

## **EXHIBIT D: STATEMENT OF COSTS AND FINANCING**

### **1 Contents and Purpose of this Exhibit**

Exhibit D is a statement of costs and financing for the operation of the Boundary Hydroelectric Project (Project), including new development costs, annual costs of the Project, the value of the Project power, and identification of the sources and extent of financing. Because Seattle City Light (SCL) is not applying for an initial license and because SCL is a municipality, 18 CFR § 4.51(e)(1) and 18 CFR § 4.51(e)(2), respectively, do not apply (see below).

### **2 Original Costs**

The regulation 18 CFR § 4.51(e)(1) does not apply to the Project because SCL is not applying for an initial license for the Project. Capital improvements made to the Project since the initial license was issued are summarized, to the extent relevant, in Exhibits C and H. Capital costs associated with hydroelectric infrastructure projects and protection, mitigation and enhancement (PM&E) measures in the new license term are summarized in Section 4, New Development Costs, of this Exhibit.

### **3 Estimate of the amount payable if the Project were to be taken over pursuant to Section 14 of the Federal Power Act**

The regulation 18 CFR § 4.51(e)(2) states that if the applicant is a licensee applying for a new license, and is not a municipality or a state, an estimate of the amount which would be payable if the project were to be taken over pursuant to section 14 of the Federal Power Act (FPA) upon expiration of the license in effect must be provided. Given that SCL is a municipality, this section does not apply.

### **4 New Development Costs**

As used here, “new development work” includes (a) any capital expended to carry out improvements or betterments to the Project consistent with existing long-term plans that will continue during the term of a new license, or with the proposals contained in Exhibits A, B, C, E, and H as well as (b) any capital required to provide environmental mitigation or enhancement during the term of a new license.

Costs for new development work for capital projects, for hydroelectric infrastructure as well as PM&E measures, are summarized in Table D.4-1. Total estimated costs include interest during construction (IDC) and overhead. It is expected that land rights will need to be acquired for the implementation of several of the new developments related to fish and aquatics PM&E measures, but the extent and cost of these land rights is unknown at this time.

**Table D.4-1.** Summary of estimated capital costs associated with new development (All costs in 2007 dollars).<sup>1</sup>

Component	Estimated Cost	Interest During Construction (IDC)	Overhead	Total Capital Cost
<b>Hydroelectric Infrastructure</b>				
Unit 55 Generator Rebuild (including runner replacement) (Year 1)	\$11,625,196 <sup>2</sup>	\$540,909	\$1,395,024	\$13,561,129
Unit 56 Generator Rebuild (including runner replacement) (Year 1)	\$20,215,703 <sup>2</sup>	\$1,427,212	\$2,425,884	\$24,068,799
Forebay Wall Hardening (Year 1)	\$7,470,006	\$1,091,985	\$896,401	\$9,458,391
Transformer Banks 151-156 Rock Damage Mitigation (Year 1 <sup>3</sup> )	\$9,804,382	\$1,180,576	\$1,176,526	\$12,161,484
Replace Step-up Transformer, Bk 240-153/4/1/2 (Year 1)	\$11,205,009	\$1,066,974	\$1,344,601	\$13,616,583
Unit 54 Generator Rebuild (Year 4)	\$6,723,005	\$312,815	\$806,761	\$7,842,580
Unit 53 Generator Rebuild (Year 5)	\$6,909,755	\$321,504	\$829,171	\$8,060,430
Unit 51 Generator Rebuild (Year 6)	\$7,189,880	\$334,538	\$862,786	\$8,387,204
Unit 52 Generator Rebuild (Year 7)	\$7,470,006	\$347,572	\$896,401	\$8,713,978
Replace Isophase Bus (Year 7)	\$11,205,009	\$1,066,974	\$1,344,601	\$13,616,583
Ozone Abatement (Year 10)	\$4,201,878	\$96,643	\$504,225	\$4,802,747
Unit 54 Runner Replacement (Year 17)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 52 Runner Replacement (Year 18)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 53 Runner Replacement (Year 19)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 51 Runner Replacement (Year 20)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Transformer Banks 151-156 Rock Damage Mitigation (Year 23)	\$5,602,504	\$128,858	\$672,301	\$6,403,662
Unit 55 Generator Rebuild (including runner replacement) (Year 28)	\$21,476,266	\$2,045,033	\$2,577,152	\$26,098,452
Unit 56 Generator Rebuild (including runner replacement) (Year 29)	\$21,476,266	\$2,045,033	\$2,577,152	\$26,098,452
Unit 54 Generator Rebuild (Year 34)	\$6,723,005	\$312,815	\$806,761	\$7,842,580
Unit 53 Generator Rebuild (Year 35)	\$6,909,755	\$321,504	\$829,171	\$8,060,430
Unit 51 Generator Rebuild (Year 36)	\$7,189,880	\$334,538	\$862,786	\$8,387,204
Unit 52 Generator Rebuild (Year 37)	\$7,470,006	\$347,572	\$896,401	\$8,713,978
Replace Step-up Transformer, Bk 240-153/4/1/2 (Year 41)	\$11,205,009	\$1,066,974	\$1,344,601	\$13,616,583
Transformer Banks 151-156 Rock Damage Mitigation (Year 48)	\$5,602,504	\$128,858	\$672,301	\$6,403,662

Table D.4-1, continued...

Component	Estimated Cost	Interest During Construction (IDC)	Overhead	Total Capital Cost
Unit 54 Runner Replacement (Year 47)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 52 Runner Replacement (Year 48)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 53 Runner Replacement (Year 49)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Unit 51 Runner Replacement (Year 50)	\$11,205,009	\$521,358	\$1,344,601	\$13,070,967
Minor Improvement Projects (Annually) <sup>4</sup>	\$466,875,355	\$10,738,133	\$56,025,043	\$533,638,531
<b>Hydroelectric Infrastructure Subtotal:</b>	<b>\$754,190,448</b>	<b>\$29,427,881</b>	<b>\$90,502,854</b>	<b>\$874,121,183</b>
<b>Environmental Measures</b>				
<b><u>Geology and Soils</u></b>				
Erosion Control Measures at Three (3) Designated Sites (the Forebay Recreation Area, Bureau of Land Management (BLM) Boundary Recreation Area, and the Dispersed Recreation Day Use/Overnight Campsite on BLM-Managed Land) (as part of the Erosion Program, a component of the Terrestrial Resources Management Plan [TRMP])	\$211,941	\$4,875	\$25,433	\$242,249
<b>Geology and Soils Total:</b>	<b>\$211,941</b>	<b>\$4,875</b>	<b>\$25,433</b>	<b>\$242,249</b>
<b><u>Water Resources</u></b>				
Structural Modification to Improve TDG Performance:				
• Throttle 4 sluice gates	\$7,263,200	\$337,949	\$871,584	\$8,472,733
• Roughen sluice flow at 3 gates	\$18,937,800	\$881,157	\$2,272,536	\$22,091,493
• Spillway modifications	\$5,026,000	\$233,855	\$603,120	\$5,862,975
<b>Water Resources Total:</b>	<b>\$31,227,000</b>	<b>\$1,452,961</b>	<b>\$3,747,240</b>	<b>\$36,427,201</b>
<b><u>Fish and Aquatics Resources</u></b>				
Upstream Fish Passage Trap-and-Haul Facility (temporary)	\$2,909,661	\$66,922	\$349,159	\$3,325,742
Upstream Fish Passage Trap-and-Haul Facility (permanent)	\$9,848,082	\$226,506	\$1,181,770	\$11,256,358
Mainstem Gravel Augmentation	\$1,024,124	\$23,555	\$122,895	\$1,170,573
Channel Modifications for Mainstem Trapping Pools at Project River Mile (PRM) 30.3	\$431,631	\$9,928	\$51,796	\$493,354
Placement of Mainstem Engineered Large Woody Debris (LWD) Jams at Tributary Deltas	\$569,247	\$13,093	\$68,310	\$650,649
Habitat Protection in Sullivan Creek River Mile (RM) 0.00 to RM 0.54	\$428,666	\$9,859	\$51,440	\$489,966
LWD and Riparian Planting in Sullivan Creek RM 0.00 to RM 0.54	\$1,219,376	\$28,046	\$146,325	\$1,393,746

Table D.4-1, continued...

Component	Estimated Cost	Interest During Construction (IDC)	Overhead	Total Capital Cost
Riparian Buffer Protection in Sullivan Creek RM 0.00 to RM 0.54	\$1,105,561	\$25,428	\$132,667	\$1,263,656
Riparian, Streambank, and Channel Improvements in Sullivan Creek RM 2.30 to RM 3.93	\$722,237	\$16,611	\$86,668	\$825,517
Culvert Replacements in Slate Creek Tributaries Slumber Creek at RM 0.20 and Styx Creek at RM 0.10	\$699,048	\$16,078	\$83,886	\$799,012
Riparian Planting in Linton Creek RM 0.00 to RM 0.20	\$448,536	\$10,316	\$53,824	\$512,677
Channel Improvements in Sweet Creek RM 0.40 to RM 0.50	\$257,902	\$5,932	\$30,948	\$294,782
Riparian Planting in Sweet Creek RM 0.00 to RM 0.50	\$346,291	\$7,965	\$41,555	\$395,810
Riparian Buffer Protection in Sweet Creek RM 0.00 to RM 0.50	\$328,680	\$7,560	\$39,442	\$375,682
Native Trout Supplementation Facility <sup>5</sup>	\$7,339,281	\$168,803	\$880,714	\$8,388,798
<b>Fish and Aquatics Resources Total:</b>	<b>\$27,678,323</b>	<b>\$636,601</b>	<b>\$3,321,399</b>	<b>\$31,636,323</b>
<b><u>Botanical Resources</u></b>				
No new development proposed that involves design and construction	NA	NA	NA	NA
<b><u>Wildlife Resources</u></b>				
No new development proposed that involves design and construction	NA	NA	NA	NA
<b><u>Threatened and Endangered Species</u></b>				
Addressed by Fish and Aquatics Resources and Wildlife Resources measures	NA	NA	NA	NA
<b><u>Aesthetics/Visual Resources</u></b>				
Addressed by Recreation Resources measures	NA	NA	NA	NA
<b><u>Cultural Resources</u></b>				
No new development proposed that involves design and construction	NA	NA	NA	NA
<b><u>Recreation Resources and Land Use</u></b>				
Improvements at Boundary Forebay Recreation Area	\$2,178,000	\$101,340	\$261,360	\$2,540,700
Improvements at Boundary Vista House Recreation Area	\$233,000	\$10,841	\$27,960	\$271,801
Improvements at Boundary Tailrace Recreation Area/Machine Hall Visitors' Gallery	\$295,000	\$13,726	\$35,400	\$344,126
Improvements at Metaline Waterfront Park Boat Launch	\$1,558,000	\$72,492	\$186,960	\$1,817,452
Development of Peewee Falls Viewpoint and Trail	\$182,000	\$8,468	\$21,840	\$212,308
Development of Metaline Falls Portage Trail	\$119,000	\$5,537	\$14,280	\$138,817

**Table D.4-1, continued...**

<b>Component</b>	<b>Estimated Cost</b>	<b>Interest During Construction (IDC)</b>	<b>Overhead</b>	<b>Total Capital Cost</b>
Enhancements to Designated Dispersed Shoreline Recreation Sites	\$236,000	\$10,981	\$28,320	\$275,301
Installation of Gates on Road Near the Vista House Recreation Area that Leads Downslope to the Tailrace East Parcel and Potentially on the Road Leading from the Ridge Downslope to the BWP (as part of the Travel and Public Access Program, a component of the TRMP)	\$254,914	\$5,863	\$30,590	\$291,367
Installation of Interpretation and Education (I&E) Signs (as part of the I&E Program, a component of the Recreation Resources Management Plan [RRMP])	\$187,000	\$4,301	\$22,440	\$213,741
Decommissioning of Well Heads and Associated Roads	\$305,000	\$14,191	\$36,600	\$355,791
<b>Recreation Resources and Land Use Total:</b>	<b>\$5,547,914</b>	<b>\$247,741</b>	<b>\$665,750</b>	<b>\$6,461,405</b>
<b><u>Socioeconomics</u></b>				
Addressed by measures of other resource areas	NA	NA	NA	NA
<b><u>Tribal Resources</u></b>				
Addressed by measures of other resource areas	NA	NA	NA	NA
<b>Environmental Measures Subtotal:</b>	<b>\$64,706,428</b>	<b>\$2,343,127</b>	<b>\$7,764,771</b>	<b>\$74,814,326</b>
<b>Grand Total:</b>	<b>\$818,855,626</b>	<b>\$31,770,059</b>	<b>\$98,262,675</b>	<b>\$948,888,360</b>

Notes:

- 1 SCL does not anticipate indirect construction costs for any of the projects.
- 2 The significant difference in the costs presented for Units 55 and 56 is due to the fact that a large portion of the Unit 55 cost will be spent under the current license term.
- 3 Effort commenced in 2009, under current license term.
- 4 Based on an estimated annual spending average of \$10 million.
- 5 For planning purposes, the propagation facility is assumed to be located at the 40-acre WDFW parcel near Indian Creek that formerly included the Usk Hatchery. If an agreement with WDFW regarding this parcel cannot be reached, SCL will explore other options in the area that could be used to implement this PM&E measure, including expansion or modification of an existing facility, which could impact the cost estimates.

All costs associated with PM&E measures (capital and O&M) are summarized by resource area in Table D.4-2 and detailed by individual measure in Attachment D-1.

**Table D.4-2.** Summary of estimated costs associated with SCL's PM&E proposal (All costs in 2007 dollars).

<b>Component</b>	<b>Estimated Capital</b>	<b>Annualized O&amp;M</b>	<b>Annualized Cost<sup>1</sup></b>
Project Operational Measures	NA	\$0 <sup>2</sup>	\$0
Geology and Soils	\$380,037	\$26,817	\$43,993
Water Resources	\$31,227,000	\$1,463,383	\$3,315,235
Fish and Aquatic Resources	\$27,678,323	\$1,550,496	\$2,739,684
Botanical Resources	NA	\$82,807	\$82,807
Wildlife Resources	NA	\$102,425	\$102,425
Threatened and Endangered Resources – Addressed by Wildlife and Fish and Aquatics Resources measures	NA	NA	NA
Aesthetics/Visual Resources – Addressed by Recreation Resources measures	NA	NA	NA
Cultural Resources	NA	\$19,211	\$19,211
Recreation Resources and Land Use	\$5,734,664	\$236,736	\$498,578
Socioeconomics – Addressed by measures of other resource areas	NA	NA	NA
Tribal Resources – Addressed by measures of other resource areas	NA	NA	NA
<b>Operational PM&amp;E Measures Subtotal:</b>	<b>NA</b>	<b>\$0</b>	<b>\$0</b>
<b>Non-operational PM&amp;E Measures Subtotal:</b>	<b>\$65,020,024</b>	<b>\$3,481,875</b>	<b>\$6,801,933</b>
<b>Total:</b>	<b>\$65,020,024</b>	<b>\$3,481,875</b>	<b>\$6,801,933</b>

Notes:

- 1 Annualized values based on a 50-year license term.
- 2 There is no anticipated loss of total generation for the proposed operational PM&E measures.

## 5 Annual Costs of Project

The annual costs of operating the Project for the period 1998 through 2007 are presented in Table D.5-1.

**Table D.5-1.** Summary of operating costs and expenses for the Boundary Project, 1998-2007. <sup>1</sup>

Year	Operation and Maintenance <sup>2</sup>	FERC Fees <sup>3</sup>	Depreciation	Admin and General <sup>4</sup>	Pend Oreille County Impact Payment	Totals
1998	\$3,222,753	\$3,423,923	\$3,885,623	\$2,015,543	\$859,804	<b>\$13,407,647</b>
1999	\$3,434,490	\$2,854,094	\$4,004,627	\$2,341,942	\$1,054,516	<b>\$13,689,669</b>
2000	\$3,551,175	\$2,647,745	\$4,167,951	\$2,819,672	\$1,085,196	<b>\$14,271,738</b>
2001	\$3,297,810	\$2,147,956	\$4,343,261	\$2,235,625	\$1,097,006	<b>\$13,121,657</b>
2002	\$3,715,223	\$2,899,738	\$4,409,960	\$3,026,287	\$1,146,419	<b>\$15,197,627</b>
2003	\$4,115,262	\$3,151,950	\$4,744,563	\$3,677,336	\$1,196,747	<b>\$16,885,857</b>
2004	\$4,567,099	\$3,023,831	\$5,135,944	\$3,659,248	\$1,212,044	<b>\$17,598,166</b>
2005	\$4,157,750	\$1,697,911	\$5,342,318	\$3,912,559	\$1,245,804	<b>\$16,356,342</b>
2006	\$4,099,374	\$1,696,611	\$5,258,920	\$3,522,956	\$1,281,800	<b>\$15,859,661</b>
2007	\$4,940,996	\$2,675,152	\$5,317,191	\$4,894,849	\$1,317,685	<b>\$19,145,872</b>
<b>Average</b>	<b>\$3,910,193</b>	<b>\$2,621,891</b>	<b>\$4,661,036</b>	<b>\$3,210,602</b>	<b>\$1,149,702</b>	<b>\$15,553,424</b>

Notes:

- 1 All dollars are nominal dollars.
- 2 FERC accounts in use as of 2007: 53560, 53760, 53860, 53960, 53902 (allocated to Boundary), 54160, 54260, 54360, 54460, and 54560.
- 3 FERC fees are Water for Power (FERC Account 536), Upstream Benefits (FERC Account 536), and Land Use (FERC Account 540)
- 4 Administrative and general costs include insurance, and are allocated based on operation and maintenance (O&M) costs.

### 5.1. Cost of Capital

SCL uses both debt and equity as sources of capital. The cost of capital is the interest rate weighted by the amount of that debt and equity. Table D.5-2 summarizes the cost of capital to SCL. At the end of 2007, SCL had \$1.3 billion in outstanding debt, with a dollar-weighted interest rate of 4.67 percent and \$0.7 billion in accumulated equity, which by City policy is evaluated with a 7 percent return. In spite of the considerable uncertainty in the future of capital markets, these interest rates and the 2007 weighted average are used as the cost of capital when annualizing costs in this License Application.

**Table D.5-2.** Cost of capital for SCL (as of December 2007; SCL 2007a, b).

Description	Amount	Rate (percent)
Total outstanding debt	\$1,342,744,853	4.67
Accumulated equity	\$661,070,558	7.00
Total capitalization	\$2,003,815,411	--
Weighted cost of capital	--	5.44

## 5.2. Local, State and Federal Taxes

Combined state and local sales tax in Pend Oreille County was 7.6 percent in 2007. Certain costs are eligible for deductions or exemptions. For example, new or replacement equipment used in manufacturing is exempt from the sales and use tax (RCW 82.08.02565, 82.12.02565). Consequently, new or replaced turbines or generators at the Project are exempt from the sales and use tax, but the labor and materials related to installation are subject to sales and use tax. PM&E measures are subject to the sales and use tax.

SCL makes a compensation payment to Pend Oreille County, which is also dispersed to school districts in the county shown in Table D.5-1. The payment in 2007 was \$1,317,685, which included \$84,653 in a retroactive payment. The payment is based on 1998 power generation at the Project and a negotiated rate per megawatt hour (MWh). SCL intends to continue payments for the period 2009-2019, terms of which are currently being negotiated with representatives of Pend Oreille County.

SCL pays taxes to the state and City of Seattle based on retail revenue (see Washington Administrative Code 458-20-179 and Seattle Municipal Code 5.48.050.D, respectively). In the event that the conditions of the new license increase the cost of owning and operating the Project, SCL will likely raise retail rates in order to pay the increased costs. The need to pay more taxes will contribute to the increase in retail revenue.

As a municipal utility, any gross income that SCL earns is exempt from federal income tax (26 USC 115). Also, no lands within the Project boundary are subject to property taxes (RCW 84.36.010).

## 6 Value of Project Power

As SCL's within-hour, load-following resource the Project is of significant value to SCL's ratepayers. In addition to the power used to serve load, the net excess generation is sold on the secondary market and the net wholesale revenue is used to maintain stable, affordable rates for SCL's ratepayers.

To provide a consistent comparison among existing operations (No Action alternative) and alternate operations, the hourly energy production was determined by the Scenario Tool (ST; (CddHoward 2008)(described in Exhibit B, Sections 3, Existing Resource Utilization, and 5, Future Resource Utilization, and in greater detail in Exhibit E, Section 4.4, Modeling Analysis, of this License Application). For the No Action alternative, total energy production from the Project is approximately 4,110,505 million MWh based on modeled results.<sup>1</sup> Purchasing an equivalent quantity of energy from the Mid-Columbia trading hub would have cost SCL \$212.7 million given the relative on- and off-peak output and prices in 2007.<sup>2</sup>

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<sup>1</sup> See Exhibit B, Section 3 for estimate for total average annual energy production.

<sup>2</sup> The average price, based on actual 2007 Mid-Columbia hourly prices, weighted by the on-peak and off-peak production, was \$51.75/MWh in 2007. The Scenario Tool, the model developed to provide a consistent comparison among existing and alternate operations, uses the same prices to estimate revenue (see Exhibit B, Section 3).

Annual costs for the Project (i.e., production costs and an allocated share of debt service) totaled \$26.3 million in 2007. Production costs were \$13.8 million (total 2007 costs in Table D.5-1 excluding depreciation). Debt service in 2007 (\$141 million) is allocated on the basis of the asset value of the Project (original cost of \$234 million as of December 31, 2007) as a percentage of SCL's total asset value (original cost of \$2.647 billion as of December 31, 2007). The allocated debt service for 2007 is \$12.5 million. This results in an average annual cost for the Project of \$6.40/MWh.

An estimate of the net 2007 value of the Project is approximately \$186.4 million, which is the difference between the gross value of the energy and the total of the production and allocated debt service costs. It should be noted that the firm market price used to estimate the gross value of the energy does not capture all the benefits and monetize all the values of the Project in 2007. These values include ancillary services, load following, price following, and resource reliability to SCL.

Factors that may influence these prices during the term of the new license are wide and varied. Most significant are the annual snow pack in the Pacific Northwest, the daily weather and its associated influence on heating and cooling loads, regulatory and legal requirements associated with the Endangered Species Act (ESA) and their constraints on generation, and the general state of wholesale energy markets on the West coast.

### **6.1. Replacement Costs of Energy and Capacity**

To replace the energy and capacity from the Project, SCL could construct or buy output from coal-fired, gas-fired, or renewable-fueled replacements. State permitting regulations and City policies effectively preclude construction of or contracts with coal-fired plants. Renewable resources do not provide the same resource reliability and capacity benefits as the Project, and therefore, could not adequately replace the energy and capacity from the Project.

The technology most similar to the Project, which has a rated capacity of 1,040 megawatts (MW) and average capacity factor of 45 percent, is a natural gas-fired combined cycle plant. Such a plant can follow load changes and provide ancillary services, although not as well as the Project.

A 1,040-MW combined cycle plant will cost approximately \$1.2 billion to construct, which, including fixed operation and maintenance costs, has an annual equivalent of \$97 million. Annual gas consumption to meet the firm output of the Project (3 million MWh per year) will cost between approximately \$83 million with a natural gas price of \$4/MMBTU to as much as \$207 million with a natural gas price of \$10/MMBTU. Adding variable operations and maintenance costs and the carbon tax, as identified in President Obama's 2010 budget proposal, and assuming a long-term levelized natural gas price of \$6/MMBTU, yields an annual variable cost of \$143 million. As a result, the annualized replacement cost for the firm output of the Project will be \$221 million (\$74.05/MWh), assuming a natural gas cost of \$6/MMBTU.

The decision to operate the replacement plant in a manner to replace some or all of the non-firm output will be based on actual market prices for energy and ancillary services compared to the operational and opportunity costs.

In addition to financial costs, the replacement plant will have certain environmental impacts. Air emissions impacts are estimated in Table D.6-1, and consumptive water use is described in the following paragraph. Other environmental impacts have not been quantified.

**Table D.6-1.** Estimated annual air emissions associated with replacement plant.

Pollutant	Estimated Annual Emissions (tons)
Nitrogen oxide	1,348.75 <sup>1</sup>
Carbon dioxide	1,213,875 <sup>2</sup>
Carbon monoxide	311.25 <sup>2</sup>
Sulfur dioxide	35.275 <sup>3</sup>
Methane	89.225 <sup>2</sup>
Total particulate matter	68.475 <sup>2</sup>
Volatile organic compounds	21.7875 <sup>2</sup>

Notes:

- 1 United States Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, AP-42 Fifth Edition, January 1995, Supplement F, April 2000, (“AP-42”), Table 3.1-1.
- 2 United States Department of Energy, Energy Information Administration, Instructions for Form EIA-1605, Appendix H.
- 3 AP-42, Table 3.1-2a.

It is anticipated that a replacement 1,040-MW combined cycle plant will have a re-circulating wet cooling system. Re-circulating wet cooling requires between 4.72 and 5.86 acre-feet of cooling water per MW per year (Maulbetsch and DiFilippo 2006). Based on the size of a combined cycle plant necessary to replace the Project, the replacement plant will have a consumptive water use of between 4,909 and 6,094 acre-feet per year of cooling water. By contrast, Project use of water is generally non-consumptive.

**6.2. Value of Ancillary Services**

Ancillary services include the ability of a power plant to respond quickly to changes in load from end-users or changes in supply from intermittent sources such as wind turbines. While the Pacific Northwest does not have an organized market or posted prices for these services, certain proxies are available.

Regional utilities post prices for these services in Open Access Transmission Tariffs and the Northwest Power Planning and Conservation Council estimates and projects these costs into the future. Based on an assessment of growing quantity demanded for these sources, the price of ancillary services is likely to rise at a rate higher than overall price inflation for the next 20 years.

SCL provides ancillary services from its Skagit River Project, Boundary Project, and certain contracts, and provides these services to SCL’s ratepayers and third parties. SCL’s ability to provide ancillary services from multiple sources increases SCL’s overall ability to respond to changes in load compared to a scenario in which SCL had only one source. Having multiple

sources is advantageous to SCL's ratepayers, but complicates the task of estimating ancillary services from a single source, such as the Project.

### **6.3. On-peak and Off-peak Values of Project Power**

In 2007, the average on-peak energy value was \$56.77/MWh, and the average off-peak hour energy value was \$44.02/MWh. These values are based on SCL sales, which vary by time of year and differ from a simple average price over all hours in the periods. During the course of the year, the on-peak/off-peak difference is usually highest in the summer and lowest in the winter. The Western Electricity Coordinating Council (WECC) defines the periods.

Over the new license term, some difference between on-peak and off-peak is likely on a monthly and annual basis. New supply resources will be renewable or gas-fired, which typically have offsetting effects on the on-peak/off-peak price differences. If gas-fired plants are run more during both periods, the price difference will be smaller. Wind is the predominant new source of renewable energy, and by its nature is most productive during early morning and evening hours, which are at the cross-over between peak and off-peak periods. This could produce more volatility in general, although this is difficult to quantify reasonably, and result in higher prices during certain peak hours, when the wind is not blowing, and lower peak prices when the wind is blowing.

### **6.4. Effect on the Value of Project Power Due to Proposed Changes in Project Operation**

As indicated in the summary of cost estimates associated with SCL's proposal (Table D.4-2), SCL anticipates that the operational proposal will result in no change in average annual power generation; therefore, it will not impact the average annual power value.

During the new license term, SCL proposes to install new high efficiency turbines in Units 55 and 56. The estimated average annual increase in Project generation is 39,838 MWh. As a result, the estimated average value of Project power will increase from approximately \$212.7 million to \$214.8 million.

## **7 Sources and Extent of Financing**

SCL has two sources of funding to meet the costs of new developments and proposed changes to the Project. First, SCL generates cash from operations, which is available for purposes approved by the City's Mayor and City Council including costs at the Project. Retail revenue, wholesale revenue, and other revenue sources pay operating expenses, taxes, debt service, and some capital requirements. Cash from operations depends on many factors, and can vary between \$10 million and \$150 million per year. Second, SCL can borrow money from private markets to meet capital requirements above the amount met with cash from operations. As of December 2007, SCL had \$1.3 billion in debt outstanding, and was borrowing every six to 24 months depending on capital markets and cash balances.

## 8 Cost to Develop the License Application

The cost to develop this License Application, from January 2002 through September 2009, is estimated at approximately \$34 million.

## 9 References

- CddHoward Consulting, Ltd. 2008. Seattle City Light Boundary Dam Scenario Tool Overview and Technical Documentation (July 23, 2008).
- EPA (Environmental Protection Agency). 1995. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, AP-42 Fifth Edition. January 1995.
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- Maulbetsch, J.S., and M.N. DiFilippo. 2006. Cost and Value of Water Use at Combined-Cycle Power Plants. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2006-034.
- SCL. 2007a. Financial Statements as of and for the Years Ended December 31, 2007 and 2006, Required Supplementary Information, and Independent Auditor's Report.  
<http://www.seattle.gov/light/AboutUs/AnnualReport/2007/2007annualstatement.pdf>
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[http://www.seattle.gov/light/news/issues/RateProc/Docs/2007rate\\_revenue\\_requirement\\_analysis.pdf](http://www.seattle.gov/light/news/issues/RateProc/Docs/2007rate_revenue_requirement_analysis.pdf)

## **Attachment D-1. Summary of Estimated Costs Associated with Proposed PM&E Measures**



**Summary of Estimated Costs Associated with Proposed PM&E Measures <sup>1,2</sup>**

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>PROJECT OPERATIONAL MEASURES (FLOW REGIME / RESERVOIR LEVELS)</b>						
<ul style="list-style-type: none"> <li>• Modify Boundary Reservoir operations according to the following constraints:                             <ul style="list-style-type: none"> <li>○ Formalize the voluntary measure of restricting forebay water surface elevations during the summer recreation season</li> <li>○ Formalize the voluntary measure to operate Units 55 and 56 above 125 MW and sequence their startup and shutdown so that they are the last units to be brought on line and the first units to be shut down in order to reduce total dissolved gas (TDG) under normal, non-spill operations <sup>5</sup></li> </ul> </li> </ul>	NA	NA	\$0 <sup>4</sup>	Annually	\$0	\$0
<b>Project Operational Measures Total:</b>	NA	NA	\$0	NA	\$0	\$0

<sup>1</sup> All costs in 2007 dollars.

<sup>2</sup> Annualized values based on a 50-year license term.

<sup>3</sup> Calculation of annualized values for capital costs includes the addition of interest during construction (IDC) and overhead.

<sup>4</sup> There is no anticipated loss of total annual generation for the proposed operational PM&E measures.

<sup>5</sup> When the proposed upgrades of Units 55 and 56 are completed, SCL will re-evaluate the need for the unit sequencing and adjust the approach to, or eliminate, the sequencing restrictions as appropriate.

	Capital		O&M			
Proposed PM&E	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	Total Annualized Cost
<b>GEOLOGY AND SOILS</b>						
<ul style="list-style-type: none"> <li>• Implement a Terrestrial Resources Management Plan (TRMP). Programs included under the plan include:                             <ul style="list-style-type: none"> <li>○ Erosion Program</li> <li>○ Habitat Protection and Enhancement Program</li> <li>○ Integrated Weed Management Program</li> <li>○ Rare, Threatened and Endangered (RTE) Plant Species Program</li> <li>○ Wildlife Program</li> <li>○ Shoreline Management Program</li> <li>○ Travel and Public Access Management Program</li> </ul> </li> </ul>	Included in costs for individual program below	See below	See below	See below	See below	See below

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement an Erosion Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>○ Erosion control measures at the Forebay Recreation Area, Bureau of Land Management (BLM) Boundary Recreation Area, and the Dispersed Recreation Day Use/Overnight Campsite on BLM-Managed Land</li> <li>○ Long-term erosion monitoring for lands adjacent to the Project reservoir</li> </ul> </li> </ul>	\$380,037 <sup>6</sup>	\$17,176	\$30,814	Annually for 3 years following implementation (monitor)	\$3,730	\$20,907
			\$5,603	Every 6 years (maint.)	\$1,041	\$1,041
		NA	NA	\$42,953	Every 10 years	\$5,087
<ul style="list-style-type: none"> <li>• Provide off-site mitigation for continuing erosion effects (through incorporation of an 89-acre<sup>7</sup> parcel of land located adjacent to the BWP into the Project boundary and management for biodiversity)</li> </ul>	NA	NA	\$420,242	One-time (purchase)	\$16,959	\$16,959
			O&M included in Erosion Program costs above	See above	See above	See above
<b>Geology and Soils Total:</b>	<b>\$380,037</b>	<b>\$17,176</b>	<b>NA</b>	<b>NA</b>	<b>\$26,817</b>	<b>\$43,993</b>

<sup>6</sup> \$43,886 in the initial year for planning; \$168,075 within 5 years for initial construction and \$168,075 within 25 years of license issuance for replacement/repairs.

<sup>7</sup> The size of the adjoining SCL-owned parcels is 89 acres, not 88 acres as previously reported.

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>WATER RESOURCES</b>						
<ul style="list-style-type: none"> <li>Acquire flood easements from private landowners in Metaline and Metaline Falls to compensate for Project-related contributions to flooding upstream of Metaline Falls and restrict future development in easement areas<sup>8</sup></li> </ul>	NA	NA	\$720,000	One-time (Within 5 Years of License Issuance)	\$29,055	\$29,055
<ul style="list-style-type: none"> <li>Implement a Total Dissolved Gas (TDG) Attainment Plan. Components under the plan include:                             <ul style="list-style-type: none"> <li>Study, develop engineering designs, and prototype some combination of throttling sluice gates, roughening sluice flow and installing a spillway splitter(s)/aerator(s) to develop a structural and operational modifications to improve TDG performance<sup>10</sup></li> <li>Reporting and consultation with the Washington Department of Ecology</li> </ul> </li> </ul>	\$31,227,000 <sup>9</sup>	\$1,851,852	\$1,375,000	Annually	\$1,375,000	\$3,226,852

<sup>8</sup> Because these easements are unnecessary for normal Project operations, SCL does not propose to include any provisions relating to these easements in the new License.

<sup>9</sup> Throttling of four (4) sluice gates (\$7,263,200), roughening sluice flow of 3 gates (\$18,937,800), and installation of 2 deflectors (\$5,026,000); values cited in the Evaluation of Total Dissolved Gas and Potential Abatement Measures Final Report (SCL 2009) with the addition of 25 percent for engineering designs and 15 percent for permitting costs.

<sup>10</sup> Costs are associated with the combination of the following: throttling 4 sluice gates, roughening sluice flow at 3 gates, and spillway modifications that involve installation of 2 deflectors and air induction.

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement a Dissolved Oxygen (DO) Attainment Plan. Components under the plan include:                             <ul style="list-style-type: none"> <li>○ Develop a Quality Assurances Project Plan (QAPP)</li> <li>○ DO monitoring</li> <li>○ Reporting and consultation with the Washington Department of Ecology</li> </ul> </li> </ul>	NA	NA	\$10,000	One-time (Year 1)	\$404	\$404
	NA	NA	\$76,000	Annually Years 2 through 6	\$13,966	\$13,966
	NA	NA	Included in DO monitoring costs above	See above	See above	See above
<ul style="list-style-type: none"> <li>• Implement an Aquatic Invasive Species Control and Prevention Plan (AISCPP). Components under the plan include:                             <ul style="list-style-type: none"> <li>○ Install and replace bottom barriers for macrophyte suppression</li> <li>○ Monitor effectiveness of bottom barriers</li> <li>○ Monitor for invasive mollusk species</li> <li>○ Conduct lab analysis if invasive mollusks species found</li> <li>○ Reporting and consultation with the Washington Department of Ecology and Water Quality Workgroup (WQWG)</li> </ul> </li> </ul>	NA	NA	\$41,250	Every 5 years	\$9,059	\$9,059
	NA	NA	\$5,500	Annually	\$5,500	\$5,500
	NA	NA	\$10,000	Annually	\$10,000	\$10,000
	NA	NA	\$400	Annually	\$400	\$400
	NA	NA	\$20,000	Annually	\$20,000	\$20,000
<ul style="list-style-type: none"> <li>• Implement aquatic habitat enhancement measures as provided in Fish and Aquatics Management Plan (i.e., riparian plantings, stream channel modifications, large wood supplementation, bank improvement, and culvert replacement in tributaries) to help meet temperature improvement goals</li> </ul>	See Fish and Aquatics below	See Fish and Aquatics below	See Fish and Aquatics below	See Fish and Aquatics below	See Fish and Aquatics below	See Fish and Aquatics below
<b>Water Resources Total:</b>	<b>\$31,227,000</b>	<b>\$1,851,852</b>	<b>NA</b>	<b>NA</b>	<b>\$1,463,383</b>	<b>\$3,315,235</b>

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>FISH AND AQUATICS RESOURCES</b>						
<ul style="list-style-type: none"> <li>• Implement a Fish and Aquatics Management Plan that encompasses all fish and aquatics-related PM&amp;E measures:                             <ul style="list-style-type: none"> <li>○ Reporting and consultation with the Fish and Aquatics Workgroup (FAWG)</li> </ul> </li> </ul>	NA	NA	\$168,075	Annually	\$168,075	\$168,075
<b>Fish Passage</b>						
<ul style="list-style-type: none"> <li>• Develop an upstream fish passage trap-and-haul facility:                             <ul style="list-style-type: none"> <li>○ Phase I monitoring</li> <li>○ Phase I temporary trap-and-haul facility installation</li> <li>○ Phase II temporary trap-and-haul facility monitoring</li> <li>○ Phase III permanent trap-and-haul facility installation</li> <li>○ Phase III permanent trap-and-haul facility monitoring</li> </ul> </li> </ul>	NA	NA	\$280,125	Annually Years 1 through 7	\$69,901	\$69,901
	\$2,909,661	\$117,417	\$445,166	Annually Years 8 through 17 (O&M)	\$151,687	\$269,104
	NA	NA	\$93,375	Annually Years 8 through 17	\$31,817	\$31,817
	\$9,848,082	\$397,411	\$306,924	Annually Years 18 through 50 (O&M)	\$250,172	\$647,583
	NA	NA	\$46,688	Annually Years 18 through 50	\$38,055	\$38,055

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>Fish Habitat</b>						
<ul style="list-style-type: none"> <li>• Implement gravel augmentation below Box Canyon Dam (initial placement and periodic replacement):                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$1,024,124 (initial)	\$46,287	\$546,160 (replacement)	Every 5 years	\$119,938	\$166,225
	NA	NA	\$18,675	Every 5 years	\$4,101	\$4,101
	NA	NA	\$23,344	Every 5 years	\$5,126	\$5,126
<ul style="list-style-type: none"> <li>• Implement channel modifications for mainstem trapping pools at Project river mile (PRM) 30.3 (initial and replacement):                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$431,631 (initial)	\$19,508	\$43,270 (replacement / repair)	Every 10 years	\$5,124	\$24,633
	NA	NA	\$9,338	Every 5 years	\$2,051	\$2,051
	NA	NA	\$9,338	Every 5 years	\$2,051	\$2,051
<ul style="list-style-type: none"> <li>• Implement placement and replacement of mainstem engineering large woody debris (LWD) at tributary deltas:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$569,247 (initial)	\$25,728	\$193,230 (replacement)	Every 7 years	\$31,249	\$56,977
	NA	NA	\$14,006	Every 5 years	\$3,076	\$3,076
	NA	NA	\$9,338	Every 5 years	\$2,051	\$2,051
<ul style="list-style-type: none"> <li>• Boundary Reservoir fish community monitoring</li> </ul>	NA	NA	\$233,438	Every 5 years	\$51,264	\$51,264
<ul style="list-style-type: none"> <li>• Implement habitat protection in Sullivan Creek river mile (RM) 0.00 to RM 0.54:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$428,666 (initial)	\$19,374	\$94,794 (replacement / repair)	Every 7 years	\$15,330	\$34,704
	NA	NA	\$28,013	Every 5 years	\$6,152	\$6,152
	NA	NA	\$28,013	Every 5 years	\$6,152	\$6,152

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement LWD and riparian planting in Sullivan Creek RM 0.00 to RM 0.54:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$1,219,376	\$55,112	NA	NA	NA	\$55,112
	NA	NA	\$9,338	Annually Years 6 through 8	\$1,130	\$1,130
<ul style="list-style-type: none"> <li>• Implement riparian buffer protection in Sullivan Creek RM 0.00 to RM 0.54:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$1,105,516	\$49,968	NA	NA	NA	\$49,968
	NA	NA	\$9,338	Year 6	\$377	\$377
<ul style="list-style-type: none"> <li>• Implement riparian, streambank, and channel improvements in Sullivan Creek RM 2.30 to RM 3.93:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$722,237 (initial)	\$32,643	\$199,001 (replacement / repair)	Every 7 years	\$32,182	\$64,825
	NA	NA	\$46,688	Every 5 years	\$10,253	\$10,253
	NA	NA	\$46,688	Every 5 years	\$10,253	\$10,253
<ul style="list-style-type: none"> <li>• Implement culvert replacements in Slate Creek tributaries Slumber Creek at RM 0.20 and Styx Creek at RM 0.10:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$699,048 (initial)	\$31,595	\$416,733 (replacement / repair)	One-time (approx. Year 40)	\$16,817	\$48,412
	NA	NA	\$9,338	Annually Years 6 through 8	\$1,130	\$1,130
<ul style="list-style-type: none"> <li>• Implement riparian planting in Linton Creek RM 0.00 to RM 0.20:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$448,536	\$20,272	NA	NA	NA	\$20,272
	NA	NA	\$9,338	Annually Years 6 through 8	\$1,130	\$1,130

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement channel improvements in Sweet Creek RM 0.40 to RM 0.50:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	\$257,902 (initial)	\$11,656	\$87,399 (replacement / repair)	Every 7 years	\$14,134	\$25,790
	NA	NA	\$28,013	Every 5 years	\$6,152	\$6,152
	NA	NA	\$28,013	Every 5 years	\$6,152	\$6,152
<ul style="list-style-type: none"> <li>• Implement riparian planting in Sweet Creek RM 0.00 to RM 0.50:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$346,291	\$15,651	NA	NA	NA	\$15,651
	NA	NA	\$9,338	Annually Years 6 through 8	\$1,130	\$1,130
<ul style="list-style-type: none"> <li>• Implement riparian buffer protection in Sweet Creek RM 0.00 to RM 0.50:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> </ul> </li> </ul>	\$328,680	\$14,855	NA	NA	NA	\$14,855
	NA	NA	\$9,338	Year 6	\$377	\$377
<ul style="list-style-type: none"> <li>• Implement tributary non-native trout suppression:                             <ul style="list-style-type: none"> <li>○ Compliance monitoring</li> <li>○ Effectiveness monitoring</li> </ul> </li> </ul>	NA	NA	\$28,013	One-time (planning)	\$1,130	\$1,130
			\$47,783	Annually (O&M)	\$47,783	\$47,783
	NA	NA	\$7,470	Annually	\$7,470	\$7,470
	NA	NA	Included in O&M cost above	See above	See above	See above
<ul style="list-style-type: none"> <li>• Construct a native trout supplementation facility</li> </ul>	\$7,339,281	\$331,711	\$429,525	Annually (O&M)	\$429,525	\$761,236
<b>Fish and Aquatic Resources Total:</b>	<b>\$27,678,323</b>	<b>\$1,189,189</b>	<b>NA</b>	<b>NA</b>	<b>\$1,550,496</b>	<b>\$2,739,684</b>

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>BOTANICAL RESOURCES</b>						
<ul style="list-style-type: none"> <li>Incorporate the 89-acre adjacent parcel of land into the Project boundary and management of both it and the BWP for biodiversity (also identified under Geology/Soils, Wildlife Resources, and Recreation and Land Use)</li> </ul>	Included in costs for Weeds and RTE Plant Programs below	See above	See above	See above	See above	See above
<ul style="list-style-type: none"> <li>Implement an Integrated Weed Management Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>Initial inventory to document the location and extent of weed populations</li> <li>Periodic inventories to identify any new infestations of noxious weeds</li> <li>Control and effectiveness monitoring of Class A and Class B-designate weed species on SCL lands within the Project boundary and along roads and at recreation areas</li> </ul> </li> </ul>	NA	NA	\$49,489	Annually	\$49,489	\$49,489
<ul style="list-style-type: none"> <li>Implement RTE Plant Species Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>Qualitative periodic surveys to evaluate RTE species distribution and population trends for widespread species in the Project area</li> <li>Conduct a census to evaluate distribution and population trends for RTE plant species with limited distribution in the Project area</li> <li>Conduct comprehensive RTE plant survey if a catastrophic event occurs in the Project area</li> </ul> </li> </ul>	NA	NA	\$11,205	One-time (planning)	\$452	\$452
	NA	NA	\$46,688	Every 6 years	\$8,676	\$8,676
	NA	NA	\$68,164	Every 3 years	\$24,191	\$24,191
	NA	NA	Included in other costs for program above	See above	See above	See above

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>Botanical Resources Total:</b>	NA	NA	NA	NA	\$82,807	\$82,807
<b>WILDLIFE RESOURCES</b>						
<ul style="list-style-type: none"> <li>• Implement Wildlife Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>○ Monitor bald eagle nest use and productivity within the Project boundary</li> <li>○ Monitor RTE wildlife species, specifically for the peregrine falcon, bank swallow, and osprey</li> </ul> </li> </ul>	NA	NA	\$126,056 \$73,766	One-time (planning) Annually	\$5,087 \$73,766	\$5,087 \$73,766
<ul style="list-style-type: none"> <li>• Implement Habitat Enhancement Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>○ Vehicle access control (in coordination with the Travel and Public Access Management Program)</li> <li>○ Implement selective habitat enhancement measures on SCL-owned lands in the Project boundary (includes the incorporation of the 89-acre adjacent parcel of land into the boundary and management of both it and the BWP for biodiversity)</li> <li>○ Protect Canada goose nests on Metaline Island and Rat Island from human disturbance and limit recreational use at other sites along the reservoir to protect ecological values</li> </ul> </li> </ul>	NA	NA	\$106,448 \$28,013 \$5,603 \$70,031	One-time (planning) Every 3 years Every 6 years (maint.) Every 10 years	\$4,296 \$9,941 \$1,041 \$8,294	\$4,296 \$9,941 \$1,041 \$8,294

	Capital		O&M			
Proposed PM&E	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	Total Annualized Cost
<b>Wildlife Resources Total:</b>	NA	NA	NA	NA	\$102,425	\$102,425
<b>THREATENED AND ENDANGERED SPECIES</b>						
<ul style="list-style-type: none"> <li>Addressed by Wildlife and Fish and Aquatics measures</li> </ul>	See above	See above	See above	See above	See above	See above
<b>AESTHETICS/VISUAL RESOURCES</b>						
<ul style="list-style-type: none"> <li>Implement aesthetic/visual resource management guidelines for future Project recreation facilities (to be included in the Recreation Resource Management Plan [RRMP])</li> </ul>	See Recreation and Land Use below	See Recreation and Land Use below	See Recreation and Land Use below	See Recreation and Land Use below	See Recreation and Land Use below	See Recreation and Land Use below
<b>CULTURAL RESOURCES</b>						
<ul style="list-style-type: none"> <li>Implement an HPMP:                             <ul style="list-style-type: none"> <li>Reporting and consultation with Cultural Resources Work Group (CRWG)</li> </ul> </li> </ul>	NA	NA	\$3,500	Annually	\$3,500	\$3,500
<ul style="list-style-type: none"> <li>Appointment and training of a staff HPMP Coordinator in historic properties management and current regulations to direct the implementation of this plan during the term of the new license; training by the Coordinator of Project employees</li> </ul>	NA	NA	\$5,000	Annually	\$5,000	\$5,000
<ul style="list-style-type: none"> <li>Historic properties treatment of three National Register of Historic Places (NRHP)-eligible properties (the Josephine Mine Historic Mining District, the Pend Oreille Mines and Metals Company [POMMC] Powerhouse Historic District and the Carl Harvey Homestead) through the integrated Interpretation and Education (I&amp;E) Program (a component of the RRMP)</li> </ul>	Included with I&E Program costs (Recreation / Land Use) below	See below	NA	NA	NA	See below

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>HABS/HAER documentation of POMMC Powerhouse</li> </ul>	NA	NA	\$20,000	One-time (Within 5 Years of License Issuance)	\$807	\$807
<ul style="list-style-type: none"> <li>If Project effects associated with activities proposed during the term of the new license are anticipated to extend beyond the current Area of Potential Effect (APE) as defined in the HPMP, SCL will consult with the CRWG to amend the definition of the APE, and will initiate appropriate measures to inventory, assess, and evaluate cultural resources within the modified APE</li> </ul>	NA	NA	\$2,000	Annual	\$2,000	\$2,000
<ul style="list-style-type: none"> <li>Monitoring of the historic archeological sites identified above and two prehistoric archaeological sites (45PO581 and 45PO583)</li> </ul>	NA	NA	\$7,500	Annually	\$7,500	\$7,500
<ul style="list-style-type: none"> <li>Monitoring following extreme high-water events if erosion is known to occur in the vicinity of the pre-historic sites (depends on flow conditions and the Cultural Resources Workgroup decisions following license issuance)</li> </ul>	NA	NA	Included in monitoring of archaeological sites cost above	See above	See above	See above
<ul style="list-style-type: none"> <li>Evaluate the Project for National Register of Historic Places (NRHP) eligibility when 50 years old (i.e., 2016)</li> </ul>	NA	NA	\$10,000	One-time	\$404	\$404
<b>Cultural Resources Total:</b>	NA	NA	NA	NA	<b>\$19,211</b>	<b>\$19,211</b>

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<b>RECREATION RESOURCES AND LAND USE<sup>11</sup></b>						
<ul style="list-style-type: none"> <li>Finalize a Recreation Resources Management Plan (RRMP) that encompasses all recreation-related PM&amp;E measures:</li> </ul>	NA	NA	Included in RRMP implementation cost below	See below	See below	See below
<ul style="list-style-type: none"> <li>Implement a RRMP:                             <ul style="list-style-type: none"> <li>Reporting and consultation with Recreation Resources Workgroup (RRWG)</li> </ul> </li> </ul>	NA	NA	\$9,000	Annually	\$9,000	\$9,000

<sup>11</sup> Costs in the Draft Recreation Resources Management Plan (Exhibit E, Attachment E-12) that are presented in 2009 dollars, have been converted to 2007 dollars for this cost summary.

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Improve recreational facilities at developed recreation sites. Proposed measures include:                             <ul style="list-style-type: none"> <li>○ <u>Boundary Forebay Recreation Area</u> – Enhance campground facilities and day-use picnic areas, extend an existing boat ramp lane, provide additional I&amp;E signage, and provide ADA-accessible facilities</li> <li>○ <u>Boundary Vista House Recreation Area</u> – Add I&amp;E signage, provide ADA-accessible facilities</li> <li>○ <u>Boundary Tailrace Recreation Area/Machine Hall Visitors’ Gallery</u> – Update I&amp;E signage and displays at the Machine Hall Visitors Gallery and provide ADA-accessible facilities</li> <li>○ <u>Metaline Waterfront Park Boat Launch</u> – Replace the existing boat launch, extend a boat ramp lane, provide adequate gravel roadway access to the boat ramp, improve parking, provide an accessible dual vault restroom in the vicinity of the boat launch parking area and provide ADA-accessible facilities</li> </ul> </li> </ul>			O&M costs included under Operations and Maintenance Program below	See below	See below	See below
	\$2,178,000	\$99,570				\$99,570
	\$233,000	\$10,652				\$10,652
	\$295,000	\$13,486				\$13,486
	\$1,558,000	\$71,226				\$71,226

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Development of new recreation sites. Proposed measures include:                             <ul style="list-style-type: none"> <li>○ <u>Peewee Falls Viewpoint and Trail</u> – Develop a new accessible trail and trailhead in the vicinity of the Vista House access road to a viewpoint of Peewee Falls, develop appropriate support facilities, including parking, vault toilet, and signage</li> <li>○ <u>Metaline Falls Portage Trail</u> – Develop a new portage trail in the vicinity of Metaline Falls and provide I&amp;E signage</li> <li>○ <u>Designated Dispersed Shoreline Recreation Sites</u> – Enhance six shoreline recreation sites (3 BLM and 3 USFS) to accommodate boat-in camping and day use</li> </ul> </li> </ul>			O&M costs included under Operations and Maintenance Program below	See below	See below	
	\$182,000	\$8,320				\$8,320
	\$119,000	\$5,440				\$5,440
	\$236,000	\$10,789				\$10,789
<ul style="list-style-type: none"> <li>• Over the term of the license, replace and/or significantly repair various recreation site facilities, infrastructure, and amenities, based on periodic monitoring</li> </ul>	NA	NA	\$56,000	Annually	\$56,000	\$56,000
<ul style="list-style-type: none"> <li>• Implement a Shoreline Dispersed Recreation Management Program (a component of the RRMP)</li> </ul>	Capital costs included under recreation facility improvements above	See above	O&M costs included under O&M Program below	See below	See below	See above and below

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement an Operations and Maintenance Program (a component of the RRMP):                             <ul style="list-style-type: none"> <li>○ Covering all SCL-managed recreation sites and use areas (developed and dispersed)</li> <li>○ Providing annual maintenance at the boat launch at Metaline Waterfront Park</li> <li>○ Periodically re-assessing the public access and security policies and needs at the Tailrace Recreation Area and Machine Halls Visitors Gallery</li> </ul> </li> </ul>	NA	NA	\$80,000 <sup>12</sup>	Annually	\$80,000	\$80,000
<ul style="list-style-type: none"> <li>• Implement a Recreation Monitoring Program (a component of the RRMP)</li> </ul>	NA	NA	\$207,166 (for periodic monitoring) <sup>13</sup> \$5,000 (for annual monitoring)	Every 6 years  Annually	\$16,720  \$5,000	\$16,720  \$5,000
<ul style="list-style-type: none"> <li>• Develop and implement a multi-resource I&amp;E Program (a component of the RRMP)<sup>14</sup></li> </ul>	\$187,000	\$8,452	NA	NA	NA	\$8,452
<ul style="list-style-type: none"> <li>• Participate in the development of regional water trail program on the Pend Oreille River</li> </ul>	NA	NA	\$14,000	One-time	\$565	\$565

<sup>12</sup> \$61,000/year for existing sites and \$19,000/year for new sites.

<sup>13</sup> \$28,000/year for monitoring every alternating 6 years and \$84,000/year for monitoring every 12 years.

<sup>14</sup> This program addresses I&E needs for recreation resources, aesthetics/visual resources, geology and soils, engineering, fish and aquatics resources, cultural resources, botanical resources and wildlife resources.

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement Shoreline Management Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>○ Define and map Project shoreline land use designations, allowed uses, and required approvals; and apply these designations to Project lands and waters</li> <li>○ Develop, implement and monitor use of guidelines for private shoreline facilities along the Boundary Reservoir shoreline</li> <li>○ Periodically remove shoreline debris</li> <li>○ Develop and implement a Project public safety and education program</li> </ul> </li> </ul>	NA	NA	\$50,423	One-time	\$2,035	\$2,035
			\$46,688	Annually	\$46,688	\$46,688
			\$4,669	Every 6 years	\$868	\$868

Proposed PM&E	Capital		O&M			Total Annualized Cost
	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	
<ul style="list-style-type: none"> <li>• Implement Travel and Public Access Management Program (a component of the TRMP):                             <ul style="list-style-type: none"> <li>○ Provide adequate operational access to Project hydroelectric facilities and operations areas</li> <li>○ Restrict and manage public access at or near certain Project facilities and hazardous operational areas for security and safety reasons</li> <li>○ Provide adequate public access to Project recreation facilities and use areas</li> <li>○ Provide compatible access to the Boundary Wildlife Preserve, Metaline Island and Rat Island and manage public use</li> </ul> </li> </ul>	\$441,664 <sup>15</sup>	\$19,962	\$4,669	Annually	\$4,669	\$24,631
<ul style="list-style-type: none"> <li>• Implement a Road Decommissioning Plan:                             <ul style="list-style-type: none"> <li>○ Decommission well heads and associated roads</li> <li>○ Monitor to ensure adequate vegetation recovery</li> </ul> </li> </ul>	\$305,000	\$13,944	NA	NA	NA	\$13,944
	NA	NA	\$2,385	Annually Years 3 and 4	\$192	\$192
<ul style="list-style-type: none"> <li>• Implement ongoing road maintenance</li> </ul>	NA	NA	\$15,000	Annually	\$15,000	\$15,000
<ul style="list-style-type: none"> <li>• Adjustments to the current FERC Project boundary to include Project-related facilities, lands and roads that are currently outside of the Project boundary (changes are detailed in Exhibit G)</li> </ul>	Costs unknown at this time	NA	NA	NA	NA	NA
<b>Recreation Resources and Land Use Total:</b>	<b>\$5,734,664</b>	<b>\$261,842</b>	<b>NA</b>	<b>NA</b>	<b>\$236,736</b>	<b>\$498,578</b>

<sup>15</sup> \$68,164 in the initial year for planning of gate installation; \$186,750 within 5 years for initial construction and \$186,750 within 25 years of license issuance for replacement/repairs.

	Capital		O&M			
Proposed PM&E	Estimated Cost	Annualized Cost <sup>3</sup>	Annual Estimated Cost	Frequency	Annualized Cost	Total Annualized Cost
<b>SOCIOECONOMICS RESOURCES</b>						
<ul style="list-style-type: none"> <li>Addressed by measures of other resource areas</li> </ul>	See above	See above	See above	See above	See above	See above
<b>TRIBAL RESOURCES</b>						
<ul style="list-style-type: none"> <li>Addressed by measures of other resource areas</li> </ul>	See above	See above	See above	See above	See above	See above
<b>Operational PM&amp;E Measures Subtotal:</b>	NA	NA	\$0	Annually	\$0	\$0
<b>Non-operational PM&amp;E Measures Subtotal:</b>	\$65,020,024	\$3,320,059	NA	NA	\$3,481,875	\$6,801,933
<b>Grand Total:</b>	\$65,020,024	\$3,320,059	NA	NA	\$3,481,875	\$6,801,933

References:

SCL. 2009. Updated Study Report. Boundary Hydroelectric Project (FERC No. 2144). Seattle, Washington. Available: [http://www.seattle.gov/light/news/issues/bndryRelic/br\\_document.asp](http://www.seattle.gov/light/news/issues/bndryRelic/br_document.asp). March 16, 2009.