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February 14, 2008

Fred Ayer, Executive Director
Low Impact Hydropower Institute
34 Providence St.
Portland, ME 04103

Subject: Final Application Reviewer Report for the Willamette Falls Hydroelectric Project

Dear Fred:

Attached please find my final reviewer's report on the application by Portland General Electric for certification of the Willamette Falls Hydroelectric Project by the Low Impact Hydropower Institute. Please contact me with any questions or concerns.

Best regards,

s//Gabriela

Gabriela Goldfarb

Attachment: as described.

Review of Low Impact Hydropower Institute Application for LIHI Certification: Willamette Falls Hydroelectric Project

Introduction and Overview

This report reviews the application submitted by Portland General Electric (applicant) to the Low Impact Hydropower Institute (LIHI) for LIHI Certification for the Willamette Falls Hydroelectric Project (project or facility) located on the Willamette River in Clackamas County, Oregon. The Federal Energy Regulatory Commission (FERC) relicensed the project (FERC 2233) in 2005 for the operation and maintenance of the 15.18 megawatt run-of-river project.

Project and site characteristics. The project is located at river mile 26.5 on the Willamette River within the city limits of Oregon City (to the east) and West Linn (to the west) in north-central Oregon, approximately 10 miles from Portland and 40 miles from the Willamette's confluence with the Columbia River. The project is located in a populated, industrial urban setting at the site of Willamette Falls, a natural waterfall that marks the head of the tidally influenced lower Willamette River. The applicant has operated hydroelectric facilities at the site since 1889. Other industrial facilities, some defunct and some still operating, still share the site, including flour, saw, pulp, and paper mills. Since 1873 the U.S. Army Corps of Engineers has operated a navigation canal and locks on the west bank of the river for commercial barge transport and recreational boat traffic.

The project boundary of the Willamette Falls Project encompasses 97.23 acres. The applicant owns most of the property, including the majority of Willamette Falls Dam, the T.W. Sullivan Powerhouse, a portion of Willamette Park (approximately 4 miles upriver) operated by the City of West Linn, and the Blue Heron Paper Company powerhouse (shut down in 2003 with decommissioning to be completed in 2008). The rest of the property comprises small parcels owned by the Blue Heron Paper Company (lands under a still-operating mill), the West Linn Paper Company (grinder rooms and a decommissioned generating facility integral to the project dam), and the State of Oregon (the fish ladder and portions of the dam and an access road).

The project boundary does not include the impoundment, which extends upstream of the project approximately 30 miles to river mile 56. According to the applicant, the pool without any project structures would extend approximately to river mile 54. The project operates in a run-of-river mode and has no water storage or flood control functions. Flashboards at the crest of the Falls currently maintain a water elevation of 54 feet above mean sea level (msl) during the summer and fall low flow periods, but washout when flows increase; the normal high is approximately 58 feet in winter. In October 2007 FERC approved a license amendment that will allow the applicant to increase flashboard heights by 1.5 feet. Typical water surface elevations range from 55 to 56 ft. msl. Water that does not flow through the powerhouse, fish ladder, or navigation locks passes over the dam and the waterfall and continues down river. Water diverted through the powerhouse rejoins the main river immediately below the Falls.

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 ft. msl and a 2,300-foot-long, 6 to 20-foot-high concrete dam with a crest elevation of 52.0 ft. msl (55.5 ft. msl with the anticipated installation of the higher flashboards). The project has one operating hydroelectric generating development, known as the T.W. Sullivan development, located on the west (West Linn) side of the river at Willamette Falls. The development consists of a forebay and a trashrack-equipped gated intake along the entire width of 13 bays, each housing vertical turbine-generators with a combined rated capacity of 15.180 MW. The project's fish ladder is located near the center of the river at the apex of the horseshoe-shaped waterfall. The fish ladder includes three entrances within the Falls and one at the T.W. Sullivan powerhouse. Although the fish ladder is owned and operated by the Oregon Department of Fish and Wildlife (ODFW), the applicant is responsible for maintenance and modifications to the ladder as specified in the FERC

license.

Settlement agreement. The FERC license incorporates the provisions of the January 2004 Settlement Agreement, in which the parties negotiated with the applicant to implement a number of measures and construct new facilities related to impacts to fish resources. These include already-completed modifications to the project's forebay and a second fish bypass system (the North Fish Bypass or NFB), and work underway to construct a new flow control structure at the apex of the Falls to improve downstream migrant fish passage over the Falls. The parties to the agreement include:

- *State natural resource agencies* – Oregon Departments of Environmental Quality (DEQ), Fish And Wildlife (ODFW), and Water Resources (WRD)
- *Federal natural resource agencies* – National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS)
- *Tribes* – Confederated Tribes Of The Warm Springs Reservation Of Oregon, Confederated Tribes Of Siletz Indians Of Oregon, Confederated Tribes Of The Grand Ronde Community Of Oregon, Columbia River Intertribal Fish Commission
- *Conservation interests* – American Rivers, The Native Fish Society, Oregon Trout, Trout Unlimited

The Settlement Agreement concerns itself with five issues: (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. The agreement does not focus on other issues.

Public comment and agency letters. LIHI received no public comments on this application.

General conclusions and caveats. The interested parties consulted in the course of this review were largely unanimous in their assessment of the project and the applicant's conduct, as follows:

1. The applicant has acted in good faith and is thus far meeting all its obligations under the FERC license and Settlement Agreement.
2. Numerous complex technical modifications to the project have been or will be implemented pursuant to the license/Settlement Agreement to address fish passage concerns. It will take time to collect and analyze data on the effects of those measures to know whether they satisfy, over time, criteria for fish passage and water quality set forth in the Settlement Agreement and license, and to implement any adaptive management measures that may be needed.

Four interested parties did not respond to telephone and email inquiries prior to the deadline for submitting this report. They are the Confederated Tribes of the Grand Ronde (one of four tribal signatories to the Settlement Agreement), the Oregon State Historic Preservation Office (charged with oversight of cultural resource protection aspects of the FERC license), and two conservation groups that were signatories to the Settlement Agreement: Oregon Trout and Trout Unlimited. According to the other conservation interests I did interview, these two signatory groups have not participated directly in the implementation process. Every effort will be made to ascertain and present the views of all these interests prior to the LIHI Governing Board's consideration of the project.

Recommendation. Based on my review of information submitted by the applicant, my review of additional documentation, and my consultations with resource agency staff, other signatories to the Settlement Agreement, and other interested parties, I believe the Willamette Falls Hydroelectric Project meets all of the criteria to be certified and I recommend certification.

LIHI Certification Criteria

A. Flows

- 1) **Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**

YES

The project includes no diversions and operates in a modified run-of-river mode. In conversations with resource agency staff, all confirmed that the applicant is in compliance with flow requirements.

If YES, go to B.

PASS.

B. Water Quality

- 1) **Is the Facility either:**
- a) **In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or**
 - b) **In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?**

YES

DEQ in its Clean Water Act Section 401 certification of the project found that operation of the project consistent with the provisions of the Settlement Agreement and FERC license will comply with Oregon water quality standards. A new flow control structure and siphon spillway modifications to improve fish passage are being monitored for possible contributions to increased total dissolved gas (TDG) downstream of the facility. Any TDG impairments revealed by monitoring would be addressed via adaptive management features of the FERC license and Settlement Agreement. Monitoring results are expected in early 2009.

If YES, go to B2.

- 2) **Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?**

YES

The Willamette River in the vicinity of the facility fails to meet water quality standards for more than a dozen pollutants including toxins, heavy metals, bacteria, and temperature.

If YES, go to B3.

3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?

YES

DEQ staff confirms that the facility is not a contributor water quality violations. The agency's CWA 401 certification reserves the right to modify conditions of the certification in the future if warranted to protect water quality.

If YES, go to C.

PASS.

C. Fish Passage and Protection

1) Is the Facility in Compliance with *Mandatory Fish Passage Prescriptions* for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?

YES

The so-called "Fish Agencies" (DEQ, ODFW, NMFS, FWS), as well as the tribes (Grand Ronde, Siletz, Warm Springs, Columbia River Intertribal Fish Commission), and nongovernmental organizations (American Rivers, Native Fish Society) consulted in the course of this review all confirmed that the applicant has complied with its obligations to date. The Fish Agencies' mandatory prescriptions, as reflected in the FERC license and consistent with the Settlement Agreement, require the development and implementation of plans to improve 1) upstream passage through a fish ladder, 2) downstream passage through the project powerhouse, 3) up-and-downstream passage over Willamette Falls, 4) decommissioning of the Blue Heron Paper Company Powerhouse, and 5) Pacific lamprey passage. Many of the measures are experimental, with monitoring underway to permit future evaluation against fish passage criteria and goals. If the criteria are not met by an initial "tier" of measures, progressively more aggressive modifications are required. Other measures are to be developed in the future based on monitoring and evaluation that are in progress. This adaptive management framework will have to be implemented over many years. Thus, while all those consulted were unanimous in confirming the applicant's track record to date of compliance, and of working in good faith to implement the letter and spirit of its obligations,¹ they were equally in agreement that "final" compliance was years away, with many technically challenging issues to resolve.

If YES, go to C5.

¹ One tribal commentator did express the sense that, while the applicant has generally done a good job of meeting its responsibilities, it could go beyond the letter of the agreement in taking more aggressive actions to improve Pacific lamprey passage in advance of the completion of lamprey studies required by the FERC license and Settlement Agreement as a prerequisite to the design and implementation of future lamprey protection and enhancement measures.

5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of *Riverine* fish?

NOT APPLICABLE

There are no mandatory fish passage prescriptions for riverine fish associated with this project.

If NOT APPLICABLE, go to C6.

6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?

YES

A number of requirements under the FERC license and Settlement Agreement are designed to protect against fish entrainment, notably the decommissioning of the Blue Heron Paper Company powerhouse and many of the downstream passage-related measures.

If YES, go to D

PASS.

D. Watershed Protection

1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline

NO

If NO = go to D2

2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1., and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?

NO

If NO = go to D3

3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)

NO

If NO = go to D4

4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.

YES

Neither the FERC license nor the Settlement Agreement require protection, mitigation, or enhancement of shorelands surrounding the project for watershed protection (see *G. Recreation* below for required enhancements related to recreation resources). The project lands and adjacent areas are heavily industrialized and urbanized, and have been since the late 1800s. The primary natural resource values that can be effectively addressed at the project site are salmonid and lamprey fisheries, and the parties to the Settlement Agreement limited their focus accordingly.

If YES = Pass, go to E

PASS.

E. Threatened and Endangered Species Protection

1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

YES

The bald eagle and five fish species 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

If YES, go to E2.

2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?

YES

In its 2005 biological and conference opinions NMFS found that relicensing the project with staff's recommended measures (i.e., measures incorporated into the Settlement Agreement and FERC license) would not likely jeopardize the continued existence of UWR Chinook salmon, UWR steelhead, LCR Chinook salmon, LCR steelhead, and LCR coho. FWS determined that the project would not adversely affect bald eagle populations.

If YES or NOT APPLICABLE, go to E3.

- 3) **If the Facility has received authority to incidentally *Take* a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?**

YES

NMFS included an incidental take statement in its biological opinion with measures focused on protecting salmon from construction-related activities, salvage of fish stranded below the falls, and monitoring and evaluation-related handling.

If YES, go to E4.

- 4) **If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:**
- a) **The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or**
 - b) **The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or**
 - c) **There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or**
 - d) **The recovery plan under active development will have no material effect on the Facility's operations?**

YES

If YES, go to F

PASS.

F. Cultural Resource Protection

- 1) **If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?**

YES

The applicant's FERC filings indicate compliance with historic property requirements imposed in the FERC license. These include a recent (December 2007) annual report that details compliance with the "Programmatic Agreement" for managing historic properties that may be affected by the project's operation, including a Historic Properties Management Plan. While the appropriate staff person at the Oregon State Historic Preservation Office did not return repeated calls and emails, it is reasonable to assume that the applicant is in compliance with its obligations related to cultural resources. Every effort will be made to contact the state office to obtain verbal confirmation of this assumption prior to the LIHI Governing Board's consideration of this application for certification.

If YES, go to G.

PASS.

G. Recreation

1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?

The applicant is moving forward with implementation of a FERC license-required Recreational Trail Improvement Project in partnership with the City of West Linn. The applicant is underwriting the costs to construct, operate, and maintain riverside recreation trails on project lands along the west bank of the Willamette River. The applicant already has provided leases, easements, and access agreements that allow the city to provide parks, boat ramps, and other recreational services.

If YES, go to G3.

3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?

The applicant does not charge any fees for access to the Willamette River through facilities located within the project. The river both upstream and downstream of the project is heavily used for recreation, including via boat access and parks on applicant-owned lands leased to the City of West Linn for community parks.

If YES, go to H.

PASS.

H. Facilities Recommended for Removal

1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?

NO

If NO, facility may be LIHI Certified.

PASS.

FACILITY IS LIHI CERTIFIED

RECORD OF CONTACTS

Date of Conversation: January 29, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Tom Downey, Env. Protection Specialist, Confederated Tribe of Siletz Indians
Telephone/email: 541-444-8226
Areas of Expertise: tribal natural resource concerns

Mr. Downey said that the applicant “went beyond what they had to do” at Willamette Falls, that the modifications required by the FERC license/settlement agreement are well underway, but that it will take time to gauge their effectiveness. The tribe’s primary interest is lamprey passage. They have worked well with the applicant on this and another project on the Clackamas, and have no concerns at this time.

Date of Conversation: January 29, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Stephanie Burchfield, Fishery Biologist, NMFS
Telephone/email: 503-736-4720
Areas of Expertise: Fisheries

Ms. Burchfield commented that everything is going well in terms of the applicant fulfilling requirements, but that the many project modifications being implemented will have to be studied over time to gauge their effectiveness. She believes the applicant is proceeding in good faith and, with a few justified exceptions, are meeting all deadlines and obligations.

Date of Conversation: January 29, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: John Zauner, Hydropower Coordinator, ODFW
Telephone/email: 971-673-6041
Areas of Expertise: Wildlife resources

Mr. Zauner expressed the belief that the applicant is working hard and “got more than they bargained for” in terms of the technical challenges of implementing the many cutting-edge or experimental aspects of this project. The applicant is moving forward well with implementation, but it will take time to figure out how to do the “mechanical fixes,” and then more time and studies to see if they work. When asked specifically about compliance with flow requirements, he confirmed that the applicant is meeting requirements, and also explained the physical set up of the fish ladder, with flows to 3 of 4 entrances positioned closer to the top of the “horseshoe” of the falls, and a separate, 4th entrance near the T.W. Sullivan powerhouse. In response to a question about why the settlement agreement deals exclusively with fish concerns, he explained that the urban/industrialized setting means that there aren’t a lot of wildlife concerns other than fish passage.

Date of Conversation: February 6, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Avis Newell, DEQ
Telephone/email: (503)229-6018, NEWELL.Avis@deq.state.or.us
Areas of Expertise: Water quality

Ms. Newell believes that overall that the applicant is implementing in good faith its license/settlement requirements relating to water quality and communicating well, and confirmed that the facility does not contribute to the 303(d) impairments listed for waters in the project's vicinity. While she has every reason to believe that the applicant will live up to its monitoring requirements, she said results of that monitoring, due in 2009, will tell whether total dissolved gas impairments will result from modifications to the project, like the new flow control structure.

Date of Conversation: February 6, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Clay Penhollow, Hydropower Review Coordinator, Confederated Tribes of Warm Springs
Telephone/email: (541) 553-2014
Areas of Expertise: Fisheries, natural resources

Mr. Penhollow says that implementation is going well, that there is a good working relationship with the applicant, which will be important as difficult technical issues need to be worked through (e.g., the issue of flashboard height has yet to be fully resolved). He explained that the Settlement Agreement's focus on fishery issues was a result of the project's urban/industrialized setting and property ownership; not a lot of other issues were present or could be meaningfully addressed. He noted that for the tribes all fish are important, but that lamprey is of particular concern in the Willamette Falls context.

Date of Conversation: February 7, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Craig Kohanek, OWRD
Telephone/email: (503) 986-0823
Areas of Expertise: Flows

He stated that to his knowledge the applicant is releasing sufficient water to meet fish and wildlife requirements, that it is meeting its obligations under the settlement agreement and FERC license, and that changes to the facility that are implemented, underway, or remain in the future will not affect flows. (Project is essentially run of river.)

Date of Conversation: February 8, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Ann Gray, U.S. Fish and Wildlife Service
Telephone/email: (503) 231-6179
Areas of Expertise: Fisheries

Ms. Gray confirmed that the applicant has done what it said it would do, has been cooperative, and done good work. However, the implementation of the license/Settlement Agreement is in its early phase. She characterized the effort as being "in step 2 of a 4 step process, and step 5 is confirming results." When

asked about FWS position regarding lamprey, she explained that due to steep populations declines and a tribal trust responsibility they are a species of concern. She noted that the applicant is doing more things sooner for lamprey due to its pursuit of an amendment to the license to increase flashboard heights. In her experience, the applicant is doing more for lamprey, via the Settlement Agreement, than has been done in other hydro projects (though she acknowledged that lamprey has become a higher-profile issue in recent times, and because of Willamette Fall's status as a historic lamprey harvest site for the region's tribes).

Date of Conversation: February 8, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Brett Swift, American Rivers
Telephone/email: 503-827-8648
Areas of Expertise: Natural resources

Ms. Swift confirmed that she was the sole representative of the nongovernmental parties to the Settlement Agreement (American Rivers, The Native Fish Society, Oregon Trout, Trout Unlimited) to participate in negotiations, but acknowledged that she has not been extensively involved in the implementation phase; to her knowledge, neither have any of the other NGO parties. She believes the applicant to be one of the better companies to work with in terms of being forthcoming and producing good work.

Date of Conversation: February 12, 2008
Application Reviewer: Gabriela Goldfarb, Consultant
Person Contacted: Ken Worcester, Dept. of Parks and Recreation, City of West Linn
Telephone/email: 503-557-4700 ext. 1555
Areas of Expertise: Recreation

Mr. Worcester said that the applicant has been great to work with in developing and implementing the Recreation Trail Improvement Plan required by the FERC license and partnerships in which the applicant leases land to West Linn for parks, boat ramps, and other recreational services provided by the city. "PGE has done everything that's been asked of them and more."
