



City of Seattle

Michael Patrick McGinn, Mayor

Seattle City Light

Jorge Carrasco, Superintendent

Letter to be dated no later than 60 days after FERC issues REA

Mr. James Bellatty
Water Quality Program Section Manager
Department of Ecology – Eastern Regional Office
4601 N. Monroe
Spokane, WA 99205

Re: Boundary Hydroelectric Project – Application for Section 401 Certification

Dear Mr. Bellatty,

The Boundary Project (FERC No. 2144) (Project), owned and operated by Seattle City Light (SCL), is located on the Pend Oreille River, in Pend Oreille County, Washington. The Project was constructed in the mid-1960s and operates under a license administered by the Federal Energy Regulatory Commission (FERC). The present license for the Project expires on September 30, 2011, and in accordance with FERC regulations, SCL filed its application for a new license on September 29, 2009. In addition, a comprehensive Relicensing Settlement Agreement and amendments to the September 29, 2009 License Application (LA) were filed with FERC in March 2010. SCL requests certification under Section 401 of the Clean Water Act¹ (401 certification) from the Washington Department of Ecology (Ecology) for its License Application as amended by the Boundary Project Relicensing Settlement Agreement.

In its document, *Water Quality Guidance for Existing Hydropower Projects (April 2005)*, Ecology recommends that applicants provide a draft 401 certification application subsequent to Preliminary Licensing Proposal (PLP) filing. SCL filed its PLP with FERC on April 30, 2009, and provided Ecology a draft 401 certification application on May 11, 2009. SCL met with Ecology to review the contents of its draft 401 certification application on June 18, 2009 and continued discussions during the following months on the information necessary for Ecology to conduct its review of SCL's 401 certification application. This letter, application form, and the documents incorporated by reference constitute SCL's 401 certification application to Ecology.

¹ 33 USC § 1341.



Project Description

Boundary Dam, situated in a narrow canyon and founded on interbedded limestone and dolomite of the Metaline Limestone formation, is a variable-radius concrete arch dam with a total height of 360 feet above the lowest part of the foundation and a structural height of 340 feet. The dam varies in thickness from 8 feet at its crest to 32 feet at its base, has a crest length of 508 feet, and has a total length, including the spillways, of 740 feet. The dam impounds the Pend Oreille River to a normal high water surface elevation of 1,994 feet North American Vertical Datum (NAVD) 88, as measured in the forebay. The average elevation of the river surface downstream of the dam is approximately 1,733 feet NAVD 88, and the impoundment provides approximately 261 feet of gross head for power purposes. More information on the specific characteristics of the Project is provided in the LA.

Consultation with Ecology

SCL initiated consultation with Ecology in early 2004 prior to the start of the relicensing process. Ecology has participated in all stages of the relicensing process to date, including review and comment on water quality study plans. During initial consultation, Ecology identified two parallel processes (Total Dissolved Gas [TDG] TMDL and Temperature TMDL) that would contribute information important to Ecology's 401 certification analysis. SCL worked in partnership with Ecology to develop the TDG TMDL, which was approved by EPA in March 2008. SCL developed its TDG Attainment Plan to be consistent with the TDG TMDL.

SCL has also actively participated in the Pend Oreille River Watershed Advisory Group during development of the Pend Oreille River Temperature TMDL. SCL provided a CE-QUAL-W2 model for the Boundary Project area that was used by Ecology to develop the initial draft TMDL, which was completed in August 2007. A final temperature TDML has not yet been completed or submitted to EPA for approval.

Existing and Proposed Water Uses

The primary nonconsumptive use of water in the Project area is for hydroelectric power. SCL holds several active water rights on file with Ecology's Water Resources Section. SCL's water rights authorize use of Pend Oreille River water for the purpose of hydropower generation in the quantities indicated below. SCL also has applied for a water right for an additional 4,400 cfs for nonconsumptive hydropower generation to allow operation of the existing Project facilities at the full capacity authorized by the current FERC license (for greater detail regarding Project water rights, see the LA, Exhibit A, Section 5.3).

- 53,700 cfs (instantaneous quantity)
- 94,500 acre-feet (annual quantity)



Other water rights are held by SCL, as described in the LA Exhibit A, Section 5.3, Table A.5-2, authorizing the following uses: seasonal irrigation, fire protection, domestic supply, and power plant cooling.

Water Quality Studies

SCL collected water quality data in the Project area during recent years, including 2007 and 2008, as part of FERC relicensing. Data collection in the Project area addressed temperature, TDG (2007, 2008, and 2009), pH, toxics, dissolved oxygen (DO), turbidity, conductivity, nutrients, chlorophyll *a*, hardness, and the effects of macrophytes on pH and DO in the mainstem Pend Oreille River. Water quality and fish and aquatics studies that support SCL's LA and 401 certification application are listed on the last page of this letter and included on the attached CD. Hardcopies have been provided to Ecology during the relicensing and are available from SCL upon request.

Water Quality in the Boundary Project Area

The 401 certification application regulations require characterization of existing water quality conditions in the Project area, an assessment of whether water quality meets Ecology's regulatory standards, and a determination of whether Project operations contribute to any exceedances of those standards. The following sections provide a summary of the primary water quality analyses presented in the LA (Exhibit E, Section 4.5.2) and the related proposed environmental measures in the Boundary Project Relicensing Settlement Agreement and detailed in the Addendum to Exhibit E of the License Application, Section 2.6.

Temperature

The Pend Oreille River is listed on Ecology's 303(d) list as being impaired for temperature, and a TMDL is being prepared. Ecology stated in its draft TMDL (Ecology et al. 2007) and in subsequent meetings with SCL that its analysis indicates that areas of the Pend Oreille River in the Boundary Reservoir at times are not in compliance with the water quality standard for temperature, and that at times the Boundary Project contributes to impaired temperature conditions. SCL's analysis of three locations in the Boundary Project area (Boundary Tailrace, Boundary Forebay, and Metaline Pool) shows that modeled surface daily maximum temperatures at the Boundary Tailrace and Metaline Pool stations are the same or cooler with the Project in place than they would be without it. The modeling analysis also showed that the Existing Condition surface daily maximum temperatures at the Boundary Forebay station were at times higher than the modeled temperatures for the Existing Condition without Boundary Project Condition.

Due to the surface daily maximum temperatures seen at times at the Boundary Forebay station, Ecology requested that SCL investigate whether there were operational changes that could lower surface daily maximum temperatures. SCL developed an alternative operational scenario to evaluate whether temperature benefits would be provided by reducing the surface



area of the reservoir and, as a result, reduce warm water accumulation in the forebay (for greater detail, see Section 4.5.2.2.2 of the LA Exhibit E and Khangaonkar et al. [2009]). The modeling results indicate that, rather than reducing or eliminating the limited surface daily maximum temperature effect observed at the Forebay station under the Existing Condition, the most extreme change in operations possible, consistent with physical constraints, would instead worsen conditions at the Boundary Forebay. Accordingly, the modeling results indicate that surface daily maximum temperatures in the Boundary Reservoir cannot be lowered using operational changes.

Under the Boundary Project Relicensing Settlement Agreement, SCL has prepared a Temperature Attainment Plan that summarizes analyses completed and outlines non-operational actions to be implemented during the next license term that will contribute to temperature improvement goals in the Pend Oreille watershed. The settlement parties identified a suite of tributary restoration and enhancement measures identified in the Temperature Attainment Plan as the most effective non-operational means of addressing Project impacts on fish and aquatic resources.

Included in these tributary measures are plans for SCL, pursuant to the Relicensing Settlement Agreement and as contractor for the Pend Oreille PUD, to remove the Mill Pond Dam on Sullivan Creek and implement related habitat restoration, and for SCL, pursuant to the Relicensing Settlement Agreement and as a funding entity, to participate in the PUD's implementation of cold water releases from Sullivan Dam. These measures should improve temperature and other aquatic habitat conditions in Sullivan Creek and its delta in the Boundary Reservoir. Other tributary aquatic habitat measures identified in the Temperature Attainment Plan include riparian plantings that will increase tributary shade, which should reduce stream temperatures. Tributary measures also include physical habitat modifications designed to improve habitat for salmonids, which could improve temperatures by creating pools (i.e., deeper water that may experience lower diel fluctuations in temperature than the shallow water habitats currently present). These tributary habitat improvements would also have a direct positive effect on designated beneficial uses, i.e., salmonid spawning and rearing. Reductions in tributary temperature could improve the quality of thermal refugia at the mouths of tributaries in Boundary Reservoir, which would improve salmonid habitat in the reservoir at the tributary deltas during summer.

In addition to tributary habitat measures, several erosion sites on the mainstem Pend Oreille River were identified for stabilization and associated riparian planting, and large woody debris jams will be placed and maintained in the upper delta regions of four tributaries to Boundary Reservoir.

The Temperature Attainment Plan also provides for temperature monitoring in the mainstem of the Pend Oreille River, and in tributary deltas in the Boundary Reservoir at the mouths of Sullivan, Sweet, and Linton Creeks, as well as compliance and effectiveness monitoring for the tributary habitat improvement measures.



Total Dissolved Gas (TDG)

Data summarized in Section 4.5.2.2.3 of the LA Exhibit E show that, at times, TDG levels in the Pend Oreille River exceed the water quality standard of 110 percent saturation.

Exceedances of Ecology's TDG standard downstream of the Project typically occur when spring flows exceed the Project power plant capacity of approximately 56,000 cfs and significant spill occurs. Average incoming TDG levels in the Boundary forebay range from 103 to 128 percent. Average tailrace TDG levels range from 106 to 131 percent, with the average TDG contributed by the Project ranging from 0 to 4 percent between the Boundary forebay and the tailrace when flows are above 70,000 cfs. When flows are between 55,000 and 70,000 cfs, the Project strips TDG from the system, i.e., at these flows, TDG in the tailrace is generally lower than in the Boundary forebay.

SCL has submitted a TDG Attainment Plan as a component of the 401 certification application. Under the Plan, SCL will evaluate and implement, as appropriate, some combination of the following three gate alternatives to attain TDG compliance:

- Throttle sluice gates, which involves operation of sluice gates in a partially open position
- Roughen sluice flow, which entails modification of the sluice gate outlets to break up and spread flow
- Spillway flow splitter/aerator, which entails modifying the spillways to aerate, break up, and spread flow

pH

During 2007 and 2008 sampling, SCL collected pH data at eight sampling locations in the mainstem Pend Oreille River as part of the larger water quality study (Water Quality Study Final Report, SCL [2009]). pH readings exceeded Ecology's water quality criterion of 8.5 at certain times at several sampling stations in Boundary Reservoir. However, the pH of water entering Boundary Reservoir also exceeded the 8.5 standard at these times and pH was generally higher in waters entering Boundary Reservoir than elsewhere in the reservoir. During times of exceedance, pH levels decreased as water passed through Boundary Reservoir, from the inflow at Box Canyon tailrace to the Boundary tailrace, indicating that pH is not adversely affected by the Project's existence or operations.

During the relicensing study phase, SCL also specifically evaluated the relationship of pH and dissolved oxygen to macrophytes in Boundary Reservoir (Relationship of pH and DO to Macrophytes Study Final Report, SCL [2009]). During this study data were collected to determine the potential influence of photosynthesis and respiration within macrophyte beds on reservoir-wide pH and DO levels.

Results of both pH data collection efforts are discussed in the LA Exhibit E, Section 4.5.2.2. In addition, spreadsheets containing the data collected for the Relationship of pH and DO



Macrophytes Study Final Report and the Water Quality Study Final Report have been prepared and are provided to Ecology with this letter for its records.

On October 22, 2009, SCL met with Ecology to review available pH data. As a follow-up to this meeting, a pH Technical Summary was completed by SCL and approved by Ecology on December 29, 2009. A copy of the pH Technical Summary is provided with this letter. As requested by Ecology and described in the Dissolved Oxygen Attainment Plan, pH will be measured simultaneously with DO to provide Ecology with pH trend data for the Pend Oreille River in the Project area.

Dissolved Oxygen (DO)

As described in Section 4.5.2.2.5 of the LA Exhibit E, data collected during relicensing studies show that DO does not vary significantly longitudinally within the reservoir. Exceedances of Ecology's DO standard (i.e., below 8.0 mg/L) were observed at the Boundary forebay sampling site at depths greater than 28.0 meters (92 feet) during the warmest summer months, and occasionally at a few other sites. However, in instances where DO concentrations were below 8.0 mg/L, they were typically still greater than 7.6 mg/L.

SCL will implement a monitoring program to better define the magnitude and spatial and temporal extent of DO concentrations below 8.0 mg/L in the reservoir. Ecology reviewed SCL's PLP and Study Report data provided by SCL, and indicated that in its preliminary assessment, DO levels did not appear to be outside the normal range for the Pend Oreille River system and that additional monitoring would help to confirm this preliminary assessment (M. Mangold, Ecology, personal communication, June 18, 2009).

SCL is submitting a DO Attainment Plan with this 401 certification application that includes a five-year DO monitoring plan, with annual reporting and consultation with Ecology, to be implemented following issuance of the new FERC license.

Aquatic Invasive Species

Mapping surveys of submerged aquatic macrophytes in the Project area were conducted in August 2007, i.e., during the period of peak macrophyte growth (Mainstem Aquatic Habitat Modeling Final Report, SCL [2009]). The entire shoreline from Box Canyon tailrace to Boundary Dam was surveyed for the presence of macrophytes.

During Project relicensing, concerns were raised regarding the spread of invasive aquatic macrophytes inside and outside the Project area. Under the Boundary Relicensing Settlement Agreement, SCL is submitting an Aquatic Invasive Species Control and Prevention Plan (AISCPP) with this 401 certification application directing the implementation of measures to suppress the abundance and control the spread of introduced invasive submerged aquatic macrophytes (mainly Eurasian watermilfoil) at targeted sites in the Project area. This AISCPP also describes how SCL will implement a monitoring and



prevention program for zebra and quagga mussels, New Zealand mudsnails, and any other newly listed aquatic nuisance species that are identified by the State of Washington.

Toxics

As summarized in Section 4.5.2.2.7 of the LA Exhibit E, SCL used several methods to evaluate the presence and potential for bioavailability of toxics of concern (arsenic, cadmium, lead, mercury, PCBs, and zinc) throughout Boundary Reservoir, including direct sampling of media (water column, sediment, and sediment pore water), toxicological models (identified factors that could promote bioavailability of toxics), pathway models (how toxics move between media such as sediments, pore-water, and surface water), and a conceptual decision matrix (to identify potential Project effects). In addition to sampling the water column, pore water, and sediment, sampling was also conducted in surface water of the reservoir's fluctuation zone (i.e., upper 10 feet of the reservoir) during a period of declining water surface elevation, to assess potential mobilization of toxics from reservoir banks and movement of toxics in a down-gradient direction. Detailed results based on these methods, as well as conclusions regarding the Project's potential effect on toxics bioavailability, are documented in the Toxics Assessment: Evaluation of Contamination Pathways Final Report (SCL 2009). Toxics sampling was conducted at 14 sites in the reservoir between the Boundary forebay and Box Canyon Dam. Sampling sites were selected to assess potential longitudinal trends in toxics concentrations and to identify input from potential toxics sources, such as active and historic mines.

Overall, concentrations of toxics were either low or undetectable in sampled media (surface water, sediment, pore water) within the Boundary reservoir; only isolated, localized exceedances were detected. Sampling conducted in the fluctuation zone during drawdown in late fall 2007 resulted in no detectable concentrations of toxics, indicating that Project operations are not drawing toxics-laden material into the reservoir (SCL 2009). During the initial sampling in March 2008, no exceedances of relevant criteria were detected in the sediment for any of the six toxics of concern, and no exceedances were measured in any media for arsenic, cadmium, mercury or PCBs. Relevant criteria include LAETs for sediment, and surface water quality standards for pore water and surface water.

A limited number of exceedances of the relevant criteria were measured in the Boundary reservoir, and are reported in the LA Exhibit E, Table E.4-18. Based on multiple lines of evidence evaluated within the context of toxicological models, pathway models, and a conceptual decision matrix, there appears to be no link between the operations of the Project and the transfer of toxics within Boundary Reservoir or toxics bioavailability. Because proposed Project operations would be nearly the same as those associated with existing conditions, it is anticipated that there would continue to be no link between operations and the transfer of toxics within the reservoir or toxics bioavailability during the term of the new Project license.



Fish Tissue Sampling

Under the Boundary Relicensing Settlement Agreement, SCL has provided a Fish Tissue Sampling Plan for submittal with this 401 certification application.

One year after license issuance, SCL will collect and analyze fish tissue samples from Boundary Reservoir for lead and zinc concentrations. Data will be provided to Ecology and the Washington Department of Health (WDOH) to assess possible human health risks due to consumption of fish in the reservoir. If health advisories are warranted, Ecology and WDOH will determine the next steps for tissue sampling or health advisory issuance.

Fish tissue samples will be collected at the following locations: Boundary forebay, near Everett Island in the Canyon Reach, near Metaline Falls, and just downstream of the Box Canyon tailrace. At each site, three centrarchids (greater than 7 inches long) and three suckers (greater than 8 inches long) will be collected by electrofishing, angling, or fyke netting. If any naturally reproduced salmonids (other than bull trout) greater than 7 inches in length are captured while sampling for centrarchids, they will be substituted for the centrarchids, for up to a total of three game fish species (centrarchids and salmonids) at each of the sites. Tissue samples will be analyzed in a laboratory accredited by Ecology.

Spill Prevention, Control and Countermeasure Plan

SCL's current Oil Spill Prevention, Control and Countermeasure Plan (SPCC), dated 2006, contributes to the maintenance of water quality in the Project area. SCL provided this plan to Ecology, and Ecology conducted a site inspection of the Boundary Project on June 15, 2009. As a result of this inspection, Ecology requested that Ecology's Spokane office contact information be included in SCL's emergency contact list. To address Ecology's comment, SCL has added language to the current SPCC referring Boundary Project staff to its Boundary Emergency Response Plan, where up-to-date Ecology contact information is listed.

SCL will provide Ecology updated SPCC Plans for the Boundary Project in accordance with federal regulations requiring routine review and updating, as appropriate.

Sediment

In consultation with Ecology on February 20, 2009, Ecology indicated that sediment data presented in SCL's relicensing studies (Sediment Transport and Boundary Reservoir Tributary Delta Habitat Study Final Report - Appendix 5, SCL [2009]) provides adequate information on sediment transport and predicted accumulation over the term of a new license. There is no evidence that sediment accumulation will be a concern over the life of the license, and therefore, Ecology indicated that a sediment management plan is not necessary for water quality certification (Email from M. Mangold, Ecology, to C. Pratt, SCL, February 20, 2009).



SCL looks forward to continued consultation with Ecology as Ecology reviews this 401 certification application and develops its draft 401 certification conditions.

Sincerely,

Barbara Greene
Boundary Relicensing Project Manager

cc: Karin Baldwin, Ecology
Marcie Mangold, Ecology
Water Quality Certification Hydropower Coordinator, Ecology
Lynn Best, Seattle City Light
Christine Pratt, Seattle City Light
Kimberly Pate, Seattle City Light



Attachments on CD

Water Quality Plans

- Temperature Attainment Plan (SCL 2010)
- TDG Attainment Plan (SCL 2010)
- Dissolved Oxygen Attainment Plan (SCL 2010)
- Aquatic Invasive Species Control and Prevention Plan (SCL 2010)
- Fish Tissue Sampling Plan (SCL 2010)

Supporting Water Quality Studies, Research, Summaries, and Information

- Boundary Project Relicensing Settlement Agreement (2010)
- License Application Addenda for Boundary Hydroelectric Project (SCL 2010)
- License Application for Boundary Hydroelectric Project (SCL 2009)
- Pre-Application Document for the Boundary Hydroelectric Project (SCL 2006)
- Boundary Hydroelectric Project Relicensing (FERC No. 2144) pH Technical Summary (December 29, 2009)
- Boundary Oil Spill Prevention, Control and Countermeasure Plan (SCL 2006)
- Evaluation of Total Dissolved Gas and Potential Abatement Measures, Study 3 Final Report (SCL 2009)
- Toxics Assessment: Evaluation of Contaminant Pathways, Study 4 Final Report (SCL 2009)
- Water Quality Constituent and Productivity Monitoring, Study 5 Final Report (SCL 2009)
 - o Spreadsheet with supporting data files for Study 5
- Evaluation of the Relationship of pH and DO to Macrophytes in Boundary Reservoir, Study 6 Final Report (SCL 2009)
 - o Spreadsheets with supporting data files for Study 6
- Mainstem Aquatic Habitat Modeling, Study 7 Final Report (SCL 2009)
- Sediment Transport and Boundary Reservoir Tributary Delta Habitat, Study 8 Final Report (SCL 2009)
- Productivity Assessment, Study 11 Final Report (SCL 2009)
- Assessment of Factors Affecting Aquatic Productivity in Tributary Habitats, Study 14 Final Report (SCL 2009)
- Boundary Hydroelectric Project Water Quality Data Summary Report 2004-2006: Pend Oreille River-Boundary Reach (Taylor Associates 2007)
- Temperature Modeling of the Pend Oreille River, Boundary Hydroelectric Project CE-QUAL-W2 Model Calibration Report (Breithaupt and Khangaonkar 2007)
- Temperature modeling and alternative operations analyses for Boundary Hydroelectric Project - CWA 401 Certification Support. (Khangaonkar et al. 2009)
- Sullivan Lake Dam Cold Water Gravity Intake – Advanced Gravity Water Supply Technical Memorandum (McMillen 2010)
- Sullivan Creek Project (FERC No. 2225) Cold Water Release Facility Plan, prepared by EES Consulting for Pend Oreille PUD (February 2010)
- Mill Pond Decommission Plan (PODUD 2010)
- Fish and Aquatics Management Plan (SCL 2010)
- Terrestrial Resources Management Plan (SCL 2010)

