

Boundary Hydroelectric Project (FERC No. 2144)
Addendum to Exhibit B of the License Application

Seattle City Light

March 2010

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1 INTRODUCTION TO EXHIBIT B ADDENDUM

This document is an addendum to Exhibit B of Seattle City Light's (SCL) License Application for the Boundary Hydroelectric Project (FERC No. 2144) that was filed with FERC on September 29, 2009. The inserts on the following pages represent complete replacements of the corresponding sections in Exhibit B, allowing the reviewer to refer to only one document, i.e., either the Exhibit B filed with the License Application or this addendum, for a given section or subsection. Each replacement section below is thoroughly documented so that there is no ambiguity as to what portions of Exhibit B have been replaced.

The organization of the following document parallels that of Exhibit B, i.e., sections are presented in the same order and all revised sections, tables, or figures are numbered or referred to according to the same scheme used in Exhibit B.

2 REVISED SECTIONS OF EXHIBIT B

2.1. Future Resource Utilization (Section 5 of Exhibit B)

The following section replaces Section 5.2, Facility Enhancements.

SCL proposes to install new high efficiency turbines in Units 55 and 56. The turbine runner upgrades will increase efficiency, i.e., they will use the same flow to produce a greater amount of energy and will have a higher total generation capacity. The turbine runner efficiency upgrades will be performed concurrently with planned electrical generator rewinds and step-up transformer replacements, which are scheduled for Years 1 and 2 after license issuance.

The Project's total authorized installed capacity is 1,003,253 kW based on total turbine ratings with a total generator capacity of 1,039.8 megawatts (MW) (1,040 MW) based on an assumed peak efficiency of 95 percent (FERC 2007). By 2008, SCL conducted actual performance tests that produced a peak efficiency of approximately 90 percent resulting in a revised total installed capacity of 981,518 kW based on turbine ratings and total generator capacity of 1,039.8 MW (1,040 MW). The proposed total authorized installed capacity after Units 55 and 56 turbine upgrades and generator rewinds will be approximately 1,002,518 kW based on turbine ratings with a total generator capacity of approximately 1,119,800 kW (1,120 MW) (see Table 2.1-1).

The following table is new, i.e., it was not included in Exhibit B of the License Application.

Table 2.1-1. Current, revised and estimated total authorized installed and generator capacity after Units 55 and 56 upgrade at the Project.

| Current Capacities in 2007 ¹ | | | | | Revised Capacities in 2008 ² | | | | | Proposed Capacities in 2009 (Estimated) ^{3,8} | | | | | Incremental Change ^{7,8} |
|--|----------|-----------------|-------------------------|----------------------------------|--|----------------|-----------------|-------------------------|----------------------------------|--|------------------------------|------------------------------|------------------------------|------------------------------------|-----------------------------------|
| Unit | Turbines | | Generators ⁵ | Authorized Capacity ⁶ | Unit | Turbines | | Generators ⁵ | Authorized Capacity ⁶ | Unit | Turbines ⁸ | | Generators ^(5,8) | Authorized Capacity ^{6,8} | |
| | HP | kW ⁴ | kW | kW | | HP | kW ⁴ | kW | kW | | HP | kW ⁴ | kW | kW | |
| 51 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | 51 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | 51 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | n/a |
| 52 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | 52 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | 52 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | n/a |
| 53 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | 53 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | 53 | 204,506 | 153,379.50 | 158,400 | 153,379.50 | n/a |
| 54 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | 54 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | 54 | 204,506 | 153,379.50 | 161,500 | 153,379.50 | n/a |
| 55 | 259,823 | 194,867.25 | 200,000 | 194,867.25 | 55 | 245,333 | 184,000 | 200,000 | 184,000 | 55 ⁽⁸⁾ | 259,333⁽⁸⁾ | 194,500⁽⁸⁾ | 240,000⁽⁸⁾ | 194,500 | 10,500 |
| 56 | 259,823 | 194,867.25 | 200,000 | 194,867.25 | 56 | 245,333 | 184,000 | 200,000 | 184,000 | 56 ⁽⁸⁾ | 259,333⁽⁸⁾ | 194,500⁽⁸⁾ | 240,000⁽⁸⁾ | 194,500 | 10,500 |
| ¹ Current Total Authorized Capacity (kW) = <u>1,003,253</u> | | | | | ² Revised Total Authorized Capacity (kW) = <u>981,518</u> | | | | | ^(3,8) Proposed Total Authorized Capacity (kW) = <u>1,002,518</u> | | | | | |
| | | | | | | | | | | ⁷ Total Incremental Change in Authorized Capacity (+kW) = <u>21,000</u> | | | | | |
| | | | | | | | | | | ⁷ Total Incremental Change in Generator Rating (+kW) = <u>80,000</u> | | | | | |

Notes:

- 1 Current capacities for turbines and generators per FERC Order Amending License and Revising Annual Charges, dated November 2, 2007. Total authorized installed capacity is 1,003,253 kilowatts (kW) based on turbine ratings. Current capacities data for Units 55 and 56 is based on original index testing assuming a peak efficiency of 95 percent at 194,867.25 kW (259,823 hp) performed by the Original Equipment Manufacturer (OEM, Toshiba) during commissioning of the units in 1985 and 1986, respectively.
- 2 Revised capacities for Units 55 and 56 are based on performance tests conducted in 2007 and 2008 that produced an actual peak efficiency of only 90 percent at 184,000 kW (245,333 hp).
- 3 Proposed capacities per City of Seattle, Seattle City Light Department (SCL) November 2009 turbine upgrade preliminary estimates for Units 55 and 56. [Note: The peak efficiency desired by SCL is a value slightly lower than the initial peak efficiency requested for the original units. SCL typically operates below the peak efficiency capacities to meet reserve requirements; therefore, a turbine with a flatter efficiency curve will produce more annual energy.]
- 4 Turbine rating in kilowatts (kW) is the product of the turbine capacity in horsepower (hp) at best gate (maximum efficiency point) opening under the manufacturer's rated head times a conversion factor of 0.75 kW/hp.
- 5 Current and revised total generating capacity is 1,039,800 kW (1,040 MW) and the proposed total generating capacity is approximately 1,119,800 kW (1,120 MW) at a power factor of 0.95.
- 6 The Commission's regulations at 18 C.F.R. § 11.1(i) state that "authorized installed capacity means the lesser of the ratings of the generator or turbine units."
- 7 Incremental change is the difference due to the proposed capacities minus the revised capacities for Units 55 and 56.
- 8 Turbine ratings for Units 55 and 56 upgrades will be verified by model tests in 2011. SCL will file an amendment when Units 55 and 56 rehabilitations are completed and field performance testing is finalized in approximately Year 3 after new license issuance.

Reconnaissance-level engineering and cost studies for the turbine runner upgrades were performed in 2008 and 2009. Recent results indicate that the proposed generator capability for Units 55 and 56 will each increase from 200 MW to 240 MW (see Figure B.5-1), for an increase of total Project generator capability from 1,040 MW to 1,120 MW and an estimated increase in average annual generation of 39,838 MWh. Cost estimates for this effort are detailed in Exhibit D of the License Application (as revised March 2010).

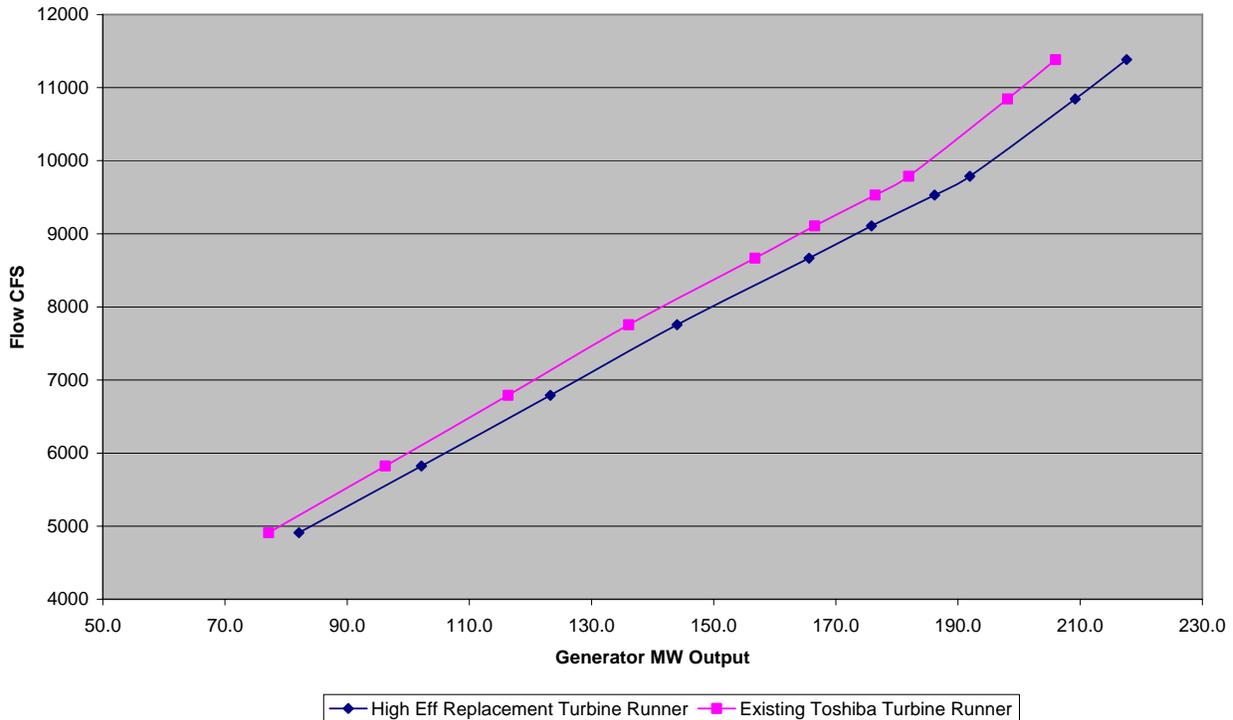


Figure B.5-1. Comparison of the efficiency of the existing and the proposed turbine runners of Units 55 and 56.

SCL also plans to rewind the generators and replace the turbine runners and transformers for Units 51 through 54 during the new license term; however, it is not expected at this time that these changes will result in an increase in capacity or generation.

Descriptions of other proposed modifications and enhancements to Project facilities are included in Exhibits A and E of the License Application (as revised March 2010).

3 REFERENCES

There are no new references in this addendum that were not already cited in Exhibit B of the License Application.

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