival.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Preliminary design
2005 1/1-3/1 -Design completed
3/1 -Final design filed with FERC
3/1-6/1 -Fabrication completed
6/1-12/31 -Construction

Post-construction study:

None. Performance will be measured in conjunction with post siphon bypass evaluation (Implementation Sheet IV.A.2.)

5. Unit 12 and 13 Discharge Flow Hydraulics

Purpose:
To reduce or eliminate potential predator aquatic habitats located in the T.W. Sullivan tailrace between the discharges of Units 12 and 13.

Summary of Measure:
PGE shall modify Unit 12 and 13 discharges to eliminate potential aquatic predator habitat.

PGE shall construct a physical structure between the Unit 12 and 13 discharges, which eliminates this area of slack water. The structure's shape will be such that discharge flow for each unit will join together, and with the overall tailrace flow, to avoid, or minimize, eddies that are favorable aquatic predator habitat.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2005 -Preliminary design
2006 1/1-3/1 -Design completed
3/1 -Final design filed with FERC
3/1-7/1 -Fabrication and permitting completed
7/1-10/31 -Construction (in water work period)

Post-construction study:
See evaluation summary:
5- Aquatic Predation Potential in the T.W. Sullivan Tailrace

6. Tailrace and forebay avian predation deterrents

Purpose:
To reduce potential for avian predation of downstream migrants passing through the T.W. Sullivan powerhouse forebay and tailrace.

Summary of Measure:
PGE shall upgrade avian predation deterrents in the powerhouse tailrace and install avian predation deterrents in the forebay.

PGE shall add avian wire (or equivalent deterrent system) towards the downstream end of the forebay where downstream migrants are concentrated. PGE shall increase avian wire in the tailrace to expand the area of avian deterrence.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2006 -Preliminary design and permitting need assessment
2007 1/1-3/1 -Design completed
3/1 -Final design filed with FERC
3/1-6/1 -Fabrication and permitting completed
6/1-12/31 -Construction

Post-construction study:
See evaluation summary:

11. Avian Predation Potential Immediately Downstream of the T.W. Sullivan Plant and Willamette Falls

7. Unit 13 Bypass Outfall Modification

Purpose:
The impact velocity of the T.W. Sullivan Unit 13 bypass system outfall flow will be reduced to within NOAA Fisheries standards to reduce the potential for bypassed fish injury, stress, and/or increased susceptibility to predation.

Summary of Measure:
PGE shall modify Unit 13 bypass outfall to meet National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) hydraulic impact velocity criteria.

PGE shall modify the existing outfall chute to slow the water velocity (i.e., use of corrugated materials) and discharge it closer to the tailrace water surface (i.e., lengthen chute or adjust with tailrace elevation).

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2005 -Preliminary design and permitting
2006 1/1-3/1 -Design completed
3/1 -Final design filed with FERC
3/1-7/1 -Fabrication and permitting completed
7/1-10/31 -Construction

Post-construction study:
See evaluation summary:
7. Downstream Migrant Survival and Injury at the Unit 13 Bypass Outfall

8. Runner Replacements

Purpose:
As part of PGE's maintenance program, older turbine runners will be replaced with new runners. The new runners will be designed to reduce gaps and improve hydraulic efficiency. Operation of the new runners will be governed by an operational plan (see Implementation Sheet A.10).

Summary of Measure:
PGE shall replace runners in Units 1–7 and 10–12 at a rate of two per year beginning in 2004 unless otherwise agreed to through consultation with the FTC. PGE shall index/efficiency test replaced runners. Mortality testing, within 1 year of replacement and prior to additional unit replacements, will be conducted for any runner of a significantly different design than that installed in Unit 8.

Consultation:
Modified runner replacement schedule: Consultation with the FTC and approval by the Fish Agencies.
Runner replacement progress: Report to FTC.
Mortality testing requirement and methods: Consultation with the FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -First year of replacements
2005 -Index/efficiency test, and mortality test if necessary, within 1 year and prior to subsequent replacements. (NOTE: See Implementation Sheet A.10 for operational requirements).

Post-construction study:
See evaluation summary:
6- Downstream Migrant Survival through the T.W. Sullivan Turbines

9. Outer headgate selected bar removal for adults

Purpose:
Adult fish accumulate immediately above the main intake (head racks) for the plant near the west (West Linn) end. Installing a passage slot at this location will provide a clear route for adult fish to pass downstream through the racks into the plant forebay and out through the fish bypass.

Summary of Measure:
PGE shall remove several outer headgate trashrack vertical bars on the west end, providing a wider opening for adult salmonids, to facilitate downstream passage of adult salmonids that are observed in this area. The opening is proposed to be 18 inches wide and 8 feet deep as opposed to the current 6-inch openings on the rack. PGE shall coordinate removal with construction of the new trashrack cleaning system to ensure any increased debris entering forebay can be removed from the forebay trashrack system.

Consultation:
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Bar removal done in conjunction with the forebay rack and guidewall modifications (see Implementation Sheet IV.A.1.)

2005 7/1 -File with FERC report of accomplishment

Post-construction study:
See evaluation summary:
4- Downstream Passage Effectiveness for Out-migrant Kelts and Fallback Salmon, Steelhead, and Adult Pacific Lamprey through T.W. Sullivan

10. T.W. Sullivan Operational Measures

Purpose:
Operate the T.W. Sullivan powerhouse, to include the Unit 13 and siphon bypass systems, in a manner that allows efficient and effective generation of electricity while minimizing impact to fish resources as a result of off-normal operating situations.

Summary of Measure:

a. Selected Unit shutdown (w/ validation after forebay modifications)

When selected unit shutdowns are necessary, PGE shall first shut down units that have the least negative effect on forebay hydraulics, as determined through physical forebay modeling. FGE testing, performed after siphon bypass installation (see Implementation Sheet IV.A. 2), will include testing to confirm, or modify, the selected unit(s) shutdown order, taking into account the runner replacement schedule in determining the long-term shutdown order.

Consultation: see Implementation Sheet IV.A.2.

b. Unit 13 maintenance shutdowns

PGE shall limit maintenance shutdown of Unit 13, which provides downstream migrant bypass capability, to no longer than 2 weeks during the period July 1 to July 31. Powerhouse operation during a maximum 2-week Unit 13 shutdown during this period will not require fish agency permission. Continued powerhouse operation during Unit 13 shutdowns longer than 2 weeks during this period, or Unit 13 shutdowns outside of this period, will require fish agency permission

Consultation: Time-critical consultation. Affirmative Fish Agency approval required to operate outside of allowed conditions.

c. Unit #1 ladder entrance 1 AWS operations

PGE shall continue to coordinate scheduled outages of Unit 1 with ODFW, and will shut down all T.W. Sullivan turbine units should Unit 1 be inoperable for more than 24 hours during upstream anadromous migration until operation of Unit 1 can be restored. Continued powerhouse operation during Unit 1 shutdowns longer than 24 hours during upstream anadromous migration will require Fish Agency permission. PGE may choose at a future date to develop a new auxiliary water supply system for fish ladder entrance #1 in lieu of this shutdown requirement.

Consultation: Time-critical consultation. Affirmative Fish Agency approval required to operate outside of allowed conditions.
New AWS system design: Consultation with the FTC and approval by the Fish Agencies.

d. Replaced Turbine runner operation within 1% of peak efficiency

PGE shall operate replaced runners in accordance with an operational plan developed by PGE in consultation with the FTC, within 1% of peak efficiency, as determined by index/efficiency testing, for the existing hydraulic conditions. When forebay FGE is at least 95% for salmonid smolts, PGE may request a change or end to this operating

condition, subject to consultation with the FTC and approval by the Fish Agencies. Such consultation will consider available information on smolts, fry and juvenile lamprey, including necessary levels of protection, in addition to runner operation and performance information.

Consultation: Operational plan: Consultation with the FTC and approval by the Fish Agencies

e. Existing Turbine runner operation within 1% peak efficiency

PGE shall operate existing turbine runners, in accordance with an operational plan developed by PGE in consultation with the FTC, within 1% of peak efficiency based on manufacturers' curves for the existing hydraulic conditions. When forebay FGE is at least 95% for salmonid smolts, PGE may request a change or end to this operating condition, subject to consultation with the FTC and approval by the Fish Agencies. Such consultation will consider available information on smolts, fry and juvenile lamprey, including necessary levels of protection, in addition to runner operation and performance information.

Consultation: Operational plan: Consultation with the FTC and approval by the Fish Agencies

f. Powerhouse operation (including Unit 13 and Siphon bypass systems) in conjunction with Controlled Flow Structure at Falls apex.

PGE shall develop an operational plan for the T.W. Sullivan powerhouse, to include the Unit 13 and siphon bypass systems, operation that is coordinated with the controlled flow structure at the Falls Apex, and specific operational measures to support the stranding management plan (see Implementation Sheet V.B.). Intent is to identify how best to operate the powerhouse and the controlled flow structure to ensure intended protection of downstream migrants over the Falls is provided by the structure and that powerhouse operation is not adversely affected (i.e., river flow is not diverted over the Falls in lieu of entering the T.W. Sullivan forebay, or river elevation is maintained too low to support full powerhouse operation.

Consultation: Operational plan: Consultation with the FTC and approval by the Fish Agencies

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Begin consultation with FTC to develop Operational Plan for the above items:
-Initiate selected unit shutdowns based on 2002/3 ENSR physical modeling

2005	3/30	-Complete Operational Plan development
	3/30	File Operational Plan with FERC
	6/30	Implement Operational Plan
	10/31-12/31	-Begin consultation with FTC to incorporate Siphon Bypass into Operational Plan
2006	1/1-6/30	-Complete consultation and update Operational Plan
	6/30	-File updated Operational Plan with FERC
	10/31-12/31	-Begin consultation with FTC to incorporate Controlled Flow Structure into Operational Plan
2007	1/1-6/30	-Complete consultation and update Operational Plan
	6/30	-File updated Operational Plan with FERC

Post-construction study:
No specific evaluation required. Operational plan will include any needed assessments as part of facility operation.

B. Blue Heron Paper Company Powerhouse

1. Shutdown and In-Place Decommissioning of BHPC Powerhouse

Purpose:
Eliminate the impact of BHPC's operation on Willamette River fish resources

Summary of Measure:
In 2003, PGE shut down the Blue Heron Power Company (BHPC) units. After consultation with the Parties, PGE shall develop a plan by December 31, 2004, for the permanent, in-place decommissioning of the units. The Plan will provide for appropriate consultation under Section 106 of the National Historic Preservation Act. PGE shall apply to FERC for approval of the decommissioning plan. Upon approval, PGE shall implement the decommissioning plan.

Consultation:
Decommission plan: Consultation with the FTC, subject to approval by FERC and other permitting agencies, as applicable.
Decommissioning activities: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003 - Shutdown BHPC powerhouse
- FERC application for BHPC powerhouse ownership transfer

2004 -Consult with FTC and develop in-place decommissioning plan

2005 3/1 -File decommissioning plan with FERC
6/1-12/31 -In-place decommissioning of BHPC powerhouse (in water work completed by 10/31))

Post-construction study:
None

C. Willamette Falls Dam

1. 150 feet of flashboard removal

Purpose:
To improve downstream migrant passage at the Falls, 150-ft of flashboards will be removed at the apex of the Falls to focus low fall flows to an area more conducive to safe, timely, and effective downstream fish passage.

Summary of Measure:
PGE shall remove 150 feet of flashboards at the Falls apex no later than October 1 prior to the start of construction of the controlled flow structure (see Implementation Sheet IV.C.2.).

Consultation:
Flashboard removal: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Demonstration study needs will determine flashboard removal timing.
2005 (and beyond) -Annually remove 150-ft of flashboards at apex no later than October 1 until the Controlled Flow Structure is installed.

Post- construction study:
No study necessary. Report accomplishment of task.

2. Controlled Flow structure at Apex of Falls

Purpose:

A controlled flow structure (a "slot") will be constructed and operated at the apex of the Falls to focus flow, and downstream migrants, that would otherwise be distributed around the crest of the Falls, to a location more conducive to safe, timely, and effective downstream passage.

Summary of Measure:
PGE shall construct and operate a controlled flow structure at the Falls apex as described in Attachment 3. PGE shall design the controlled flow structure to pass up to 15,000cfs (NOTE: actual design capacity will be determined through design analysis and planning). It will be located at the apex of the Falls. Field testing and modeling indicates this location and concept can pass a high percentage of downstream migrants over a high range of river flows. Conceptual design indicates multiple sections of obermeyer type gates located at a natural channel at the apex of the Falls that would be operated in accordance with an overall Operational plan. Minimizing impacts to upstream adult salmonid passage, and enhancing upstream adult lamprey passage, will be included as design elements of the controlled flow structure.

Consultation:
Design of the controlled flow structure: Consultation with the FTC and approval by the Fish Agencies.
Construction: Report to FTC.
Downstream passage study and follow-up measures (if any): Consultation with the FTC and approval by the Fish Agencies.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003 -Preliminary hydraulic capacity assessment
-Pilot study of mark/recapture techniques in fall 2003
2004 -CFD modeling of upstream flow field affects
-Small scale model planning
2005 -Small scale modeling and preliminary design development and permitting needs.
2006 1/1-3/1 -Design completed
3/1 -Final design filed with FERC (NOTE: will know if 1 or 2 construction years needed at this filing)
3/1-6/1 -Fabrication and permitting completed
6/1-12/31 -Construction
2007 1/1-10/31 -Complete construction as necessary.

Post-construction study:
See evaluation summary:
8. Downstream Migrant Survival through the Controlled Flow Structure

9. Effects of the Willamette Falls Controlled Flow Structure on Upstream Passage of Adult Salmonids.

3. Willamette Falls Avian Predation deterrents

Purpose:
Eliminate/reduce potential for avian predation on downstream migrants that pass the Project over the Falls. This will decrease predation potential and increase opportunity for downstream migrants to leave the horseshoe area of the Falls and enter deeper river flows.

Summary of Measure:
PGE shall install avian predation deterrent devices in the lower horseshoe area of the Falls.

PGE shall employ wire, or other effective technology, at the downstream end of the horseshoe of the Falls where avian predation activity has been observed.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2005 -Preliminary design and permitting needs
2006 1/1-3/1 -Design completed
3/1 -Final design filed with FERC
3/1-6/1 -Fabrication and permitting completed
6/1-12/31 -Construction/Installation

Post-construction study:
See evaluation summary:

11. Avian Predation Potential Immediately Downstream of the T.W. Sullivan Plant and Willamette Falls

4. Wet Hole Egress

Purpose:
Eliminate the stranding potential associated with the current "wet hole" condition.

Summary of Measure:
In 2004, subject to obtaining necessary permits and the available in-water work period, PGE shall modify the "wet hole" located at the northeastern base of the Falls to provide egress, at a cost of up to $80,000. This amount is in addition to PGE's permitting and design costs.

Consultation:
Design: Consultation with the FTC and approval by the Fish Agencies
Construction progress: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003 -Preliminary design and permit planning

2004	1/1-7/1	-Continue design and permitting
	7/1	-Design and permitting completed.
	7/1-10/31	-Construction (during in water work period)
2005	7/1	-File with FERC report of accomplishment

Post-construction study:
None. Location will become part of Stranding Management Plan annual egress reconnaissance.

V. Programs

A program is a measure that is performed on an ongoing basis
The following Programs are described in this section:

A. Willamette Falls Fish Ladder
B. Stranding Management Plan
C. Adult Pacific Lamprey
D. Juvenile Pacific Lamprey
E. Water Quality

A. Willamette Falls Fish Ladder

Willamette Falls Fish Ladder Responsibilities
The present fish ladder at Willamette Falls was constructed by Oregon Department of Fish and Wildlife (ODFW) between 1968 to 1971, and major renovations were made in 1996/1997. While ODFW will continue to hold ownership of the ladder and remain responsible for operation and maintenance of the fish counting station, PGE shall assume

most of the fishway operations and maintenance (O&M) duties under this Implementation Plan, as well as other measures described in this section.

1. Fish Ladder Operation and Maintenance (O&M)

PGE shall complete the backlog and annual O&M tasks described below to ensure continued and proper operation of the Willamette Falls fish ladder.

a. Backlog O&M Items

PGE shall complete the following Willamette Falls fish ladder backlog O&M items:

(1) PGE shall, to the extent feasible, and if not already corrected, perform the following projects within 6 months after the new license becomes final or by July 2005, whichever occurs first, taking into account appropriate in-water work periods.

- Repair or replace the forebay level transducer.
- Replace the weir support on the Obermeyer weir that has broken off.
- Replace side seals on the Obermeyer weir and reattach restraining straps.
- Install a new heater on the Obermeyer weir to prevent freezing on the end plates.

(2) PGE shall perform the following backlog projects as part of its annual O&M commitment (in addition to the items listed under subsection b, below):

- Grease the gate stem for auxiliary water discharge at ladder entrance #1 and gate stems for the two exit gates on the 67-foot deck.
- Clean out the level sensor stilling wells at entrances #2 and #3.
- Clean out debris at the auxiliary water channels at all three entrances.
- Exercise all equipment each month as listed on the exercise log.

(3) PGE shall also be responsible to perform the following tasks; however, PGE and the Parties understand that an outside source of funding is being pursued to complete these backlog items. Should this outside funding be procured, PGE shall contribute $100,000 (Note: this amount is subject to escalation in accordance with Section II.B.4.) in matching funds to conduct Pacific lamprey research in the Willamette Basin. This amount is in addition to funding committed to elsewhere in the Settlement Agreement. In the case of partial agency funding for these two items, PGE will be responsible to perform or fund the remaining tasks, and contribute $0.50 in matching funds for the Pacific lamprey research for every dollar that the agencies put toward these backlog items, not to exceed $100,000. If outside funding is not obtained, PGE, in consultation with the FTC, will develop a plan and complete the below items within 3 years after the new license becomes final.

- diffuser grate cleaning and removal of debris from diffuser chambers (all three legs and pool 48)
- fishway joint repairs (all three legs)

b. Annual O&M Items

Unless otherwise indicated, within 6 months after the new license becomes final, or July 2005, whichever occurs sooner, PGE shall implement the following regarding the Willamette Falls fish ladder annual O&M responsibilities:

(1) PGE shall assume, for the life of the new license, responsibility, including all labor and necessary repair or replacement of equipment, to perform annual O&M tasks directly associated with fish ladder operation. Attachment 2 lists all annual O&M tasks and specifies whether PGE, or ODFW, has responsibility.

(2) PGE shall assume debris removal responsibility at the fish ladder sluiceway adjacent to the Willamette Falls fish ladder. Debris removal will be consistent with an operational plan that takes into account debris loading in the river, PGE debris removal activities at T.W. Sullivan, and downstream migrant behavior, abundance and timing. The sluiceway will be opened to pass debris only between the hours of 10:00 a.m. and 2:00 p.m.

(3) PGE shall develop an operational plan for the above ladder measures. The plan will include appropriate tracking and reporting mechanisms to determine if specific changes are needed in the annual O&M plan to ensure proper fish ladder operation.

Consultation:

Fish Ladder Operational plan: Consultation with the FTC and approval by the Fish Agencies.

Schedule:

PGE shall undertake such actions in accordance with the following schedule:

2004 Begin consultation with FTC for Ladder Maintenance Operational Plan
2005 3/1 -File Ladder Maintenance Operational Plan with FERC
7/1 -Ladder Maintenance Operational Plan implemented

2. Log Boom Extension

If feasible, PGE shall extend the log boom in the T.W. Sullivan pre-forebay to reduce the amount of debris that accumulates at the fish ladder sluiceway. Any such extension would be completed within 1 year of the new license becoming final.

Consultation:
Log boom extension: Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 Determine feasibility and begin design if feasible

If determined feasible:

2005 1/1-3/1 -Complete design
3/1 -File design with FERC
3/1-6/1 -Complete fabrication and permitting
6/1-10/31 -Construction

3. Pacific Lamprey Passage Ladder Improvements

In addition to the measures identified above, PGE shall fund or undertake measures to enable the Willamette Falls fish ladder to pass adult Pacific lamprey upstream more effectively. Potential measures, subject to recommendation by the lamprey research expert (see section IV.C., item 4, below) include, but are not necessarily limited to:

- Partially covering the floor gratings with a solid contiguous plate.
- Rounding off 90-degree corners at critical junctures in the ladder.
- Installing an infrared light at the counting window instead of a bright light.
- Modifying ladder entrances.
- Other modifications identified through regional and/or national Pacific lamprey research.

Consultation:
Ladder modifications: Consultation with the FTC and approval by the Fish Agencies.

Schedule:
NOTE: specific modifications and scheduling will be developed upon conclusion of lamprey research effort and FTC consultation (see item V.C). Ladder modifications will be completed within 3 years of lamprey research effort conclusion.

4. Hydraulic Conditions at Ladder Entrance #1

PGE shall determine the extent of ladder entrance #1 non-compliance with NOAA fisheries hydraulic criteria for ladder entrances, entrance pools, and auxiliary water systems (AWS), taking into account the changing hydraulic conditions at Willamette Falls and upstream migration run-timing. Evaluation results will inform the consultation with the FTC and development of an action plan for needed modifications that PGE shall implement.

These criteria include, but are not limited to:

- The fishway entrance head (hydraulic drop shall be maintained between 1 to 1.5 feet).
- The minimum entrance width shall be 4 feet and depth at least 6 feet.
- Staff gages shall be installed to verify the entrance head.
- Diffusers shall consist of non-corrosive, vertically-oriented flat-bar grates with a maximum 1-inch clear opening.
- The maximum AWS diffuser velocity shall be less that 1 fps for vertical diffusers and 0.5 fps for horizontal diffusers.

PGE shall develop and implement an action plan for agreed upon modifications.

Consultation:
Assessment of ladder entrance: Consultation with the FTC and approval by the Fish Agencies
Action Plan: Consultation with the FTC and approval by the Fish Agencies
Construction (if required): Report to FTC.

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003 -Complete assessment relative to hydraulic criteria compliance and run timing

2004 -Consult with FTC, develop conceptual action plan

2005 -1/1-6/1 -Finalize action plan
-6/1 -File action plan with FERC
-6/1 -Implement action plan (Note: additional modification scheduling may be needed as a result of the action plan)

B. Stranding Management

General Management Approach

Fish that are temporarily held in pools without stress and that are able to find egress are not considered "stranded" and should not be salvaged. Salvage efforts are needed when fish have been stranded at least 48 hours (or less when they show signs of stress), and other means to ameliorate the stranding proven ineffective.

Any Party can notify PGE, ODFW, or USFWS that it believes that fish are "stranded." When ODFW or USFWS determines that fish are "stranded," PGE shall take such action as soon as practicable consistent with the objectives set forth below. The first approach for PGE to implement will be to encourage fish to move downstream voluntarily by providing flow into the stranding pool or modifying Project operations as described by actions in Objective 1 below. If a pool or channel has become a chronic stranding problem to fish, PGE shall implement actions to provide egress channels, as identified in Objective 2 below. PGE shall implement salvage operations, described in Objective 3 below, as needed, but only if the actions in Objective 1 have been implemented and found to be insufficient. Objective 4 (see below) includes actions that the Parties agree will reduce or eliminate stranding during closures of the Willamette Falls fish ladder. Project operations to support this stranding management program will, to the extent possible, be incorporated into the Operational Plan developed in consultation with the FTC under Implementation Sheet IV.A.10.

Objective 1:

Reduce or eliminate adult salmonid and Pacific lamprey stranding potential at Willamette Falls resulting from annual flashboard installation or other Project operations.

Action 1.1: PGE shall operate the controlled flow structure, when constructed, at the apex of Willamette Falls to minimize fish stranding below the Falls.

Action 1.2: PGE shall notify the FTC when flashboard installation is planned. The first notification will be approximately 2 weeks prior to the expected installation date, and the second notification 3–5 days prior to actual installation.

Action 1.3: Immediately after flashboard installation, PGE shall reduce load at the T.W. Sullivan powerhouse to minimize the duration of time that there is a disruption of flow over the crest of the Falls, and use the controlled flow structure to minimize stranding. Normal plant operation will resume when flow through notches, installed under Action 1.6, has been established.

Action 1.4: During the flashboard installation and over the following 2 days, PGE shall coordinate (with those FTC members expressing interest in response to notification under Action 1.2) and conduct reconnaissance survey of adult salmonid stranding locations and severity at the Willamette Falls. PGE shall record adult Pacific lamprey congregations and movement. Appropriate actions will be determined under Objective 3.

Action 1.5: For Project operations that may result in stranding, such as startup after a powerhouse shutdown, PGE shall also notify the FTC 3 days prior to a planned event or within 24 hours of an unplanned event. Appropriate actions will be determined under Objective 3.

Action 1.6: PGE shall provide flow to pools, or other areas, that either have fish in them, or could later have fish present. Appropriate flow at each location will be determined considering the nature of the pool, egress potential for fish, and the need to maintain head at the Project. Flow can be provided either through notches in flashboards and/or by not adding felt cloth to selected flashboard sections.
Consultation: Time-critical consultation.

Objective 2:

Provide egress channels at stranding pools by implementing structural changes to eliminate stranding pool blockages, including a specific problem identified at the "wet hole".

Action 2.1: PGE shall provide $5,000 annually to fund the creation of egress channels. This amount can be funded in advance if a specific modification project will cost more than the amount accrued. In the event an identified modification will exceed available funding, PGE shall consult with the FTC on how to address the funding shortfall.
Consultation: Need for additional funding: Consultation with the FTC.

Action 2.2: The FTC will assess the Falls each spring with the intent of identifying stranding conditions that could be improved by physically modifying the topography below the Falls to provide egress from stranding pools.
Consultation: Assessment of stranding conditions: Consultation with FTC

Action 2.3: During the first year after a stranding situation is identified, the Parties will identify possible corrective actions and PGE shall do the preparatory work (including permitting, cost estimating, channel modification assessments) for their modification the following year. The cost of this preparatory work is in addition to the annual commitment described in Action 2.1.
Consultation: Design: Consultation with the FTC and with approval by the Fish Agencies.
Construction: Report to FTC.

Action 2.4: The year following the identification of locations having egress blockage, PGE shall re-survey these locations. To the extent funding is available under Action 2.1, and the egress blockage persists, PGE shall take corrective actions in the next available in-water work period.
Consultation: Report to FTC

Objective 3:

Provide actions to reduce or eliminate the stranding, including salvage operations if needed, of adult salmonids and Pacific lamprey stranded in pools or structures at the Falls as the result of the annual installation of the flashboards or other Project operations that may cause stranding.

Action 3.1: PGE shall operate the controlled flow structure, when constructed, at the apex of Willamette Falls so as to minimize the occurrence of fish stranding below the Falls.

Action 3.2: PGE shall apply for all federal and State permits required to conduct the salvage of adult salmonids and Pacific lamprey stranded in pools or structures at the Falls. Permit applications will include a salvage plan, developed in consultation with the FTC. PGE shall be prepared to implement the plan in accordance with Action 3.6.
Consultation: Salvage Plan: Consultation with FTC.

Action 3.3: PGE and the Fish Agencies will determine salvage feasibility and needs when flashboards are installed each year.
Consultation: Time-critical consultation.

Action 3.4: PGE and the Fish Agencies will also determine appropriate actions, including any reconnaissance and salvage needs, following flow fluctuations that might cause stranding, such as fluctuations due to powerhouse startup after a shutdown or significant river flow

changes (i.e., flow changes greater than 10% in a 24-hr period). PGE shall contact the FTC as described in Action 1.5 to coordinate this determination.
Consultation: Time-critical consultation.

Action 3.5: For safety concerns, PGE shall conduct salvage for adult salmonids, if necessary, only in the old fish ladder pools located on the west side of the Falls. PGE shall release the fish in the tailwater of the Falls.

Action 3.6: When deemed necessary by the Fish Agencies, PGE shall conduct adult Pacific lamprey salvage over a 2-day period determined by Actions 3.3 and 3.4. PGE shall release lamprey either above or below the Falls as determined by ODFW and USFWS.
Consultation: Time-critical consultation.

Action 3.7: PGE shall document the number and species of fish salvaged. PGE shall also note carcasses prior to salvage effort and document for the FTC any fish mortality associated with salvage efforts.
Consultation: Report to FTC

Objective 4:

Reduce or eliminate stranding of adult salmonids and Pacific lamprey inside the Willamette Falls ladder during fish ladder closures.

Action 4.1: PGE shall develop, an Operational plan for the installation and removal of exclusion gratings at the Willamette Falls fish ladder.
Consultation: Consultation with the FTC and approval of the Fish Agencies.

Action 4.2: PGE shall be responsible for the cost of constructing, maintaining, installing, and removing the exclusion grating for all four fish ladder entrances at the Willamette Falls fish ladder.

C. Adult Pacific Lamprey

PGE shall implement the following measures at Willamette Falls to develop a site-specific knowledge base regarding adult Pacific lamprey behavior, including passage, and to assist in effective upstream passage of adult Pacific lamprey through the Project:

1. PGE shall initially install a minimum of two lamprey passage ramps each year, and

notch the flashboards, when flashboards are installed, to provide flows for lamprey below the dam and Falls, focusing on those areas where lamprey are known to congregate, such as the old fishway. PGE shall implement these measures within 6 months of the new license becoming final. PGE shall assess the effectiveness of the ramps during the Pacific lamprey research project (item 3, below), and continued implementation will be guided by the results of that research. PGE, in consultation with the FTC, will conduct a preliminary assessment of lamprey ramp use in 2004 (see item VI.D.). PGE shall make modifications to the placement and design of ramps if results of the monitoring program suggest that such actions are appropriate. If effective, PGE shall install additional ramps as needed to provide passage in areas where Pacific lamprey can be attracted.

Consultation: Placement of Lamprey Passage Ramps: Time-critical consultation
All Other Elements Above: Consultation with the FTC and approval by the Fish agencies

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2003 Annually at flashboard installation, install Lamprey passage ramps and notch flashboards.

2. PGE shall undertake an effort to salvage stranded Pacific lamprey in accordance with the objectives listed in the Stranding Management Program. PGE shall release salvaged adult Pacific lamprey back into the river in accordance with Action 3.6 of the Stranding Management Program.

3. PGE shall fund, within 6 months of the new license becoming final, a research effort on Pacific lamprey passage and behavior consistent with Attachment 4 (Adult Pacific Lamprey Passage Plan). PGE shall initiate development of this research effort in 2004, to include the following:

- Research objectives and general approaches will be developed by an ad hoc committee of lamprey experts drawn from agencies, tribes, universities and private industry. This committee's recommendation and the proposed scope of research will be reviewed by the FTC. PGE shall then contract with one or more research groups to conduct this work. Research will be conducted by a lamprey expert mutually acceptable to PGE and the FTC.

  Consultation: Selection of Ad hoc committee: Consultation with the FTC
  Selection of Lamprey expert: Consultation with the FTC
  Scope of lamprey research: Consultation with the FTC and approval by the Fish Agencies.

- The research will evaluate Pacific lamprey passage at the Project area and identify potential modifications to the dam/flashboards and the Willamette Falls fish ladder to improve passage.
  Consultation: Report to FTC

- If Pacific lamprey passage problems are identified, the research effort will assess the applicability and effectiveness of a lamprey capture-and-haul program at the Falls as a potential interim management tool to be used until permanent solutions to the passage problem are implemented.
  Consultation: Consultation with FTC and approval by Fish Agencies

- The research will evaluate the effectiveness of the lamprey passage ramps at the Falls.
  Consultation: Report to FTC

- The research will consider appropriate testing of Pacific lamprey passage performance of the controlled-flow structure at the apex of the Falls, and specifically evaluate upstream passage effectiveness of adult lamprey passage features constructed along with or near the controlled flow structure.
  Consultation: Report to FTC

- The research will develop a reasonable Project structure related performance goal for upstream passage of Pacific lamprey at Willamette Falls.
  Consultation: Consultation with the FTC and approval by the Fish Agencies

  Schedule:
  PGE shall undertake such actions in accordance with the following schedule:

  2004 -PGE initiate research effort development in consultation with FTC
  2005 3/1 -File Research plan with FERC
  5/1 -PGE fund and initiate research plan

4. After the completion of the research study outlined above, and construction of the controlled flow structure at the apex of the Falls, PGE shall implement Pacific lamprey passage improvements to the dam/flashboards and the Willamette Falls fish ladder (see V.A.3) as required to meet any passage effectiveness goal identified by the research program. Improvements shall be implemented by PGE within 3 years of completion of the research study.
Consultation: Consultation with the FTC and approval by the Fish Agencies

5. PGE shall also test downstream passage of adult Pacific lamprey through the siphon bypass and controlled flow structure. PGE shall make modifications to the structures as needed to assure safe, timely, and effective passage of Pacific lamprey.
Consultation: Testing: Consultation with the FTC

Modifications: Consultation with the FTC and approval by the Fish Agencies

Note: This evaluation is part of the siphon bypass and controlled flow structure Post-construction evaluation plans.

D. Juvenile Pacific Lamprey

PGE, in consultation with the FTC, shall develop, fund and implement a joint evaluation study program covering juvenile Pacific lamprey. The study program will address the following:

1. Determine Pacific lamprey guidance efficiency through the T.W. Sullivan powerhouse after implementation of the Tier 2 siphon bypass measure.

2. To the extent technically feasible, estimate the potential impact (i.e. injury and mortality) of the T.W. Sullivan powerhouse to juvenile Pacific lamprey.

3. Determine additional improvements to passage conditions using the information gained through the above evaluations and other relevant information to determine additional improvements to passage conditions at the Project site for PGE to implement.

To achieve the goal of "safe, timely, and effective" passage for juvenile Pacific lamprey, PGE, in consultation with the FTC, shall implement additional measures identified by these studies as appropriate to reduce injury and mortality of Pacific lamprey that pass through the T.W. Sullivan powerhouse, and, if technology allows assessment, through the controlled flow structure at the Willamette Falls apex. PGE shall implement the additional measures within 3 years of assessment completion.

The above assessments for juvenile lamprey will be part of the siphon bypass and controlled flow structure evaluation programs (see Implementation Sheets IV.A.2. and IV.C.2.).

Consultation: Study Plan: Consultation with the FTC and approval by the Fish Agencies
Design: Consultation with the FTC and approval by the Fish Agencies.

Schedule:
Assessments done as part of the siphon bypass (IV.A.2.) and controlled flow structure (IV.C.2.)

E. Water Quality

The Oregon Department of Environmental Quality (ODEQ) is the lead agency regarding compliance with water quality standards through its 401 Water Quality Certification process. PGE has applied for certification pursuant to Section 401 of the federal Clean Water Act. PGE shall comply with the requirements established by ODEQ in its 401 water quality certification for the Project.

Critical to this process, is the need for assurance that the controlled flow structure to be located at the apex of Willamette Falls will be designed and operated in a manner to not contribute to high total dissolved gas conditions that have occurred at the Falls. To this end, PGE shall coordinate the design of the controlled flow structure (including the use of a small-scale physical model) with ODEQ in accordance with the 401 water quality certification, in addition to the FTC.

Also critical is the development of a Water Quality Monitoring and Management Plan (WQMMP). At ODEQ's request, PGE has agreed to develop appropriate WQMMP(s) for the Project.

VI. 2004 Assessments

This section provides those assessments to be done in 2004 to gain a more complete understanding of existing conditions.

Purpose:
The below assessments are intended to develop information in 2004 concerning the performance of the existing T. W. Sullivan bypass system as it relates to the presence and condition of salmonid fry and juvenile pacific lamprey. This includes a field assessment of juvenile Pacific lamprey impingement of the Eicher fish screen at Unit 13.

Summary of Assessments:

A. Salmonid Fry and Juvenile Pacific Lamprey presence and condition in the T.W. Sullivan bypass

PGE shall collect presence and condition data for salmonid fry and juvenile Pacific lamprey that are observed in the T.W. Sullivan bypass system as part of its annual fish count program.
Consultation: Report to FTC

B. Juvenile Pacific Lamprey Impingement on the Unit 13 Eicher Screen

In 2004, PGE shall determine the rate of impingement of juvenile Pacific lamprey on the existing Eicher screen utilizing juvenile Pacific lamprey from mainstem Columbia River bypass systems. PGE, in consultation with the FTC, will develop an appropriate

assessment method and study plan. Potential methods include, but are not limited to:

- Perform a mark-recapture study of externally marked juvenile lamprey in the evaluator plunge pool to determine rate of recapture.
- Perform a mark-recapture study of externally marked juvenile lamprey released in front of Unit 13. Recapture/examination in the evaluator will emphasize checking their condition that might have resulted from interactions with the Unit 13 Eicher screen.
- Install an underwater video camera and monitor the Eicher screen during operation for the presence of juvenile lamprey impinged on the screen.

Consultation: Study & Assessment elements: Consultation with the FTC

C. Current bypass system improvements testing

PGE shall assess improvements to the Unit 13 bypass and evaluator system to determine if issues associated with delay in the bypass/evaluator system are eliminated or reduced. This assessment will be done in 2004 using PIT tags on smolts to provide an indication of how the system is operating prior to its use for performance testing of subsequent PM&E measures.
Consultation: Consultation with the FTC

D. Lamprey Passage Ramp use preliminary assessment.

As part of the Adult Pacific Lamprey Program described in section V.C. item 1, PGE, in consultation with the FTC, will conduct a preliminary assessment of lamprey ramp use in 2004. The purpose of this preliminary assessment is to inform subsequent decisions regarding the placement and design of lamprey passage ramps.
Consultation: Consultation with the FTC

Schedule:
PGE shall undertake such actions in accordance with the following schedule:

2004 -Consult with FTC to develop assessment plans for 2004
-Perform presence and condition assessments for fry and juvenile lamprey
-Perform Eicher Screen impingement assessment for juvenile lamprey
-Perform current bypass system improvements testing
-Perform lamprey ramp use assessment

2005 7/1 -File with FERC report of accomplishment

Attachment 1 (to Appendix E)

Evaluation Summaries

Background

Portland General Electric Company (PGE) has committed to a series of measures at the Willamette Falls Project with the intent of meeting public expectations for environmental resource protection and agreements made with multiple stakeholders in PGE's collaborative effort to re-license the Project with the FERC. Of particular concern, and addressed most strongly by these measures, are native and ESA-listed anadromous fish that migrate up- and downstream through the Project during their life cycles. Measures committed to by PGE are intended to reduce delays, injuries, and/or mortality of these fish as they attempt to migrate through the Project. The Evaluation Summaries in this Attachment outline many of the basic steps that will be taken to assure that the realized performance of the measures implemented by PGE under its new FERC-issued operating license will provide sufficient protection to migratory fish.

Implementing and Evaluating Measures

Completion of the measures to which PGE has committed will follow an adaptive approach, much of which has been outlined in this Implementation Plan. A tiered series of measures to address each of multiple fish passage issues or other concerns will be implemented at the Project over a period extending a decade and possibly farther into the future (see schedules in Attachment 6). Initial (Tier 1 and 2) measures identified in this Implementation Plan will be completed and their efficacy at meeting pre-defined performance standards or goals tested. Measures or suites of measures meeting the standards or goals specific to the issue(s) they address will be considered both successful and sufficient. Additional measures (Tiers 3 and/or 4, as appropriate) will be taken if and where initial measures at the Project do not meet the relevant standard(s) or goal(s).

With regard to the performance standards and goals (see Section III. of this Appendix), success in meeting some (generally the standards) will be measurable using readily available technologies and evaluative study designs not dramatically different than those that have been already applied either at the Project or at hydroprojects elsewhere in the region. Others (typically the goals) will be measurable to varying levels of precision or certainty, using technologies that may or may not be familiar or available to the parties at present. In at least one instance (the survival of out-migrant lamprey), future evaluations of the efficacy of specific measures or suites of measures to meet the agreed standard or goal for protecting one or more lifestages of a particular migratory fish might not occur until well into the new license period. This is because existing study technologies and

methods would be insufficient to conduct reliable tests of whether or not the relevant performance standard or goals are being met.

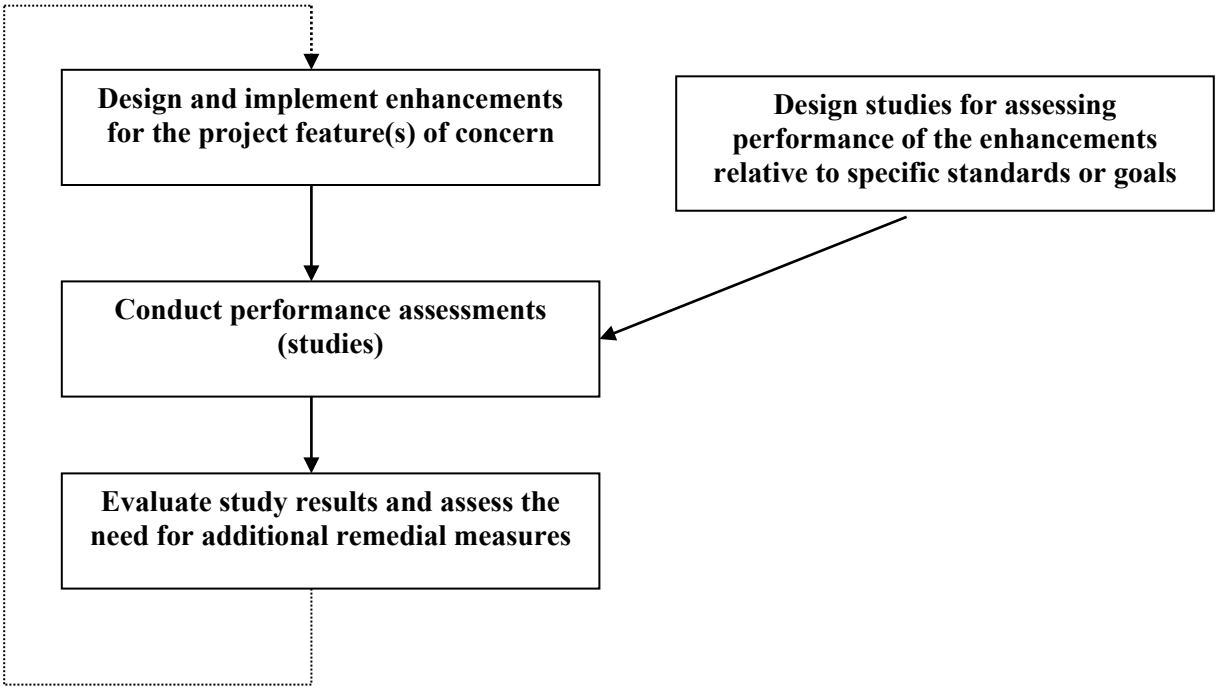
The Implementation/Evaluation Cycle

Evaluating performance of measures implemented at the Project will follow a consistent pattern, shown in Figure 1. At approximately the same time that the design and construction of an initial measure or logical group (referred to earlier as a "suite") of initial measures is completed, the Fisheries Technical Committee (FTC) will work to clarify measurable elements of any relevant performance standards or goals that at the time are still lacking clear definition. This process of clarification may often result in little more than a slightly improved understanding of the conditions under which the effectiveness of the measure(s) will be judged a success, but will be essential to designing meaningful evaluative studies and making efficient use of both PGE funding and the time of the FTC members. The FTC will coordinate with PGE or its consultants in the design of studies appropriate for evaluating whether or not the measures in question meet the relevant performance standard(s) or goal(s). If situations arise where it becomes difficult or impossible to reach agreement on the design of a particular study, the FTC may seek decision-making support or dispute resolution, pursuant to provisions of the Settlement Agreement, which includes the possible use of a mutually agreed upon third party expert to assist the FTC in reaching its decision.

When a measure or logical suite of measures has been implemented, the approved evaluative studies (see Section II.B.3. of this Appendix) will occur. Study execution and associated analyses of evaluation data will take place in close consultation with the FTC. PGE will consult with the FTC regarding its choice of consultants or other experts to develop and execute the studies and associated analysis. Results of the study (or studies) will be summarized in a report that PGE and the FTC will use in determining whether the standard(s) or goal(s) of interest have been met. The approved report will provide a clear, documented, and technical basis for determining that PGE has either met its obligation or needs to implement additional remedial measures in its efforts to meet the agreed performance levels. If situations arise where there is difficulty reaching agreement on interpretations of study results, or on how these results ought best be characterized in a final evaluation report, the FTC may seek decision-making support or dispute resolution, pursuant to provisions of the Settlement Agreement, which includes the possible use of a mutually agreed upon third party expert to assist the FTC in reaching its decision.

A study report and associated decision indicating that applicable standard(s) and/or goal(s) had been met would complete efforts to improve the specific Project feature(s) evaluated. A report and decision indicating otherwise would lead PGE to take additional remedial steps to improve fish passage conditions at the evaluated Project feature(s) and initiate another cycle of designing and implementing additional measures, concurrent

study design efforts involving the FTC, evaluative study, and an assessment of the need for still further Project enhancements. Whether one or more than one cycle of



improvement is needed at a given Project feature or logical group of features, it is anticipated that the same basic pattern as depicted in Figure 1 will be followed.

Figure 1. Characteristic evaluation cycle to be followed during implementation of measures at the Willamette Falls Hydroelectric Project.

Summaries of Future Evaluation Efforts at the Willamette Falls Project

Per the evaluation cycle characterized in Figure 1, studies necessary to evaluate the efficacy of measures at the Project will be designed in concert with the design and implementation of these measures. Detailed study plans for the evaluations are not available at present because the design and implementation process is just getting underway. However, the Parties see value in describing what is already known about the evaluative studies that need to be conducted. Summaries of most of these evaluations are provided on the pages that follow.

1. Downstream Passage Effectiveness for Salmonid Smolts Through T.W. Sullivan

***Measures*:** Inner forebay rack replacement (units 1-3), guidewall realignment, siphon bypass installation, evaluator improvements (e.g., PIT tag detectors), Unit 13 bypass chute modification, and a new trash rack cleaning system.

Performance standard: A survival standard has been established for smolts entering the Sullivan forebay. Actual performance will be compared against the standard, based on an integration of information on fish guidance efficiency (FGE), turbine survival rates, bypass survival rates, effects of the new cleaning system for the forebay racks, and estimated direct mortality of surviving fish that exit the plant for both the bypass and turbines.

Performance assessment: Performance of the improved fish bypass system at T.W. Sullivan will be evaluated using live fish testing with passive integrated transponder (PIT) tag technology, radio telemetry and other research methods as needed or available.

- FGE will be evaluated with PIT tag technology using methods described by Skalski (2000), to ensure statistically sound results. FGE testing will be done on spring chinook salmon in the fall (October 1 to December 15) and in the spring (March 1 to June 1) and on steelhead in the spring (April 1 to June 15). Each species for each season could have six paired releases (forebay and calibration), four from the middle of the forebay and two with composite releases at left, middle and right side of forebay. As an example, each forebay release group could be 150 test fish, each control or calibration release would be done concurrent with forebay releases and could be 75 test fish. This approach would yield PIT tag test fish releases of 1,350 in the fall and 4,050 in the spring for a total sample size of 5,400 test fish per year.
- Direct survival will be determined using 48 hour holding periods of fish collected from the fish bypass evaluator. Survival can also be estimated when using radio tags or other "sending" tags that indicate test fish are alive and moving downstream past two established monitoring stations.
- Direct survival assessments may incorporate existing data on turbine survival from on-site studies conducted in the 1960s and in 1997, or from tests of new turbine runners. These estimates could be adjusted for effects of the inner forebay rack cleaning system.
- Predation on fish that have successfully passed through the plant, either via the bypass or turbines, will be estimated for each route.
- Fish behavior through the forebay and bypass system will be assessed using radio telemetry to determine individual unit passage and bypass holding location(s).
- Effects of PIT tagging will be assessed as part of the evaluation by holding tagged and untagged fish separate from field testing.

- Effects of an inner forebay rack cleaning system to be installed in 2005 will be assessed by conducting FGE testing with the system operating and idle, or through use of an underwater video camera, or both.

Assessment timing: Focused study of the improved fish bypass facility will occur for a minimum of three years and begin within a year after the new facilities are installed and operating. The evaluation will occur with the siphon bypass operating and redesigned inner forebay completed. Study plan preparation, permitting, equipment and tag procurement will occur a year prior to field study each year. PGE shall conduct routine testing of the PIT tag interrogation system as well as other monitoring stations will occur.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the Fisheries Technical Committee (FTC) and PGE. Such evaluation may involve routine monitoring, focused study, or both.

2. Downstream Passage Effectiveness of Salmonid Fry (≤60 mm) Through T.W. Sullivan

Measures: Inner forebay rack replacement (units 1-3), guidewall realignment and siphon bypass installation, evaluator improvements (e.g., PIT detectors), Unit 13 bypass chute modification and a new trash-rack cleaning system.

***Performance standard*:** A survival standard has been established for salmonid fry entering the Sullivan forebay. Actual performance will be compared against the standard, based on an integration of information on FGE, turbine survival estimates, bypass survival estimates, effects of the new cleaning system for the forebay racks, and estimated direct mortality of surviving fish that exit the plant for both the bypass and turbines.

Performance assessment: Evaluations of the improved fish bypass system for passing downstream migrant fry will be conducted using live fish testing. Fry are not readily available from the T.W. Sullivan evaluator so there will be a need for an outside source of test fish, most likely from a fish hatchery. Hatchery fry size will be representative of naturally migrating fry.

- FGE testing could be conducted on fry using mark-recapture techniques with total body dye used to identify test fish. The dyes used to mark fry last approximately 48 hours creating logistical problems with a mark-recapture study. It may take more than 48 hours for test fish to be recaptured after release. A schedule and sampling design will be developed for fry FGE testing through the fisheries technical committee (FTC). FGE testing could also be attempted on fry using PIT tag technology. Effects of PIT tagging on fry will be factored into the FGE assessments.
- Effects of an inner forebay rack cleaning system to be installed in 2005 will be

assessed by conducting FGE testing with the system operating and idle, or through use of an underwater video camera, or both.

- Direct survival of fry using the bypass could be determined using 48 hour holding periods of salmonid fry collected from the fish bypass evaluator. The study will include, as appropriate, a control group of fry.
- Turbine survival of fry will be estimated using known models and equations as there are no tags or methods available to adequately test fry passing this route. These estimates could be adjusted for effects of the inner forebay rack cleaning system.
- Salmonid fry presence will be documented in the Sullivan fish bypass evaluator whenever fish counts are performed.

Assessment timing: Focused study of the improved fish bypass facility's effectiveness at passing fry safely downstream will be conducted over a three year period and shall begin within a year after the new facilities are operating or as soon thereafter as the FTC believes that suitable testing technologies are available to PGE. The evaluation will occur with the siphon bypass and redesigned inner forebay completed. Study plan development and associated permitting will occur through the FTC prior to field study each year.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

3. Downstream Passage Effectiveness of Juvenile Lamprey Through T.W. Sullivan

Measures: Inner forebay rack replacement (units 1-3), guidewall realignment and siphon bypass installation, evaluator improvements (e.g., PIT detectors), and a new trash-rack cleaning system.

***Performance goal*:** A goal of "safe, timely and effective" downstream passage has been established for juvenile lamprey entering the T.W. Sullivan forebay. Success in meeting the goal will be evaluated by testing FGE, estimating turbine survival rates, and assessing bypass survival rates, including rates of impingement of juvenile lamprey guided to the existing Eicher screen. The necessary studies will not be conducted until the FTC concludes that available study technologies are sufficient to yield meaningful results. A clearer definition of what constitutes "safe, timely and effective" passage will be developed by the FTC and PGE, which will help guide the study design and evaluation process.

Performance assessment: Performance of the improved fish bypass system with regard to downstream passage of lamprey will be tested using live juvenile fish (> 100 mm total length). Methods for conducting this testing are not as well developed as those commonly used to evaluate passage effectiveness for salmonid smolts (i.e., passive integrated transponder (PIT) tag technology, radio telemetry and other research methods). Limited exploratory studies will be conducted in the near-term to get a clearer sense of how and how well juvenile lamprey are passing through T.W. Sullivan. Such studies might suggest ways to improve passage effectiveness for these fish. The methods ultimately settled upon by the FTC for more detailed evaluative efforts will need to have a reasonable likelihood of answering the questions of interest in an authoritative manner before post-implementation field studies are conducted.

- FGE will be evaluated at T.W. Sullivan with a mark/recapture study using externally marked juvenile lamprey and or PIT tag technology on an experimental basis, or using other improvements in technology proven effective for marking/tagging juvenile lamprey. Either a fin clip or body dye could be used along with extended manual checks of the bypass catch tank to recapture test lamprey. At present, there is no known method to recapture juvenile lamprey at the proposed siphon bypass.
- Effects of an inner forebay rack cleaning system to be installed in 2005 will be assessed by conducting FGE testing with the system operating and idle, or through use of an underwater video camera, or both.
- Overall survival of juvenile lamprey using the bypass will be determined using 48 hour holding periods of juvenile lamprey collected from the fish bypass evaluator.
- Turbine survival assessments of juvenile lamprey will be conducted if feasible. If no tagging techniques have been developed for this species for this type of testing, turbine survival rates could be estimated using existing information. These estimates could be adjusted for effects of the inner forebay rack cleaning system.
- Assessing the Eicher screen for juvenile lamprey impingement and condition will be conducted in 2004 with test specimens provided from other locations. PIT tagging, mark-recapture methods or underwater video monitoring could be used for this experiment. A study plan will be developed through the FTC.
- Juvenile lamprey presence will be documented in the Sullivan fish bypass whenever fish counts are performed.

Assessment timing: Focused studies of the improved fish bypass facility's effectiveness at meeting the performance goal for juvenile lamprey will be conducted for a minimum of three years and shall begin within a year after the new facilities are operating or as

soon thereafter as the FTC believes that suitable testing technologies are available to PGE. The evaluation will occur with the siphon bypass and redesigned inner forebay completed, with the exception of an impingement assessment of the Unit 13 Eicher screen that will occur in 2004. Study plan preparation, permitting, equipment and any tag procurement will occur through the FTC prior to field study each year.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

4. Downstream Passage Effectiveness for Out-migrant Kelts and Fallback Salmon, Steelhead, and Adult Pacific Lamprey through T.W. Sullivan

Measures: Gap in outer forebay racks, inner forebay rack replacement (units 1-3), guidewall realignment and siphon bypass installation, evaluator improvements (e.g., PIT tag detectors), and a new trash-rack cleaning system.

***Performance goal*:** A goal of "safe, timely and effective" downstream passage of steelhead kelts, and fallback salmon, steelhead, and adult Pacific lamprey has been established for fish entering the Sullivan forebay. Adding clarity to this goal will help guide study design and the evaluation process.

Performance assessment: Performance of the improved fish bypass system will be monitored and evaluated using live adult fish testing. Steelhead kelts, fallback adult salmon, and adult Pacific lamprey will either be collected for assessments from the bypass catch tank or acquired from a hatchery or other sources. It is expected that radio telemetry and other "sending" tags, or other appropriate methodologies will be used to evaluate condition of these fish after using and exiting the fish bypass system.

- Kelt and fallback salmon and lamprey condition will be evaluated in areas immediately upstream, at, and immediately downstream of the Project for indications that fish are (or are not) having difficulty passing downstream. A focused study will evaluate the downstream passage success of several test groups of steelhead kelts (~50 fish each) obtained from an appropriate fish hatchery and released into specific routes of passage at the Project. The FTC and PGE will agree upon the details of this study prior to field study.
- Overall condition of steelhead kelts and adult fallback salmon and lamprey will be estimated using radio tags or other "sending" tags that indicate fish are alive and moving past two established monitoring stations downstream, or through some other method identified by the FTC. When using radio telemetry for this assessment, it is assumed that adult salmonids and lamprey will continue downstream to be detected at stationary radio receiver sites.

- Fish behavior through the forebay and bypass system can be assessed using radio telemetry to determine potential bypass holding locations.
- A passage slot will be installed at the main intake for the plant near the west corner of the main head racks. Adult fish accumulate immediately above this location. The passage slot is intended to provide a better route for adult fish that pass downstream through the racks into the plant forebay and out through the fish bypass. The slot is proposed to be 18 inches wide and 8 feet deep as opposed to the current 6-inch openings on the rack. This passage slot will become part of the improved fish bypass system at the Sullivan plant.

Assessment timing: Routine study of the improved fish bypass facility will occur for a minimum of three years. Testing will coincide with documented steelhead kelt presence in the fish bypass evaluator and during upstream migration periods of spring chinook salmon, steelhead, and lamprey from approximately February through June. Study plan preparation, permitting, equipment and tag procurement will occur through the FTC prior to field study each year. Routine testing of the radio tag system as well as other monitoring stations will occur.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both. Any follow-up evaluations will be conducted after remedial measures that address the problem(s) have been implemented.

5. Aquatic Predation Potential in the T.W. Sullivan Tailrace

Measures: Inner forebay rack replacement (units 1-3), guidewall realignment, siphon bypass installation, unit 13 bypass outfall modifications and flow deflectors at units 12 and 13 discharge.

Performance: The goal is to reduce or eliminate aquatic predator habitat in the Sullivan plant forebay and tailrace. Success in achieving this goal can be evaluated either by assessing aquatic habitat before and after the facilities are built, or by assessing behavior of aquatic predatory fish, or both. A clearer definition of what constitutes adequate reduction in predator habitat will be developed by the FTC and PGE. Developing clarity in this definition will inform study design and the evaluation process.

Performance assessment: An assessment of the physical aquatic habitat in the tailrace will be conducted using habitat mapping and information on water velocity profiles collected prior to completion of the siphon bypass and prior to installation of structural flow deflectors near the unit 12 and 13 discharge areas. A similar analysis will be done after the siphon bypass is operating and the flow deflectors are in place. Detailed bathymetry evaluations of the Sullivan tailrace have already been completed. Any need

for additional bathymetry data will be assessed when conducting this before-and-after analysis.

The before-and-after field data will be used to show changes in aquatic habitat from the siphon bypass discharge into the Sullivan tailrace that may eliminate low velocity areas suited for predators. If velocity profiles and physical habitat mapping do not suffice in characterizing the effects of the siphon bypass outfall and the flow deflector structures on reducing aquatic predator habitat, or a significant predation problem is identified by the FTC, a study using live fish and radio tagging will be conducted.

Assessment timing: Focused assessment of physical habitat characteristics near the siphon bypass outfall will be completed within one year after installation. Field data collection will occur during normal operating conditions in the spring and fall and when conditions within the area can be safely accessed.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

6. T.W. Sullivan Plant Evaluation Summary

Issue: Downstream Migrant Survival through the T.W. Sullivan Turbines

Measures: Installation of new turbine runners at T.W. Sullivan and operation of the turbines in accordance with the operating plan.

***Performance*:** Mortality test a replacement runner, designed differently than in Unit 8, prior to subsequent runner replacements. Index/efficiency testing of replaced runners will be part of the runner replacement engineering effort.

Performance assessment: An assessment of fish mortality through a new turbine runner if the new runner is a different design than in Unit 8.

Existing knowledge relevant to the design and conduct of this evaluation, should it occur, includes:

- Turbine mortality testing can be conducted through Sullivan's turbines using the Hi-Z Turb'N Tag technique and has successfully been completed before at Sullivan (unit # 8 in 1997).

- Assessing turbine mortality through any newly designed turbine runner(s) to be installed at T.W. Sullivan may be beneficial in determining improvements to this

passage route, or it may show that mortality reductions associated with new runner designs help meet the downstream passage standard.

Assessment timing: Turbine mortality testing, if necessary, will be done within 1 year of installation and prior to any subsequent year installations of that runner design.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

7. Downstream Migrant Survival and Injury at the Unit 13 Bypass Outfall

Measures: Redesigned bypass outfall at unit 13

Performance*:* The goal will be to redesign the Unit 13 bypass outfall chute to meet established passage criteria (NOAA Fisheries) for impact velocity at the tailwater. Mortality and injury of smolts and salmonid fry using the bypass as determined by live fish testing will be used in determining if the overall T.W. Sullivan performance standards are met (See Summaries 1 & 2).

Performance assessment: The existing chute has been assessed hydraulically under a range of conditions to determine impact velocities. After the chute is modified or replaced, its performance will be evaluated hydraulically to determine if impact velocity criteria established by NOAA Fisheries is being met. Design modifications will be developed for the Sullivan bypass outfall chute through the FTC.

- Alterations to the outfall chute will be analyzed relative to tailwater conditions when migrating fish are present and exiting the bypass via the chute. A hydraulic assessment will be completed that will show if the chute is meeting criteria, or not.
- Additional adjustments and modifications to the outfall chute will be developed by the FTC and implemented by PGE if the passage criteria have not been achieved.
- Additional testing for mortality and injury using live fish will be conducted in conjunction with FGE bypass testing, as determined by the FTC, to determine if overall performance standards for passage through the TW Sullivan plant are being met (see Summaries 1 and 2).

Assessment timing: Focused hydraulic assessments of the improved fish bypass outfall will occur following modifications. Additional assessments of fish condition for fish that pass through the improved bypass outfall could occur in conjunction with other bypass testing.

Evaluation of additional measures: The performance of any additional structural or

operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

8. Downstream Migrant Survival Through the Controlled Flow Structure

Measures: Controlled flow structure installed at apex of Willamette Falls

Performance standard and goals: A survival standard has been established for juvenile salmonid smolts passing through the proposed Willamette Falls controlled flow structure. A goal of "safe, timely and effective" downstream passage has been established for adult lamprey, juvenile lamprey, adult salmonids and steelhead kelts. A clearer definition of what constitutes "safe, timely and effective" passage will be developed by the FTC and PGE. Developing clarity in the definition of this goal will help guide study design and the evaluation process.

Performance assessment: Assessing the performance of the controlled flow structure placed at the apex of Willamette Falls will use results of a demonstration study completed in the fall of 2003 with spring chinook salmon smolts. This demonstration study used radio tags and Hi-Z Turb'N tags to better understand the feasibility of assessing survival and fish condition through the controlled flow structure using these methodologies in future testing. Results of this demonstration study will inform PGE and the FTC in study plan development to assess the controlled flow structure. Assessing the performance of the controlled flow structure will also depend on safe access to the site for releasing test fish through the slot.

- Kelt and fallback salmon condition will be evaluated in areas immediately upstream, at, and immediately downstream of the controlled flow structure for indications that fish are (or are not) having difficulty passing downstream. A focused study will evaluate the downstream passage success of several test groups of steelhead kelts (~50 fish each) obtained from an appropriate fish hatchery or the unit 13 bypass evaluator and released through the structure. The FTC and PGE will agree upon the details of this study.
- Salmonid smolt condition will be assessed through the slot using Hi-Z Turb'N tags, radio tags or other "sending" tags that indicate fish are alive and moving downstream past two established monitoring stations. The radio telemetry receiver established site at Sportcraft Marina will be used with 2 separate receivers and antennas spaced approximately ¼ mile apart.
- Fish behavior in the horseshoe area of the Falls and downstream will be assessed after passage through the slot using radio telemetry to determine potential holding locations or problem outfall areas.
- At this time, technology and research methods are not well established for juvenile lamprey and salmonid fry to assess these animals at this structure. Salmonid smolt condition will act as a surrogate for fry and juvenile lamprey until such time

appropriate technologies are available for mark-recapture studies.
- Adult Pacific lamprey condition and survival through the controlled flow structure will be tested as part of the post-construction monitoring and evaluation for injury and mortality.

Assessment timing: Focused study of the controlled flow structure will coincide with downstream passage peaks of adult steelhead kelts, fall back salmon and salmonid smolts and occur for a minimum of three years. Access to the controlled flow structure for testing in the spring (March through June) when these peaks occur, will be a logistical and safety challenge.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both. Any follow-up evaluations will be conducted after remedial measures that address the problem(s) have been implemented.

9. Effects of the Willamette Falls Controlled Flow Structure on Upstream Passage of Adult Salmonids.

Measures: Controlled flow structure installed at apex of Willamette Falls

Performance goal: A goal of "safe, timely, and effective" upstream passage of adult salmonids has been established for the Willamette Falls Project. A clearer definition of what constitutes "safe, timely and effective" passage will be developed by the FTC and PGE. A clearer definition of the goal will be helpful in guiding study design and the evaluation process.

Performance assessment: The operation of the proposed controlled flow structure and its potential impacts to upstream migrations will be assessed. Effects of the controlled flow structure on upstream salmonid passage through the Willamette Falls fish ladder will be assessed. Effects of the controlled flow structure placed at the apex of Willamette Falls on upstream salmonid passage will incorporate the use of radio telemetry technology or other "sending" type tags. The assessment is not intended to measure the performance of the Willamette Falls fish ladder in meeting a standard of passage efficiency or passage time. The assessment will attempt to identify problem areas associated with operation of the controlled flow structure that negatively affect upstream salmonid passage. A detailed study plan will be developed with FTC review.
- Adult salmonid upstream passage will be evaluated in the horseshoe area of Willamette Falls near the controlled flow structure discharge. The study will focus immediately downstream of the controlled flow structure for indications that fish are (or are not) having difficulty passing upstream. Assessment of the discharge of the controlled flow structure on attraction to entrances 2, 3 and 4 of the fish ladder will be

conducted, possibly through intermittent operation of the spillway during field testing.

- These studies will evaluate the effects of the controlled flow structure on upstream passage of adult winter steelhead (*Oncorhynchus mykiss*) and spring chinook salmon (*Oncorhynchus tshawytsca*) with approximately 50 test fish for each stock. No assessment is intended for adult summer steelhead, fall chinook salmon or coho salmon, unless there are indications that passage for these species is being adversely impacted.
- Test fish can be obtained from the Willamette River below the Falls by angling, from the Willamette Falls fish ladder trap on leg #1, or from an appropriate fish hatchery. The FTC and PGE will agree upon the details of this study.
- These studies will use an array of radio receivers or other tag detection devices at the horseshoe section of the Falls, below the Falls at Sportcraft Marina and above the Falls. Each detection array above and below the Falls will cover the entire river channel.

Assessment timing: Assessment of the controlled flow structure on upstream salmonid passage will occur throughout passage periods (February through June). These assessments will occur for a minimum of three years.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both. Any follow-up evaluations will be conducted after remedial measures that address the problem(s) have been implemented.

10. Aquatic Predation Potential Immediately Downstream of Willamette Falls

Measure: *Controlled flow structure installed at apex of Willamette Falls*

Performance: The goal is to reduce or eliminate aquatic predator habitat in the outfall area of the controlled flow structure in the horseshoe section below Willamette Falls. Success in achieving this goal can be evaluated either by assessing aquatic habitat before and after the facilities are built, or by assessing the behavior of aquatic predatory fish, or both. A clearer definition of what constitutes adequate reduction of predator habitat or unfavorable predator behavior will be developed by the FTC and PGE. Clarity in the definition of this goal will be needed to guide study design and the subsequent assessment of Project effectiveness.

Performance assessment: An assessment of the physical aquatic habitat in the horseshoe section of the Falls will be done using habitat mapping and water velocity profiles prior to installing and operating the controlled flow structure at the Falls. A similar analysis will be done with the facility installed and operating. The before-and-after field data is

intended to show changes in aquatic habitat from the operation of the controlled flow structure into the horseshoe section of the Falls. Willamette River flow and water surface elevation below the Falls will be a variable in these analyses. Access to the field data collection areas may limit sampling. If velocity profiles and physical habitat mapping do not suffice in determining the effects of the controlled flow structure outfall on reducing aquatic predator habitat, a study using live fish and radio tagging could be investigated. Detailed bathymetry of the horseshoe section of the Falls are already completed. Any additional detail toward gathering more bathymetry data will be assessed when conducting this analysis.

Assessment timing: Focused assessment of physical habitat characteristics near the controlled flow structure outfall and the siphon bypass outfall will be completed within one year after both are installed and operating. Field data collection could most likely safely occur in moderate to low flows in the spring and fall.

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

11. Avian Predation Potential Immediately Downstream of the T.W. Sullivan Plant and Willamette Falls

***Measures*:** Controlled flow structure installed at apex of Willamette Falls. Sullivan Plant inner forebay rack replacement (units 1-3), guidewall realignment, siphon bypass installation, redesigned bypass outfall at unit 13 and flow deflectors in tailrace.

Performance: The goal is to reduce or eliminate avian predation opportunities on fish in the Sullivan plant tailrace and the outfall area of the controlled flow structure in the horseshoe section below Willamette Falls. This goal could be accomplished using physical barrier deterrents. Efficacy of deterrents in the tailrace can be monitored and evaluated by quantifying avian predation activity before and after installed.

Assessment monitoring: An assessment of the efficacy of avian predation deterrents should be done during downstream juvenile salmon and steelhead migrations with the unit 13 bypass, siphon bypass and apex controlled flow structure operating. If it is determined that deterrents are not effective, hazing of birds to reduce predation will be investigated.

Assessment timing: Focused assessment of physical avian deterrents in the Sullivan tailrace and Willamette Falls will be completed after the siphon bypass and controlled flow structure are installed and operating. Field observations should occur during

downstream fish migrations in the spring (March 1 to June 1) and in the fall (October 1 to December 15).

Evaluation of additional measures: The performance of any additional structural or operational measures implemented to address identified problems will be evaluated following protocols agreed upon by the FTC and PGE. Such evaluation may involve routine monitoring, focused study, or both.

Attachment 2 (to Appendix E)

O&M Task List at Willamette Falls Ladder:

The following list is from the table *Anticipated Costs of Willamette Falls Fish Ladder (5/5/03*) developed by ODFW. Tasks associated with ODFW personnel (ie, labor, potable water, and sanitary facilities) and fish management (ie, counting and trapping stations, and aesthetics) will remain the responsibility of ODFW. PGE shall assume its tasks within six months of the new license becoming final.

PGE O&M ITEMS

ANNUAL OPERATIONS

Power

ANNUAL MAINTENANCE

Cranes-routine exercising and minor maintenance
Entrance One Crane
Chain Hoist over gates 1b, 1c
Chain Hoist @ gate 1d
Jib Crane - Fishway One
Jib Crane - #1 on 67' Deck
East Jib Crane on 67' Deck
South Jib Crane on 67' Deck
Sealion barrier frame hoist @ Entrance
Inspection & maintenance
Misc. Repairs
Contract annual service

ELECTRIC PUMPS
Entrance one dewatering pump
Entrance two dewatering pump
Entrance three dewatering pump
Valve pit dewatering pump
Lower count room sump pump
Inspection & maintenance

HYDRAULIC GATE OPERATORS
Entrance one gates 1b, 1c
Entrance two
Entrance three
Entrance four

Water intake gates 1-12
Inspection & maintenance

ELECTRIC GATE OPERATORS
Entrance One gate 1d
Fishway entrance gate North
Fishway entrance gate South
Entrance Two Aux. Water valve
Entrance Three Aux. Water valve
Pool 48 makeup water valve.
Velocity Gate
Inspection & maintenance

PLC & COMPUTER EQUIP.
Inspection & maintenance

Lighting
Inspection & maintenance

BASCULE BRIDGE
Inspection & maintenance

OBERMEYER WEIR
Inspection & maintenance

TRASH RAKE
Inspection & maintenance

PAINTING
Inspection & maintenance

STAFF GAUGE (CLEANING AND MAINT.)

Inspection & maintenance

LEVEL TRANSDUCERS
Wet well & debris cleaning

WATERTIGHT BULKHEADS
Inspection & maintenance

DEBRIS REMOVAL

Debris removal (head racks)
Debris removal contract (head racks)
Fishways & Aux. Channels

ODFW O&M ITEMS

ANNUAL OPERATIONS

Labor, Phone, Contract annual service

ANNUAL MAINTENANCE

ELECTRIC PUMPS
Misc. Repairs year 2002

WINDOW WASH UNIT
Inspection & maintenance

VERTICAL CROWDER
Inspection & maintenance

HORIZONTAL CROWDER
Inspection & maintenance
light box

VIDEO EQUIPMENT
Inspection & maintenance

PAINTING
Aesthetic

HVAC

ELEVATOR
O&M (contract), inspect., license

SMOKE & FIRE ALARM
O&M (contract), fire extinguishers

Potable Water system
Inspection & maintenance

Sanitary Facilities
Inspection & maintenance

Lower count room and trap

KOWASKI MULE

STORAGE CONTAINER

Attachment 3 (to Appendix E)

Willamette Falls Controlled Flow Structure Design Process and Proposed Operation

A. Objectives

1. The purpose of a controlled flow structure at the apex of the Falls is to focus river flow that would otherwise be distributed around the crest of Willamette Falls to the apex (most upstream location) which is more conducive to safe, timely, and effective downstream passage of fish.

2. The controlled flow structure design and its operation will change the location where the flow actually goes over the Falls (within flows that it can control). It is not intended to significantly change the amount of water that goes over the Falls.

3. Assuming an obermeyer type structure is used, opening the structure to pass more flow involves lowering the obermeyer and closing the structure to pass less flow involves raising the obermeyer. A multi-segment structure is anticipated with a deeper obermeyer in the center and a shallower obermeyer on either side (dependent on bathymetry).

4. Operation of the structure is based upon upstream river elevation, which changes as river flow changes.

5. The design maximum capacity of the controlled flow structure is based on a top elevation of 54.5", which is a 6" veil flow over the top of the flashboards.

6. The controlled flow structure will influence approximately 25,000 cfs of river flow based on a 6” veil spill over the dam and flashboards, distributed as follows: Sullivan fish ladder 6” veil flow ~ 10,000cfs; controlled flow structure ~ 15,000 cfs*.

   Downstream migrants are assumed to avoid a veil flow less than or equal to 6”.

7. Improved upstream passage of adult lamprey will be a design element of the controlled flow structure (either integrated into the structure or located adjacent to it). The design and operation of the controlled flow structure will enhance upstream passage conditions for adult lamprey to the extent practicable.

*Actual flow amount will be determined through the design process described in the following section.

B. Design process of a Controlled Flow Structure at the Falls apex.

PGE shall implement the following steps, in consultation with the FTC and subject to the approval of the Fish Agencies, relative to the sizing and design of the controlled flow structure at the apex of the Falls:

1. Design capacity objective of the structure is 15,000 cfs based on an elevation of 54.5'.
2. Engineering analysis of any hydraulic or physical constraints for a 15,000 cfs structure at the Falls apex. (2003),
3. If constrained, determine the maximum design capacity for a structure at Falls apex.
4. CFD model the resultant structure flow capacity to assess upstream flow fields (2004)
5. Small-scale physical model to aid in design and minimize impacts (ie, downstream migrants, fish ladder entrances, and total dissolved gas). 2005/2006
6. Structure construction in 2006/2007

C. Proposed Controlled Flow Structure Operational Concept:

PGE, in consultation with the FTC, will develop an operating plan for the controlled flow structure and T.W. Sullivan powerhouse that takes into account the objectives in Section A and the need to maintain river flow to those measures implemented around the Falls (i.e., notches in flashboards, lamprey ramps, and future lamprey passage devices). The following description is conceptual only. Specific operating details will be developed in consultation with the FTC and subject to approval by the Fish Agencies in the operating plan developed under Implementation Sheet IV.A.10.

For the purposes of discussion, description of the proposed operation of the controlled flow structure starts with river flows decreasing through the spring and all T.W. Sullivan units and fish bypass systems operating. Flashboards are not in place (typically having been washed out during winter high flows), and the controlled flow structure is fully open (lowered) but there is sufficient flow in the river such that upstream elevation is >52.5' at the dam.

The structure will remain fully open (lowered) at river elevations > 52.5' or elevation required for full T.W. Sullivan powerhouse operation (turbine units and fish bypass systems), whichever is higher. This is referred to as the "pre-flashboard level". This is consistent with Objectives 1 and 2.

As river flow continues to decrease and upstream elevation decreases to the pre-flashboard level, the structure will be incrementally closed (raised) as needed to maintain upstream elevation. As flow varies, the exact position of the structure will be adjusted as needed.

PGE shall install flashboards at the Falls when considered safe to do so, taking into

account that the structure may allow installation of flashboards earlier that historically possible due to the structure reducing flow over the concrete dam.

With flashboards installed (this includes the required areas of flashboard notches to provide stranding pool flow), the structure will be operated to maintain upstream elevation between 53' and 54.5'. The 53' minimum elevation ensures adequate T.W. Sullivan forebay levels for fish bypass system operation, and the 54.5' maximum ensures a veil of no more than 6" of water flowing over the flashboards. While river flows are less than 25,000 cfs, if other water routes are in operation (ie, TWS, ladder), the structure is passing all flow over the Falls (minus what is going through board seams, lamprey passage structures, and stranding flow notches).

As flows begin to increase in the fall/winter, the structure will be opened (lowered) to maintain upstream elevation between 53'-54.5'. As river flows approach 25,000 cfs, the structure will be at or near full open (lowered) and will remain in the full open position until the following spring when flows start to decrease.

Attachment 4 (to Appendix E)

The Willamette Falls Project:
Adult Pacific Lamprey Passage Plan

Study outline for Adult Lamprey Issues
At Willamette Falls

Evaluate effectiveness of adult lamprey passage through project area:

PGE shall fund a research effort on Pacific lamprey passage and behavior consistent with the proposal below. PGE shall initiate development of this research effort in 2004 with the intent for research to begin in 2005.

PROPOSED MAIN OBJECTIVES:
Determine specific passage routes of adult Pacific lamprey moving upstream through the project; and identify potential passage problems including but not necessarily limited to:

- The Falls
- The dam with and without flashboards
- The Willamette Falls fish ladder.

Determine passage effectiveness at lamprey passage structures, including ramps, the controlled flow structure, the Willamette Falls fish ladder, flashboard notches, or any other passageway constructed

Determine the feasibility and applicability of a capture and haul program as a means to improve/ensure adequate passage.

POTENTIAL PROPOSED METHODOLOGIES AND OTHER OBJECTIVES

a. Implant lamprey captured throughout the project area with radio tags (for example: 100 to 150 per year to ensure adequate sample size for subsequent evaluations); release fish in immediate vicinity of capture;
b. Track radio-tagged lamprey to develop estimates of the proportion and timing of lamprey passing by route (fish ladder or Falls), and distribution of lamprey across the Falls. Set up antennas and receivers so that passage routes can be determined at a relatively fine scale, and so that lamprey negotiating the Falls but not the dam/cap can be identified;
c. Estimate overall success of passage as the proportion of adult lamprey reaching a pre-determined starting point (e.g., ladder entrance, and a specific area below the Falls assumed to be a point beyond which the individual is attempting to move past the Falls) that successfully pass upstream;
d. Evaluate the sequential effectiveness of lamprey attempting to pass first over the bedrock Falls and subsequently over the dam/flashboards atop the Falls, to

estimate "unimpaired" passage effectiveness for the project area (see Figure 1). Results of this evaluation of "unimpaired" effectiveness may be used to refine the preliminary goal for lamprey passage.

e. Use information collected to determine where passage impediments exist and therefore where passage could be improved;
f. Develop plan for specific improvements for PGE to implement and subsequently evaluate.

Commitments from the Applicant

It is estimated that this study will take two years. Annual budgets for the proposed work will depend on the level of effort expended to capture and mark lamprey, the number of lamprey radio tagged, and the precision used in determining locations of radio-tagged lamprey. For reference, the estimated cost for the first year is likely to range from a minimum of $140,000 to a maximum of $190,000.

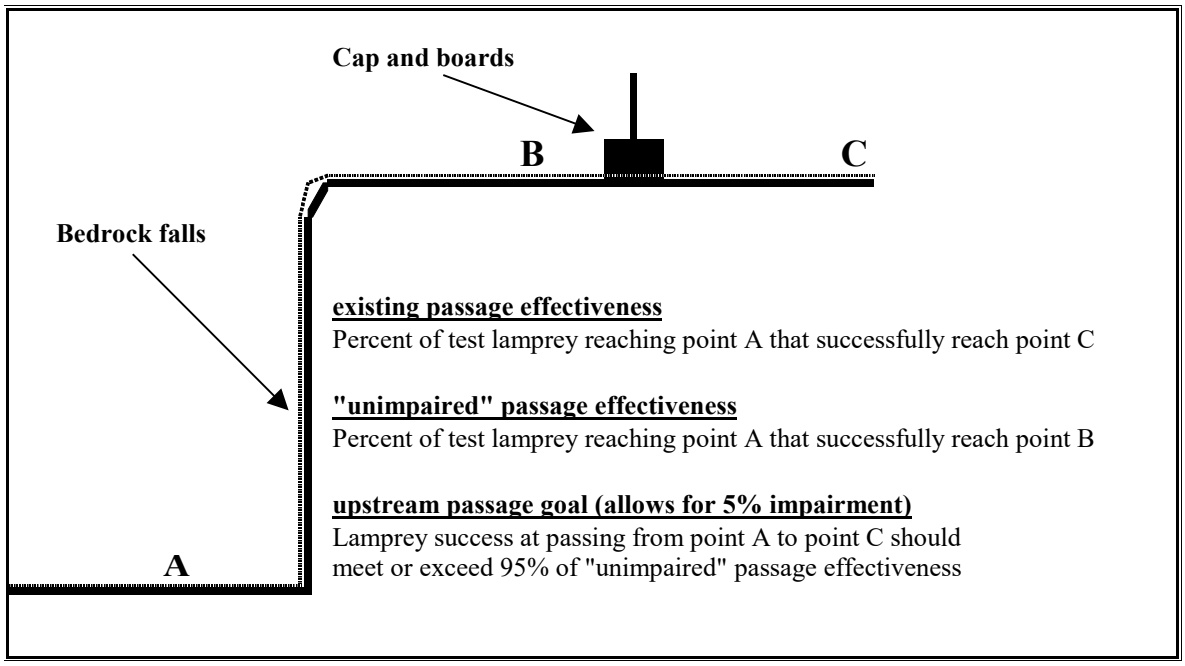


Figure 1. Conceptual approach to developing an upstream passage goal for Pacific Lamprey at Willamette Falls.

Attachment 5 (to Appendix E)

Comprehensive List of Fishery Resource Measures by Structure

A. T.W. Sullivan Powerhouse

Tier 1 (Pre-license: present to January 2005)

Environmental Measures

- Implement shutdown priorities for TWS turbine units to maintain FGE during periods of low flow based on forebay modeling.
- Modify trashracks in front of Units 1, 2 and 3 and modify forebay guidewall to support siphon bypass construction in 2005.
- Remove selected bars at headgate trashracks for adult downstream passage.

Design Work / Modeling/Analysis

- Model TWS forebay, including changes for the guide wall and siphon bypass; model runs to include a range of forebay flows, selected unit(s) offline, and trash rack spacing.
- Small scale model and preliminary design of siphon bypass to support construction in 2005
- Design trash rack cleaning system to support construction in 2005.
- Clarify how rights for the additional water needed for siphon bypass operations will be addressed.
- Assess Unit 13 bypass outfall relative to NMFS velocity impact standards.

Monitoring and Evaluations

- Determine impingement rate of lamprey at the Unit 13 Eicher screen.
- Assess presence and condition of salmonid fry guided through TWS fish bypass.
- Assess presence and condition of juvenile lamprey guided through the TWS fish bypass.
- Verify performance of Unit 13 bypass improvements (delay and mortality testing).
- Perform turbine index/efficiency testing for replaced runners (2 per year), and operates replaced, and existing runners within peak efficiency band based on consultation with fish agencies. Mortality test new runner design as applicable.

Tier 2 (Planned post-license measures; final testing to be completed by 2008)

Environmental Measures

- Siphon bypass constructed (2005).
- Implement PIT technology in the siphon bypass.
- Trash rack cleaning system installed (2005).

- Modify Unit 12 and 13 discharge to reduce predator-holding areas after implementation of siphon bypass. (2006)
- Modify or replace existing bypass outfall in tailrace to meet NMFS criteria (2006.)
- Implement TWS shutdown program when fish protection facilities are not functioning per agreed upon schedule. (greater than two weeks during July 1 to July 31 period).
- If Unit 1 off-line for >24hrs during upstream salmonid migration period, then remaining turbine units will be shutdown. (2005 and on)
- Rehabilitate the Unit 13 fish bypass system by adding a new large volume PIT tag detection system in the bypass discharge to allow PIT tag interrogation in both bypass and sampling mode.

Monitoring and Evaluations

- Evaluate FGE and mortality and injury for smolts (spring chinook, steelhead), salmonid fry, and juvenile lamprey after implementation of siphon bypass, to include effects of turbine passage and turbine shutdown sequencing on fish guidance. Three years of fall and spring testing starting in the fall of 2005 or 2006.
- Verify the effects of turbine selected unit shutdown on FGE during low flow periods to verify physical model results.
- Assess the detection efficiency of new PIT tag detector installed in Unit 13 bypass (non-sampling route) and siphon bypass.
- Assess upstream passage effectiveness for adult salmonids (project-level evaluation) after siphon bypass is installed and operating.
- Hydraulic evaluation of tailrace after modification of Units 12 & 13 discharge.
- Assess the injury and mortality of downstream migrant steelhead kelts and adult lamprey after passage through the siphon bypass.
- Upgrade the avian predation deterrents in place at the T.W. Sullivan tailrace and install avian deterrents in the forebay after the siphon bypass has been installed.

Tier 3 (Post-license measures to be implemented if Tier 2 measures are insufficient. Order of implementation, assessing the protective value to the resource, and a review of additional options would occur before construction. Implementation would begin no later than 2009 unless agreed to by the FTC.)

Environmental Measures

- Assess injury/mortality of fish caused at TWS's 2-inch spaced trashracks, and implement new rack system if indicated as reducing mortality (wider/narrower bars, solid/perforated plate, angled/straight bars)
- Behavioral deterrent devices (strobe/acoustic)
- Eicher screen installed in Unit 12 and linked to Unit 13 bypass/evaluator, if the existing Eicher screen is favorable for juvenile lamprey passage.
- Other bypass structure/equipment upgrades as identified.

Monitoring and Evaluations

- Performance monitoring as needed for modifications made.

Tier 4 (This is an open-ended list of options in the event that Tier 3 measures are not sufficient to meet standards. This would begin not more than 10 years after the new license is finalized unless agreed to by the FTC.)

- Criteria Screening.
- Seasonal shutdowns during salmonid migration periods.
- Project decommissioning.
- Other options as determined.

B. Willamette Falls

Tier 1 (Pre-license: present to January 2005)

Environmental Measures

- Remove 150 feet of flashboards at the Falls apex no later than October 1 prior to start of construction of the controlled flow structure at Falls apex.
- Place lamprey passage devices at the cap (minimum of 2) when flashboards are installed.
- Notch flashboards to provide flow into stranding pools below the dam and Falls.
- Provide "Wet Hole" egress.

Design Work / Modeling / Analysis

- Assess ladder entrance #1 for compliance with NMFS criteria. Consult with NMFS, USFWS and ODFW on action plan for ladder entrance #1.
- Assess constraints and begin design of a controlled flow structure at the Falls apex including use of an upstream CFD model. Capacity goal is 15,000 cfs.
- Convene lamprey expert group and design upstream lamprey research study for implementation in 2005.

Monitoring and Evaluations

- Pilot study (fall 2003) to demonstrate the feasibility of evaluating juvenile salmonid survival through a controlled flow structure at the Falls apex.
- Preliminary assessment of lamprey passage devices installed with the flashboards (2004). Results will inform subsequent design of lamprey passage devices in consultation with the FTC and lamprey research group for field testing.004.

Tier 2 (Planned post-license measures; final testing to be completed in 2009)

Environmental Measures

- Construct controlled flow structure at Falls apex and make minor downstream landing area improvements associated with the controlled flow structure. (2006/2007)

- Install avian predation deterrents below the horseshoe section of the Falls. (2006)
- Begin implementing Willamette Falls fish ladder entrance #1 modifications, O&M task list and stranding plan. (2005)
- Consult with FTC to implement new or improved (such as existing ladders) passage for adult lamprey passage as indicated by research efforts.

Monitoring and Evaluations

- Provide funding for Lamprey research effort at the Falls (2 year effort beginning in 2005).
- Small-scale physical model to aid design of controlled flow structure at apex of Falls and to assess/avoid potential adverse impacts that the controlled-flow structure might have on the ability of fish to locate the Willamette Falls fish ladder entrances. (Note: model construction in 2005). Include potential impacts on water quality (i.e. TDG, etc.) from the installation of the controlled-flow structure.
- Perform injury and mortality testing (for juvenile downstream migrants) through the controlled-flow structure.
- Assess the efficiency of the avian predation-deterrents installed below the Falls.
- Assess the fate of downstream migrant steelhead kelts and adult salmonids classified as fallback at the controlled-flow structure.
- Evaluate the controlled-flow structure to ensure it is not compromising the adult salmonid guidance to the adult fish ladder entrances.
- Assess overall upstream passage effectiveness for lamprey including benefits of trap-and-haul and/or capture-and-haul program.

Tier 3 (Post-license measures to be implemented if Tier 2 measures are insufficient. Order of implementation, assessing the protective value to the resource, and a search for additional options would occur before construction. Implementation would begin no later than 2010 unless agreed to by the FTC.)

Environmental Measures

- Major modifications to the downstream/landing area of the flow-control structure(s) to improve downstream migrant survival.

Monitoring and Evaluations

- Evaluate any operational changes made in Tier 3.
- Evaluate physical changes made at the Falls or controlled-flow structure(s).

Tier 4 (This is an open-ended list of options in the event that Tier 3 measures are not sufficient to meet standards. (not more than 10 years after the new license is finalized unless agreed to by the FTC.)

- Decommissioning and removal of the dam on Willamette Falls.
- Additional structure at Falls if improved juvenile passage is still needed at the Falls.
- Other options as determined.

Attachment 6 (to Appendix E)

Implementation Timeline

The Parties agree to the following implementation timeline associated with the T.W. Sullivan and Willamette Falls PM&E measures. The intent of the following timeline is to complement Section IV (Implementation Sheets for T.W. Sullivan and Willamette Falls measures).

PRE LICENSE ISSUANCE

2003

T.W. Sullivan

- Model TWS forebay, including changes for the guide wall and siphon bypass; model runs to include a range of forebay flows, selected unit(s) offline, and wider trashrack spacing.
- Assess Unit 13 bypass outfall relative to NMFS velocity impact standards
- Clarify how rights for the additional water needed for siphon bypass operations will be addressed.
- Implement shutdown priorities for TWS turbine units to maintain good FGE during periods of low flow based on forebay modeling.

Willamette Falls

- Assess constraints for a control flow structure designed for 15,000 cfs as desired capacity
- Pilot study (fall 2003) to demonstrate the feasibility of evaluating juvenile salmonid survival through a controlled flow structure at the Falls apex.
- Place lamprey passage devices at the cap (minimum of 2) when flashboards are installed.
- Notch flashboards to provide flow into stranding pools below the dam and Falls.
- Assess fish ladder entrance #1 for NMFS entrance criteria

2004

T.W. Sullivan

- Modify trashracks in front of Units 1, 2 and 3 and modify forebay guidewall to support siphon bypass construction in 2005.
- Remove selected bars at headgate trashracks for adult downstream passage.
- Small scale model and preliminary design of siphon bypass to support construction in 2005
- Design trash rack cleaning system to support construction in 2005.

- Determine impingement rate of lamprey at the Unit 13 Eicher screen.
- Assess presence and condition of salmonid fry guided through TWS fish bypass.
- Assess presence and condition of juvenile lamprey guided through TWS fish bypass.
- Verify performance of Unit 13 bypass improvements (delay and mortality testing)
- Perform turbine index/efficiency testing for replaced runners (2 per year), and operate replaced and existing runners within 1% of peak efficiency based on consultation with FTC. Mortality test new runner design as applicable.

Willamette Falls
- Remove 150 feet of flashboards at the Falls apex NLT October 1 prior to the start of construction of the controlled flow structure at Falls apex.
- CFD modeling of Controlled Flow Structure upstream flow field extent.
- Provide "Wet Hole" egress
- Preliminary assessment of lamprey passage devices installed with the flashboards (2004). Results will inform subsequent design of lamprey passage devices in consultation with the FTC and lamprey research group for field testing

POST FINAL LICENSE

2005
T.W. Sullivan
- Complete design and construct siphon bypass, to include any additional forebay modifications, not completed in 2004, identified by physical forebay model.
- Upgrade Unit 13 fish bypass system by adding and assessing a new large volume PIT tag detection system in the bypass discharge to allow PIT tag interrogation in both bypass and sampling mode. This will improve monitoring and evaluation capabilities.
- If technically possible, implement and assess PIT technology in the siphon bypass to improve monitoring and evaluation capabilities. (ongoing based on technical capabilities)
- Trash rack cleaning system installed. (2005/2006)
- Implement TWS shutdown program when fish protection facilities are not functioning per agreed upon schedule. (greater than two weeks during July 1 to July 31 period).
- Evaluate FGE and mortality and injury for smolts (spring chinook, steelhead), salmonid fry and juvenile lamprey after implementation of siphon bypass, to include effects of turbine passage and turbine shutdown sequencing on fish guidance. Three years of fall and spring testing starting in the fall of 2005 or 2006.
- If Unit 1 off-line for >24hrs during upstream salmonid migration period, then remaining turbine units will be shutdown. (2005 and on)

Willamette Falls
- Begin design of Controlled Flow Structure, to include small-scale physical model (2005). Physical modeling will assess methods for preventing contribution to high TDG.

- Assess overall upstream passage effectiveness for lamprey including benefits of trap-and-haul and/or capture-and-haul program.
- Begin implementing Willamette Falls fish ladder O&M task list and stranding plan.

2006
T.W. Sullivan
- Modify Unit 12 and 13 discharge to reduce predator-holding areas after implementation of siphon bypass.
- Modify or replace existing bypass outfall in tailrace.
- Upgrade avian predation deterrents in T.W. Sullivan tailrace and
- Observational data collection on juvenile lamprey, and as new technology becomes available and proven, participate in implementing juvenile lamprey bypass efficiency studies.
- Assess downstream migrant steelhead kelts after passage through the siphon bypass.

Willamette Falls
- Install controlled flow structure at Falls Apex. (2006/2007)
- Install avian predation deterrents in horseshoe area of Falls (2006-2007)
- Initiate injury and mortality testing through the controlled-flow structure at the Falls.
- Assess downstream migrant steelhead kelts and adult salmonids classified as fallback at the controlled-flow structure.
- Evaluate the controlled-flow structure to ensure it is not compromising the adult guidance to the adult fish ladder entrances.
- Evaluate the impacts on water quality (i.e. TDG, etc.) from the operation of the controlled-flow structure.

2007
T.W. Sullivan
- Hydraulic evaluation of tailrace after modification of Units 12 & 13 discharge and siphon bypass installation.
- Verify the effects of turbine selected unit shutdown on fish guidance FGE during low flow periods to verify physical model results.

Willamette Falls
- Assess the effectiveness of the avian predation-deterrents installed below the Falls and in the T.W. Sullivan tailrace. (2007/8)

2008
Willamette Falls
- Based on performance testing of controlled flow structure, make minor modifications to downstream landing area to meet standards as needed. Test after modification(s).

2009
Willamette Falls
Evaluate modifications made associated with control flow structure.

2010

(Note: Exact implementation timeline of the following items will be determined as need is identified. Post modification testing performed by this time will provide information to help identify which measures would be meaningful. Anticipated timeframe is 3-5 years).

T.W. Sullivan
- Assess injury/mortality of fish caused at TWS's 2-inch spaced trashracks, implement new rack system if indicated as reducing mortality (wider/narrower bars, solid/perforated plate, angled/straight bars)
- Behavioral deterrent devices (strobe/acoustic)
- Eicher screen installed in Unit 12 and linked to Unit 13 bypass/evaluator.
- "Fish Friendly" runner replacements on all/selected Units.
- Other bypass structure/equipment upgrades as identified.
- Performance monitoring as needed for modifications made.

Willamette Falls
- Assess options associated with control flow structure (ie, major modification to landing area, additional structure locations).

2015
Re-engage Parties to determine next steps.

Form L-3
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED MAJOR PROJECT AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Article 4. The project, including its operation and maintenance and any work incidental to additions or alterations authorized by the Commission, whether or not conducted upon lands of the United States, shall be subject to the inspection and supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto, and shall notify him of the date upon which work with respect to any alteration will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall submit to said representative a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of said alterations or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights or occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission any direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity

for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable

modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 22. Whenever the United States shall desire to construct, complete, or improve navigation facilities in connection with the project, the Licensee shall convey to the United States, free of cost, such of its lands and rights-of-way and such rights of

passage through its dams or other structures, and shall permit such control of its pools, as may be required to complete and maintain such navigation facilities.

Article 23. The operation of any navigation facilities which may be constructed as a part of, or in connection with, any dam or diversion structure constituting a part of the project works shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of the Army.

Article 24. The Licensee shall furnish power free of cost to the United States for the operation and maintenance of navigation facilities in the vicinity of the project at the voltage and frequency required by such facilities and at a point adjacent thereto, whether said facilities are constructed by the Licensee or by the United States.

Article 25. The Licensee shall construct, maintain, and operate at its own expense such lights and other signals for the protection of navigation as may be directed by the Secretary of the Department in which the Coast Guard is operating.

Article 26. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 27. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 28. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.