



IN THE MATTER OF

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY
FOR THE RUSKIN DAM AND POWERHOUSE UPGRADE PROJECT

DECISION

March 30, 2012

Before:

**M.R. Harle, Commissioner/Panel Chair
A.W.K. Anderson, Commissioner
N.E. MacMurchy, Commissioner**

TABLE OF CONTENTS

Page No.

| | |
|---|-----------|
| EXECUTIVE SUMMARY..... | 1 |
| 1.0 INTRODUCTION..... | 3 |
| 1.1 The Application | 3 |
| 1.2 Key Participants | 4 |
| 1.3 Key Issues..... | 4 |
| 1.4 Overview of the Decision | 5 |
| 2.0 BCUC LEGISLATIVE AUTHORITY | 7 |
| 2.1 Legal Context | 7 |
| 2.2 Legislative Amendments..... | 10 |
| 2.3 The Introduction of New Materials Through Final Submissions | 12 |
| 3.0 NEED FOR A PROJECT | 14 |
| 3.1 BC Hydro Submission | 14 |
| 3.2 Intervener Submissions..... | 15 |
| 3.2.1 AMPC Submission | 15 |
| 3.2.2 BCOAPO Submission | 15 |
| 3.2.3 BCSEA Submission | 16 |
| 3.2.4 CEBC Submission | 16 |
| 3.2.5 CEC Submission..... | 17 |
| 3.2.6 Kwantlen Submission | 17 |
| 3.2.7 MRCC Submission | 17 |
| 3.2.8 Quigley Submission | 18 |
| 3.2.9 Other Intervenors | 18 |
| 3.2.10 Legislative Requirements | 18 |
| 4.0 PROJECT ALTERNATIVES..... | 19 |
| 4.1 The Project: The Ruskin Dam and Powerhouse Upgrade..... | 19 |
| 4.1.1 The Dam Work..... | 19 |
| 4.1.1.1 Upper Dam Work..... | 20 |
| 4.1.1.2 Right Abutment Work..... | 21 |
| 4.1.1.3 Left Abutment Work..... | 21 |

TABLE OF CONTENTS

Page No.

| | | |
|------------|--|-----------|
| 4.1.2 | Intervener Proposal to Reduce the Work Required for the Upper Dam, the Right Abutment, and the Left Abutment | 22 |
| 4.1.3 | Powerhouse Work | 25 |
| 4.1.3.1 | Intervener Objection to the Need for Powerhouse Work..... | 26 |
| 4.1.4 | Switchyard Work | 32 |
| 4.1.4.1 | Assessment of Alternative Means of Carrying out the Switchyard Work..... | 34 |
| 4.1.4.2 | Intervener Views of Switchyard Work..... | 36 |
| 4.2 | Alternative Solutions to the Project | 39 |
| 4.2.1 | Permanently De-Rate Two Generating Units, Remove the Third Generating Unit (Alternative A)..... | 40 |
| 4.2.2 | Abandon with Overflow (Alternative B) | 40 |
| 4.2.3 | Abandon and Dam Removal (Alternative C) | 41 |
| 4.2.4 | Abandon without Dam Removal (Alternative D) | 41 |
| 4.2.5 | Permanently De-Rate all Generating Units and Perform Intake Modifications (Alternative E)..... | 41 |
| 4.2.6 | Economic Analysis of the Alternatives | 42 |
| 4.2.7 | Deferral Alternative | 45 |
| 4.3 | Issues Associated with Various Components of the Project | 46 |
| 4.3.1 | Dam – Spillway Gates and Piers Configuration | 46 |
| 4.3.2 | Dam – Right Abutment Remediation | 48 |
| 4.3.3 | The Dam Crossing | 49 |
| 4.3.4 | Powerhouse – New versus Rehabilitate/Replace | 51 |
| 4.3.5 | Powerhouse – Two versus Three Unit Configuration | 52 |
| 4.3.6 | Timing of Replacement of the Third Generating Unit..... | 55 |
| 4.3.6.1 | BC Hydro Position | 55 |
| 4.3.6.2 | Intervener Positions..... | 57 |
| 4.4 | Commission Determination | 58 |
| 5.0 | PROJECT COSTING, SCHEDULE, AND RISK MANAGEMENT | 61 |
| 5.1 | Project Cost Components | 61 |
| 5.2 | Project Cost Component Determinations..... | 62 |
| 5.2.1 | Direct and Indirect Costs | 62 |

TABLE OF CONTENTS

Page No.

| | | |
|------------|---|-----------|
| 5.2.2 | Contingency on Expected Amount, Dismantling and Removal, and Inflation Contingency on Expected Amount | 63 |
| 5.2.2.1 | Dismantling and Removal | 64 |
| 5.2.2.2 | Inflation..... | 64 |
| 5.2.3 | Capital Overhead (COH) Rate and Interest During Construction | 65 |
| 5.2.3.1 | Interest During Construction | 68 |
| 5.2.4 | Intervener Submissions Related to the Expected Amount | 68 |
| 5.2.5 | Commission Determination..... | 69 |
| 5.3 | Schedule..... | 70 |
| 5.4 | Risk Management | 70 |
| 5.4.1 | Cost Risk Management..... | 71 |
| 5.4.2 | Schedule Risk Management | 72 |
| 5.4.3 | Construction Risk Management | 73 |
| 5.4.4 | Resource Risk Management | 73 |
| 5.4.5 | Worker Safety Risk Management..... | 73 |
| 5.4.6 | Public Safety Risk Management | 74 |
| 5.4.7 | Outage and Failure Risk Management | 74 |
| 5.4.8 | Environmental Risk Management | 75 |
| 5.5 | Project Reporting | 75 |
| 6.0 | PUBLIC ENGAGEMENT | 77 |
| 7.0 | FIRST NATIONS CONSULTATION | 80 |
| 7.1 | The Duty to Consult | 80 |
| 7.1.1 | The Crown's Duty | 80 |
| 7.1.2 | The Commission's Role..... | 81 |
| 7.2 | BC Hydro's Consultation with First Nations other than Kwantlen | 82 |
| 7.2.1 | Identification of Potentially Impacted First Nations | 82 |
| 7.2.2 | BC Hydro's Strength of Claim Assessments..... | 82 |
| 7.2.3 | Consultation with SN, STC and HTG | 83 |
| 7.2.4 | Consultation with Matsqui | 84 |
| 7.3 | BC Hydro's Consultation with Kwantlen | 87 |
| 7.3.1 | Capacity Funding | 91 |

TABLE OF CONTENTS

| | Page No. |
|---|------------|
| 7.3.2 The Project Alternatives | 92 |
| 7.3.3 BC Hydro's Decision Making Timeline | 93 |
| 7.3.4 Assessment of the Strength of Claim | 94 |
| 7.3.5 Project Impacts | 98 |
| 7.3.6 The Duty to Consult on the Project | 101 |
| 7.4 BC Hydro and Kwantlen's Positions on the Adequacy of Consultation | 102 |
| 7.4.1 Did BC Hydro fail to correctly assess the scope of consultation owed to Kwantlen? | 103 |
| 7.4.2 Did BC Hydro fail to adequately consult Kwantlen on the selection of preferred alternative? | 105 |
| 7.4.3 Was BC Hydro's CPCN application made prematurely? | 110 |
| 7.5 Overall Assessment of the Adequacy of BC Hydro's Consultation with Kwantlen... | 111 |
| 7.6 Adequacy of Consultation With First Nations | 114 |
| 8.0 CONCLUSION AND COMMISSION PANEL DETERMINATIONS | 115 |

COMMISSION ORDER C-5-12

APPENDIX 1 Background and Regulatory Process

APPENDIX 2 List of Acronyms

EXECUTIVE SUMMARY

This Decision relates to an application to the British Columbia Utilities Commission by the British Columbia Hydro and Power Authority (BC Hydro) pursuant to section 46(1) of the *Utilities Commission Act* for a Certificate of Public Convenience and Necessity for the Ruskin Dam and Powerhouse Upgrade Project (Project). In this Decision, the Ruskin Dam and Powerhouse (also described as the Ruskin Generating Station) are collectively referred to as the Ruskin Facility. The Ruskin Facility provides dependable capacity in BC Hydro's major load center, as well as voltage support to a significant transmission network.

The Application identifies that the Project is needed because, without the investment contemplated, the Ruskin Facility will no longer be fit for its intended purpose and its deficiencies pose significant safety, reliability, environmental, and financial risks.

The Project includes work to the Upper Dam, Right Abutment, Left Abutment, Powerhouse superstructure, Powerhouse equipment, and Switchyard. The Application states that the status quo is not an option and, in addition to the Project, BC Hydro explored several alternative long term solutions, including two de-rating and three decommissioning alternatives. The Expected Amount of the Project applied for is \$718.10 million.

The proceeding was conducted as a written hearing. There were eleven interveners, of which eight filed submissions: Association of Major Power Customers of British Columbia, British Columbia Old Age Pensioners Organization, British Columbia Sustainable Energy Association, Clean Energy Association of British Columbia, Commercial Energy Consumers of British Columbia, Kwantlen First Nation, Mission Regional Chamber of Commerce, and William Quigley.

Several key issues emerged during the proceeding. These are addressed in the Decision and include:

- The scope of the Project, including matters such as the spillway gates and piers configuration, Right Abutment remediation, road widening crossing the Dam, the relocating of the Switchyard, replacement or refurbishment of the Powerhouse, the replacement/refurbishment of all three generating units including the timing of such actions;
- Project costs, particularly in relation to the potential for “gold-plating”; and
- The adequacy of First Nations consultation.

On February 2, 2012, the Government of British Columbia amended the Electricity Self-Sufficiency Regulation issued under the *Clean Energy Act* and Special Direction No. 10 to the British Columbia Utilities Commission issued under the *Utilities Commission Act*. These changes had to be fully considered in the Commission Panel’s deliberations and decision making regarding the Application.

After carefully considering the evidence and arguments of all parties, **the British Columbia Utilities Commission grants a Certificate of Public Convenience and Necessity for the Project, subject to the directives set out in this Decision.**

1.0 INTRODUCTION

1.1 The Application

On February 2, 2011 the British Columbia Hydro and Power Authority (BC Hydro) filed an application (the Application) with the British Columbia Utilities Commission (BCUC, Commission) pursuant to section 46(1) of the *Utilities Commission Act (UCA)*¹ for a Certificate of Public Convenience and Necessity (CPCN) for the Ruskin Dam and Powerhouse Upgrade Project (Project).

The Ruskin Generating Station, a Heritage Asset under Section 1 and Schedule 1 of the *Clean Energy Act (CEA)*², and Ruskin Dam (together referred to as the Ruskin Facility) are classified as a strategic asset for BC Hydro asset management purposes. In this Decision, the Ruskin Generating Station (also described as the Ruskin Powerhouse or Powerhouse) and the Ruskin Dam are collectively referred to as the Ruskin Facility. The Ruskin Facility provides dependable capacity in BC Hydro's major load center, as well as voltage support to a significant transmission network. As a cascading station, it also forms part of the Stave River System.

The Project has two main components:

1. Replacement/refurbishment of parts of the seismically deficient dam, which was completed in 1930. This includes replacement of the spillway piers and gates, rehabilitation of the spillway surface, replacement of the roadway crossing the top of the dam, anchoring and reinforcing sections of the existing right abutment, construction of a new seepage cut off wall at the right abutment, and reducing the slope and installing a filter blanket and monitoring instrumentation at the left abutment; and
2. Rehabilitation/replacement of the Ruskin Powerhouse, including generating equipment brought into service between 1930 and 1950 and associated transmission facilities. This entails seismic upgrades to the Powerhouse superstructure, replacement/rehabilitation of the three generating units, electrical and mechanical equipment and ancillary systems, water conveyancing components, and step-up transformers. It also includes the upgrade and relocation of the switchyard from the roof of the existing Powerhouse to an area near the Powerhouse.

¹ RSBC 1996, c. 473.

² SBC 2010, c. 22.

Appendix 1 to this Decision describes the background of the Application, including a description of the Applicant, the Order sought by the Applicant, and the regulatory process by which the Application was heard.

1.2 Key Participants

There were eleven registered interveners involved in the proceeding:

1. Association of Major Power Customers of British Columbia (AMPC);
2. British Columbia Old Age Pensioners Organization (BCOAPO);
3. British Columbia Sustainable Energy Association (BCSEA);
4. Clean Energy Association of British Columbia (CEBC);
5. Commercial Energy Consumers Association of British Columbia (CEC);
6. Kwantlen First Nation (Kwantlen);
7. District of Mission;
8. Mission Regional Chamber of Commerce (MRCC);
9. William Quigley;
10. Ruskin Townsite Residents Association; and
11. Vernon Ruskin.

1.3 Key Issues

While a number of parties explicitly supported the Project, a number of key issues did emerge and were addressed during the proceeding. These include:

- The proposed scope of the Project including such items as the spillway gates and piers configuration, Right Abutment remediation, road widening crossing the Dam, the relocating of the Switchyard, replacement or refurbishment of the Powerhouse, the replacement/refurbishment of all three generating units including the timing of such actions;
- Project costs, including contingency amounts and Project administration; and

- The adequacy of consultation with First Nations.

These issues are explored more fully in the Decision.

On February 2, 2012, the Government of British Columbia amended the Electricity Self-Sufficiency Regulation issued under the *Clean Energy Act (CEA)* and Special Direction No. 10 (SD 10) to the Commission issued under the *UCA*. These changes had to be fully considered in the Commission Panel's deliberations and decision making regarding the Application.

1.4 Overview of the Decision

Section 2 of this Decision overviews the legislative authority and legal context of the Decision. It also addresses issues related to the attempted introduction of new materials into the proceeding through final submissions.

Section 3 addresses the need for the Project and its justification.

Section 4 reviews the alternatives considered to meet the need, and concludes that the proposed Project is the preferred alternative. These alternatives address the need and provide options for addressing Upper Dam work, Right Abutment work, Left Abutment work, Powerhouse work, Powerhouse equipment work including the number of generation units, and Switchyard work. In addressing the need it also describes the project scope issues including those related to the roadway crossing the Dam, the location of the Switchyard, and the timing of replacement of the third generation unit in the Powerhouse.

Section 5 considers costs, the Project schedule, and Project risk management.

Section 6 addresses public engagement, while Section 7 deals with First Nations Consultation.

Section 8 summarizes our overall Decision conclusions and determinations.

After having carefully considered and weighed the evidence and arguments of all parties participating in the proceeding, the Commission Panel concludes that the Project is needed to address safety, reliability, environmental, and financial risks. For the reasons given in this Decision, **the Commission Panel finds that the Ruskin Dam and Powerhouse Upgrade Project is necessary and in the public interest as it is the most cost-effective long term solution. The Project also serves the British Columbia energy objectives including meeting both the BC Hydro self-sufficiency requirements of the CEA, consistent with the February 2012 amendments to the Electricity Self-Sufficiency Regulation, and the BC Hydro self-sufficiency requirements resulting from the February 2012 amendments to Special Direction No. 10 to the Commission. In addition, section 6(1) of the amended SD 10 also requires the Commission to assume that there is need for the Project's firm energy and dependable capacity. We also find that public consultation has been sufficient, and that First Nations consultation has been adequate to the date of this Decision. Subject to the directives contained in this Decision and the related Order, the Commission Panel grants BC Hydro a CPCN for the Ruskin Dam and Powerhouse Upgrade Project.**

2.0 BCUC LEGISLATIVE AUTHORITY

2.1 Legal Context

The Application has been made by BC Hydro pursuant to section 46(1) of the *UCA*. Section 46(3), which is subject to section 46(3.3) in the case of BC Hydro, grants authority to the Commission to issue or refuse to issue the CPCN, or issue a certificate for a part of the proposed facility. When deciding whether to issue a CPCN to BC Hydro under section 46(3.3) the Commission must consider the interests of persons in British Columbia (BC) who may receive power from BC Hydro and must consider and be guided by British Columbia's energy objectives.

Pursuant to section 1 of the *UCA*, "British Columbia's energy objectives" have the same meaning as in section 1(1) of the *CEA*, which refers to the objectives set out in section 2 of the *CEA*. The following objectives listed in section 2 of the *CEA* are relevant for the purposes of the Application:

- (a) to achieve electricity self-sufficiency;
- (b) to generate at least 93% of the electricity in British Columbia from clean or renewable resources and to build the infrastructure necessary to transmit the electricity;
- (e) to ensure [BC Hydro's] ratepayers receive the benefits of the heritage assets and to ensure the benefits of the heritage contract under the *BC Hydro Power Legacy and Heritage Contract Act* continue to accrue to [BC Hydro's] ratepayers; and
- (g) to reduce BC greenhouse gas emissions
 - (i) by 2012 and for each subsequent calendar year to at least 6% less than the level of those emissions in 2007;
 - (ii) by 2016 and for each subsequent calendar year to at least 18% less than the level of those emissions in 2007;
 - (iii) by 2020 and for each subsequent calendar year to at least 33% less than the level of those emissions in 2007;
 - (iv) by 2050 and for each subsequent calendar year to at least 80% less than the level of those emissions in 2007; and
 - (v) by such other amounts as determined under the *Greenhouse Gas Reduction Targets Act*.

The Commission is also bound by section 6 of the *CEA*, SD 10 and the Electricity Self-Sufficiency Regulation. The impact of the recent amendments to SD 10 and the Electricity Self-Sufficiency Regulation on the Application are discussed further in Section 2.2.

BC Hydro takes the position that the test of whether the Project is in the interests of persons in British Columbia who receive power from BC Hydro consists of: “(1) Whether or not the Project will meet a demonstrated need; and (2) Whether or not the Project has been demonstrated to be cost-effective in meeting that need.” (BC Hydro Final Submission, p. 6)

BC Hydro relies upon the Commission’s decision *In the Matter of British Columbia Transmission Corporation: An Application for a Certificate of Public Convenience and Necessity for the Vancouver Island Transmission Project*, July 7 2006 (Order C-4-06) at p. 15 where the Commission states that the task is “not to select the least cost project, but to select the most-cost effective project.” (BC Hydro Final Submission, p. 6)

Both the CEC and BCSEA concur that demonstrating need and cost-effectiveness is the appropriate public interest test for the Project. CEC submits that “the cost-effectiveness part of the test is multi-faceted, including safety, reliability, security, environment, socio-economics, first nations as well as cost, scope, schedule, procurement, task plan and risks.” (CEC Final Submission, p. 1)

BC Hydro cautions the BCUC in granting a CPCN for only a part of the Project. “This Application concerns a technically complex project. If the BCUC were to grant a CPCN for a part only of the Project it could be materially altering not just the Project scope, but the schedule, costs, risks, and even the fundamental nature of the Project, and therefore would be effectively be placing itself in the position of managing BC Hydro.” (BC Hydro Final Submission, p. 15) CEC does not believe that BCUC’s jurisdiction is quite as constrained as BC Hydro might be proposing. CEC indicates that “BC Hydro would be wise to work with whatever conditions the Commission judges as necessary for the public convenience and necessity. The CEC is not at all sure that there is a bright line excluding the Commission from conditioning what would otherwise be viewed as BC Hydro management areas of responsibility.” (CEC Final Submission, p. 3)

The Commission Panel concurs and determines that the tests of the need for the Project, and its cost-effectiveness are the appropriate basis for assessing whether the public interest will be met in granting a CPCN. The Commission Panel notes the BCOAPO's concerns that BC Hydro may be implying that the "provincial energy goals may trump the public interest consideration when the two are in conflict." (BCOAPO Final Submission, p. 3) As noted above, section 46(3.3) of the *UCA* provides that the Commission must consider and be guided by British Columbia's energy objectives. However, as BC Hydro indicates there may be no inherent conflict between the public interest and the Commission's duty to consider and be guided by British Columbia's energy objectives as the Project both aligns with and advances the objectives, and is in the interests of persons in British Columbia who receive or may receive service from BC Hydro. (BC Hydro Final Submission, pp. 5-6)

One of the BCUC's roles in this proceeding is to assess whether or not consultation has been adequate with Kwantlen and other First Nations that may be affected by the Project. Kwantlen submits that BC Hydro has not fulfilled its duty to meaningfully consult with and accommodate Kwantlen in relation to the Application. This subject is dealt with in greater depth in Section 7.

However, at this stage of the Project we can acknowledge that, as has been determined by the British Columbia Court of Appeal in *Kwikwetlem First Nation v. British Columbia (Utilities Commission)* 2009 BCCA 68 (*Kwikwetlem*) that the assessment of the adequacy of the Crown's duty to consult with First Nations is up to the date of the Commission's decision.³ *Kwikwetlem* has been followed by this Commission.⁴

When considering the "public interest" before granting a CPCN, we recognize that "the public interest" is a flexible and broad test. It transcends the interests of any one stakeholder group. However, our assessment of the merits of the Application requires achievement of a reasonable weighing and balancing of individual stakeholder interests with the broader public interest.

³ *Kwikwetlem* at paras 15 and 70.

⁴ Decision *In the Matter of An Application by British Columbia Transmission Corporation for a Certificate of Public Convenience and Necessity for the Columbia Valley Transmission Project*, September 3, 2010 (Order C-5-10); Decision *In the Matter of British Columbia Transmission Corporation ;Reconsideration of the Interior to Lower Mainland Transmission Project*, February 3, 2011 (Order G-15-11).

2.2 Legislative Amendments

On January 9, 2012, BC Hydro filed its Reply to the Kwantlen Sur-Reply, initially bringing to a close the parties submissions on the Application. However, on February 2, 2012, the Government of British Columbia amended SD 10 and the Electricity Self-Sufficiency Regulation by Order in Council Numbers 35 and 36 respectively of the Lieutenant Governor in Council.

Prior to the issue of Order in Council No. 36, the Electricity Self-Sufficiency Regulation (Regulation) had mandated that the water conditions prescribed for purposes of the definition of “heritage energy capability” in section 6(1) of the *CEA* were critical water conditions, which the Regulation defined as “the most adverse sequence of stream flows occurring within the historical record.” The amendments to the Regulation now prescribe water conditions for the purposes of “heritage energy capability” as “average water conditions” which the Regulation defines to mean “the average stream flows occurring within [BC Hydro’s] historical record.”

The amendments to SD 10 also substitute the same definition of “average water conditions” for “critical water conditions” and result in the definition of “firm energy capability” to now mean “the maximum amount of annual energy that a hydroelectric system can produce under average water conditions.” In considering a BC Hydro application for a CPCN under section 46 of the *UCA*, Section 3 of the amended SD 10 now requires the Commission, to use the new planning criterion of average water. Section 1(2) of the amended SD 10 requires the Commission to interpret “firm energy capability” for the purposes of SD 10 to be consistent with the fact that in 2011, BC Hydro’s firm energy capability was 48,200 gigawatt hours.

Further, as a result of the amendments to Section 3 of SD 10 the 3,000 GWh/year “insurance” requirements have been repealed.

The amended SD 10 also contains a new Section 6. In deciding whether to issue a CPCN to BC Hydro for the Project, Subsection 6(1) requires the BCUC to assume that BC Hydro requires the

Project's 334 GWh/year of firm energy, and 114 megawatts (MW) of dependable capacity by 2018 to meet its electricity supply obligations. Section 1 of the amended SD 10 defines "electricity supply obligations" to mean:

- (a) electricity supply obligations for which rates are filed with the commission under section 61 of the [UCA]; and
- (b) any other electricity supply obligations that exist at the time this Special Direction comes into force.

In short, the BCUC must assume that the firm energy and dependable capacity output that the Project is capable of delivering are needed.

BC Hydro's uncontested evidence in this proceeding, which the Commission Panel accepts, is that "... the Powerhouse Work would result in an increase in the equipment efficiency and energy amount of approximately 28 GWh/year for a total of 334 GWh/year of firm energy and an increase of 9 MW of capacity for a total of 114 MW of dependable capacity." (Exhibit B-1, pp. 1-3, 1-4)

BC Hydro notified the Commission of the amendments to the Regulation and SD 10 by letter dated February 8, 2012, provided its submissions on the effect of the amendments, and suggested a process for interveners to provide their submissions and for BC Hydro to reply to intervenor submissions. In its letter, it submitted:

"The effect of subsection 6(1) is that no matter what the energy and capacity LRBs [Load Resource Balances] are, the BCUC must accept there is a need for the Project's firm energy and dependable capacity. Therefore, BC Hydro's evidence concerning the LRBs under different self-sufficiency assumptions ... is no longer relevant to the Project CPCN decision." (BC Hydro letter to BCUC dated February 8, 2012, p. 2 of 3)

By letter dated February 9, 2012, the Commission agreed to BC Hydro's suggested process and established a timetable for intervenor submissions and BC Hydro reply. (Exhibit A-19) Seven interveners filed submissions and BC Hydro filed its reply on February 15, 2012. BCSEA and CEC accepted BC Hydro's interpretation of the amendments to SD 10, AMPC advised it had no further

submissions arising from the amendments, Kwantlen did not disagree with BC Hydro's interpretation, and Mr. Quigley did not seem to disagree. The CEBC asked the regulatory approval of the Project be held in abeyance pending BC Hydro providing an updated load and resource balance and its assessment of the changes on its cost assumptions.

By letter dated February 29, 2012, the Commission agreed with BC Hydro's assessment of the legal impact of amended SD 10 and denied CEBC's request to re-open the evidentiary record.

(Letter L-11-12)

In view of the foregoing, the Commission Panel considers that, with respect to the Project, any issues which might negatively impact the Project's ability to enable the Ruskin Facility to achieve the firm energy and capacity need assumptions specified in amended SD 10 are rendered moot, irrespective of whatever determination the Commission Panel may have otherwise reached based on the evidence.

2.3 The Introduction of New Materials Through Final Submissions

As BC Hydro has identified in its Reply Submission, "CEABC [CEBC] and Mr. Quigley have improperly attempted to introduce new materials through their Final Submissions. (BC Hydro Reply Submission, p. 2) Mr. Quigley has attempted to introduce new materials largely relating to electric and magnetic fields (EMF). In the case of CEBC, BC Hydro submits that: "Virtually every section of CEABC's [CEBC's] Final Submission contains new material not on the record". (BC Hydro Reply Submission, p. 3) These CEBC materials relate to such subject areas as climate change, the cost of alternative supply, the value of capacity, the cost of decommissioning, cost effectiveness and the priority ranking of capital projects, and a project alternative.

The regulatory timetable provided for three rounds of Information Requests (IRs). The timetable for filing of evidence extended for over nine months. The Commission Panel considers that this was ample time to have permitted both Mr. Quigley and CEBC to have filed evidence and pursued the lines of questioning in those areas where they sought to introduce new materials during their

Final Submissions. Furthermore, as BC Hydro indicates “Unlike Kwantlen, who properly requested that the BCUC amend the regulatory timetable to permit the filing of Kwantlen’s evidence, CEBC took no such step.” (BC Hydro Reply Submission, p. 8)

For reasons of natural justice and fairness, the Commission Panel will not give any weight whatsoever to the materials that Mr. Quigley and CEBC attempted to introduce for the first time during Final Argument.

3.0 NEED FOR A PROJECT

3.1 BC Hydro Submission

BC Hydro submits that “Without investment the Ruskin Facility will no longer be fit for its intended purpose. There is a need for significant upgrading and rehabilitation of the Ruskin Facility to meet ... modern seismic/safety and operational requirements, standards and best practices.” (Exhibit B-1, p. 1-7) BC Hydro purports that the Dam does not meet the present Canadian and international safety guidelines, and the Powerhouse structure does not meet National and BC building codes. The Dam and the Powerhouse are essentially 80 years old, as are the Powerhouse components except for Unit 3 (U3) which is 60 years old.

Dam Deficiencies

The Dam is classified as “Very High Consequence” under the British Columbia Dam Safety Regulation. Engineering studies have determined there is a risk of failure of the Dam spillway piers and gates with ground movement below expected earthquake design standards. The Right Abutment has had seepage and piping issues, and could fail in a moderate to large earthquake. The Left Abutment has similar concerns. To reduce the seismic risk, BC Hydro has taken interim measures but submits that, given the age and condition of the Ruskin Facility, substantial work is now needed to implement a long-term solution.

Powerhouse Deficiencies

BC Hydro submits that the Powerhouse does not conform to the present National Building Codes for seismic standards. In addition, it says that “...the Powerhouse contains 80 year old equipment and is no longer reliable.” It also concludes that “major Powerhouse equipment and ancillaries have reached ‘poor’ or ‘unsatisfactory’ equipment health ratings.” (Exhibit B-1, p. 1-8) Recent engineering studies of the condition of the Powerhouse have concluded that “there are remaining safety and environmental risks associated with the continued operation of the plant ...The condition of these structures and equipment ... lead us to conclude that there is a high likelihood of a major equipment failure that could cause personnel injury as well as an extended outage and result in extensive repair and replacement costs.” (Exhibit B-1, Appendix B-3, p. 7 of 54)

Furthermore, “Current performance data shows that the reliability of the Powerhouse’s three generating units is declining; the three units are at an increasing risk of failure.” (Exhibit B-1, p. 1-9)

BC Hydro indicates that it would be “exposing itself and ratepayers to significant risks ... [if it ignored] ... the fact that the Powerhouse superstructure does not meet seismic safety requirements even under a moderately low earthquake scenario. BC Hydro has knowledge that the Powerhouse superstructure is seismically deficient, and has knowledge of the consequences that could include: injury or death to personnel ...injury or death to the public ...environmental consequences ...loss of electricity generation.” (Exhibit B-18, BCUC 3.7.1)

Regulatory Requirements

In addition to the concerns around safety and environmental considerations associated with the condition of the Ruskin Facility, there are concerns that its condition may impact the ability of BC Hydro to achieve electricity self-sufficiency as is required by the *CEA*. (Exhibit B-1, p. 3-17) The firm energy and dependable capacity of the Ruskin Facility are necessary elements of meeting this objective, as is emphasized in the recent amendment to SD 10.

3.2 Intervener Submissions

3.2.1 AMPC Submission

AMPC has not challenged the fundamental need for the Project. However, it does not support the Project as proposed. It has several significant reservations with regard to approach, scope, and associated cost estimates of the Project. These concerns will be addressed in Sections 4.0 (Project Alternatives) and 5.0 (Project Costs).

3.2.2 BCOAPO Submission

BCOAPO endorses the designated consequence rating of the Ruskin Facility as “Very High Consequence” “given the strong potential for property damage, environmental impacts, financial loss, or even more importantly loss of life in the event of a breach.” (BCOAPO Final Submission,

p. 3) Furthermore, BCOAPO states “it is possible to conclude that the proposed Project will be cost-effective in whether Self-Sufficiency remains unchanged or not” and “Based on the outlook for the load/resource balance going forward, our clients see a clear need for Ruskin’s firm energy and dependable capacity to meet the currently legislated Self-Sufficiency requirement in F2017.” (BCOAPO Final Submission, p. 4)

In summary BCOAPO supports the need for the Project. “Based on the evidence...BCOAPO does not oppose the inclusion of these three components [3 generating units] in an Order granting a CPCN” (BCOAPO Final Submission, p. 5), and “...BCOAPO supports the Ruskin Project.” (BCOAPO Final Submission, p. 10)

3.2.3 BCSEA Submission

“BCSEA is satisfied that the Project is the most cost-effective way to meet the need for energy, capacity, and transmission support that would be provided by the Project.” (BCSEA Final Submission, p. 2) Also, “BCSEA supports BC Hydro’s application for a CPCN for the Ruskin Dam and Powerhouse Upgrade Project.” (BCSEA Final Submission, p. 3)

3.2.4 CEBC Submission

CEBC asserts that “while the Project appears to be cost effective in the limited context in which it has been evaluated, there are several considerable risks that it may not be the most cost effective project for BC Hydro at this time. Accordingly, the Association believes the Application could benefit from temporarily being set in abeyance, while alternatives are re-evaluated in an attempt to find the best option that balances the needs for safety and security with the need to both maintain and grow the electricity system in a way that regulates the pace of future electricity rate increases.” or, failing this, “the Application should be rejected outright.” (CEBC Final Submission, p. 11)

While CEBC has raised concerns with respect to climate change, the cost of alternative supply, the value of capacity, the cost of decommissioning, capital rationing, and other alternatives to the

Project, there is little on the evidentiary record that would support CEBC's position to set the Application in abeyance or to reject it outright. **The Commission Panel rejects CEBC's proposal to place the Application in abeyance or to reject it outright.**

3.2.5 CEC Submission

CEC accepts that the driving force for the Project as it relates to the Dam is dam safety for seismic and flood risks, and for the Powerhouse is safety and reliability of generation. CEC submits that BC Hydro has provided sufficient evidence that makes the Ruskin Dam safety improvements a necessity, subject to a demonstration of cost-effectiveness. Also, BC Hydro has provided sufficient evidence regarding safety and reliability issues with the Powerhouse superstructure and equipment to support the Powerhouse components of the Project. Further, it concludes that the switchyard portions of the Project are in the public interest and should be approved, subject to demonstration of cost-effectiveness. Finally, CEC submits the "Commission should conclude that the Ruskin Project is in the public interest with respect to closing the load resource gap, subject to demonstration of cost-effectiveness." (CEC Final Submission, pp. 4-5)

3.2.6 Kwantlen Submission

Kwantlen has not objected to the basic need for the Project. However, it submits that BC Hydro has not fulfilled its duty to meaningfully consult and accommodate Kwantlen in relation to the Application. Its concerns include: BC Hydro's alleged failure: (a) to correctly assess the scope of consultation owed to Kwantlen, and (b) to adequately consult Kwantlen regarding the selection of the preferred option for addressing the seismic and power generation deficiencies of the Ruskin Facility. In addition, it believes that the CPCN application has been made prematurely. These concerns are dealt with in Section 7.0.

3.2.7 MRCC Submission

"The Mission Regional Chamber of Commerce fully supports the proposed BC Hydro Ruskin Dam and Powerhouse Upgrade Project for the benefit of the community." (MRCC Final Submission, p. 2)

3.2.8 Quigley Submission

Mr. Quigley's intervention in the proceeding largely related to his concerns around potential EMF. It is unclear whether he supports or opposes the need for the Project. This notwithstanding, there is no sufficient evidence on the record to justify his concerns that the Project will materially impact EMF levels. Indeed, BC Hydro has fully responded to such concerns in Exhibit B-7-2, Quigley IRs 1.1.1-1.1.3 and 1.2.1-1.2.8. EMF levels associated with the Ruskin Facility remain within internationally accepted levels.

3.2.9 Other Interveners

No other intervener made Final Submissions. However, Vernon Ruskin does provide implied support for the Project in Exhibit C11-6.

3.2.10 Legislative Requirements

As indicated in Section 2.2, the amendments to the Electricity Self-Sufficiency Regulation and to SD 10 prescribe the need for the firm energy and dependable capacity associated with the Project.

Commission Determination

The evidentiary record confirms that the current condition of the Dam, Powerhouse superstructure, Powerhouse equipment, and Switchyard are such that they represent significant safety and environmental risks, and they merit significant upgrading and rehabilitation. **The Panel determines that the need for the Project has been established for safety, and environmental reasons. This clear need for the Project is fully consistent with the amended Electricity Self-Sufficiency Regulation and the amended SD 10 described in Section 2.2.**

Alternative approaches to address the established need are assessed in Section 4.0.

4.0 PROJECT ALTERNATIVES

BC Hydro has proposed several alternative solutions to address the need that was established in Section 3. These alternative solutions include:

1. The Ruskin Dam and Powerhouse Upgrade Project;
2. Permanently de-rate two generating units and remove the third generating unit (Alternative A);
3. Abandon with overflow (Alternative B);
4. Abandon and Dam removal (Alternative C);
5. Abandon without Dam removal (Alternative D); and
6. Permanently de-rate all generating units and perform intake modifications (Alternative E).

BC Hydro also briefly considered a deferral alternative.

Each of these alternatives is discussed in the following subsections.

4.1 The Project: The Ruskin Dam and Powerhouse Upgrade

The Project consists of the replacement of parts of the seismically deficient dam (completed in 1930), and the rehabilitation/replacement of the Ruskin Powerhouse, including generation equipment brought into service between 1930 and 1950, and relocation of the associated Switchyard facilities. (Exhibit B-1, p. 1-2) This subsection describes the components of the Project, and alternative means for carrying them out. The discussion is organized around work for the Dam (Upper Dam, Left Abutment, Right Abutment, Dam crossing), the Powerhouse (superstructure, equipment), and the Switchyard, including its location.

4.1.1 The Dam Work

The dam work addresses deficiencies in the Upper Dam, the Right Abutment, and the Left Abutment. This work is described below.

4.1.1.1 Upper Dam Work

This component of the Project includes the reinforcement of the Dam's upper right bank against further seepage, reducing the slope of the left bank, replacement of the spillway piers and spillway gates, rehabilitation of the spillway surface, installation of new unit intake gates, and replacement of the roadway crossing the top of the Dam. (Exhibit B-1, p. 1-2)

The work is needed to provide adequate post-earthquake performance, including the ability to draw down the Hayward Lake and Slave Lake Reservoirs as needed, and to provide high reliability to open spill gates in response to floods, up to and including the Probable Maximum Flood.

Under the British Columbia Dam Safety Regulation the Upper Dam, Right Abutment, and Left Abutment are "Very High Consequence" structures. This means that:

1. The downstream impacts of a breach may include loss of life and significant financial, property, and environmental damage; and
2. These structures must be capable of withstanding a Maximum Design Earthquake (MDE) corresponding to a 1/10,000 return period (1/10,000 earthquake).

For the spillway gates the seismic criteria are:

1. That there be no damage to the spillway gate system in 1/500 year earthquake; and
2. At least two gates must survive a 1/10,000 year earthquake.

All the gates need to be replaced to meet the first seismic criteria since not all of the existing piers and gates would survive a 1/500 year earthquake and pier damage is expected at a 1/100 year earthquake. Seismic damage could include a complete failure of one or more gates. Complete failure of a gate could lead to uncontrolled water releases. These flows are generally expected to be contained within the downstream river channel and not result in flooding. Inability to operate the spill gates due to seismic damage is not acceptable as the ability to draw down Hayward Lake

Reservoir and Stave Lake Reservoir post-earthquake would be impaired. An inability to pass inflows increases the likelihood of overtopping the Dam and/or both Left and Right Abutments, and could lead to an eventual catastrophic failure.

BC Hydro requires that the spillway gates system be reliable to allow for a post-earthquake drawdown or to provide safe passage of the Probable Maximum Flood (PMF). BC Hydro submits that “The spillway system at the existing Ruskin Facility is deficient. Once the Project is implemented, the Ruskin Facility will be able to safely pass floods up to the PMF without overtopping the Dam.” (BC Hydro Final Submission, pp. 20-21)

4.1.1.2 Right Abutment Work

This part of the Project consists of anchoring and reinforcing sections of the Right Abutment and construction of a new seepage cut-off wall. (Exhibit B-1, p. 1-2)

The Right Abutment has been identified as the weakest seismic point in the Dam. The Right Abutment has had ongoing seepage and piping issues, and could fail in a moderate to large earthquake. (Exhibit B-1, p. 1-8) At shaking levels close to the 1/475 earthquake, movements and damage of the existing cut-off wall are expected, including the possibility of a catastrophic collapse resulting in an uncontrolled release of the Hayward Lake Reservoir. However, due to liquefaction susceptibility, seismic damage to the cut-off wall may occur at less than a 1/475 earthquake. (BC Hydro Final Submission, pp. 21-22)

4.1.1.3 Left Abutment Work

The proposed work at the Left Abutment includes reducing the downstream slope and installing a filter blanket and monitoring instrumentation. (Exhibit B-1, p. 1-2)

The method of failure in the Left Abutment by a seismic event that would impact public safety would be from abutment failure due to prolonged seepage eroding the sand layers causing piping and slope instability, eventually leading to degradation of the abutment. This failure mode could

be the result of increased seepage from leakage of the U3 power tunnel and the presence of erodible sands within the embankment. In its current state the Left Abutment's downstream slope (immediately behind the Powerhouse) is prone to failure. In an earthquake less than a 1/2,475 earthquake, this over steepened slope could suffer a localized failure and could send slope material into the transformers and rear wall of the Powerhouse building. (BC Hydro Final Submission, pp. 22-23)

4.1.2 Intervener Proposal to Reduce the Work Required for the Upper Dam, the Right Abutment, and the Left Abutment

In its Final Submission AMPC points out that the Ruskin Dam's very high consequence rating results from the expectation that damage resulting from a major earthquake could result in the deaths of more than 100 people, property damage estimate exceeding \$100 million, and likely damage to salmon spawning habitat. The AMPC asserts the consequence rating could be reduced if BC Hydro took steps to reduce fatalities and property damage in the event of a worst case scenario earthquake, and developed a fish habitat compensation plan. A reduced Dam MDE consequence rating could change the scope of work required for the Upper Dam Work, the Right Abutment Work, and the Left Abutment Work (e.g., withstanding a 1/2,475 event corresponds to structures being capable of withstanding a ground acceleration of 0.47 g).

The AMPC submits that the fatality and property damage estimate is driven by the number of trailer park and industrial park residents, as well as the number of beach users in proximity to the Dam. Examples of steps that BC Hydro could consider to reduce these risks are relocating the Ruskin Dam Recreation Area, and relocating or indemnifying trail park residents and industrial park facility owners against property damage.

The AMPC states that it is reasonable to speculate that this would be cheaper than seismic reinforcement of the Dam. In addition, the Commission should be certain that withstanding a 1/2,475 year seismic event is not a potentially applicable standard before authorizing reinforcement to withstand a one in 10,000 year event. (AMPC Final Submission, pp. 15-16)

The AMPC requests that the BCUC re-open the record to require further evidence concerning the feasibility of indemnifying and/or relocating the downstream population as a way of reducing the Very High Consequence classification.

In BC Hydro's view the re-opening of a lengthy evidentiary phase which lasted nearly nine months for the purpose of exploring an idea put forward for the first time in argument does not accord with an efficient or effective hearing. (BC Hydro Reply Submission, p. 90)

BC Hydro asserts that AMPC's concepts of indemnification and relocation as a way of potentially reducing the scope of the Upper Dam, Right Abutment, and Left Abutment Work through reduction in the MDE are not workable and are unacceptable. (BC Hydro Reply Submission, p. 90)

To reduce consequences and ensure fewer deaths, BC Hydro would need to relocate the trailer park and all residents, as well as the industrial operations in the lower Stave River and prevent access to that reach of the Stave River by recreational users and members of the Kwantlen exercising their asserted right to the Stave River fishery. It could not simply provide indemnification against personal and property damage. (BC Hydro Reply Submission, p. 90)

BC Hydro also sees indemnification as unworkable given that some of the population at risk are recreational and other periodic users of the lower Stave River and surrounding areas. BC Hydro raises the question as to how it would identify and indemnify users of the Lougheed Highway and Canadian Pacific Railway bridges, or anglers and swimmers in the lower Stave River. It is also not clear that Department of Fisheries and Oceans, the Canadian federal regulatory agency responsible for the fish protection and fish habitat provisions of the *Fisheries Act*⁵, would accept indemnification in lieu of actual protection of salmon habitat. (BC Hydro Reply Submission, p. 91)

BC Hydro believes that relocation is not as simple as a one-off buying out of: (1) the two trailer parks located one km and two km downstream; (2) an industrial area 2.8 km downstream;

⁵ RSC 1985, c.F-14.

(3) residences at the shoreline of Silvermere Lake; and (4) moving the Ruskin Dam Recreation Site, the BC Hydro Ruskin Site Office, and the Powerhouse. (BC Hydro Reply Submission, p. 92)

In BC Hydro's view, the buy-out would need to be extended into land use restrictions that effectively prohibited development of both banks of the Stave River below Ruskin Dam and around Silvermere Lake due to the remaining seismic risks associated with the Upper Dam, Right Abutment, and Left Abutment. BC Hydro suggests it is reasonable to speculate that Mission would not accept such a low value land use. It is also unclear where the Powerhouse would be re-located as there are significant constraints on placement. (BC Hydro Reply Submission, p. 92)

BC Hydro further notes that (1) the seepage cut-off wall and downstream filter work on the Right Abutment is required to protect against the 1/2,475 year seismic event, as well as larger events up to the 1/10,000; and (2) the setting of the applicable standard falls under the authority of the BC Controller of Water Rights (CWR), not the BCUC. (BC Hydro Reply Submission, p. 92)

BC Hydro submits that mitigating the risk of uncontrolled release of Hayward Lake Reservoir by improving the seismic withstand of the Upper Dam, Right Abutment, and Left Abutment, and rectifying the remaining Right Abutment seepage/piping issues, is clearly preferable and is in the public interest. (BC Hydro Reply Submission, p. 93)

Five interveners (BCOAPO, BCSEA, CEC, MRCC and Mr. Ruskin) support the granting of the CPCN to BC Hydro for the Project as proposed. No intervener other than the AMPC raised specific objections related to Upper Dam Work, the Right Abutment Work, or the Left Abutment Work. "The CEC agrees with BC Hydro that the driving force for the Ruskin Project as it relates to the dam is dam safety for seismic risks and for flood risks affecting the dam facility... The CEC submits that the BC Hydro evidence with respect to the right abutment and the left abutment of the dam is sufficient evidence of seismic risk making the Ruskin dam safety improvement a necessity. The CEC submits that the BC Hydro evidence with respect to the reliability risk from potential seismic events and flooding events is sufficient evidence to support the upper dam work portion of the Ruskin Project. [and] the dam safety and reliability conditions are sufficient to demonstrate that those

portions of the Ruskin Project improving the dam abutments and upper dam work are in the public interest and should be approved ..." (CEC Final Submission, p. 4)

Commission Determination

The Commission Panel determines that AMPC's indemnification and relocation option to reduce the Very High Consequence classification and to mitigate the risks inherent with the existing conditions of the Upper Dam, the Right Abutment, and the Left Abutment are insufficient. The evidence on the record for the option does not adequately mitigate the potential risks of loss of life, property loss, and likely damage to salmon habitat. AMPC had ample opportunity to explore the option over the more than nine months of the regulatory timetable. It waited until its Final Submission to first introduce the option. **The AMPC's proposal to reopen the evidentiary record for further submissions on its indemnification and relocation option as a means of mitigating risks associated with the Upper Dam, Right Abutment, and Left Abutment is, therefore, denied.** Reopening the evidentiary phase on this matter is not deemed as in the public interest as BC Hydro has demonstrated that there are sufficient risks with the current condition of the Upper Dam, Right Abutment, and Left Abutment to consider, long term solutions now, and reopening the evidentiary record for further submissions will not change this.

The Commission Panel finds that there are sufficient risks associated with the current condition of the Upper Dam, the Right Abutment, and the Left Abutment to consider long-term alternative solutions to address these risks, solutions that will mitigate against uncontrolled release of Hayward Lake Reservoir by improving seismic withstand of the Upper Dam, Right Abutment, Left Abutment, and rectifying the remaining seepage and piping issues. These alternatives should be considered within the scope of the Project.

4.1.3 Powerhouse Work

Powerhouse work proposed for the Project encompasses both the superstructure and its equipment. It includes:

- seismic upgrades to the Powerhouse superstructure;
- rehabilitation/replacement of the three generating units, electrical and mechanical equipment, and ancillary systems;
- rehabilitation of water conveyance components (draft tubes, penstocks and intakes); and
- the replacement of step-up transformers.

(Exhibit B-1, p. 1-2)

The Powerhouse structure seismic withstand is estimated to be within the range of 0.1 to 0.15g horizontal ground acceleration. As indicated in Section 3.1 this rating does not conform to the present National Building Code of Canada (NBCC) or BC Hydro's expectation of meeting a 1/2,475 year earthquake estimated at 0.47g. In addition, the Powerhouse contains 60 to 80 year old equipment which is at the end of useful life and is no longer reliable. BC Hydro identified a number of deficiencies which present ongoing safety, environmental, and financial risks. Pursuant to BC Hydro's Equipment Health Ratings (EHRs) the major Powerhouse equipment and ancillaries have reached "poor" or "unsatisfactory" equipment health ratings and should be replaced. R.W. Beck, Inc., a consultant engaged by BC Hydro to conduct a condition assessment of the Powerhouse, reached a similar conclusion in its November 2010 report entitled "Ruskin Power Plant Assessment Report" (RW Beck Report). (Exhibit B-1, Appendix B-3, pp. 1-8 to 1-9)

4.1.3.1 Intervener Objection to the Need for Powerhouse Work

AMPC contends that the Powerhouse replacement can be deferred, and that the refurbishment of the Powerhouse equipment can be managed and replaced on an as-needed basis.

(a) Powerhouse Superstructure

AMPC notes that:

- The NBCC generally does not require reconstruction following a building code update. Given that BC Hydro has known of the Powerhouse seismic withstand capability since 2000, AMPC assumes replacing the superstructure is not urgent;

- Incremental improvements such as filling in windows, air vents, and bracing can be scheduled to correspond with generation refurbishment or replacement – when refurbishment or replacement of a specific unit is required;
- It is concerned about the scope of the additional miscellaneous work. Given that Ruskin is an unmanned facility located in a mild climate, AMPC sees no need for an air conditioned control room; and
- While supporting the addition of a fire suppression system and handrails, the AMPC does not believe BC Hydro has adequately justified replacing the existing overhead cranes. In AMPC's view the cranes should be operated until they reach the end of their economic lives. AMPC believes BC Hydro should not "seek a gold plated standard" (AMPC Final Submission, pp. 9-10)

In response to the AMPC proposals BC Hydro submits:

- The AMPC assumption that "replacing the powerhouse superstructure is not urgent" is not correct. BC Hydro initiated a project in 2000 to complete a design, in preparation for construction and tendering, for replacement of U3 asbestos panels and seismic strengthening of the Powerhouse. However, that work was not carried out as BC Hydro determined that it should address all the Ruskin Facility issues and risks simultaneously.
- There is nothing on the record to indicate that seismic strengthening of the Powerhouse structure on a fragmentary basis as proposed by AMPC is technically possible, or that it would address the existing seismic deficiencies in the Powerhouse.
- Air conditioning of the control room is necessary to provide a clean and safe environment for a complex array of electronic control and communications equipment. Given the concentration of electronic equipment in the control room considerable heat is produced which must be offset with cooling (that is, air conditioning) to protect the electronic equipment from failure.
- BC Hydro rejected upgrading or rehabilitating the existing cranes (which was \$1 million less than BC Hydro's proposal for the Project) because this would not address all reliability risks, such as motors and controls, electric feeds, existing wooden walkways, and mechanical parts. Responding to these issues is estimated at a further \$1.9 million.
- Reliable operation of the cranes is a critical requirement in both the implementation of the Powerhouse Work and the ongoing operation of the Ruskin Facility. There are significant schedule, worker safety, and equipment issues with an unreliable crane.
- Any delays resulting from a failure of the crane to safely operate, particularly during the installation of the generating units, will result in a delay of the Project's completion.

Costs associated with such a delay could more than offset the marginal cost of the new crane.

(BC Hydro Reply Submission, pp. 93-95)

No other intervenor took exception to BC Hydro's proposed approach to the Powerhouse work. The CEC submits that "the powerhouse portions of the Ruskin Project improving safety and reliability are in the public interest and should be approved..." (CEC Final Submission, p. 4)

(b) Powerhouse Equipment

It is AMPC's view that BC Hydro should run the existing generating units to the end of their economic lives, continuing to maintain the units and taking advantage to extend their operating lives. This would include refurbishing units as needed, with regular maintenance and replacement when required. This is seen as a prudent approach as opposed to rebuilding or replacing every component of the powerhouse to a Greenfield standard.

APMC supports this position on the following grounds:

- AMPC makes several references to the RW Beck report. While acknowledging that RW Beck's overall recommendation is to replace all of the Powerhouse Equipment at the same time, AMPC points out that the RW Beck report "is clear that the existing units retain value and their lives can be extended."
- AMPC also sees that there is flexibility in the timing of the replacement of the generation units given that the component most likely to fail, the stator windings, are referred to in the RW Beck report as follows:

The Ruskin stator windings visually "[show] some surface contamination, but not more than would be expected, especially considering the open cooling systems." Also stated by RW Beck "[T]he stator windings of the Ruskin generators all have the original insulation system.....which historically has proven to have a very long life, often outlasting newer, modern insulation systems. We attribute the very long life attained by the Ruskin generator stator windings to an initial robust winding design and to relative low and stable loading of the generators..."

- AMPC notes that BC Hydro has conceded that "conceptually it would be possible to split the Powerhouse portion of the Project into three parts, and undertake each only when a given unit has failed." However, BC Hydro rejected this approach based on "the

increased costs for multiple mobilizations, uncertainty in timing, and lack of scale in attempting three small projects.” However, BC Hydro rejected a recommendation by Pacific Liaicon to install all three generators at once on the basis that “[s]hutting down the Powerhouse does not ... significantly increase lay down area to allow multiple units to be installed in parallel.” AMPC agrees with BC Hydro that, given the cathedral architecture associated with the Ruskin vintage of powerhouses, there is adequate lay down area and submits that, given BC Hydro’s refusal to simultaneously replace the three units, its refusal to consider three projects on an as-need basis because of “multiple mobilizations” and “lack of scale”, makes little sense.

(AMPC Final Submission, pp. 10-12)

BC Hydro disputes the AMPC assertion that the optimal approach is to run the existing units to the end of their economic lives with refurbishment and maintenance as required. BC Hydro bases its objections to the AMPC approach by asserting that AMPC takes selected, fragmented quotations from the RW Beck Report and attempts to convey a completely different meaning than the Report intended. In its Reply Submission BC Hydro provides more extensive extracts from the RW Beck Report that include those portions quoted by AMPC in its Submission. The more extensive extracts, in BC Hydro’s view, make it clear that the RW Beck Report justifies the claim that the Powerhouse Equipment needs to be replaced. The findings of the Report are summarized as follows:

“We are of the opinion that given the unreliable condition of many plant elements and the overall poor condition of the equipment, all equipment and systems need to be replaced or refurbished, to be determined during detail design development. We do not recommend to only perform rehabilitation or replacement of selected components or systems if BC Hydro intends to continue operation of the Ruskin plant into the future. We recommend that the rehabilitation work, once the scope has been determined, be performed at the same time by one or more contractors. Only where there is a safety issue, which requires immediate attention and resolution, should, in our opinion, partial rehabilitation be considered. The step-up transformers fall into this category.”
(Exhibit B-1, Appendix B-3, p. 32 of 54) (BC Hydro Reply Submission, pp. 95-98)

BC Hydro also takes exception with APMC’s assertion that it rejected Pacific Liaicon’s suggestion to install all three generators at once because “shutting the Powerhouse down does not ... significantly increase the lay down area to allow multiple units to be installed in parallel.” BC Hydro states that, while this may be true, the reasons BC Hydro rejected Pacific Liaicon’s suggestion

related more to overall scheduling improvements as being unlikely, and the unacceptable environmental risks of a three year continuous spill, than to the potential size of the lay down area. BC Hydro again accuses AMPC of “selective citation” of the Pacific Liaison report and notes that in its transmittal letter Pacific Liaison acknowledges that it had not taken into account the potential environmental impact of its recommendation. (BC Hydro Reply Submission, pp. 104-105)

Furthermore, as outlined in BC Hydro’s response to AMPC IR 1.5.2, Exhibit B-7-2, BC Hydro submits that splitting the Powerhouse project into three separate projects to be implemented on an as-needed basis will increase costs and risks for various reasons. These reasons include: (1) multiple mobilizations for each major contract which will add costs, as compared to the Project which will require a single mobilization; (2) uncertainty in supplier timing if implementation is on an ‘as-needed’ basis which will attract a risk premium, as compared to the Project which presents a known schedule; and (3) a smaller scope of three single Turbine-Generator and three single ancillary equipment and installation contracts which requires one contract for each work package and must therefore increase procurement costs (both for BC Hydro and suppliers) which will eventually be reflected in the capital costs incurred, as compared to the Project. (BC Hydro Reply Submission, p. 105)

BC Hydro does not believe that it is possible to retain the existing Powerhouse equipment and continue to operate it, even with an increased level of effort and expenditure on repair and maintenance. BC Hydro suggests that such an approach is the same as a deferral approach and would only have a positive economic impact if the Ruskin Facility could continue in service for another eight years before the Project is undertaken. This is an unrealistic expectation in BC Hydro’s view. BC Hydro would have to remove the Ruskin Facility from its resource stack at some time in the deferral period given the poor condition of the Powerhouse equipment. The Ruskin Facility would not be able to provide dependable capacity and firm energy. The result would be that BC Hydro would have to acquire replacement firm energy and dependable capacity from alternative BC sources, and this may need to be done in an accelerated fashion. The residual risks and related cost of deferral are not deemed by BC Hydro as cost-effective over any time period. (Exhibit B-7-2, AMPC 1.5.2, pp. 4-8)

No other interveners took exception to the improvements to the Powerhouse equipment. “The CEC submits that BC Hydro has provided sufficient evidence with respect to the safety issues in the powerhouse superstructure and for the reliability issues with the powerhouse equipment to support the powerhouse components of the Ruskin Project.” (CEC Final Submission, p. 4)

Commission Determination

The Commission Panel accepts the evidence as presented by BC Hydro that there are substantial safety, reliability, environmental, and financial risks associated with the existing condition of the Powerhouse, including both the superstructure and equipment. **The Panel determines that these risks are deemed sufficiently worthy to explore alternative solutions and they need to be addressed in a timely and deliberately planned manner. Refurbishment and deferral of replacement on an as-needed basis is not sufficient to satisfy these risks.**

The Commission Panel acknowledges AMPC’s efforts through its IRs and Final Submission to demonstrate ways in which the Project could be modified in order to reduce costs. However, AMPC did not introduce evidence of its own in support of its positions. While AMPC has made observations regarding the adequacy of the lay down area for scheduling the refurbishment or replacement of the generating units, AMPC seems to have misinterpreted BC Hydro’s comments as suggesting that there is adequate lay down area for parallel generator installation. In any event, we agree with BC Hydro that this is not determinative in assessing the condition of the equipment, or how it relates it to the scheduling and environmental factors for addressing the equipment shortcomings. (BC Hydro Reply Submission, p. 105)

The Commission Panel concludes that there is insufficient evidence to support AMPC’s positions. We accept BC Hydro’s evidence provided in support of the Project components relating to the Powerhouse Work, including both superstructure and equipment. **The Commission Panel approves the Powerhouse Work as described in the Application.**

4.1.4 Switchyard Work

The Switchyard Work consists of upgrading and relocating the switchyard from the roof of the existing Powerhouse to an area near the Powerhouse. (Exhibit B-1, p. 1-2).

BC Hydro identified a number of issues at the switchyard.

- Limits of Approach (LOA)

BC Hydro is most concerned with the safety risk that the Switchyard poses to workers. The most significant issue with respect to the current condition of the Switchyard is the LOA deficiency. LOA issues are governed by WorkSafeBC's Occupational Health and Safety Regulation. LOA impacts both qualified and unqualified workers. The limited space, low profile, and close proximity to energized equipment put all individuals who access the Powerhouse roof at risk of electrical contact.

As a result of the restricted space and configuration of the Switchyard, it is unavoidable to be no more than three meters away from energized 69 kV equipment when walking on the Powerhouse roof. This distance is not within the safe LOA for unqualified electrical workers and accordingly, these workers cannot enter onto or perform work on the Powerhouse roof without either the supervision of qualified electrical workers or a suitable facility outage. The Powerhouse rooftop is a multiple use area and there is significant maintenance and repair work to be carried out on a regular basis, which normally would not require qualified electrical worker training to perform the tasks. Tasks not requiring a qualified electrical worker include work on the roof and walls, heating/ventilation air conditioning systems, telecommunications facilities, auxiliary power systems, and general building maintenance including light bulb replacements and gutter cleaning. Currently, overall access to the Switchyard is restricted to authorized electrical workers, and areas of the switchyard are taped off and cannot be accessed by others due to LOA violations.

- Design Deficiencies

The 1930 Switchyard design is outdated and lacks the switching and isolation capability for performing maintenance work in accordance with LOA standards. As a result, an outage of one or more 69 kV circuits is required to perform most maintenance tasks on the Powerhouse roof or on the Switchyard equipment. Outages impact the Ruskin Facility's ability to maintain flow continuity and may also require BC Hydro to spill water inflows, which results in lost energy and has the potential to cause a harmful alteration, disruption or destruction of fish habitat (HADD).

- Roof Condition

The existing roof has drainage issues and requires repair, which will necessitate 69 kV circuit outages and take three or four weeks to perform. Such outages can result in lost energy, Lower Mainland transmission impacts, and affect Stave River downstream flow continuity.

- Environmental Concerns

The design and location of the high voltage Switchyard equipment atop the Powerhouse creates a risk of accidental contact to birds. This has resulted in Blue Heron mortalities. Blue herons are federally and provincially protected. Relocating the Switchyard to a less exposed location and reconfiguring equipment spacing will reduce the potential for bird strikes. BC Hydro also notes that there will be no oil containing equipment in the proposed new Switchyard as the entire station will be at the 69 kV voltage level and no oil-filled transformers are needed. (Exhibit B-7, BCUC 1.8.1)

- Seismic Deficiencies

The existing Switchyard does not meet current seismic standards as defined in the Electrical and Electronics Engineering Recommended Practice for Seismic Design of Substations standard 693 (IEEE 693). To upgrade and maintain the Switchyard on the Powerhouse roof to this standard, BC Hydro would be required to upgrade the steel framing to withstand the design earthquake.

Structural upgrades were estimated at about \$200,000 (direct construction cost including contingency) in a 2000 study. (Exhibit B-10-2, AMPC 2.10.4)

- Location of the Switchyard

The Switchyard was originally developed on the roof of the Powerhouse to keep clear of the construction when the second and third generators were installed in the 1930s and 1950s, and to keep the units operational during construction. The current roof condition's drainage issues could require a substantial station outage to repair the deficiencies. Also, the design and location of the existing Switchyard and high voltage conductors give rise to environmental concerns related to bird strikes. (Exhibit B-1, p. 3-9)

4.1.4.1 Assessment of Alternative Means of Carrying out the Switchyard Work

BC Hydro looked at three alternative means of carrying out the Switchyard Work to address the foregoing issues, concerns, and deficiencies. The three options examined were:

Option 1 –Relocate the Switchyard to the Stave Falls Facility

This option was determined not to be feasible given the need for approximately seven kilometres of new transmission rights of way, impacting 400,000 square meters of land and requiring the purchase of private property. In addition Option 1 would be less reliable and more costly than BC Hydro's proposed solution.

Option 2 – Refurbish the Switchyard and leave it in its current location on the Powerhouse roof

In assessing Option 2, BC Hydro examined the potential for installing new Switchyard equipment that could possibly resolve the LOA issues. Roof top design configurations included gas insulated switchgear (GIS), a compact ring-bus design, and hybrid style switchgear. GIS Bus-work migration to the Powerhouse control room was also evaluated.

BC Hydro submits that all of these design options (and any other option where a new Switchyard is built on the Powerhouse roof) would have the following disadvantages:

- A temporary Switchyard off the roof would have to be constructed;
- All four transmission lines currently connected to the existing Ruskin Switchyard will need to be taken out of service for up to six months during construction; and
- Crane placement alongside the Powerhouse building is required because the only access to the roof is through the elevator inside the Powerhouse, which is limited in its lifting capacity to no more than four persons.

In a study dated April 2009, British Columbia Transmission Corporation also concluded that the option to maintain the Ruskin Switchyard on the roof of the Powerhouse was unfeasible for the following reasons:

- Safety issues during redevelopment and construction of the Powerhouse while maintaining a live operating high voltage Switchyard needed to supply power to the area;
- Outage scheduling challenges to accommodate construction schedule;
- Difficulties in maintaining proper limits of approach during construction and the effects this would have on the safety of workers as well as the construction schedule; and
- Impractical to redevelop the powerhouse superstructure due to shared ground/grid roof structure.

BC Hydro rejected this option since it was not cost-effective or a feasible solution due to the constructability risks and seismic vulnerabilities as outlined above. (Exhibit B-7, BCUC 1.8.1, p. 4)

Options 1 and 2 were found to have serious deficiencies and/or to be more expensive than the proposed option, Option 3.

Option 3 – Re-locate the Switchyard from the Powerhouse roof to an area near the Powerhouse on previously disturbed land owned by BC Hydro

The 2009 British Columbia Transmission Corporation Report concluded that Option 3 is more cost-effective, more reliable, and has less social/environmental impacts than Option 1. Relevant factors supporting the Option 3 solution include:

- Option 3 results in a limited footprint impact and the limited right-of-way impacts associated with the realignment of the circuits to connect to the new switchyard. This compares to the requirement to secure seven km of new transmission ROW impacting significant land areas, and the need to purchase private property dictated by Option 1. Option 1 was deemed not feasible because of less intrusive solutions were available.
- Option 3 is estimated to cost \$22 million compared to over \$30 million for Option 1. (Exhibit B-7, BCUC 1.8.1, p. 3 of 5)
- Option 3 is closer to the existing load and provides higher interconnection reliability than Option 1 which would leave the Ruskin Facility relying on a single circuit for its energy transmission.

In the 2009 study, the BC Transmission Corporation found Option 3 to be the preferred option. (Exhibit B-7, BCUC 1.8.1, pp. 3-5)

BC Hydro also concluded that Option 3 is the preferred option.

4.1.4.2 Intervener Views of Switchyard Work

The only intervener objecting to the Switchyard Work as proposed by BC Hydro was AMPC. AMPC believes BC Hydro's assessment of the need to move the Switchyard from the Powerhouse roof does not provide sufficient reasons for moving away from the status quo (maintaining the Switchyard on the Powerhouse roof). AMPC argues that the BC Hydro's analysis is deficient for the following reasons:

- The risk of electrical contact is a risk that BC Hydro has proven capable of managing for 80 years, by relying on trained and qualified staff.
- BC Hydro's technical design deficiency explanation in its response to BCUC IR 1.8.1, Exhibit B-7, is that the Switchyard cannot be isolated for repair and maintenance work, unlike a more modern facility, and accordingly an outage is required to undertake this work. This condition is also one that BC Hydro has been able to manage for 80 years.
- The roof requires repairs to address "drainage issues" and issues associated with outages are cited. The response presumably means that repairing drainage issues may trigger an outage, but it is still unclear why BC Hydro cannot repair and maintain the roof as it has since 1930.
- "Environmental concerns" are described in response to BCUC IR 1.8.1, Exhibit B-7, as Blue Heron bird strikes. While AMPC supports efforts to minimize impacts on species at risk, AMPC submits that there are likely alternative bird strike mitigation measures other than Switchyard relocation that could be implemented (e.g., effigies and sound cannons could be considered). This issue does not justify a \$20 million cost.

AMPC argues that BC Hydro missed the point of the Commission Panel's question asking BC Hydro to "discuss how BC Hydro's risk tolerance affected the choice of project options for safety related scope items," including the Switchyard. In AMPC's view the status quo is a reasonable option and should not only have been considered, but preferred. (AMPC Final Submission, pp. 6-7) While AMPC acknowledges that safety conditions would be improved by reducing exposure to energized equipment and reducing the chance of relying on scaffolding instead of a hydraulic lift, "in AMPC's view the degree of improvement does not warrant the cost." and it "is concerned that BC Hydro does not sufficiently take cost into account when choosing how to pursue safety objectives." (AMPC Final Submission, pp. 5-6)

BC Hydro's response to AMPC's objections is to reiterate its evidence submitted in response to BCUC IR 1.8.1 which, amongst other observations, concludes that "As a result of worker safety issues, the BC Hydro Board of Directors (Board) rejected the status quo for the Switchyard."

The CEC submits that worker safety issues related to the LOA to equipment, as well as the general age of the Switchyard assets warrants inclusion in the Project. "The CEC submits that the

Commission should conclude that the switchyard portions of the Ruskin Project improving safety and reliability are in the public interest and should be approved...” (CEC Final Submission, pp. 4-5)

No other intervener made specific observation in relation to the need to address safety and reliability concerns related to the Switchyard equipment.

BC Hydro concludes that:

“The Ruskin Switchyard Redevelopment Project is a small portion of the overall cost of the Ruskin Powerhouse and Dam Improvement Project. Despite the switchyard’s small relative costs, it is an integral component of the whole project’s success as it could significantly impact the complete project schedule.... building a new switchyard at Ruskin ... provides for the long term development of the transmission system, is more cost-effective, more reliable, and has less social environmental impacts than [the other alternatives considered]”
(Exhibit B-7-1, BCUC 1.8.1, Attachment 1, p. 16 of 16)

Commission Determination

The Commission Panel accepts that the safety, reliability, and environmental issues merit the upgrade work on the Switchyard, and that the relocation of the Switchyard to an area of previously disturbed land owned by BC Hydro is the preferred alternative. The new Switchyard does provide for the long-term development of the transmission system in a complementary manner to the other elements of the Project. We acknowledge the CEC’s observations that “The CEC is not persuaded by the evidence that deferral of portions of the Ruskin Project [such as deferring the improvements associated with the Switchyard Work] would contribute significant value ...” and “A piecemeal approach may run significant risks of interactions between components of the project, which could have unintended consequences.” (CEC Final Submission, p. 6) Further, the potential for outages associated with the inability to isolate areas of the Switchyard for repairs and maintenance from support the need to address current design deficiencies. Relying on BC Hydro’s ability to manage these risks over the past 80 years is, in itself, insufficient to defer development of an appropriate solution to the Switchyard deficiencies.

Therefore, the Panel determines that the Switchyard Work should be included in the scope of the project alternatives considered for the Project. Option 3, relocation of the Switchyard location from the roof of the Powerhouse to an area near the Powerhouse on previously disturbed land owned by BC Hydro is the appropriate Option.

4.2 Alternative Solutions to the Project

BC Hydro does not consider the status quo to be an alternative solution to the Project given the significant seismic/safety deficiencies of the Dam and Powerhouse, and the need to maintain the reliability of the Powerhouse. Therefore, BC Hydro considered two de-rating and three decommissioning long-term alternatives to the Project. BC Hydro concluded that the Project described in Section 4.1 is more cost-effective than any of the alternatives considered. This is considered further below.

BC Hydro filed two reports that it had prepared to assist with the selection of a preferred solution, and investigation of the alternatives:

- The Black and Veatch Report “Ruskin Hydroelectric Facility Minimum Cost Analysis Study” (B&V Report) focused on the minimal direct engineering, demolition, and construction costs of the alternatives. (Exhibit B-1, Appendix G-2)
- The Hemmera Report “Minimum Cost Analysis Study, Socio-Economic and Environmental Assessment of Alternatives, RUSKIN” focused on the socio-economic and environmental costs of the alternatives, including mitigation and compensation costs likely to be required. (Exhibit B-1, Appendix G-3)

The estimates in both reports were prepared to an accuracy of -35/+65 percent, in line with BC Hydro’s standard for feasibility-stage estimates.

The long term alternatives considered are outlined below. These are more fully described in the Application, Exhibit B-1, pages 3-19 to 3-21.

4.2.1 Permanently De-Rate Two Generating Units, Remove the Third Generating Unit (Alternative A)

This alternative consists of:

- Removing the spillway gates and installing small (about 2.5 m in height) automated crest gates on the Dam crest to provide enough spill capability to ensure that a plant trip does not dewater the Stave River;
- Maintaining the reservoir elevation at 37 m;
- Removing Unit 3 as it is inoperable at this reservoir level;
- Replacing Units 1 and 2 and ancillary equipment as proposed in the Project;
- Constructing a berm in the Stave Falls GS tailrace to maintain tailrace elevation and prevent turbine cavitation problems at Stave Falls (this is a requirement for all of the long-term alternatives); and
- Undertaking the ground improvement work to stabilize the Right Abutment. (Also required for Alternatives B and E described below.)

4.2.2 Abandon with Overflow (Alternative B)

This alternative consists of:

- Removing the spillway gates and installing flashboards on the crest of the five interior spillway bays;
- Lowering the operating level of the Hayward Lake Reservoir;
- Leaving the Dam in place;
- Constructing a berm in the Stave Falls GS tailrace to maintain tailrace elevation and to prevent turbine cavitation problems at Stave Falls;
- Removing the Powerhouse down to the generator floor;
- Installing new discharge valves in a newly-constructed valve-house. These valves would be sized to allow the Unit 1 and Unit 2 penstocks to pass the normal flow of approximately 100 m³/s each into the Unit 1 and Unit 2 draft tubes; and

- Filling the Unit 3 penstock and draft tube with gravel, and cap them with concrete at both ends.

4.2.3 Abandon and Dam Removal (Alternative C)

This alternative consists of:

- Removing the Dam;
- Returning of the Hayward Lake Reservoir, to the extent practicable, to its original condition;
- Constructing a berm in the Stave Falls GS tailrace to maintain tailrace elevation and prevent turbine cavitation problems at Stave Falls;
- Removing the Powerhouse down to the generator floor; and
- Filling all three penstocks, as well as all three draft tubes, with gravel and cap with concrete at both ends.

This alternative would require dewatering of the Hayward Lake Reservoir prior to the removal of the Dam.

4.2.4 Abandon without Dam Removal (Alternative D)

This alternative is similar to Alternative C. However, rather than completely removing the Dam, a large opening would be cut through the base of the Dam to allow water passage.

4.2.5 Permanently De-Rate all Generating Units and Perform Intake Modifications (Alternative E)

This alternative consists of:

- Removing the spillway gates and installing small (about 2.5 m in height) automated crest gates on the Dam crest to provide enough spill capability to ensure that a plant trip does not dewater the lower Stave River;

- Maintaining the reservoir elevation at 37 m, leaving 0.5 m of freeboard on the crest gates;
- Modifying the intake to Unit 3 to permit its continued use by excavating the approach channel to the intake and lowering the intake to the same elevation as the two other units (this allows continued use of Unit 3);
- Undertaking the Powerhouse work substantially as proposed in the Project, leaving the facility with three operating units but with a reduced hydraulic head, resulting in lower energy and capacity at the Ruskin facility.

4.2.6 Economic Analysis of the Alternatives

BC Hydro analyzed the economic impact of the alternatives, both on the basis of the net present of benefits, and on the basis of the levelized unit cost of energy (UEC) for each alternative. The UEC is the net present value of all costs of the alternative, divided by the net present value of all of the energy delivered. A summary of the net present value (NPV) analysis is set out in Exhibit B-1, Table 3-4, p. 3-26. It indicates that the NPV of the alternatives are:

| Alternative | NPV at FY 2011 in \$million 2010 |
|------------------------------|---|
| The Project (Retain 3 Units) | 301.4 |
| Alt A: De-rate 2 Units | 259.1 |
| Alt B: Overflow | - |
| Alt C: Remove | (71.8) |
| Alt D: Tunnel | (67.5) |
| Alt E: De-rate 3 Units | (229.8) |

The Project has the most attractive NPV when compared to the other alternatives.

The UEC calculated by BC Hydro for the Project and each of the Alternatives is as set out below.

| Levelized Cost of Energy | | | | | | |
|--|--|---|----------------------------------|--------------------------------|--------------------------------|---|
| 2010 \$/MWh (Using Expected Amount Costs) | | | | | | |
| | Project Retain <u>3 Units</u> | Alt A De-rate <u>2 Units</u> | Alt B <u>Overflow</u> | Alt C <u>Remove</u> | Alt D <u>Tunnel</u> | Alt E De-rate <u>3 Units</u> |
| Unit Cost -Gross | 67.5 | 59.4 | 119.5 | 135.9 | 134.9 | 75.0 |
| Capacity credit | (16.5) | (12.5) | - | - | - | (17.0) |
| Unit Cost - Net | 50.9 | 46.9 | 119.5 | 135.9 | 134.9 | 58.0 |

Source: Exhibit B-1, Table 3-5, p.3-28

BC Hydro notes that the UEC, net of decommissioning costs can be compared between the Project, Alternatives A and E, and to the cost of long-term firm energy obtained from the BC electricity market (IPPs). The most recent BC market acquisitions stem from the Clean Power Call, with a price of \$129/MWh (F2011\$) for a flat block of energy delivered to the lower mainland, and \$50/MWh for non-firm energy. For a resource with the Ruskin Facility's firmness profile, the weighted average value would be \$120/MWh. BC Hydro sees this as a fair comparison to the gross UEC's shown above. (Exhibit B-1, pp. 3-28, 3-29)

With gross UECs less than the external supply cost of \$120/MWh for equivalent firmness, the Project, and Alternatives A and E are attractive. Between these three choices, the Project provides the greatest amount of energy and capacity. The energy volume from the Project and the margin between the Project UEC and the BC market cost of energy is, in BC Hydro's view, enough to more than make up for the Project's marginally higher UEC compared to Alternative A, which results in the Project being BC Hydro's preferred alternative. (Exhibit B-1, p. 3-29)

The CEBC requested BC Hydro to provide a sensitivity analysis to the Table shown above to reflect alternative firm energy costs of \$70/MWh and \$100/MWh. BC Hydro in its response states that the "break-even" energy value for the Project is \$67.46/MWh for average energy, or \$69.84/MWh for firm energy. BC Hydro notes that there is no evidence that future resources can provide firm energy at \$69.84/MWh. The lowest accepted Levelized Firm Energy Price in the Clean Power Call was \$105.36/MWh. The results of the sensitivity analysis are set out below:

| Levelized Cost of Energy | | | | | | |
|--|--|---|----------------------------------|--------------------------------|--------------------------------|---|
| 2010 \$/MWh using Expected Amount Costs | | | | | | |
| | Project Retain <u>3 Units</u> | Alt A De-rate <u>2 Units</u> | Alt B <u>Overflow</u> | Alt C <u>Remove</u> | Alt D <u>Tunnel</u> | Alt E De-rate <u>3 Units</u> |
| Assuming \$100/MWh Alternative Energy | | | | | | |
| Unit Cost - Gross | 67.5 | 59.4 | 94.0 | 110.3 | 109.4 | 75.0 |
| Capacity Credit | (16.5) | (12.5) | - | - | - | (17.0) |
| Unit Cost - Net | 50.9 | 46.9 | 94.0 | 110.3 | 109.4 | 58.0 |
| Assuming \$70/MWh Alternative Energy | | | | | | |
| Unit Cost - Gross | 67.5 | 59.4 | 67.6 | 93.9 | 83.0 | 75.0 |
| Capacity Credit | (16.5) | (12.5) | - | - | - | (17.0) |
| Unit Cost - Net | 50.9 | 46.9 | 67.9 | 83.9 | 83.0 | 58.0 |

Source: Exhibit B-10-2 CEBC IR 2.6.1

The benefit cost analysis of the Project and the alternatives used a \$55/KW-year for valuation of the capacity. This was based on the capacity from Revelstoke 6. Given the 50+ expected life of the Ruskin Facility, post-Project, BC Hydro believes the value of dependable capacity from Ruskin is likely to be greater than \$55/KW-year. Looking at large-scale capacity options beyond Revelstoke 6 BC Hydro capacity values ranging from \$70/KW-year (Simple Cycle Gas Turbine at Kelly Lake) to \$112/KW-year (pumped storage at Mica). (Exhibit B-10-2, CECBC 2.2.1)

“It is BCOAPO’s position that BC Hydro has considered a reasonable range of alternatives and chosen the most cost-effective.” (BCOAPO Final Submission, p. 5) Also, “The CEC is satisfied that the BC Hydro alternatives developed include sufficient options to cover a reasonable range of options necessary to evaluate cost-effectiveness.” (CEC Final Submission, p.5) No other intervenor commented specifically on the comparative Alternatives examined by BC Hydro.

Commission Determination

In Section 3 of this Decision, the Commission Panel determined the need for the Project had been established for safety and environmental reasons, and that this was fully consistent with the recent amendments to the Electricity Self-Sufficiency Regulation and to SD 10. As noted in Section 2.2, the Commission Panel accepts BC Hydro's uncontested evidence that the Project would result in approximately 334 GWh/year of firm energy and a total of 114 MW of dependable capacity. To address these needs **the Commission Panel finds that BC Hydro has explored sufficient and appropriate options to address the safety, reliability, environmental, and financial risks represented by the Project. It is evident that the Project is the most attractive option from an economic perspective when compared with the alternatives.**

The economic analysis of the Alternatives is somewhat redundant as amended SD 10 requires that the Commission take full account of the need for the Ruskin Facility's capability to deliver 334 GWh/year of firm energy and 114 MW of dependable capacity by 2018 and over the expected life of the Project. SD 10 trumps the economic analysis of the Alternatives. The Alternatives considered would fail to meet the assumed needs identified in amended SD 10 for firm energy and capacity.

The Commission Panel determines that the Project is the preferred alternative to address the need.

4.2.7 Deferral Alternative

BC Hydro also considered a deferral alternative. This is not a long-term alternative but could act as a one to three year bridge to implementing (1) the Project; (2) either of the two de-rating alternatives; or (3) the lowest-cost decommissioning alternative, all of which will require the completion of the Right Abutment work. The net effect of the deferral alternative is that it reduces the net present value of the Project as a whole unless the deferral exceeds eight years. Given the worker safety risks, environmental risks, and the reliability risks, BC Hydro submits that the deferral

alternative is not as cost-effective as the Project over any time period. The RW Beck Report agrees with BC Hydro that deferring the Powerhouse work was not the best option given the unsafe condition of many plant components and the poor condition of the equipment. (Exhibit B-1, Appendix B-3, p. 7 of 54)

Commission Determination

The Commission Panel concurs that a deferral alternative is not an appropriate solution to be considered further, given the necessity to address the safety, reliability, environmental, and financial risks in a timely manner.

4.3 Issues Associated with Various Components of the Project

In the process of developing its application BC Hydro identified a number of issues associated with various components of the Project. It also assessed a number of alternative means to carry out the Project. These issues and alternatives are:

1. Options with respect to the Spillway gate and piers configuration.
2. Options with respect to remediation of the Right Abutment.
3. The Dam Crossing
4. An alternative location for the Powerhouse (New versus rehabilitate/replace).
5. A two turbine-generator unit development versus a three unit configuration.
6. Timing of Replacement of a third generating unit

4.3.1 Dam – Spillway Gates and Piers Configuration

The Upper Dam, consisting of seven spillway gates, six inner piers and a roadway, is seismically deficient. BC Hydro considered three spillway gate configurations and pier options, each of which is capable of passing the probable maximum flood.

Option 1 (Pier Hybrid Option) – Replace three of the existing central piers with new piers, anchor the remaining three of the weaker existing central piers, and install seven new radial gates.

This option was not selected because:

- It would not withstand the maximum design earthquake or meet the 1/500 year earthquake “no damage to spillgate system” criteria;
- It would limit space available for vertical anchors (which limits flexibility in design);
- It would prohibit the ability to easily incorporate a stop log system; and
- It had the lowest maximum spill capacity of the considered options (which reduces flexibility in spill management).

Option 2 (Widened Pier Option) – Widen the six existing central piers, replace and install seven new radial gates.

This option would involve the encapsulation of the existing piers with new concrete in an effort to reduce costs. This option was not selected because:

- It was assessed as having a high degree of constructability uncertainty;
- There is concern about the bonding between existing and new concrete;
- There is concern that seismic load may generate shear forces that might split the pier along the interface and/or that the existing and new concrete may experience differential deformation under post-tensioned stresses.

Option 3 – (New Pier Option) – Replace the six existing central piers, with four new inner piers. Replace the existing seven radial gates with five new larger radial gates.

This is the preferred option from a technical and constructability perspective. The option was selected because:

- It provides increased strength to the Upper Dam structure;
- New wider piers provide increased overall pier strength;
- It provides greater trunnion anchorage and allows the Upper Dam to accommodate a stop log maintenance gate system requiring a two-lane roadway.

Overall BC Hydro estimates that Option 3 is about 10 percent more expensive than Option 2 (\$134 million to \$122 million in 2005 \$). In BC Hydro's view the technical and constructability advantages justify the incremental increase in cost between the two options. (Exhibit B-1, p. 3-50)

No intervener made specific observations or took exception to the option selected by BC Hydro for the proposed dam spillway and piers configuration.

Commission Determination

The Commission Panel accepts BC Hydro's view that Option 3's technical and constructability advantages justify the incremental cost. **We determine that the replacement of the six central piers with four new inner piers, and the replacement of the seven existing radial gates with five new larger gates is the appropriate option to address concerns related to the spillway gate and pier configuration for the Project.**

4.3.2 Dam – Right Abutment Remediation

The seepage cut-off wall of the Right Abutment was found to be seismically deficient, and a static deficiency with respect to seepage and piping was also identified. BC Hydro considered three high-level upgrade approaches to remediate these deficiencies:

- Approach 1 – Upgrade the existing cut-off structure (above the Dam).
- Approach 2 – Build a new cut-off structure (above the Dam).
- Approach 3 – Improve drainage and downstream slope (below the Dam).

Through the engineering process BC Hydro determined that Approach 3 was required in conjunction with either Approach 1 or 2. It then developed Approaches 1 and 2 to the feasibility-level design phase before selecting Approach 2. Approach 1 was not selected because of the considerable constructability risk of drilling through the existing cut-off slabs and because there was concern about the effectiveness of this option below the treated zone. In addition, implementation of this option would require an extended deep drawdown on the Hayward Lake Reservoir. Approach 3 on its own, does not fully address the seismic issue, but was adopted (in conjunction with Approach 2) because it greatly reduced the static (piping) and post-seismic risks.

No intervenor made observations or took exception with BC Hydro's preference to build a new cut-off structure above the Dam (Approach 2) and improve drainage and the downstream slope below the dam.

Commission Determination

The Commission Panel accepts that building a new cut-off structure above the Dam and improving drainage and the downstream slope below the dam is the appropriate solution for the Right Abutment remediation component of the Project. We accept BC Hydro's assessment of constructability and seismic risks that lead to this as the preferred Approach.

4.3.3 The Dam Crossing

BC Hydro submits that the Upper Dam portion of the Project has been designed for the installation of stop logs to provide isolation of the spillway gates to carry out maintenance and inspection work on the Dam. Without these stop logs BC Hydro would be required to draft the reservoir each time it carries out maintenance and inspection of the spillway gate, potentially impacting flow continuity and giving rise to *Fisheries Act* violations. Furthermore, it could impact public access which is required under a perpetual agreement with the District of Mission. (Exhibit B-7-2, AMPC 1.5.2)

The placement and removal of the stop logs requires either a gantry crane or a large mobile crane. The Project scope includes a gantry crane to avoid future crane availability risk and gain the benefit of a custom stop log handling system. The gantry crane requires that the dam crossing be widened to two lanes. While a pedestrian walkway is not needed for the gantry crane, it will improve worker and public safety with “minimal incremental cost.” The District of Mission, Mission Chamber of Commerce, Fraser Valley Regional District, District of Mission Fire and Rescue Service, and RCMP all support the widening of the crossing and the provision of a pedestrian walkway. (Exhibit B-10-2, BCOAPO 2.1.1)

A gantry crane was selected over a mobile crane because a mobile crane would need more than two lanes of road width to accommodate stabilizing outriggers. (Exhibit B-10-2, BCUC 2.36.1.1.1)

“AMPC submits that in fairness to its ratepayers BC Hydro should seek a funding contribution [for the Dam crossing] from the Municipal District of Mission” and “BC Hydro refuses to do so, however, because accepting contributions could purportedly have a negative impact on operating costs.” (AMPC Final Submission, p. 8) BC Hydro indicates that it has not solicited contributions “to safeguard BC Hydro’s right to use the roadway for the purposes of Dam maintenance, including periodic road closures as required, without allowing the argument that a third party’s contributions would entitle them to approve or deny such closures, or place conditions on the timing and duration of a closure. BC Hydro believes that such interference in scheduling operations on top of the Dam would ultimately have a negative impact on operating costs.” (Exhibit B-7-1, BCUC 1.30.3)

AMPC disagrees with this rationale and submits BC Hydro should adopt a “best efforts” approach to consultation and “ought to pursue a reasonable road funding contribution given the benefits it provides to Mission residents.” (AMPC Final Submission, p. 8)

Commission Determination

The Commission Panel accepts the benefits of widening the roadway to two lanes and the addition of a pedestrian walkway. The operational benefits of using a gantry crane to place and

remove the stop logs, combined with the minimization of potential *Fisheries Act* violations and the increased worker and public safety with the pedestrian walkway, merit the widening of the roadway to two lanes and addition of the pedestrian walkway.

However, the Commission Panel also agrees with AMPC that BC Hydro could pursue a funding contribution from the District of Mission for the addition of the road widening and pedestrian walkway, to partially compensate for the costs of line painting and the pedestrian walkway which contribute to public safety. We do not fully accept BC Hydro's arguments that it would be giving Mission the authority to approve or deny road closures or place conditions on the timing and duration of closures. BC Hydro will still own the road and be able to control it for operational requirements. However, as AMPC points out, it should take stakeholder concerns into account when closing the road, if only to be a good neighbour. BC Hydro is encouraged to consider seeking a funding contribution from the District of Mission for the road widening and addition of the pedestrian walkway, and to agree on the nature of consultations that would take place around road closures.

4.3.4 Powerhouse – New versus Rehabilitate/Replace

In 2005, BC Hydro initially explored the option of building a new Powerhouse on the same site or rehabilitating the existing structure. The building of a new Powerhouse was estimated at that time to be \$109 million more costly than rehabilitating the existing structure.

In 2007, BC Hydro retained Kohn Crippen Berger Ltd. (KCBL) to examine the cost-effectiveness of a third option: construction of a new Powerhouse downstream of the existing site. KCBL concluded that the preferable option was to rehabilitate/replace the existing Powerhouse for the following reasons:

- While a new Powerhouse downstream would permit reconfiguration using two larger units, it would not result in significant benefits due to the limited storage in the Hayward Lake Reservoir and the resulting need to coordinate flows between the Stave Falls and Ruskin Facilities;

- There was a net present value benefit of at least \$100 million (in 2007\$) to rehabilitate/replace the current building compared reasonably to building a new Powerhouse;
- There were significant construction constraints associated with building a new powerhouse downstream due to unknown geotechnical issues associated with bedrock at a new powerhouse location, rather than rehabilitation/replacement at the existing site (Exhibit B-7, BCUC 1.9.1; and
- No significant additional head can be developed by building a new powerhouse downstream.

No intervener made specific observations regarding an alternative location for the powerhouse.

Commission Determination

The Commission Panel accepts the evidence in the KCBL Report and determines that it is appropriate to rehabilitate the current Powerhouse, rather than developing a new one in a different location.

4.3.5 Powerhouse – Two versus Three Unit Configuration

BC Hydro considered the alternative of upgrading only Turbine-Generator Units 1 (U1) and 2 (U2). In BC Hydro's view, the benefits of having three units and a greater amount of capacity than might strictly be required to capture the available energy associated with only two units were worthy of pursuit. These benefits include:

- Flexibility and reliability in the management of water and releases;
- System support benefits; and
- Benefits of capacity in meeting load requirements, system reliability requirements, and market trade benefits.

BC Hydro's economic evaluation of three units versus two units concluded:

- The annual energy generated by a three unit system versus a two unit system is an additional 18.6 GWh. The firm energy component (where the contribution of U3 is pro-rated based on its average energy contribution) is an additional 16.4 GWh;
- The NPV of the incremental power generated from a 3 unit system versus a 2 unit system is \$52.4 million (Exhibit B-1, p. 3-48 and Exhibit B-10, BCUC 2.33.1);
- The incremental cost of the third unit installation is \$41.7 million (direct cost);
- The NPV benefit of a Three Unit Alternative versus a 2 unit alternative is \$10.7 million (considering direct costs only). (Exhibit B-1, p. 3-48)

The Commission Panel notes that only the incremental direct cost of the third unit installation (\$41.7 million) is included in the NPV benefit determination of installing the third unit.

BC Hydro considers loaded cost figures in evaluating projects or project alternatives to be irrelevant. (Exhibit B-10-1, BCUC 2.33.1) BC Hydro also makes reference to the Commission's Decision in the Revelstoke Unit 5 proceeding in which the Commission states: "In evaluating a project which primarily provides dependable capacity to its ratepayers BC Hydro has calculated the UCC [Unit Capacity Cost] of the project using incremental costs and excluding IDC [Interest During Construction] and Corporate Overhead and the Commission Panel agrees with this approach."⁶

The Panel disagrees with BC Hydro that only direct costs should be included in this determination. Calculating UCC for tax purposes as was referred to in the Revelstoke 5 proceeding is not the same as calculating a revenue requirement for regulatory purposes. An appropriate analysis of the NPV of the net benefit of the installation of the third unit should include the loaded cost amounts. Notwithstanding this, we also note BC Hydro's observation that "Including the Capital Overhead loading as part of the incremental capital costs of installing the third unit would reduce the NPV of the decision to install a third unit by that amount, or from \$10.7 million to \$3.8 million." (Exhibit B-10-1, BCUC 2.33.1) Inclusion of capital overhead loading would still render a positive NPV for installing the third unit.

⁶ *In the Matter of British Columbia Hydro and Power Authority: Application for a Certificate of Public Convenience and Necessity for Revelstoke Unit 5*, July 12, 2007, Order C-8-07 at p.59 (*Revelstoke Decision*)

BC Hydro states that, from a system perspective, the recent increase of variable wind generation and non-dispatchable run-of-river hydro results in the need to balance loads in real-time. System generation must be dispatchable to a much greater degree than historical demands. Units with “a flat efficiency curve” offer a more effective way to meet this need as these units will provide the variable energy required without operating outside their intended limits. Flexibility in unit output provided by the ability to change output while using water effectively has become more critical for dispatchability services as a marketable asset. These benefits are largely attributable to the additional capacity provided by a three-unit Powerhouse. (Exhibit B-10, BCUC 2.29.6.1)

A variation on the two versus three unit operation that has been examined by BC Hydro is to replace units 1 and 2 and run U3 until it fails, and then replace it. The estimated cost for the future replacement of the third unit is \$44.9 million direct costs. BC Hydro calculates the “break-even” time for deferral in installing U3 is 5.5 years (any shorter deferral would result in an economic cost rather than a benefit). BC Hydro further notes that it would take three years after failure to procure and install a new unit, which implies that U3 would have to remain in service for nine years to make deferral an economically attractive alternative. (Exhibit B-10, BCUC 2.33.4, p. 3)

BC Hydro also notes that it is problematic as to whether it would run U3 to failure. Consequences of that failure are difficult to predict but could include worker safety issues, environmental issues associated with oil contamination and debris, possible damage to other generating units, and the loss of capacity to the Lower Mainland until U3 is replaced. (Exhibit B-10, BCUC 2.33.4)

Commission Determination

The Commission Panel accepts BC Hydro’s evidence related to the benefits of the three unit configuration, including those related to flexibility and reliability of water and releases, system support, and capacity, as well as its economic evaluation of having a positive NPV. **We determine that the benefits of three generating units exceed those of only having two units. We determine that the three generating unit configuration is appropriate for the Project.** This is consistent with the requirements of the amended Electricity Self Sufficiency Regulation and amended SD 10.

4.3.6 Timing of Replacement of the Third Generating Unit

In Section 4.1.2 the Commission Panel determined the need to address the safety, reliability, environmental, and financial risks associated with the current state of the Powerhouse equipment, and the three generating units in particular, as one component of the Project. Refurbishment and replacement of them on an as-needed basis was not deemed to satisfy these risks. While BC Hydro explored the option of upgrading only U1 and U2, it determined that a three unit configuration was necessary to meet the legislated needs for firm energy and dependable capacity. This is consistent with the amended Electricity Self-Sufficiency Regulation and amended SD 10. The three unit solution also provided a financial benefit by providing the ability to shape output into higher value periods. It also decreased the risks of a spill with the attendant environmental impacts, while at the same time in improving flexibility in scheduling outages. Further, it provides redundancy for the Ruskin Facility. (Exhibit B-7-2, AMPC 1.5.2) The Panel confirmed that the three unit solution was appropriate in Section 4.3.5, leaving only the question of timing of replacement of U3.

4.3.6.1 BC Hydro Position

BC Hydro states that:

- “Notwithstanding the worker safety, reliability, and environmental concerns raised by continuing to run U3 in its current condition, it is conceptually possible to gain the benefits of retaining a three-unit powerhouse by deferring the capital expenditure of replacing the third unit. In this case, BC hydro would replace U1 and U2 and retain the existing U3 on a ‘run to failure’ basis as described in Exhibit B-10, BC Hydro’s response to BCUC IR 2.33.4. In BC Hydro’s analysis, this alternative is uneconomic. In addition, this alternative would exacerbate concerns related to capacity sufficiency in the Lower Mainland.... this strategy gains a time-value of money benefit by delaying the expenditures for the U3 replacement, but it also incurs additional costs for the second mobilization, an extended outage following failure of U3, additional procurement activities, and anticipated lower construction efficiencies in a smaller project....”
- “... the break-even delay was 5.5 years: U3 must remain in service at least 5.5 years after the currently planned replacement in 2017 for the deferral to provide an economic benefit” RW Beck assessed the annual probability of failure of the generating unit is

approximately 39 percent. “The probability of U3 remaining in service for the 5.5 year period required to provide an economic benefit is less than 7 percent.”

- “BCH is concerned with any reduction in dependable capacity in the Lower Mainland, given among other things, DSM deliverability risk, the legislated constraints on Burrard Thermal Generating Station, and the intermittent nature of the IPPs awarded EPAs in the Lower Mainland region.”
- “For these reasons, BC Hydro does not believe that this would be a satisfactory or cost-effective solution.”

(Exhibit B-18, BCUC 3.10.2)

BC Hydro also states:

- “The annual benefit of retaining a third generating unit rather than replacing only two generating units is shown in Exhibit B-1, Table 3-12, page 3-48 as \$3.3 million, and provides a NPV benefit of \$10.7 million by including the third generating unit in the Project scope.”

(Exhibit B-18, BCUC 3.10.1)

U3 provides the ability to shape output into periods when customers have the greatest need for power and during the time of system contingencies. Few clean or renewable energy resources provide this capability. That is, U3 enhances the ability to meet the demand for firm energy and dependable capacity. When BC Hydro is able to achieve its legislated requirements for self-sufficiency + 3,000 GWh/year energy, it will be able to sell surplus energy and have the ability to shape output to allow it to maximize the value of what is sold externally for the benefit of BC Hydro ratepayers. (Exhibit B-7-2, CEC 1.19.0)

U3 provides a limited amount of additional energy due to avoided spill. Its primary economic benefit, however, is the additional capacity and the ability to shape the output into high load periods and out of low load periods. The incremental value of the energy from the Ruskin Facility with U3 in place is 18.6 GWh with an incremental value of \$3.3 million, after adjusting for firmness. (Exhibit B-10-2, BCUC 2.4.1)

Deferring replacement of U3 would also incur costs. According to BC Hydro: “A future replacement will require a second mobilization and demobilization for the installation. In addition during the extended operating period maintenance costs for the existing U3 may be higher than anticipated for the new unit installed in the Project. The timing of replacement, and therefore the supplier’s order backlog at the time of that replacement, cannot be predicted ... BC Hydro will bear the cost exposure to a single-source contract for a turbine/generator to match those installed under the reduced Project scope ... or face the cost of multiple designs in a small three unit powerhouse and the increase in future spares stocking and maintenance costs.” (Exhibit B-10, BCUC 2.33.4) A smaller project to replace a single unit will also lead to lower construction productivity and loss of economies of scale.

BC Hydro states: “The ‘break-even’ duration for the deferral is 5.5 years, and a deferral of any shorter duration is an economic cost, rather than a benefit.” If the replacement of U3 were deferred, the consequences of a “failure are difficult to predict but could include worker safety issues, environmental issues associated with oil contamination and debris, possible damage to other generating units and the loss of capacity in the LM until U3 is replaced.” (Exhibit B-10, BCUC 2.33)

4.3.6.2 Intervener Positions

AMPC submits that “it is entirely reasonable to replace components as needed and take steps to refurbish them in a prudent manner, without rebuilding every component of the powerhouse [including U3] to a Greenfield standard.” (AMPC Final Submission, p. 12)

The RW Beck Report concludes: “it is R.W. Beck’s opinion that the serious safety concerns should be addressed immediately and that an overall life extension program be formulated and initiated as soon as possible. In our opinion, major replacement of critical equipment and reconstruction and refurbishment of the vital Project components [including U3] will be the best path to ensuring a continued and long Project life at the Ruskin Hydroelectric Power Project.” (Exhibit B-1, Appendix B-3, p. 33 of 54) [emphasis added]

“The CEC submits that the choices BC Hydro has made with respect to the alternative approaches to the Ruskin Project work represent reasonable choices and that there is no substantive alternative which the CEC could focus on to recommend to the Commission that it should impose terms and conditions with respect to the Ruskin Project work, which would have the effect of substantially improving upon BC Hydro’s recommended Ruskin Project approach.” (CEC Final Submission, p. 7)

Commission Determination

The Commission Panel determines that it is appropriate to include the replacement/refurbishment of U3 within the scope of the Project at this time. There is no financial benefit to deferring it until the existing unit fails; in fact there could be substantial additional cost, as well as the worker safety and environmental risks through such a deferral. Further, such a deferral could impact BC Hydro’s ability to satisfy its legislated targets for self-sufficiency in 2017, as well as lose its ability to shape output to optimize value for its ratepayers. Replacing/refurbishing U3 at this time is fully consistent with the requirements of the amended Electricity Self-Sufficiency Regulation and the amended SD 10.

4.4 Commission Determination

The Commission Panel has considered the evidence related to the various alternatives presented in the Application and the submissions made by all interveners. BCOAPO, BCSEA, CEC, and MRCC fully support the Project as proposed. Mr. Ruskin has given implied support. We acknowledge CEC’s submission that BC Hydro’s evaluation of the Project may be too conservative:

“The CEC submits that the BC Hydro evaluation is likely too conservative and therefore submits that because the Ruskin Project has the highest capacity contribution of the alternatives that the economic case for the Ruskin Project is stronger than BC Hydro has shown.”

Furthermore, CEC states “The CEC submits that the valuation basis of clean and renewable firm energy used by BC Hydro is likely significantly understated.” and

“CEC submits the Commission should conclude that the Ruskin Project is the most cost-effective option among the alternatives reviewed and leads to strong support for the view that the public interest would best be served through approval of the Ruskin Project.”

Finally, “... a piecemeal approach may run significant risks of the interactions between the components of the project, which could have unintended consequences. The CEC does not believe there is sufficient merit in any potential savings to warrant undertaking the risks.”

(CEC Final Submission, pp. 5-6)

The Panel also acknowledges AMPC’s concerns related to “excessive costs” and Kwantlen’s concerns regarding the adequacy of consultation. These will be further addressed in subsequent Sections of this Decision. Further, the Panel acknowledges the concerns raised by CEBC and Mr. Quigley in their Final Submissions but, as previously stated, concludes that there is insufficient evidence on the record to merit further consideration of them.

The Commission Panel determines that the proposed Ruskin Dam and Powerhouse Upgrade Project is the most cost-effective alternative to address the underlying safety, reliability, environmental, and financial risks that give rise to the Project. The Commission Panel approves the scope of the Ruskin Dam and Powerhouse Upgrade Project as requested in the Application.

This includes:

- Replacement of the six central piers with four new inner piers and replacement of the existing radial gates with five new larger gates to address concerns related to the spillway gate and pier configuration component of the Project;
- Building a new cut-off structure above the dam and improving the drainage and downstream slope below the dam for the Right Abutment remediation component of the Project;
- Widening of the roadway to two lanes and the addition of a pedestrian walkway for the dam crossing component of the Project;

- Rehabilitation of the current Powerhouse, rather than developing a new one at a different location for the powerhouse component of the Project;
- A three generating unit configuration for the generation component of the Project;
- Replacement/refurbishment of generating unit U3 at this time; and
- Relocation of the Switchyard from the roof of the Powerhouse to an area near the Powerhouse on previously disturbed land owned by BC Hydro for the switchyard component of the Project.

This is fully consistent with the requirements of the amended Electricity Self-Sufficiency Regulation and amended SD 10.

5.0 PROJECT COSTING, SCHEDULE, AND RISK MANAGEMENT

In this Section of the Decision the Project Costs are reviewed (Sections 5.1 and 5.2), the Project Schedule is considered (Section 5.3), and Project Risk Management is assessed (Section 5.4).

5.1 Project Cost Components

BC Hydro's original application requested approval for a CPCN in the amount of \$856.9 million for the Project, which included \$718.10 million for the "Expected Amount" of Project costs based on P50 cost estimates, \$98.80 million for incremental other costs to bring its cost estimates to a P90 level, plus a further \$40 million "Management Reserve". BC Hydro subsequently amended its Application in its Evidentiary Update (Exhibit B-15) to request a CPCN be granted on the basis of the Expected Amount of \$718.10 million, a summary breakdown of which is shown in Table 2.4 of the Application (Exhibit B-1, p. 2-31).

BC Hydro explains that expenditures in excess of the Expected Amount up to the Authorized Amount require the prior approval of its internal Board Capital Projects Committee. BC Hydro also states that expenditures in excess of the Expected Amount could be subject to a prudence review in a future revenue requirements application proceeding. (Exhibit B-15, p. 2)

This Section of the Decision addresses the development of the Project costs resulting in the Expected Amount of \$718.10 million, including contingency, inflation, capital overhead and interest during construction (IDC). The Expected Amount represents the Project scope discussed and approved in Section 5.0.

The Project comprises the following components and cost elements:

| | Ruskin Dam Project Cost Component | (\$ million) |
|----|--|---------------------|
| 1 | Direct Construction | 325.20 |
| 2 | Project Management and Engineering | 40.30 |
| 3 | Other Indirect Construction | 4.70 |
| 4 | Sub-total Direct and Indirect | 380.20 |
| 5 | Contingency on Expected Amount | 56.00 |
| 6 | Dismantling and Removal | 10.40 |
| 7 | Inflation | 41.40 |
| 8 | Sub-total | 107.80 |
| 9 | Sub-total Implementation Amount | 488.00 |
| 10 | Capital Overhead (COH) | 77.50 |
| 11 | IDC | 65.60 |
| 12 | Sub total | 143.10 |
| 13 | Sub-total, Implementation, Loaded | 631.10 |
| 14 | Identification, Definition, Early Implementation | 87.00 |
| 15 | Total Expected Amount | \$718.10 |
| | Less: Capital Overhead | 77.50 |
| | Expected Amount less COH | \$640.6 |

(Source: Exhibit B-1, Table 2-4, p. 2-31)

5.2 Project Cost Component Determinations

5.2.1 Direct and Indirect Costs

The direct construction costs of the Project are estimated as \$325.16 million. In addition there are project management and engineering costs of \$40.33 million, and indirect construction costs of \$14.68 million, resulting in total direct and indirect Project costs of \$380.20 million, before contingencies, loadings, and other costs.

BC Hydro describes the Expected Amount, \$718.10 million, as having an accuracy range of +/- 20 percent. It states that:

“The elements of the Project include items similar to those associated with the development of hydroelectric generation projects of a similar size. With the exception of the Right Abutment, there is little new or unusual technology, or

construction methodology, required in implementation that would necessitate an unusual form of contracting or specific assumption of construction risk by BC Hydro. However, there are two main challenges impacting construction at the site: [Space Limitations and Downstream Flow Requirements]” (Exhibit B-1, p. 2-30)

BC Hydro describes its Cost Risk Management approach in Exhibit B-1, Section 5.3.1, discussed below. The Panel determination with respect to direct costs follows that discussion.

5.2.2 Contingency on Expected Amount, Dismantling and Removal, and Inflation Contingency on Expected Amount

The Expected Amount costs include estimated contingency costs of \$56.0 million, calculated using a Monte Carlo statistical analysis based on the expected range of values for major cost categories. The analysis results in a probability distribution for the total construction costs. The resulting P50 and P90 values are then used as the basis for determining the Expected and Authorized Amounts for the Project cost estimate. (Exhibit B-7-1, BCUC 1.45.1)

BCOAPO seems to suggest that the Expected Amount of \$718.10 million excludes capital overheads and IDC. (BCOAPO Final Submission, p. 6) The Panel notes that both capital overhead and IDC calculated on the Expected Amount are included in requested \$718.10 million. (Exhibit B-1, Table 2-4)

AMPC comments on what it describes as “additional larger contingency amounts” and “margins in the construction cost estimate” of \$25 million for contract management and service fee, and \$20 million for currency exchange fees being, in addition to “a generous built-in contingency estimate.” (AMPC Final Submission, p. 13) The Panel notes that the \$20 million foreign exchange reserve amount was part of the Authorized Amount which is not included in the amended Application, and the \$25 million contract management fee is included in Direct Costs as Construction Management.

There were no comments from the other interveners addressing contingencies.

Commission Determination

The Commission Panel considers the Monte Carlo analysis methodology to be an appropriate tool for calculating contingencies, and considers BC Hydro's application of the Monte Carlo analysis to be acceptable for estimating the contingency of \$56.0 million on the Expected Amount. The \$56.0 million contingency provision included in the Expected Amount represents 14.7 percent of the total direct and indirect costs of \$380.20 million, a proportion which the Panel considers to be within a reasonable range for projects of this magnitude and complexity.

5.2.2.1 Dismantling and Removal

Dismantling and removal costs have been estimated at \$10.40 million, +/-2 percent of costs. No submissions have been made in respect of these costs.

Commission Determination

The Commission Panel accepts the estimate of dismantling and removal costs of \$10.40 million as reasonable.

5.2.2.2 Inflation

BC Hydro has used an inflation rate of 2.1 percent. Its rationale for the use of this inflation rate is described as follows:

"An inflation rate of 2.1 per cent is the current recommended rate used for cost estimating purposes for BC Hydro Generation projects for the years 2010 and onwards. The rate is consistent with the B.C. CPI rates provided by the B.C. Ministry of Finance which are used by BC Hydro for planning and net income forecast purposes; these are 2 per cent for 2011 and 2012, and 2.1 per cent for 2013 and 2015." (Exhibit B-7-1, BCUC 1.39.1)

The Panel notes that the 2.1 percent annual inflation rate used in the Project cost estimate is the same as the BC Consumer Price Index annual planning value. (Exhibit B-7-1, BCUC 1.47.2) BC Hydro also indicates that cash flows for inflation and IDC calculations were determined on the basis of activity schedules and task duration assumptions. (Exhibit B-1, Appendix G-1, p. 5 of 14)

No intervenor submissions were received with respect to the rate or method of calculating inflation for determination of the Expected Amount estimates.

Commission Determination

The Commission Panel considers that BC Hydro's rate and methodology for calculating inflation are appropriate for the Project, and determines that the rate and methodology are approved for the purposes of the CPCN Expected Amount cost estimates.

5.2.3 Capital Overhead (COH) Rate and Interest During Construction

BC Hydro states that its "... Capital Overhead (COH) rate is established at the beginning of each fiscal year for each BC Hydro business group and is determined by dividing the planned capital overhead amount by the planned capital expenditures eligible for COH. The COH rate increased from 13.3 percent in F2010 to 16.41 percent in F2011 because the amount of planned capital expenditures eligible for capital overhead decreased from F2010 to F2011." (Exhibit B-7-1, BCUC 1.39.1)

BC Hydro's response to CEC IR 1.11.6, Exhibit B-7-2 includes the observation that "... BC Hydro changes the overhead accumulation rate, either as costs and the level of capital activity change, or in response to applicable accounting requirements ... without affecting the economic outcome of any particular project. For these reasons, BC Hydro excludes IDC and capital overhead in project evaluation. This treatment was accepted by the BCUC in the *Revelstoke Decision* at p. 59."

Total COH included in the Expected Amount is \$77.50 million based on using a rate of 16.41 percent, the rate determined for 2011. BC Hydro estimates that the implementation of International Financial Reporting Standards (IFRS) would decrease BC Hydro's Generation Business Group Capital Overhead rate to 4.07 percent for 2012, but it is undertaking a more detailed study of COH allocation to confirm or revise the appropriate amount of overhead to allocate to capital under IFRS. (Exhibit B-18, BCUC 3.1.1)

BC Hydro comments on the COH rates as follows: "following the implementation of IFRS, the capital overhead rate will be lower because IFRS requires that additions of 'Property, Plant and Equipment' must be 'directly attributable' to the asset." In addition, BC Hydro "submits that the proper forum to examine capital overhead allocation is the F2012 to F2014 RRA." (Exhibit B-15, p. 4) BC Hydro is requesting that a CPCN be issued for the Project on the basis of, among other things, the Expected Amount, which includes a COH rate of 16.41 percent using existing Canadian Generally Accepted Accounting Principles (CGAAP).

BC Hydro notes that, "given that future capital overhead rates are unknown due to the variability of both capital expenditures and capitalizable overhead costs in future years, the rate in effect at the time of preparing the Project estimate is used as the proxy for future rates. BC Hydro acknowledges that in particular, there is uncertainty regarding future capitalized overhead rates relating to the application of IFRS. However, both BC Hydro's capitalizable overhead costs and the impact of applying IFRS can be addressed within BC Hydro's F12-F14 RRA and future RRA proceedings. As set out in Exhibit B-1-1, page 1-4, BC Hydro is proposing to submit semi-annual progress reports to the BCUC should a CPCN be granted for the Project. BC Hydro proposes that the semi-annual progress reports include the following:

- The cost impact/effect on the Expected Amount which reflects the application of IFRS; and
- A revised Project expenditure forecast reflecting the application of IFRS.

This information would be included in BC Hydro's ongoing semi-annual reporting to the BCUC after the BCUC issues its decision concerning BC Hydro's F12-F14 RRA." (Exhibit B-18, BCUC 3.1.4)

Although some interveners have expressed concern regarding the overall level of Project costs, no intervenor submissions were received specifically with respect to the rate or method of calculating COH rates for determination of the Expected Amount estimates.

Commission Determination

The Commission Panel notes that the impact of any IFRS adjustment on the determination of the capital overhead rate would be significant. The Panel also notes BC Hydro's statement that the use of the current 16.41 percent capital overhead rate for the purposes of determining an Expected Amount for this Project would be a proxy for whatever rate is ultimately established for each year over the lifetime of the construction of the Project. However, the Panel is concerned that the use of a proxy rate as high as the proposed 16.41 percent may become "embedded" in the Expected Amount for the purpose of evaluating the actual versus estimated performance of the Project costs. The Panel does note the rather significant yearly variations in capital overhead rates which appear to be driven primarily by fluctuations in direct capital expenditures, without corresponding fluctuations in the annual expenditures on capital overhead items.

The Panel concurs with BC Hydro's view that the ultimate determination of the Capital Overhead is, at this point of time, appropriately made in the course of BC Hydro's Revenue Requirement proceedings.

The Commission Panel is not convinced that the current Capital Overhead Rate of 16.74 percent used by BC Hydro is the appropriate rate given the uncertainty with respect to the determination of the applicable rate for 2012 and subsequent years. **The Commission Panel determines that the Basic Expected Amount for the Project should exclude Capital Overhead, with the provision to add Capital Overhead at the applicable Capital Overhead Rate approved by the Commission from time to time, to arrive at a Total Expected Amount. This approach results in a Basic Expected**

Amount for the Project of \$640.6 million, being the requested Expected Amount of \$718.10 million less the proposed COH of \$77.50 million. This \$640.6 million will be supplemented in the future as COH rates are approved by the Commission. The Commission Panel directs BC Hydro to reflect this approach in its proposed semi-annual progress reports for the Project.

5.2.3.1 Interest During Construction

BC Hydro states that “The IDC rate represents the cost of borrowing to BC Hydro and is the forecast weighted average cost of debt. For purposes of establishing IDC rates, BC Hydro uses financial assumptions from the B.C. Ministry of Finance.” (Exhibit B-7, BCUC 1.39.1)

As stated above some interveners have expressed concern regarding the overall level of Project costs. However, no intervener submissions were received specifically with respect to the rate or method of calculating IDC for determination of the Expected Amount estimates.

Commission Determination

The Commission Panel notes that the rate for calculation of IDC will fluctuate and will be based on actual costs of debt as the Project progresses. **The Panel considers that BC Hydro’s rate and methodology for calculating IDC are appropriate, and determines that the rate and methodology are approved for the purposes of the CPCN Expected Amount cost estimates.**

5.2.4 Intervener Submissions Related to the Expected Amount

AMPC submits that the Commission’s review should bear in mind the broader conclusions of the Independent Review Panel of BC Hydro’s operations. AMPC states that it “... is concerned about the scope of the Project and BC Hydro’s overall approach, and surprised that, following a senior and credible review of its operations and practices, BC Hydro ‘[determined] that modification of the Project scope and the Expected Amount is not required’. It is improbable that the Project is free of the issues raised by the Independent Review Panel.” (AMPC Final Submission, pp. 2-3)

While “BCOAPO has serious concerns about the cost uncertainties associated with BC Hydro’s application for its ‘Expected Amount’ Those concerns are subsumed by the greater public interest and as such, BCOAPO supports the Ruskin Project.” (BCOAPO Final Submission, p. 10) In support “CEC accepts the BC Hydro Expected Amount cost estimate for the Ruskin Project of \$718.10 million...” (CEC Final Submission, p. 7)

BCSEA, CEBC, Kwantlen, MRCC, and Mr. Quigley made no specific submissions in relation to the Expected Amount.

5.2.5 Commission Determination

The Panel notes the references to the Independent Review Panel report, in the Final Submission of AMPC to BC Hydro’s “zero risk culture”, “gold plating”, and “over-engineering” with respect to its capital projects. AMPC submits that “BC Hydro has in fact adopted a ‘gold plated’ approach to the Project, missing opportunities to limit Project scope and reduce costs and ratepayer impacts.” (AMPC Final Submission, p. 3) Further, AMPC submits that it “has focussed its attention on several discrete areas of the Project. AMPC seeks a determination by the Commission that these amounts are excessive, and a corresponding reduction of the Project’s Authorized Amount.” (AMPC Final Submission, p. 4)

The Panel considers that were these allegations valid, they may well be applicable to both cost estimates and the design/scoping of such projects. However, in this Application, there has been no evidence adduced which can be said to give any supporting weight to the allegations.

Consequently, the Panel has no basis on which to consider any adjustments to the Application associated with such the allegations. Furthermore, while AMPC seeks a reduction in the Project’s Authorized Amount, the Panel notes that the revised Application in the Evidentiary Update seeks only the Expected Amount and not the Authorized Amount.

In respect to AMPC’s reference to zero risk culture, gold plating, and over engineering, **the Commission Panel has reviewed BC Hydro’s evidence, including responses to Information**

Requests, and concludes that there is no evidentiary basis upon which to make a finding other than to accept BC Hydro's evidence with respect to the direct cost estimates for the Project.

Subject to the directive provided in Section 5.2.3, the Commission Panel approves the Expected Amount of \$640.6 million for the Project, plus Capital Overhead at the rates determined from time to time by the Commission in its decisions on BC Hydro's Revenue Requirement Applications.

5.3 Schedule

BC Hydro has developed a Project schedule to achieve a completion date of March 2018. The schedule is the result of the Project elements and construction period constraints itemized in Section 2.5.1 of the Application. Details of the schedule are provided in Appendix D of Exhibit B-1.

No intervenor made submissions on the proposed Project schedule.

Commission Determination

The Commission Panel accepts the Project Schedule set out in the Application.

5.4 Risk Management

BC Hydro describes its risk management of the Project in Exhibit B-1, Section 5. It describes risks of the Definition Phase of the Project to include:

- Delays caused by the Commission not issuing a CPCN in a timely manner, thereby contributing to project implementation delays, impacts on project costs, and extension of operational risks. The status quo is not considered an option; BC Hydro must address the current condition of the Ruskin Facility irrespective of the long-term alternative implemented.
- Risks associated with First Nations whose rights or interests are potentially impacted by the Project. The Kwantlen have raised concerns in relation to the Project and these are

more fully addressed in Section 7.0. No other First Nation has raised any issues or objections to the Project.

The Implementation Phase risks discussed are set out in Exhibit B-1, Section 5.3 and include:

1. Cost
2. Schedule
3. Construction
4. Resource
5. Worker Safety
6. Public Safety
7. Outage and Failure
8. Environmental

These are discussed below.

5.4.1 Cost Risk Management

BC Hydro states that “In the absence of treatment including mitigation measures, the Project cost risk is high; With treatment, the Project cost risk is medium;” (Exhibit B-1, p. 5-3) BC Hydro indicates that the risk of incorrect cost estimates has been reduced by:

- Clearly defining the scope of the Project and conducting a detailed cost analysis using range estimating techniques (Monte Carlo simulation) that take into account the differing levels of uncertainty.
- Including a Management Reserve in the Project cost to fund potential items which are not currently in scope but which BC Hydro may determine are necessary and appropriate to be included in the Project. In its Evidentiary Update (Exhibit B-15), BC Hydro was no longer seeking approval for this Management Reserve as it is not included in the Expected Amount.
- Retaining a third party consultant to provide a due diligence review of BC Hydro’s cost estimate, contracts strategy, and schedule.

- Developing a detailed Project schedule to enable best estimate for accumulation of direct and indirect costs, and loadings such as IDC.
- Developing a procurement strategy for the Project which incorporates advanced level of design, the assignment of experienced staff to the Project, early contractor involvement in the most specialized portion of the Project, preparing detailed specifications, and bi-weekly contractor progress reports.

In its Final Submission BCOAPO also notes that the Expected Amount does not include the Management Reserve allowance and, therefore, “does not adequately address the risks associated with cost escalation.” (BCOAPO Final Submission, p. 6) As indicated above, the Panel notes that expenditures in excess of the Expected Amount could be subject to a prudency review.

The Commission Panel notes that BC Hydro’s amended request for approval of the Expected Amount instead of the Authorized Amount no longer recognizes the \$40 million Management Reserve originally sought. As such foreign exchange risks and potential price fluctuations are of concern to the Panel. However, the Panel takes note of the semi-annual reports suggested by BC Hydro, and BC Hydro’s claim that “expenditures in excess of the Expected Amount could be subject to a prudency review” in the future. (Exhibit B-15, p. 3)

5.4.2 Schedule Risk Management

BC Hydro has identified three risks potentially impacting the Project schedule. These include:

- Excavation work and material challenges;
- Adverse weather; and
- Inflow conditions.

A series of management techniques and scheduling strategies have been identified to mitigate these risks.

5.4.3 Construction Risk Management

BC Hydro has identified that the three Project components with the greatest risk potential include:

- The Upper Dam piers and gates;
- The Right Abutment cut-off wall; and
- The Turbine and Generator Technical Design.

A Construction Management Plan (CMP) will be prepared with various management activities and construction strategies designed to mitigate the risks identified.

5.4.4 Resource Risk Management

BC Hydro has identified risks associated with:

- Availability of scarce technical expertise; and
- Coordination of contractor activities.

BC Hydro has rated these activities as low and medium risk respectively. It believes adequate resources are available locally. Furthermore, most of the responsibility to secure the scarce resources will fall on contractors and their ability to fulfill this responsibility will be considered in contractor selection. BC Hydro is structuring work packages to minimize the interdependencies between major work packages and possible interference between contractors performing the main contracts.

5.4.5 Worker Safety Risk Management

BC Hydro is well familiar with the hazards of working in its own generating facilities. A full-time staff member will be assigned as the Person in Charge during construction with responsibilities including supervising electrical and mechanical hazard isolation for the contractor's work, and

supervision of the contractor's safety staff. Several control and mitigation measures have also been identified for worker safety, including a Site Specific Safety Management Plan (SSSMP), emergency response plans, and ongoing compliance audits with WorkSafeBC regulations and the SSSMP.

5.4.6 Public Safety Risk Management

BC Hydro will develop a Public Safety Management Plan for the Project. It will address risks related to:

- Road closures and road access restrictions;
- Dam and waterway access restrictions; and
- Flood and seismic risk management.

Appropriate procedures and protocols in regards to these will be introduced to minimize and mitigate risks to public safety.

5.4.7 Outage and Failure Risk Management

BC Hydro recognizes that there are risks associated with extending the use of the Powerhouse equipment during the implementation phase. BC Hydro will minimize the risks of forced outages during construction by replacing units in the sequence from the least reliable to the most reliable. BC Hydro does not believe there are any means to reduce residual risks. Forced outage risks reduce significantly after each new unit is placed in service and after residual commissioning and start up deficiencies are corrected.

Also, there are risks that during construction contractors could accidentally damage one or more units resulting in an unplanned outage. To mitigate this, contractors will be required to submit a CMP and Risk Management Plan prior to starting construction.

5.4.8 Environmental Risk Management

BC Hydro has identified the areas of greatest potential environmental risk during construction.

These include:

- Loss of continuity of flow;
- Spill volumes to maintain flow continuity exceeding Total Dissolved Gas guidelines;
- Potential reservoir draw-downs impacting the ability to maintain tailwater elevations by spilling in the event of a forced outage;
- Relocation of the Switchyard to a previously disturbed area increasing the Ruskin Facility footprint; and
- Concrete, soil and excavation work in proximity to water.

During construction, BC Hydro will have an on-site environmental risk monitor to ensure appropriate risk management of such environmental matters.

Commission Determination

BC Hydro provides a summary of material risks for the Project, control and mitigation strategies employed, and the level of residual risk remaining after implementation of the control and mitigation strategy in Exhibit B-1, Table 5-1, pp. 5-19 to 5-22.

The Panel accepts the adequacy of BC Hydro's risk identification and approaches to their management and mitigation. BC Hydro's assessment of these risks is reasonable and they should be manageable through appropriate monitoring and mitigation.

5.5 Project Reporting

As BC Hydro proceeds with the Project the Commission Panel expects to be kept informed of its progress in relation to issues encountered, cost performance, schedule, and risk management.

Commission Determination

We direct BC Hydro to file with the Commission semi-annual progress reports on the Project schedule, costs with a comparison to the Expected Amount as set out in the Application, and any variances or difficulties that the Project may be encountering. The form and content of the semi-annual progress reports will be consistent with other BC Hydro capital project progress reports filed with the Commission. The semi-annual progress reports will be filed within 45 days of the end of each reporting period.

We also direct BC Hydro file a final report within six months of the end or substantial completion of the Project. The final report is to include a breakdown of the final costs of the Project, a comparison of these costs to the Expected Amount set out in the Application and provide an explanation of all material cost variances.

6.0 PUBLIC ENGAGEMENT

BC Hydro has identified a variety of public groups affected by the Ruskin Facility including local businesses and local area residents in the Ruskin Townsite, mobile home parks, and general vicinity. They include users of Hayward Street, the single lane roadway crossing over the dam, and users of several recreational sites and facilities in the general area of the Ruskin Facility. BC Hydro states that the Ruskin Facility is an integral part of the community and because of past public engagement that it has carried out in the area, “BC Hydro has built an understanding of the community surrounding the Ruskin Facility, their issues and interests, and preferred methods of communication.” (Exhibit B-1, p. 4-18).

Since 2005, BC Hydro has identified and engaged the following groups with respect to the Project: Mission Mayor and Council, local residents and property owners, recreational users, local businesses and the Mission Chamber of Commerce, local community and environmental groups, Members of the Legislative Assembly for Mission-Maple Ridge and Mission-Abbotsford Electoral Districts, emergency responders, School District #75, Stave Monitoring Advisory Committee, Department of Fisheries and Oceans, Transport Canada, Canadian Wildlife Service, Ministry of Environment (MOE), and Environmental Assessment Office (EAO).

Approaches and methods of communication have occurred with individuals, communities, and local governments and have included workshops, open houses, site visits, local newspaper advertisements and articles, newsletters, project signage, the BC Hydro website, emails, and personal communications with project staff. Project newsletters were issued regularly via postal drop to about 4,000 area residents.

There have been site visits and meetings with various government agencies, including the MOE and EAO.

The Mission Mayor and Council and Mission Chamber of Commerce have expressed direct support for the Project, as have the Fraser Valley Regional District, and the MLA for Maple Ridge-Mission.

The Mission Royal Canadian Mounted Police, the Mission Fire and Rescue Service, and the Mission Early Childhood Development Committee have also supported the widening of the dam crossing to two lanes.

Particular issues raised through consultation activities largely relate to impacts during construction and deal with Dam crossing closure during construction, recreation facility closure during construction, safety, environmental matters, construction related noise, and duration of construction. BC Hydro has proposed a number of mitigation measures to deal with these issues. It has also committed to continue to meet with the various groups to understand where improvements can be made during construction of the Project. Engagement activities proposed as the Project progresses include meetings, presentations, workshops, targeted newsletters, media releases, and the installation of notification signage. BC Hydro has identified specific publics, dates and timing, and descriptions of communications proposed for:

- Project updates, briefings, and reports to local governments
- Briefing and updates to the Provincial Government
- Public updates, information sessions, notifications, and workshops
- Media releases and advertising, website and phone

BC Hydro has committed to continuing public engagement as the Project progresses.

No interveners have commented on or taken exception to the manner in which BC Hydro has undertaken its public consultation activities regarding the Project. The Kwantlen First Nation has serious concerns with BC Hydro's consultations with the Kwantlen. These concerns are more fully addressed in Section 7.0, First Nations Consultation.

Commission Determination

The Commission Panel finds that overall public consultation efforts have been adequate to date.

The Commission's Public Consultation Guidelines have been followed in that: stakeholders who

may be directly impacted by the Project have been identified; information and consultation programs have been undertaken with them; their issues and concerns have been identified; measures to address these have been indicated or explanations provided as to why no further action is required; outstanding issues and concerns have been identified; and BC Hydro has committed to address these as the Project proceeds.

7.0 FIRST NATIONS CONSULTATION

Section 7 explores the nature and adequacy of consultation with First Nations potentially impacted by the Project, focusing primarily on the Kwantlen First Nation which was the only First Nation to actively intervene in this proceeding.

7.1 The Duty to Consult

7.1.1 The Crown's Duty

BC Hydro, as a Crown Corporation, has a constitutional duty to consult First Nations for the activities it undertakes that may impact First Nations' rights or title when it has knowledge of the potential existence of a First Nations' right or title. The consultation duty is grounded in the honour of the Crown. The duty is triggered when the Crown has knowledge, real or constructive, of the rights asserted under section 35(1) of the *Constitution Act, 1982* which states, in part, "[t]he existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed."

The Supreme Court of Canada has examined the origin of the duty to consult and accommodate. The Court in *Haida Nation v. British Columbia (Minister of Forests)*, [2004] 3 S.C.R. 511, 2004 SCC 73 (*Haida Nation*) states at paragraph 25:

Put simply, Canada's Aboriginal peoples were here when Europeans came, and were never conquered. Many bands reconciled their claims with the sovereignty of the Crown through negotiated treaties. Others, notably in British Columbia, have yet to do so. The potential rights embedded in these claims are protected by s. 35 of the *Constitution Act, 1982*. The honour of the Crown requires that these rights be determined, recognized and respected. This, in turn, requires the Crown, acting honourably, to participate in processes of negotiation. While this process continues, the honour of the Crown may require it to consult and, where indicated, accommodate Aboriginal interests.

In *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43 (*Rio Tinto Alcan*) the Court states:

The duty to consult described in *Haida Nation* derives from the need to protect Aboriginal interests while land and resource claims are ongoing or when the proposed action may impinge on an Aboriginal right.

...The duty seeks to provide protection to Aboriginal and treaty rights while furthering the goals of reconciliation between Aboriginal peoples and the Crown. Rather than pitting Aboriginal peoples against the Crown in the litigation process, the duty recognizes that both must work together to reconcile their interests... (paras. 33-34)

The level of consultation and accommodation required in a given case is proportionate to a preliminary assessment of a First Nation's strength of claim to rights or title and to the seriousness of the potentially adverse effect on that claimed right and title (*Haida Nation*, para. 39). This is commonly referred to as the *Haida* spectrum. In cases where the claim to title is weak, the First Nation right is limited or the infringement will be minor, the level of consultation required will be at the low end of the spectrum. Conversely, where a strong claim is established, the rights and infringement are of high importance to the First Nation and the risk of damage is high then the scope of the duty is at the high end of the spectrum.

7.1.2 The Commission's Role

The Commission's role in assessing the Crown's duty to consult was confirmed by the Supreme Court of Canada in *Rio Tinto Alcan* where it held that the Commission has the power to consider whether adequate consultation with First Nations has taken place. (*Rio Tinto Alcan*, para. 74)

Further, in *Kwikwetlem First Nation v. British Columbia (Utilities Commission)*, 2009 BCCA 68 (*Kwikwetlem*), the British Columbia Court of Appeal affirmed the Commission's obligation at paragraph 13 in relation to BC Hydro's Interior to Lower Mainland (ILM) Transmission Project:

The Commission's constitutional duty was to consider whether the Crown's constitutional duty of consultation had been fulfilled with respect to the subject matter of the application. Thus, before it certified the ILM Project as necessary and convenient in the public interest, it was required to determine when the Crown's duty to consult with regard to that project arose, the scope of that duty, and whether it was fulfilled.

In *Kwikwetlem*, the Court also held that the Commission’s duty is to determine whether the Crown’s duty to consult and accommodate First Nations has been adequate up to the point of the Commission’s decision.⁷

The following Sections of this Decision address the Commission’s duty.

7.2 BC Hydro’s Consultation with First Nations other than Kwantlen

This Section considers the scope of consultation with all First Nations and Tribal Councils excluding Kwantlen First Nation as Kwantlen was the only group to actively intervene in the Proceeding and present evidence and Argument. Consultation with Kwantlen is addressed in Section 7.3 of this Decision.

7.2.1 Identification of Potentially Impacted First Nations

BC Hydro reviewed publicly available information on First Nations asserted traditional territories and used knowledge it had developed from working in the Project area to identify five First Nations and Tribal Councils that are potentially impacted by the Project: Kwantlen; Stó:lō Nation (SN); the Stó:lō Nation Tribal Council (STC); Matsqui First Nation (Matsqui); and the Hul’qumi’num Treaty Group (HTG). (Exhibit B-1, p. 4-2)

The STC represents 8 First Nations, including Kwantlen. The SN represents 11 First Nations, including Matsqui. The HTG is made up of 6 Vancouver Island-based First Nations and the Project is located within the group’s asserted “Marine Traditional Territory.” (Exhibit B-1, p. 4-3)

7.2.2 BC Hydro’s Strength of Claim Assessments

BC Hydro relied on various sources of information to assess strength of claim, including publicly available information such as information from the BC Treaty Commission website, BC Hydro’s own

⁷ *Kwikwetlem*, paras 15 and 70.

knowledge, and information from the BC EAO. For Matsqui, BC Hydro also relied on an ethnography entitled “An Examination of Matsqui Traditional Territory, A Literature Review” written by Kennedy and dated 2011 (2011 Matsqui Report). (Exhibit B-7, BCUC 1.14.1, Attachment 2) The 2011 Matsqui Report was commissioned by BC Hydro in March 2011 to summarize known and available evidence and concludes that Matsqui’s traditional territory was on the south bank of the Fraser River. It further claims that Matsqui were forced from the Fraser by Kwantlen sometime before 1900 but the time frame of Matsqui’s resulting migration is not known. (Exhibit B-7, BCUC 1.14.1, Attachment 2, p. 21 of 29)

Based on the evidence it reviewed, BC Hydro’s preliminary assessment is that Matsqui has a weak claim to the Project area and that the scope of the duty to consult Matsqui is at the lower end of the *Haida* spectrum. (Exhibit B-7, BCUC 1.14.1)

BC Hydro did not assess a strength of claim for SN and STC given their directions to BC Hydro to consult with Kwantlen on the Project, which are discussed in the next section.

BC Hydro’s view is that there is no duty to consult the HTG member First Nations because the Project area is outside the core territory of the HTG members. (Exhibit B-7, BCUC 1.14.1)

7.2.3 Consultation with SN, STC and HTG

BC Hydro notified the SN of the Project by email dated March 28, 2007, and offered to make a presentation to the Tribal Council. The SN responded by letter dated May 18, 2007, and provided a further letter at BC Hydro’s request, dated December 22, 2009, whereby they informed BC Hydro that the Project is within the core territory of Kwantlen and referred consultation to the Kwantlen. (Exhibit B-1, Appendix H-2, pp. 1-6) At the time of BC Hydro’s first letter Matsqui were members of the SN. (Exhibit B-7, BCUC 1.27.1)

BC Hydro notified the STC of the Project by email dated May 17, 2007. STC responded to BC Hydro by letter dated June 22, 2007, stating that it respects Kwantlen's authority to deal with its own territory. (Exhibit B-1, Appendix H-3, pp. 1-6)

BC Hydro informed the HTG of the Project in November 2008, after it applied to the EAO and the EAO identified the HTG as potentially being affected by the Project. BC Hydro also provided the HTG with the Summary of Information document in December 2009 (which is discussed further in Section 7.3 below) requesting the HTG to contact BC Hydro if further information about the Project was required or if the HTG had any concerns.

In response, HTG sent BC Hydro a letter on February 1, 2010, informing BC Hydro that the HTG Referrals Office was permanently closed and that the HTG member First Nations must be contacted individually. The letter provided contact information for the six member First Nations. (Exhibit B-1, Appendix H-5, pp. 6-7)

BC Hydro decided not to provide further information to HTG members because the Project is located outside the core territory asserted by the HTG as shown in the map provided to the BC Treaty Commission. (Exhibit B-1, Appendix H-5, p. 1; Exhibit B-1, p. 4-14).

7.2.4 Consultation with Matsqui

In November 2008, BC Hydro informed Matsqui of the Project after the EAO identified Matsqui as potentially being affected. BC Hydro subsequently provided Matsqui with the Summary of Information (discussed in Section 7.3) and informed them of BC Hydro's plan to file the Application with the Commission. BC Hydro received no response from Matsqui until February 2011. (Exhibit B-1, p. 4-12)

In February 2011, BC Hydro sent a copy of the CPCN Application to Matsqui. On February 28, 2011, BC Hydro held a public workshop on the CPCN Application which legal counsel for Matsqui attended. BC Hydro states it first learned Matsqui were interested in the Project from the

workshop because BC Hydro had received no indication from Matsqui that they were interested before that date. (Exhibit B-7, BCUC 1.27.3)

In March 2011, Matsqui requested capacity funding to review the CPCN Application. BC Hydro provided the Matsqui with capacity funding in March and April 2011. (Exhibit B-7, BCUC 1.14.3.1)

In late March and early April of 2011, BC Hydro sent Matsqui a copy of two ethnographies, including the 2011 Matsqui Report and a copy of BCUC IR 1.14.1 (found at Exhibit B-7) which provides BC Hydro's detailed assessment of Matsqui's strength of claim assessment as weak and the scope of duty to consult as at the lower end of the *Haida* spectrum.

In response, on April 18, 2011, Matsqui emailed BC Hydro stating they had reviewed the 2011 Matsqui Report and BC Hydro's response to BCUC IR 1.14.1 and disagreed with BC Hydro's assessment that they have a weak claim to the Project area. Matsqui raises concerns that BC Hydro used the wrong map to assess their strength of claim, that the Project infringes Matsqui title, and that they should have been involved in BC Hydro's determination of which project alternative to pursue. In the email, Matsqui made requests for:

- i. information on which BC Hydro made the decision not to pursue decommissioning;
- ii. an explanation of capital costs for the Project and how any aboriginal consultation and accommodation costs were arrived at; and
- iii. information on whether revenue sharing was considered.

(Exhibit B-7, Attachment 1 to BCUC 1.27.1)

BC Hydro confirms it previously received the map Matsqui refers to on February 20, 2009 in relation to the ILM Project. (Exhibit B-10, BCUC 2.38.1)

The Matsqui did not intervene in this Proceeding and did not raise concerns with the Commission about the adequacy of consultation.

Commission Determination

The Commission Panel finds BC Hydro's consultation with respect to the Stó:lō Nation, the Stó:lō Nation Tribal Council, Matsqui First Nation, and the Hul'qumi'num Treaty Group to date to be adequate for the Project. Both the SN and the STC clearly directed BC Hydro to consult with the Kwantlen.

The Commission has reviewed the Statement of Intent Map provided by the HTG to the BC Treaty Commission (Exhibit B-1, Appendix H-5, p. 1) and agrees with BC Hydro that the Project is not within the core traditional territory claimed by the HTG. BC Hydro therefore does not have a duty to consult the HTG members.

Although Matsqui raised concerns to BC Hydro about the adequacy of consultation, they did not raise these same concerns with the Commission even though they were given proper notice of the Proceeding. Matsqui were aware of the Proceeding as they attended one of the activities on the Regulatory Timetable.

In *Mikisew Cree First Nation v. Canada* (Minister of Canadian Heritage) 2005 SCC 69 (*Mikisew Cree*), para. 65 the Supreme Court of Canada states:

It is true, as the Minister argues, that there is some reciprocal onus on the Mikisew to carry their end of the consultation, to make their concerns known, to respond to the government's attempt to meet their concerns and suggestions, and to try to reach some mutually satisfactory solution.

Given that Matsqui had an opportunity to make their case known with the Commission but chose not to do so, the Commission interprets this lack of comment to the Commission to mean that Matsqui considers consultation to be adequate to this point.

7.3 BC Hydro's Consultation with Kwantlen

BC Hydro submitted an extensive consultation log outlining its meetings, correspondence and communications with Kwantlen. Between December 2006 and April 2011, BC Hydro and Kwantlen met 36 times and had 6 site visits. The consultation record is too large to recount; accordingly, this Section describes those events that have significance to the overall Decision.

On November 1, 2006, BC Hydro sent a form notification letter to the Kwantlen about the Project and followed up with an email and phone call to set up a meeting. The letter states, in part, "after examining a number of options for upgrading the dam, we are now completing engineering design for this work. Over the next several years, we will design and implement an upgrade to the dam." (Exhibit B-1, Appendix H-1, p. 3)

Kwantlen and BC Hydro met for the first time on the Project on December 20, 2006. Between December 2006 and December 2009 BC Hydro and Kwantlen met 12 times and had 2 site visits (Exhibit B-1, pp. 4-5 to 4-8)

Tumia Knott, the Kwantlen councillor who is the primary Band member engaged in consultation with BC Hydro on the Project, states that by the spring of 2007, Kwantlen understood the Project to consist of upgrades to the Dam to bring it up to seismic standards and replacement or upgrade of the generators. (Exhibit C3-6, Evidence of Tumia Knott, p. 5)

Ms. Knott recalls asking BC Hydro whether decommissioning would be considered at the October 22, 2007 meeting and she understood that BC Hydro would do a cost comparison of decommissioning to justify the expense associated with the Project. Ms. Knott submits there was no further information provided to indicate decommissioning was viable. (Exhibit C3-6, Evidence of Tumia Knott, p. 5)

At a meeting on October 22, 2007, Kwantlen presented BC Hydro with a Memorandum of Understanding (MOU) to establish a framework to deal with the broader relationship between

Kwantlen and BC Hydro and their mutual interests in the Stave River system rather than dealing with project-based matters. Over the next eleven months the proposed MOU was a topic of discussion at meetings between the parties. It is Kwantlen's evidence that BC Hydro responded to the MOU on September 25, 2008, and advised Kwantlen it did not have the mandate to address historical grievances but would be prepared to work with Kwantlen on other items in the MOU. (Exhibit C3-6, Evidence of Tumia Knott, p. 6)

In the fall of 2008 BC Hydro informed Kwantlen that Right Abutment Stage 1 work needed to occur on the area of a particular archaeological site, DhRo59. Kwantlen states that its archaeologist tried to identify construction alternatives to save the site but BC Hydro advised there were no other options. Kwantlen states it reluctantly agreed to archaeological work to identify and preserve artefacts at DhRo59. The archaeological work took place in the summer of 2009 and uncovered hearths, storage boxes, and house floors indicating the site was most likely used for habitation. (Exhibit C3-6, Evidence of Duncan McLaren, p. 2)

Kwantlen states that part way through the excavation BC Hydro advised Kwantlen that it had examined the soil at the site and found it to be unsuitable for the shoring work required and that BC Hydro would proceed with an alternative design that did not require destruction of DhRo59. Ms. Knott states:

We were frankly shocked that, after insisting that there was simply no option but destroying the site to build the concrete shoring, BC Hydro then announced that it did not in fact need to go ahead with the work on the site and had come up with another alternative. I would describe this event as a set-back in our relationship with BC Hydro. It undermined our faith in the reliability of the information BC Hydro was giving us, as well as our confidence in the thoroughness of their assessment of ways in which to avoid impacts to Kwantlen. It also affected the pace and timing of our consultations concerning the Ruskin Upgrade Project, as we were occupied in the summer of 2009 with the excavation and then, subsequent to BC Hydro revising its plans, with discussions about how to remedy what now appeared to be the needless destruction of an important archaeological site. (Exhibit C3-6, Evidence of Tumia Knott, pp. 7-9)

BC Hydro states that it and Kwantlen agreed on accommodation measures for this situation in the form of an artefact repository for archaeological materials recovered in the Right Abutment Stage 1 work. (Exhibit B-7, BCUC 1.23.1)

On May 30, 2008 BC Hydro sent Kwantlen draft Terms of Reference for four Environmental and Archaeological studies. BC Hydro states that Kwantlen only provided written comments on the draft Terms of Reference for the archaeology studies. (Exhibit B-7, BCUC 1.13.1)

Between May and August 2008, Kwantlen provided a field assistant for vegetation and wildlife studies, led archaeological assessments, and provided on-site archaeological and environmental monitoring for BC Hydro work. (Exhibit B-1, pp. 4-5, 4-6)

In October 2008, BC Hydro informed Kwantlen that it was going to voluntarily opt-in to the EAO process and requested Kwantlen to provide comments on the draft project description within two weeks. (Exhibit B-1, Appendix H-1, p. 92) BC Hydro eventually submitted an application to the EAO on January 15, 2009, but the EAO refused to grant the application. (Exhibit B-7-2, Kwantlen 1.1.1)

On February 20, 2009 Kwantlen participated in a site visit to the Ruskin Facility by the BC Minister of Environment and the Environmental Assessment Office. Kwantlen states that at this visit BC Hydro described the Project as a seismic upgrade and generator replacement. (Exhibit C3-6, Evidence of Tumia Knott, p. 8)

In March 2010, BC Hydro, Kwantlen and Kwantlen's archaeologist completed a jointly-developed plan for the management of archaeological work in the Stave and Hayward Lake Reservoirs from 2010 to 2030. (Exhibit B-7-2, Kwantlen 1.6.1)

At a meeting on December 15, 2009, BC Hydro provided Kwantlen with a document entitled "Ruskin Dam and Powerhouse Upgrade Project: Summary of Information." Appendix B of that document contains a five page section entitled "Project Design Alternatives Considered" which describes three alternatives that were considered to upgrade the Dam including an option to fix the

existing facility, an option to lower Hayward Lake Reservoir, and an option to decommission the dam. The document explains why the four options other than the Preferred Alternative were dismissed by BC Hydro. For decommissioning of the Dam, BC Hydro states in the Summary of Information that the option was not considered viable because of engineering, social, and environmental costs, as well as an uncertain time frame for completion. (Exhibit B-1, Appendix H-1, p. 128)

Kwantlen states it received the document but that BC Hydro made no indication that it was seriously considering other options.

“Everything we had been told to that date indicated that the decision to proceed with the Ruskin Upgrade Project had been made. I do not recall BC Hydro saying anything to indicate that this was not the case and in fact there was a real opportunity for Kwantlen to influence the selection of options and, importantly, to participate in a discussion about whether the dam should be removed or decommissioned.” (Exhibit C3-6, Evidence of Tumia Knott, p. 10)

Kwantlen states this is supported by the fact that the Summary of Information refers to the assessment of alternatives in the past tense. (Exhibit C3-6, Evidence of Tumia Knott, p. 10)

At that meeting Kwantlen also tabled a proposal to have BC Hydro fund an archaeological repository. BC Hydro agreed to the proposal. (Exhibit C3-6, Evidence of Tumia Knott, p. 9)

On July 22, 2010, BC Hydro made a PowerPoint presentation to update the Kwantlen on the Project. The presentation includes one slide which lists the three options BC Hydro presented in the Summary of Information, although the presentation uses slightly different names than the Summary. The presentation also includes a slide on the minimal cost studies that BC Hydro would complete on the alternatives as “[d]ue-diligence in evaluating all alternatives to the Ruskin Dam and Powerhouse Upgrade Project and ensuring preferred option is reflective of public interest objectives.” The presentation includes six slides on the Preferred Alternative. (Exhibit B-1, Appendix H-1, pp. 139-163)

Kwantlen acknowledges that it received the presentation but that Ms. Knott's understanding was that the slide with the information on alternatives was provided to explain the process by which BC Hydro had determined that it would proceed with the Project. (Exhibit C3-6, Evidence of Tumia Knott, p. 11)

On September 28, 2010, BC Hydro met with Kwantlen and their newly hired environmental consultant, Pottinger Gaherty. BC Hydro presented a PowerPoint on the results of the environmental studies. (Exhibit B-1, Appendix H-1, pp. 164-224)

On October 13, 2010, Pottinger Gaherty provided Kwantlen with its preliminary review on the Project. This preliminary review made 31 requests of BC Hydro including requests for more information, requests for BC Hydro to explain various issues, and requests for documents. (Exhibit B-1, Appendix H-1, pp. 225-228)

Between October 2010 and February 2011, BC Hydro provided responses to Pottinger Gaherty's requests. (Exhibit B-1, Appendix H-1, pp. 229-345)

7.3.1 Capacity Funding

Throughout the consultation timeline the issue of capacity funding was under consideration. BC Hydro offered capacity funding at the initial meeting with Kwantlen in December 2006. Kwantlen raised the issue at a February 14, 2007 meeting and an initial capacity funding payment was made in July 2007. BC Hydro states that it made additional capacity funding offers in October 2008 and September 2009 and offered to pay for Kwantlen's work on an invoice basis. BC Hydro provided interim funding on January 5, 2010 for Kwantlen to complete a Traditional Use Study. An overall Capacity Funding Agreement was concluded in June 2010 (Exhibit B-7, BCUC 1.14.3.1)

Kwantlen's evidence is that when BC Hydro initially started discussing a broader capacity funding agreement Kwantlen did not know the scope of the review, and whether it would include the BC EAO process or not. Kwantlen wanted to defer serious discussion about capacity funding until

there was more clarity around the Project review process. Kwantlen states that by 2010 they knew the Project would not go through the EAO process and accordingly finalized a funding agreement on June 28, 2010. (Exhibit C3-6, Evidence of Tumia Knott, pp. 7, 9)

In its Rebuttal Evidence, BC Hydro states that it informed Kwantlen about the EAO decision no later than June 2, 2009 and that the delay in executing a Capacity Funding Agreement was caused by the need to address the Right Abutment Work issues and Kwantlen's desire to address broader relationship issues. (Exhibit B-16, p. 3)

7.3.2 The Project Alternatives

BC Hydro states that although the five options considered are technically or theoretically plausible that does not mean they are acceptable to other government or regulatory agencies. Specifically BC Hydro cites the District of Mission, which draws on Hayward Reservoir for drinking water. All the alternatives would trigger *Canadian Environmental Assessment Act*⁸ assessments with the Department of Fisheries and Oceans as the likely lead agency. Three of the alternatives would also trigger reviews under the *Utilities Commission Act*.

BC Hydro submits that it presented the Project alternatives to Kwantlen, in writing, five times:

- December 15, 2009 – Summary of Information
- July 22, 2010 – PowerPoint Presentation
- December 2, 2010 – Black & Veatch 2010 Minimum Cost Analysis Study and Hemmera's 2010 Minimum Cost Analysis Study
- February 24, 2011 - CPCN Application
- February 28, 2011 – BC Hydro Workshop PowerPoint Presentation

(Exhibit B-7, BCUC 1.14.6)

⁸ SC 1992,c.37.

7.3.3 BC Hydro's Decision Making Timeline

On March 27, 2006, BC Hydro Senior Executives approved expenditures of \$80,000 to continue with Identification Phase work including the development of technically feasible, cost-effective options for the Dam refurbishment. Following that, on April 24, 2006, BC Hydro's Board of Directors approved BC Hydro management to spend \$3 million for initial engineering work for the Project. (Exhibit B-7-2, Kwantlen 1.3.2)

BC Hydro defines its Identification Phase as the phase when a project is conceptualized and the feasibility is determined. (Exhibit B-7-2, Kwantlen 1.5.9.1)

BC Hydro's view is that the duty to consult was likely triggered after August 2006 (Exhibit B-10, BCUC 2.48.1)

In the fall of 2008 BC Hydro voluntarily opted-in to the BC EAO process. (Exhibit B-1, p. 4-6)

BC Hydro states that the decision on the Preferred Alternative was made on February 17, 2011 when the Board authorized funding for the filing of the CPCN Application with the Commission. (Exhibit B-7-2, Kwantlen 1.2.1) At the time of this decision the Board had a summary document on the Project (Exhibit B-7, BCUC 1.97.1, Attachment 1) which states:

[Aboriginal Relations and Negotiation] has reviewed its records of consultation and has concluded that the consultation has been adequate up to this point in time and that it is honourable for the Board of Directors to give approval to proceed to the implementation phase of the project and to submit an application to the BCUC for a CPCN.

Kwantlen's view is that the evidence supports that BC Hydro had determined that the Ruskin Upgrade Project was the Preferred Alternative sometime before November 17, 2008, when it decided to opt-in to the EAO process. (Exhibit C3-9, BCUC 4.1)

7.3.4 Assessment of the Strength of Claim

BC Hydro relied on the various sources of information discussed in Section 7.2.2 above, to assess strength of claim. For Kwantlen, BC Hydro also relied on an ethnography by Bouchard and Kennedy entitled “An Evaluation of First Nations’ Aboriginal Rights and Title Interests in the Vicinity of the Ruskin Dam” written in 2008 (2008 Kennedy and Bouchard Report). (Exhibit B-7, BCUC 1.14.1)

BC Hydro had a Traditional Use Study on the Project area from 1996 but did not consult it at the time of its preliminary strength of claim assessment. BC Hydro states that Kennedy and Bouchard reviewed extensive traditional use information in the preparation of their report. (Exhibit B-10, BCUC 2.42.1, 2.42.2)

The 2008 Kennedy and Bouchard Report is a 54 page ethnography of the Ruskin Dam area that recounts and assesses various ethno-historic sources including journals of European settlers to the area, histories and archives, and anthropological papers and texts. On review of the evidence the authors conclude:

[T]he Kwantlen First Nation has Aboriginal interests in the Stave River and Stave Lake areas. The evidence supports the conclusion that Kwantlen people established and maintained a village site and more temporarily-occupied settlements in the Stave River area after all or most of the original Aboriginal occupants, the “Skayuks,” died, as a result of the first smallpox epidemics of the 1770s. While other tribes camped in this area along the Fraser River for short periods of time, or at least did so after Fort Langley was established by the Hudson’s Bay Company in 1827, their occupation was short term. (Exhibit B-7, BCUC 1.14.1, Attachment 1, p. 1)

The 2008 Kennedy and Bouchard Report also present evidence that by 1850 the Stave River was known as the Kwantlen River (Exhibit B-7, BCUC 1.14.1, Attachment 1, p. 39)

After review of the available information BC Hydro determined that Kwantlen has a “reasonable” rights and title claim in the Project area. BC Hydro defines “reasonable” as a claim that is not weak but for which there is insufficient evidence to conclude that the claim is strong. (Exhibit B-7, BCUC 1.14.1) BC Hydro made this assessment based on the following information:

- Kwantlen have reserves near the Project; and
- STC advised BC Hydro that Kwantlen have the strongest claim in the area;

and based on BC Hydro's view that:

- Kwantlen have not been in the Stave River area since "time immemorial" but moved into the area after another Aboriginal group, the Skayuks, died because of a smallpox epidemic;
- After the Skayuks left, the Kwantlen became the dominant First Nation in the area;
- It is unclear whether Kwantlen had "exclusive pre-sovereignty occupation" on or before 1846;
- Kwantlen probably have a reasonable claim to fishing and traditional activities in the Project area but it is difficult to determine the precise scope and nature of the rights because there is limited traditional use information on the area;
- Archaeological artefacts found in the area cannot be directly linked to Kwantlen; and
- BC Hydro cannot conclude that a Kwantlen village was definitively located at the Stave River.

(Exhibit B-7, BCUC 1.14.1; Exhibit B-10, BCUC 2.40.1)

BC Hydro did not share its preliminary strength of claim or the 2008 Kennedy and Bouchard Report with the Kwantlen until March 2011 during this CPCN Proceeding. (Exhibit B-10, BCUC 2.39.1)

Kwantlen disagrees with BC Hydro and submit it has a strong claim to Aboriginal rights and title in the Project area. (Exhibit C3-9, BCUC 6.3; Kwantlen Final Submission, para. 22)

Kwantlen has six reserves, two of which are located south of Hayward Lake, while the main community is located north of Fort Langley. Kwantlen submits the location of these reserves and Kwantlen's oral history reflects Kwantlen's use and occupation of the Project area. (Exhibit C3-6, Evidence of Tumia Knott, pp. 1-2)

Kwantlen's evidence is that the Stave River watershed is the "heart of our traditional territory" which supported an abundant salmon fishery, especially at Stave Falls, until the Stave Falls and

Ruskin Dams were built. Kwantlen submits that the area above the falls was used extensively for harvesting and processing fish, hunting, trapping, gathering, trading, and spiritual practices. Kwantlen recounts oral history provided by a Kwantlen member in 1997-1999 who grew up before the dams were built that identifies a village site near the current Ruskin Dam. Kwantlen submits it continues to use the Project area for fishing, spiritual practices, and gathering. (Exhibit C3-6, Evidence of Tumia Knott, pp. 2-3)

Kwantlen asserts title and the following Aboriginal rights in the Project area:

- The right to practice a food, social, and ceremonial fishery;
- The right to harvest and use forest resources;
- The right to carry out cultural and spiritual traditions;
- The right to preserve, manage, and steward Kwantlen cultural resources including archaeological resources; and
- The right to hunt for food, social, and ceremonial purposes.

(Exhibit C3-9, BCUC 1.1)

Kwantlen states that other First Nations, likely other Stó:lō groups, used the Project area but were “guests...permitted to use sites in the region based on kinship ties or friendly relations with Kwantlen members.” (Exhibit C3-8, BC Hydro 4.1, 4.2)

Kwantlen’s evidence is that the Skayuks were decimated by smallpox and that their territory was taken over by the Kwantlen prior to European contact. (Exhibit C3-8, BC Hydro 5.1)

Kwantlen presents evidence of European exploration (the Work expedition) that identified Kwantlen settlements at the mouth of the Stave River in 1824. (Exhibit C3-8, BC Hydro 5.3)

Kwantlen submitted in evidence its own ethnography, the “Report on Kwantlen Occupation and Land Use in Sxeyə’qs and the Surrounding Region” edited by Duncan McLaren, dated June 20, 2011 (McLaren Report). (Exhibit C3-6, Tab B to the Evidence of Duncan McLaren). The report

summarizes historic/ethnographic/ethnohistoric research including interviews and archival research, archaeological data and the history of reserve creation, and determines that the Project area was subject to long-term, repeated use by the Kwantlen for hunting, gathering, and fishing, settlement activities, forestry and tool-making, and ceremonial activities. (Exhibit C3-6, Tab B to Evidence of Duncan McLaren, p. i)

BC Hydro does not agree with the findings of the McLaren Report. Specifically BC Hydro is concerned with the report's opinions and conclusions on "the intensity, time frame and frequency of use of the identified sites; the potential overlapping areas of use and occupation by other groups, and Kwantlen's relationship with those groups; and the factual circumstances around the creation of the Kwantlen reserves." (Exhibit B-18, Kwantlen 3.2.5)

Commission Determination

The Commission has reviewed the ethnographic evidence on the record, including the 2008 Kennedy and Bouchard Report, the McLaren Report, and the evidence of Ms. Knott, and concludes that Kwantlen has a high strength of claim to rights and title in the Project area.

The 2008 Kennedy and Bouchard Report is a comprehensive survey of ethnographic evidence from the time of European settlement, commissioned by BC Hydro. The conclusion of that report is that the Kwantlen established and maintained a village site and other settlements in the Stave River area sometime after the 1770s and the report presents evidence that by 1850 the Stave River was known as the Kwantlen River. The McLaren report presents the Work expedition that encountered Kwantlen settlements at the mouth of the Stave River in 1824. The evidence in the two reports and from Ms. Knott is voluminous and, when reviewed as a whole, demonstrates that Kwantlen was the dominant group in the Project area before 1850. The Commission accepts the evidence of Kwantlen that if other Aboriginal groups used the area, they used it under the laws of Kwantlen.

7.3.5 Project Impacts

BC Hydro's assessment is that the Project will have minimal adverse impacts on First Nations because most of the impacts will be temporary, will take place within the existing facility footprint, and BC Hydro will mitigate the impacts. BC Hydro submits that the Project will cause only temporary impacts to fish during construction, and does not increase the risk of Total Dissolved Gas (TDG) incidents which could damage fish. BC Hydro submits that TDG will be monitored and the potential for impacts to fish and fish habitat will be reduced by the Project as the condition of the equipment is upgraded. (Exhibit B-1, p. 2-44) The permanent impacts from the Project are the relocation of Hayward Street by one road width, relocation of the switchyard causing a new 50 x 100 m footprint, and realignment of the transmission lines to the new switchyard location. (Exhibit B-1, p. 4-4; Exhibit B-7, BCUC 1.14.1)

BC Hydro gathered its knowledge of Kwantlen's asserted rights at meetings held in 2009 and 2010. It shared the Project impacts with Kwantlen by way of the draft environmental study Terms of Reference provided in May 2008, and the provision of the completed environmental and archaeological studies between September and November 2010 and February 2011. BC Hydro rates the Project incremental impacts to all asserted rights and interests as low after the mitigation measures it proposes. (Exhibit B-7, BCUC 1.15.1.1)

Kwantlen submits that the Project impacts are high, long-term and irreversible (Kwantlen Final Submission, para. 39). Kwantlen submits that the impacts of the Project include:

- The assumption of BC Hydro to use and occupy lands thereby depriving Kwantlen of the right and ability to exercise Kwantlen title rights;
- Fisheries impacts related to the drawdown and construction;
- Ongoing fisheries impacts from the refurbishment of the Dam, including TGP impacts;
- Impacts to archaeological sites;
- Impacts to wildlife from the draw downs and construction;
- Impacts to botanical and forest resources, soils, water, and air from the Project;

- The perpetuation, for an indefinite period of time, of the dam which is a barrier to fish passage and has destroyed Kwantlen's traditional fishery and village site.

(Exhibit C3-9, BCUC 1.2)

Kwantlen's archaeologist, Mr. McLaren, sees potential impacts to archaeological sites arising from the direct construction associated with the Project, and from the Hayward Reservoir drawdown which will expose the sites to rain, wind, waves and looting. Mr. McLaren provides recommendations for a plan to manage and mitigate the impacts of the draw down. (Exhibit C3-6, Evidence of Duncan McLaren, pp. 3-4)

BC Hydro states it is open to developing and funding an overall Project-related archaeological plan. (Exhibit B-7-2, Kwantlen 1.6.1)

Pottinger Gaherty identifies five impacts of highest concern:

- Harmful levels of TDG;
- Water quality effects (e.g., sedimentation) during construction;
- Flow continuity during sensitive periods in the Lower Stave River;
- Fish habitat loss in Hayward Reservoir during the Project drawdown; and
- Rate of reservoir drawdown.

(Exhibit C3-6, Evidence of Susan Wilkins, Tab D, p. 4)

Kwantlen submits that only the water quality effects concern is restricted to the construction phase while the other four concerns will occur during both the construction and the ongoing operation of the Dam. (Exhibit C3-10-1, BCOAPO 5.1) BC Hydro disagrees and submits that based on input from its environmental consultant and from the Department of Fisheries and Oceans, all five concerns are confined to the Project construction phase. (Exhibit B-16-2, p. 1)

BC Hydro submits that the Project is expected to reduce TDG incidents, while the Kwantlen submits that the scale of impacts to the Kwantlen exceed the construction-related impacts of the Project. (BC Hydro Final Submission, p. 60; Kwantlen Final Submission, para. 36)

In its Final Submission Kwantlen submits that the impacts of the Project include the lost opportunity to have the fishery restored. Kwantlen submits:

BC Hydro's assessment of impacts is thus restricted to impacts arising from the construction of the Project. It fails to take into account the impacts to Kwantlen of BC Hydro's higher level, strategic decision to select the Project as the preferred alternative. In omitting consideration of the impacts of this strategic aspect of BC Hydro's actions, BC Hydro erred in law, and took an unreasonably narrow approach to assessing the potential impacts of its actions to Kwantlen. (Kwantlen Final Submission, para. 30)

Kwantlen further submits that the options considered by BC Hydro have significantly different potential impacts. Kwantlen submits “[i]n particular, the complete removal of the Dam would restore the lower Stave River to a flow and condition that is as close to its natural state as can be achieved, given BC Hydro's other facilities on the system.” (Kwantlen Final Submission, para. 33)

BC Hydro states that the Stave River flows could only be restored to historic norms if both the Ruskin and Stave Falls facilities were decommissioned. (Exhibit B-18, Kwantlen 3.2.2)

Commission Determination

The Commission Panel finds the impacts from the Project on Kwantlen rights and title to be low.

The Commission Panel finds that the only green field impacts are the new location of the Switchyard and the movement of Hayward Street. Archaeological impacts can be mitigated through the Archaeology Plan for the Stave and Hayward Reservoirs developed jointly by BC Hydro and Kwantlen or the overall Project-related archaeological plan that BC Hydro is open to funding. The other impacts from the Project are either temporary or have already been mitigated. Regarding fishery impacts, the Commission Panel accepts BC Hydro's submission that the Project

will reduce TDG events and could therefore be beneficial to the fishery. The concerns raised by Pottinger Gaherty will occur during the construction phase and will be temporary.

Kwantlen submits that BC Hydro's assessment of impacts fails to take into account the impacts to Kwantlen of BC Hydro's strategic decision to select the Project as the Preferred Alternative. Kwantlen appears to assert that BC Hydro was choosing between the Project and decommissioning the Dam which would return the river to its natural state and that the impact of the Preferred Alternative decision therefore creates the impact of the proposed Project versus the river in its natural state.

These assertions are flawed. The Preferred Alternative decision was between the Project and four other options considered. As well, decommissioning the Dam alone would not return the river to its natural state so the comparison of the impact from the Project versus the river in its natural state is not a valid comparison.

Regarding Kwantlen's submission that the impact of the Project includes the lost opportunity to have the fishery restored, the Court at paragraph 45 of *Rio Tinto Alcan* states:

The third element of a duty to consult is the possibility that the Crown conduct may affect the Aboriginal claim or right. The claimant must show a causal relationship between the proposed government conduct or decision and a potential for adverse impacts on pending Aboriginal claims or rights. Past wrongs, including previous breaches of the duty to consult, do not suffice.

The impacts on the natural state of the fishery occurred with the original construction of the Dam. *Rio Tinto Alcan* holds that past grievances are not the subject of consultation and are therefore not considered in the assessment of the current Project impacts.

7.3.6 The Duty to Consult on the Project

Based on its assessment of a "reasonable" claim to rights and title and minimal impacts, BC Hydro concludes that it has a medium duty to consult Kwantlen. (Exhibit B-7, BCUC 1.14.1)

The Kwantlen asserts that it is owed deep consultation, at the upper end of the *Haida* spectrum, given their high strength of claim and the level of impact from the Project. (Kwantlen Final Submission, para. 39)

Commission Determination

Based on the determinations above, that Kwantlen have a high strength of claim to the Project area and the impacts of the Project are low, **the Commission Panel finds BC Hydro has a medium duty to consult with Kwantlen on the Project.**

7.4 BC Hydro and Kwantlen's Positions on the Adequacy of Consultation

BC Hydro's overall position is that its consultation has been adequate and has exceeded the medium range based on the following actions:

Engaging in consultation in November 2006, which was early on in the Project decision-making process; putting forward proposals that are not yet finalized; seeking Kwantlen input and opinion on those proposals; informing Kwantlen of all relevant information upon which those proposals are based; not promoting but listening with an open mind to what Kwantlen had to say; being prepared to alter the original proposal; and providing feedback during the consultation process (which will continue after the BCUC decision-process). (BC Hydro Final Submission, pp. 73-74)

Kwantlen's position is that BC Hydro's consultation has been inadequate for three main reasons:

1. BC Hydro failed to correctly assess the scope of consultation owed to Kwantlen;
2. BC Hydro failed to adequately consult Kwantlen on the selection of preferred option for addressing the seismic and power generation deficiencies at Ruskin; and
3. BC Hydro's CPCN application was made prematurely.

(Kwantlen Final Submission, para. 1)

The remainder of this Section addresses these assertions.

7.4.1 Did BC Hydro fail to correctly assess the scope of consultation owed to Kwantlen?

The Commission Panel has dealt with the assessment of the scope of consultation owed to Kwantlen in the sections above and found that BC Hydro erred in its assessment of the strength of Kwantlen's claim but not in its overall assessment of the scope of the duty to consult.

As part of this complaint Kwantlen also submits that BC Hydro "committed a threshold error by failing to prepare, and be guided by, an assessment of the scope and content of the duty owed Kwantlen at the outset of the consultation process." (Kwantlen Final Submission, para. 13) Kwantlen submits that there is nothing in the record to show that BC Hydro prepared a preliminary strength of claim assessment and BC Hydro did not provide Kwantlen opportunity for input into its assessment. (Kwantlen Final Submission, paras. 13, 17) Kwantlen submits that the recent cases *Adams Lake Indian Band v. British Columbia* 2011 BCSC 266 (*Adams Lake*) and *Halalt First Nation v. British Columbia (Environment)*, 2011 BCSC 945 (*Halalt*) require the Crown share the strength of claim assessment with the affected First Nation.

BC Hydro submits that there is no absolute obligation on the Crown to share strength of claim and impact assessments with First Nations and to find or impose such a duty would be detrimental to the consultation process. (BC Hydro Reply Submission, p. 37)

Kwantlen's evidence is that they did not receive BC Hydro's preliminary strength of claim assessment or the 2008 Kennedy and Bouchard Report until the end of March 2011. "Given the importance of this document in influencing the scope and nature of the consultation process, as well as the importance to our community that such a report reflect our input before it is made public by filing it with the Commission, we would have expected BC Hydro to provide us with a draft copy of this document at a much earlier date." (Exhibit C3-6, Evidence of Tumia Knott, p. 14)

Commission Determination

In *Adams Lake* at paragraph 131 the Court states, in part:

On my review of the authorities, it is well established that where the Crown has notice of a claim asserted by an aboriginal group and the duty to consult has been triggered, the Crown is obliged to make a preliminary assessment of the strength of the claim and the potential impact of the proposed decision on the asserted rights. The Crown's obligations also extend to providing the affected aboriginal group with an opportunity to comment on these preliminary assessments.

In *Halalt* at paragraph 641 the Court states, in part:

Second, as a matter of fairness, Halalt ought to have been given an opportunity to respond to the information in the possession of the EAO upon which it based its assessment of the strength of claim and the scope of its duty to consult with respect to both the rights and title claims of Halalt.

The Commission Panel finds that these cases do not require, by law, that the Crown share their strength of claim assessments.

The Commission has addressed this issue previously in its Decision on the ILM CPCN Court of Appeal Reconsideration and the further reconsideration of that Decision. In those Decisions, the Commission found that case law does not specifically require the Crown to disclose strength of claim assessments and that the Court's comments in *Adams Lake* were without binding force since no strength of claim assessment was prepared in that case. (Decision *In the Matter of British Columbia Transmission Corporation: Reconsideration of the Interior to Lower Mainland Transmission Project*, February 3, 2011, Order G-15-11, p. 101 (*ILM Reconsideration Decision*); Decision *In the Matter of British Columbia Transmission Corporation: Reconsideration of the Interior to Lower Mainland (ILM) Transmission Project Certificate of Public Convenience and Necessity*,

Court of Appeal Reconsideration, Application for Reconsideration of the ILM Decision, May 6, 2011, Order G-77-11, p. 10)⁹

At page 101 of the *ILM Reconsideration Decision*, the Commission states:

The Commission Panel accepts BC Hydro's testimony that sharing initial strength of claim assessments can be unproductive and accepts BC Hydro's submissions that case law does not specifically require the Crown to disclose strength of claim assessments. The Commission Panel finds that the initial strength of claim assessments need not necessarily be disclosed at the outset of consultation and the fact that they were not disclosed prior to the Options Decision did not cause consultation to be inadequate.

Halalt was decided after the *ILM Reconsideration Decision* and the reconsideration of the *ILM Reconsideration Decision*. In *Halalt*, the Court found the opportunity to respond to the strength of claim assessment to be a matter of fairness because in that case the Halalt were not provided with a strength of claim assessment until the conclusion of the environmental review. That is not the case here. BC Hydro shared its preliminary strength of claim analysis and the 2008 Kennedy and Bouchard Report with Kwantlen in March 2011. Kwantlen has had the opportunity in this proceeding to file evidence and make submissions in response. It has done so.

While *Adams Lake* and *Halalt* encourage the Crown to share its strength of claim assessments, they do not require the Crown to do so. In this case, BC Hydro has shared its assessments early on in the Commission proceeding.

7.4.2 Did BC Hydro fail to adequately consult Kwantlen on the selection of preferred alternative?

Kwantlen claims that BC Hydro failed to adequately consult it on the selection of the preferred alternative. Ms. Knott states: "I disagree that BC Hydro has carried out any, or adequate,

⁹ The Stó:lō Nation Tribal Council and the Seabird Island First Nation have appealed the *ILM Reconsideration Decision*. (BCCA File Number CA038855)

consultation with Kwantlen regarding its decision to select the Ruskin Upgrade Project as the preferred alternative.” (Exhibit C3-6, p. 12)

Ms. Knott further states:

At no point did BC Hydro approach Kwantlen and advise that they were making a strategic choice between various project alternatives, and at no point did BC Hydro seek to consult with Kwantlen regarding project alternatives. At each step of the consultation process the initial meetings, the overviews of the Project BC Hydro provided, the application to opt-in to the EA process, the discussion of the Right Abutment Stage I work, the discussion of potential Project-related opportunities - it was our understanding, based on the information provided by BC Hydro, that the Ruskin Upgrade Project was the work that was going ahead. As noted above, the alternatives-related information provided in the Project Summary of December 2009 was phrased in the past tense, referring to options that BC Hydro had already considered and, presumably, rejected. There was never any suggestion that Kwantlen could in fact have influence and a say in the decision about which alternative to select... If BC Hydro wanted our input on the selection of the best alternative, I would have expected them to identify that as an issue at the beginning of our consultations, back in 2006 and 2007. (Exhibit C3-6, Evidence of Tumia Knott, p. 12)

Kwantlen submits that the Project has been presented as a *fait accompli* based on the past tense used in the initial November 2006 notification letter and the Summary of Alternatives. Kwantlen submits that the first disclosure of substantive information concerning the assessment of alternatives was in December 2, 2010 when BC Hydro provided Pottinger Gaherty with BC Hydro’s environmental consultant’s study on the alternatives. (Kwantlen Final Submission, paras. 42, 52).

Kwantlen submits, in part:

“What the Commission should instead ask is ‘did BC Hydro proactively engage with Kwantlen in selecting the preferred alternative in a timely manner that facilitated meaningful Kwantlen participation in the decision on alternatives before key internal BC Hydro decisions were made?’ That is the standard that is required of BC Hydro by the law, and that is the standard that should be applied. If that standard is applied, the answer is clearly ‘no’

Consultation on this Project never reached the level of integrating Kwantlen into BC Hydro's decision-making processes. There was no Kwantlen involvement in selecting the Project as the preferred alternative.” (Kwantlen Final Submission, paras. 57, 65)

BC Hydro submits that the Decision on the Preferred Alternative was not made until February 2011 and that the Summary of Information includes the wording “[s]ome of these design alternatives continue to be assessed” and “[s]ome alternatives continue to be considered.” (Exhibit B-16, p. 17)

In its Rebuttal Evidence, BC Hydro points out that its “voluntary opt-in application to the EAO was not a strategic decision by BC Hydro to narrow the number of alternatives under consideration or to proceed with the Project without further consideration of alternatives to the Project...BC Hydro’s understanding is that generally the role of the EAO is to examine the environmental effects of a proposed project and not to review alternatives to a project. (Exhibit B-16, p. 16)

As well, BC Hydro states that other than Pottinger Gaherty’s request in October 2010 for alternatives analysis, Kwantlen did not raise the issue of alternatives and did not make its preference for any alternative known during consultation. (Exhibit B-16, p. 11)

Commission Determination

The Commission Panel finds that BC Hydro did not consult Kwantlen adequately in making the Decision on the Preferred Alternative.

The case law is clear that the Crown must consult First Nations at an early stage and on strategic level decisions. In *Haida Nation* the Court states at paragraph 76:

I conclude that the Province has a duty to consult and perhaps accommodate on T.F.L. [Tree Farm Licence] decisions. The T.F.L. decision reflects the strategic planning for utilization of the resource. Decisions made during strategic planning may have potentially serious impacts on Aboriginal right and title.

In *Kwikwetlem* the Court states at paragraph 70:

“If consultation is to be meaningful, it must take place when the project is being defined and continue until the project is completed. The pre-application stage of the EAC process in this case appears to have synchronized well with BCTC’s practice of first seeking a CPCN and not making formal application for an EAC until a CPCN is granted. The question the Commission must decide is whether the consultation efforts up to the point of its decision were adequate.” [emphasis added].

Despite BC Hydro’s assertion that it did not make its decision on the Preferred Alternative until February 17, 2011, in the Commission Panel’s view, BC Hydro had its “chips” behind the Project in August 24, 2006, when the Board accepted \$3 million in spending for initial engineering work during the identification phase. BC Hydro obviously devoted considerable resources to the Project well before February 17, 2011, because it filed its CPCN Application with the Commission on February 24, 2011. BC Hydro defines the identification phase as when the project is conceptualized and the feasibility determined. The Commission is of the view that this is the stage where information about impacts to Aboriginal rights is necessary – the Crown needs to know whether or not a proposal affects Aboriginal rights and title. The Crown also needs to know how different proposals it is considering affect Aboriginal rights and title in different ways. Information about rights and title and the potential impacts to them cannot be gathered unilaterally by the Crown – First Nations must be consulted to have input into this information. It is the subject of consultation.

The Crown must then use this information in its screening and elimination process or in its decision on the Preferred Alternative. The Crown must weigh all project costs and benefits (including impacts to Aboriginal rights), and on balance, determine the Preferred Alternative.

Haida Nation states:

“Pending settlement, the Crown is bound by its honour to balance societal and Aboriginal interests in making decisions that may affect Aboriginal claims. The Crown may be required to make decisions in the face of disagreement as to the adequacy of its response to Aboriginal concerns. Balance and compromise will then be necessary. (para. 45)

BC Hydro did not present the various alternatives to Kwantlen until December 2009 and when it did, it presented them in the past tense which indicates the decision was made. The Commission Panel is not persuaded by BC Hydro's submission that two phrases in the Summary of Information indicate that it was still considering alternatives when the majority of the language in the Summary of Information and in the initial Project letter present the Project as a decision already made. It appears that BC Hydro did not gather Kwantlen input on the alternatives before it made its choice of Preferred Alternative.

The Commission Panel does not agree with Kwantlen's assertion that consultation should integrate Kwantlen into BC Hydro's decision-making processes and that it was problematic that there was no Kwantlen involvement in selecting the Project as the Preferred Alternative. The Commission believes that First Nations do not necessarily have the right to be an integral part of the decision making as Kwantlen asserts. However, they do have the right to have their input considered at the earliest stage possible and when strategic decision making takes place. BC Hydro, in this case, remains the decision maker.

The Commission Panel does agree with Kwantlen's view that "[a]n assessment of the potential impacts and/or benefits to Kwantlen of the options should be included in BC Hydro's options selection process, in addition to the cost and power generation considerations that BC Hydro focused on." (Exhibit C3-9, BCUC 3.3)

The Commission Panel also finds Kwantlen did not uphold its reciprocal duty to engage in consultation. See *Mikisew Cree* at para. 69; *Halfway River First Nation v. British Columbia (Ministry of Forests)*, 1999 BCCA at para. 161. Kwantlen was informed that there were alternative options in December 2009 but it did not seriously raise its concerns about the selection of alternatives with BC Hydro until 2011.

7.4.3 Was BC Hydro's CPCN application made prematurely?

In Kwantlen's view, as of August 2011 BC Hydro did not have full knowledge of the potential impacts to Kwantlen. (Exhibit C3-9, BCUC 1.4)

Ms. Knott submits that BC Hydro's consultation on environmental impacts has been inadequate, especially regarding ways to mitigate impacts to fish from TGP, having a comprehensive plan to identify and protect archaeological resources, and on revenue and benefit sharing. (Exhibit C3-6, Evidence of Tumia Knott, pp. 14-16) However, in response to a BC Hydro Information Request Kwantlen confirmed that it received the final version of "Stave and Hayward Reservoir Archaeology Program: A BC Hydro Archaeological Management Plan for the Years 2010 through 2030" on October 13, 2010. (Exhibit C3-8, BC Hydro 3.1)

Kwantlen submits that a CPCN is the only regulatory approval required by BC Hydro before commencing the Project. (Kwantlen Final Submission, para. 11) In this context, Kwantlen states:

"Consultations, including accommodation, concerning the Project's potential impacts to Kwantlen must be completed before the CPCN is issued. The fact that construction will occur after the CPCN is issued is irrelevant to the question of whether consultation must be completed prior to the issuance of the CPCN. The point of consultation is to ensure Aboriginal interests are addressed before decisions authorizing the activity are made, and demonstrably integrated into the course of action that will be authorized by the decision."
(Exhibit C3-9, BCUC 5.1)

For example Kwantlen submits that regarding a TDG Management Plan:

"The problem created by BC Hydro's way of proceeding is that the Project infrastructure will be determined and approved through the CPCN, and under construction, before the consultations on how to manage, reduce and mitigate TOP impacts get underway. As TOP is functionally an attribute of, and significantly determined by, infrastructure design, BC Hydro's proposal would severely limit the design-based mitigation and management measures open for discussion." (Exhibit C3-9, BCUC 7.1)

In its Rebuttal Evidence, BC Hydro states that Kwantlen's view is unreasonable and "would result in giving Kwantlen a de facto veto over the Project, which is contrary to findings of the Supreme Court of Canada and other courts." (Exhibit B-16, p. 11)

BC Hydro submits that the Commission must assess the adequacy of consultation to the close of the evidentiary phase of a proceeding. (BC Hydro Final Submission, p. 8)

Commission Determination

Kwikwetlem holds that the Commission must determine adequacy of consultation to the point of its decision. **Therefore, the Commission Panel must decide the adequacy of consultation to the point of its decision in this proceeding. That determination, however, will necessarily flow from the evidence of the consultation efforts on the evidentiary record before the Panel at the time of its decision.** The Commission Panel does not accept Kwantlen's submission that consultation must be complete before a CPCN is issued because consultation on the Project must continue on the Project until the Project is complete. The Project cannot be complete at a time when the CPCN is issued. The Commission Panel accepts Kwantlen's submission that the point of consultation is to ensure Aboriginal interests are addressed before decisions authorizing the activity are made, and demonstrably integrated into the course of action that will be authorized by the decision, but the Panel believes this can be accomplished to the point of the CPCN decision and does not require consultation to be complete for the Project as a whole.

7.5 Overall Assessment of the Adequacy of BC Hydro's Consultation with Kwantlen

BC Hydro further submits that its consultation has been adequate and that it has addressed all of Kwantlen's concerns including:

- Environmental concerns by sharing all the Terms of References for environmental studies; (Exhibit B-16, p. 9)
- Archaeological concerns by hiring Kwantlen's preferred archaeologist who has led all archaeological assessments and has completed an Archaeological Impact Assessments

for the entire Project area, and by including Archaeological monitoring commitments in Environmental Management Plan. Further, BC Hydro also submits it will consider developing and funding, an archaeological survey plan for the two currently anticipated Project construction related drawdowns of the Hayward Lake Reservoir; and (BC Hydro Final Submission, pp. 67-68; Exhibit B-7-2, Kwantlen 1.6.1)

- Revenue sharing concerns by the Director of BC Hydro Aboriginal Relations and Reconciliation meeting with Kwantlen to discuss BC Hydro's limited ability to revenue share. (BC Hydro Final Submission, p. 71)

Kwantlen's position is that BC Hydro's overall consultation has not been adequate because information sharing was not timely or adequate. Kwantlen submits that most key environmental documents were provided only because Pottinger Gaherty specifically requested them and that Kwantlen was only in position to fully understand and evaluate Project impacts as of February 2011 when the last report requested was provided. (Kwantlen Final Submission, paras. 67-73)

Kwantlen proposes that the appropriate remedy to its conclusion that consultation is inadequate is to deny the CPCN Application because BC Hydro failed to consult on the Project alternatives and this failure cannot be remedied if the Application remains in place. (Kwantlen Final Submission, para. 80)

In the alternative, Kwantlen suggests the CPCN could be suspended pending BC Hydro's completion of remedial consultation on Project alternatives, economic accommodation, fisheries impacts including TGP, and archaeological resources. (Kwantlen Final Submission, para. 81)

As a further alternative, in the event the Commission approves the CPCN, Kwantlen seeks the following conditions:

- “(a) BC Hydro is required to continue negotiation of a Project benefit agreement with Kwantlen;
- (b) BC Hydro is required to fund Kwantlen's participation in the development of a site-specific TGP guideline for the facility, including funding for technical assistance; and

- (c) BC Hydro is required to fund the preparation and implementation of a Project specific archaeological survey and protection plan with Kwantlen, prior to any drawdown of the Hawyard [sic] Reservoir.” (Kwantlen Final Submission, para. 82)

BC Hydro replies that these conditions are unnecessary because it is committed to continuing negotiations with Kwantlen on a Benefits Agreement, willing to consider funding to enable Kwantlen to participate in developing a site-specific TDG guideline, and committed to working with Kwantlen on the development of an overall Project-related archaeological plan. (BC Hydro Reply Submission, p. 85)

BC Hydro further submits that there is no clear statutory authority in the *UCA* that grants the Commission the jurisdiction to direct BC Hydro as to how to consult and that the Commission’s role is to assess, based on the evidence submitted in the proceeding, whether or not consultation has been adequate to the point of the CPCN decision. (BC Hydro Final Submission, p. 17)

BC Hydro further submits that the Commission’s role is *functus officio* with respect to assessing the adequacy of consultation after the CPCN is issued and that once a CPCN is issued the Commission has discharged its duties pursuant to section 46(3) of the *UCA*. It submits that if Kwantlen disagreed on how BC Hydro carried out the consultation it was directed to undertake, the Commission would have no power to act. BC Hydro accepts that the Commission can make “non-binding suggestions” in its Decision but it urges the Commission not to in this case because negotiations could be upset. (BC Hydro Reply Submission, p. 86)

Commission Determination

The Commission Panel has determined that the Kwantlen was owed a medium duty to consult. The Commission Panel also found that BC Hydro did not consult adequately on the selection of the Preferred Alternative but that once Kwantlen knew of the alternative, it did not uphold its reciprocal duty to raise the concern in a timely manner, but rather left it too late in the process. On the evidence, the Commission Panel cannot find that consultation efforts, which began, over five years ago, have been inadequate to this point.

The Commission Panel also finds that BC Hydro was responsive and engaged in consultation. The evidence shows that it responded to concerns and questions raised by Kwantlen, most notably by responding to the 31 requests for information made by Pottinger Gaherty.

The Commission Panel is concerned with BC Hydro's communication to Kwantlen about the required Right Abutment work that was then found to have alternatives. It appears that BC Hydro told Kwantlen there were no other alternatives but to excavate the archaeological site when in fact there were. These actions show disregard for something that was important to Kwantlen. The Commission Panel is not surprised that, as the Kwantlen says, its faith in BC Hydro was undermined and the pace and timing of consultation was slowed. That said, BC Hydro was quick to accommodate Kwantlen for those impacts with the commitment to create an artefact repository which is responsive and good faith consultation.

The Commission must assess consultation and its adequacy to the point of its decision on whether to grant a CPCN for the Project. Based on the findings above, the Commission Panel finds BC Hydro's consultation with Kwantlen adequate to this point in time to meet the medium duty to consult, which Kwantlen is owed. The Commission Panel agrees it can make suggestions to BC Hydro. Accordingly, we encourage BC Hydro to: i) involve Kwantlen in the development of a site-specific TGP guideline for the Ruskin Dam; and ii) develop and implement a Project specific archaeological survey and protection plan with Kwantlen, prior to any drawdown of the reservoir. We also direct BC Hydro to include in its semi-annual progress reports on the Project, detailed reporting on its ongoing consultation with First Nations, similar to the Revelstoke Unit 5 Project Quarterly Reports.

7.6 Adequacy of Consultation With First Nations

For all the reasons above **the Commission Panel finds that BC Hydro has adequately consulted with First Nations on the Project to the point of this Decision.**

8.0 CONCLUSION AND COMMISSION PANEL DETERMINATIONS

After having carefully considered and weighed the evidence and submissions of all parties participating in the proceeding, the Commission Panel concludes that the upgrade to the Ruskin Facility is needed to address safety, reliability, environmental, and financial risks. It is also consistent with the requirements of the amended Electricity Self-Sufficiency regulation and the amended SD 10. For the reasons given in this Decision, we find that the Ruskin Dam and Powerhouse Upgrade Project to be necessary and in the public interest as it is the most cost-effective long term solution. We also find that public consultation has been sufficient, and that First Nations consultation has been adequate to the point of the date of this Decision.

Subject to the directives contained in this Decision and the related Order, **the Commission Panel grants BC Hydro a CPCN for the Ruskin Dam and Powerhouse Upgrade Project as set out in the Application.**

In this Decision the Panel has made a number of specific determinations and directives. These are summarized below:

Overall

The Commission Panel finds that the Ruskin Dam and Powerhouse Upgrade Project is necessary and in the public interest as it is the most cost-effective long term solution. The Project also serves the British Columbia energy objectives including meeting both the BC Hydro self-sufficiency requirements of the CEA, consistent with the February 2012 amendments to the Electricity Self-Sufficiency Regulation, and the BC Hydro self-sufficiency requirements resulting from the February 2012 amendments to Special Direction No. 10 to the Commission. In addition, section 6(1) of the amended SD 10 also requires the Commission to assume that there is need for the Project's firm energy and dependable capacity. We also find that that public consultation has been sufficient, and that First Nations consultation has been adequate to the date of this

Decision. Subject to the directives contained in this Decision and the related Order, the Commission Panel grants BC Hydro a CPCN for the Ruskin Dam and Powerhouse Upgrade Project.

Legislative Authority

The Commission Panel concurs and determines that the tests of the need for the Project, and its cost-effectiveness are the appropriate basis for assessing whether the public interest will be met in granting a CPCN.

For reasons of natural justice and fairness, the Commission Panel will not give any weight whatsoever to the materials that Mr. Quigley and CEBC attempted to introduce for the first time during Final Argument.

The Need for a Project

The Commission Panel rejects CEBC's proposal to place the Application in abeyance or to reject it outright.

The Panel determines that need for the Project has been established for safety, and environmental reasons. This clear need for the Project is fully consistent with the amended Electricity Self-Sufficiency Regulation and the amended SD 10 described in Section 2.2.

Project Alternatives

The Dam Work

AMPC's proposal to reopen the evidentiary record for further submissions on its indemnification and relocation option as a means of mitigating risks associated with the Upper Dam, Right Abutment, and Left Abutment is, therefore, denied.

The Commission Panel finds that there are sufficient risks associated with the current condition of the Upper Dam, the Right Abutment, and the Left Abutment to consider long-term alternative solutions.

Powerhouse Work

The Panel determines that these risks are deemed sufficiently worthy to explore alternative solutions and they need to be addressed in a timely and deliberately planned manner. Refurbishment and deferral of replacement on an as-needed basis is not sufficient to satisfy these risks.

The Commission Panel approves the powerhouse work as described in the Application.

Switchyard Work

The Panel determines that the Switchyard Work should be included in the scope of the project alternatives considered for the Project. Option 3, relocation of the Switchyard location from the roof of the Powerhouse to an area near the Powerhouse on previously disturbed land owned by BC Hydro is the appropriate Option.

Alternative Solutions to the Proposed Project

The Commission Panel finds that BC Hydro has explored sufficient and appropriate options to address the safety, reliability, environmental, and financial risks represented by the Project. It is evident that the Project is the most attractive option from an economic perspective when compared with the alternatives.

The Commission Panel determines that the Project is the preferred alternative to address the need.

The Commission Panel concurs that a deferral alternative is not an appropriate solution to be considered further.

Dam Issues

The Commission Panel determines that the replacement of the six central piers with four new inner piers, and the replacement of the seven existing radial gates with five new larger gates is the appropriate option to address concerns related to the spillway gate and pier configuration for the Project.

The Commission Panel accepts that building a new cut-off structure above the dam and improving drainage and the downstream slope below the dam is the appropriate solution for the Right Abutment remediation component of the Project.

The Commission Panel accepts the benefits of widening the roadway to two lanes and the addition of a pedestrian walkway.

Powerhouse Issues

The Commission Panel accepts the evidence in the KCBL Report and determines that it is appropriate to rehabilitate the current Powerhouse, rather than developing a new one in a different location.

The Commission Panel determines that the benefits of three generating units exceed those of only having two units. We determine that the three generating unit configuration is appropriate for the Project.

The Commission Panel determines that it is appropriate to include the replacement/refurbishment of U3 within the scope of the Project at this time.

Overall Determination on Alternatives

The Commission Panel determines that the proposed Ruskin Dam and Powerhouse Upgrade Project is the most cost-effective alternative to address the underlying safety, reliability, environmental, and financial risks that give rise to the Project. The Commission Panel approves the scope of the Ruskin Dam and Powerhouse Upgrade Project as requested in the Application.

Project Costing

The Commission Panel considers the Monte Carlo analysis methodology to be an appropriate tool for calculating contingencies, and considers BC Hydro's application of the Monte Carlo analysis to be acceptable for estimating the contingency of \$56.0 million on the Expected Amount.

The Commission Panel accepts the estimate of dismantling and removal costs of \$10.40 million as reasonable.

The Commission Panel considers that BC Hydro's rate and methodology for calculating inflation are appropriate for the Project, and determines that the rate and methodology are approved for the purposes of the CPCN Expected Amount cost estimates.

The Commission Panel determines that the Basic Expected Amount for the Project should exclude Capital Overhead, with the provision to add Capital Overhead at the applicable Capital Overhead Rate approved by the Commission from time to time, to arrive at a Total Expected Amount. This approach results in a Basic Expected Amount for the Project of \$640.6 million, being the requested Expected Amount of \$718.10 million less the proposed COH of \$77.50 million. This \$640.6 million will be supplemented in the future as COH rates are approved by the Commission. The Commission Panel directs BC Hydro to reflect this approach in its proposed semi-annual progress reports for the Project.

The Panel considers that BC Hydro's rate and methodology for calculating IDC are appropriate, and determines that the rate and methodology are approved for the purposes of the CPCN Expected Amount cost estimates.

The Commission Panel has reviewed BC Hydro's evidence, including responses to Information Requests, and concludes that there is no evidentiary basis upon which to make a finding other than to accept BC Hydro's evidence with respect to the direct cost estimates for the Project.

Subject to the directive provided in Section 5.2.3, the Commission Panel approves the Expected Amount of \$640.6 million for the Project, plus Capital Overhead at the rates determined from time to time by the Commission in its decisions on BC Hydro's Revenue Requirement Applications.

Project Schedule

The Commission Panel accepts the Project Schedule set out in the Application.

Risk Management

The Panel accepts the adequacy of BC Hydro's risk identification and approaches to their management and mitigation.

Project Reporting

We direct BC Hydro to file with the Commission semi-annual progress reports on the Project schedule, costs with a comparison to the Expected Amount as set out in the Application, and any variances or difficulties that the Project may be encountering.

We also direct BC Hydro file a final report within six months of the end or substantial completion of the Project. The final report is to include a breakdown of the final costs of the Project, a

comparison of these costs to the Expected Amount set out in the Application and provide an explanation of all material cost variances.

Public Engagement

The Commission Panel finds that overall public consultation efforts have been adequate to date.

First Nations Consultation

The Commission Panel finds BC Hydro's consultation with respect to the Stó:lō Nation, the Stó:lō Nation Tribal Council, Matsqui First Nation, and the Hul'qumi'num Treaty Group to date to be adequate for the Project.

The Panel has reviewed the ethnographic evidence on the record, including the 2008 Kennedy and Bouchard Report, the McLaren Report, and the evidence of Ms. Knott, and concludes that Kwantlen has a high strength of claim to rights and title in the Project area.

The Commission Panel finds the impacts from the Project on Kwantlen rights and title to be low.

The Commission Panel finds BC Hydro has a medium duty to consult with Kwantlen on the Project.

The Commission Panel finds that these cases do not require, by law, that the Crown share their strength of claim assessments.

The Commission Panel finds that BC Hydro did not consult Kwantlen adequately in making the Decision on the Preferred Alternative.

The Commission Panel also finds Kwantlen did not uphold its reciprocal duty to engage in consultation.

The Commission Panel must decide the adequacy of consultation to the point of its decision in this proceeding. That determination, however, will necessarily flow from the evidence of the consultation efforts on the evidentiary record before the Panel at the time of its decision.

The Commission must assess consultation and its adequacy to the point of its decision on whether to grant a CPCN for the Project. The Commission Panel finds BC Hydro's consultation with Kwantlen adequate to this point in time to meet the medium duty to consult, which Kwantlen is owed. The Commission Panel agrees it can make suggestions to BC Hydro. Accordingly, we encourage BC Hydro to: i) involve Kwantlen in the development of a site-specific TGP guideline for the Ruskin Dam; and ii) develop and implement a Project specific archaeological survey and protection plan with Kwantlen, prior to any drawdown of the reservoir. We also direct BC Hydro to include in its semi-annual progress reports on the Project, detailed reporting on its ongoing consultation with First Nations, similar to the Revelstoke Unit 5 Project Quarterly Reports.

The Commission Panel finds that BC Hydro has adequately consulted with First Nations on the Project to the point of this Decision.

DATED at the City of Vancouver, the Province of British Columbia, this 30th day of March 2012.

Original signed by:

M. R. Harle
Panel Chair/Commissioner

Original signed by:

A.W.K.A Anderson
Commissioner

Original signed by:

N.E. MacMurchy
Commissioner

**BRITISH COLUMBIA
UTILITIES COMMISSION**

**ORDER
NUMBER C-5-12**

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**IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473**

and

**Application by British Columbia Hydro and Power Authority
for a Certificate of Public Convenience and Necessity
to Construct and Operate the Ruskin Dam and Powerhouse Upgrade Project**

BEFORE: M.R. Harle, Panel Chair/Commissioner
N.E. MacMurchy, Commissioner March 30, 2012
A.W.K. Anderson, Commissioner

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

WHEREAS:

- A. On February 22, 2011, British Columbia Hydro and Power Authority (BC Hydro) filed pursuant to section 46(1) of the *Utilities Commission Act* (the Act), an application for a Certificate of Public Convenience and Necessity (CPCN) to construct and operate the Ruskin Dam and Powerhouse Upgrade Project (the Project) as described in the Application;
- B. The Project is located at the existing Ruskin Dam and Generating Station (Ruskin Facility) located on the Stave River in the District of Mission. The Ruskin Facility was originally constructed in 1930, and has seismic and static deficiencies which require remediation to mitigate public and employee safety, financial and environmental risks. The age and condition of the existing units at the Ruskin Facility represent a significant and increasing risk to reliability;
- C. The Project has an Expected Amount of \$718.10 million that includes costs to date;
- D. The Project has two main components:
 - (i) the Dam upgrade entails measures to address the seismic/safety deficiencies of parts of the Dam, namely: the replacement of the spillway piers and spillway gates, rehabilitation of the spillway surface, replacement of the roadway crossing the top of the Dam, anchoring and reinforcement of sections of the existing Right Abutment and construction of a new seepage cut-off wall at the Right Abutment and construction of a new seepage cut-off wall at the Left Abutment, and reducing the slope and installing a filter blanket and monitoring instrumentation at the Left Abutment, and
 - (ii) the Powerhouse upgrade includes seismic upgrades to the Powerhouse structure, rehabilitation/replacement of the three generating units, electrical and mechanical systems, rehabilitation of water conveyancing components, replacement of step-up transformers, and an upgrade and relocation of the Switchyard currently located on the roof of the existing Powerhouse to an area above the Powerhouse.

The Project has a target Completion Date of March 2018;

**BRITISH COLUMBIA
UTILITIES COMMISSION**

**ORDER
NUMBER C-5-12**

2

- E. By Order G-34-11 dated February 24, 2011, the British Columbia Utilities Commission (Commission) established a Written Public Hearing process for the review of the Application having two rounds of Information Requests according to the Regulatory Timetable as set out in Appendix A to that Order;
- F. BC Hydro held a Workshop on the Application on February 28, 2011, at the Commission Hearing Room, 12th Floor, 1125 Howe Street in Vancouver, BC;
- G. By letter dated March 29, 2011, BC Hydro applied for a revision to the Regulatory Timetable to:
- provide BC Hydro additional time to respond to the large number of Intervener Information Requests (IRs);
 - allow more time for Interveners to review the Application; and
 - schedule an informal Ruskin site visit for Commission staff and Interveners;
- H. BC Hydro circulated a draft copy of the proposed changes to the Regulatory Timetable to all Interveners registered for the Proceeding on Friday, March 25, 2011, and no Intervener raised any concerns;
- I. By Order G-65-11 dated March 31, 2011, the Commission approved BC Hydro's request for a revised Regulatory Timetable as set out in Appendix A to that Order;
- J. By letter dated April 21, 2011, the Commission received a request from counsel for the Kwantlen First Nation (Kwantlen) to amend the Regulatory Timetable to extend the date for filing Intervener Evidence. The letter further stated Kwantlen's counsel had canvassed BC Hydro and Interveners and no concerns were raised;
- K. By Order G-76-11 dated May 4, 2011, the Commission approved the Kwantlen First Nation's request for a revised Regulatory Timetable as set out in Appendix A to that Order;
- L. By letter dated June 23, 2011, BC Hydro requested an amendment to the Regulatory Timetable in order to narrow Project-related issues through further dialogue with the Kwantlen First Nation. BC Hydro heard no objections to the proposed amendment from Interveners;
- M. By Order G-116-11 dated June 30, 2011, the Commission approved BC Hydro's request to amend the Regulatory Timetable as set out in Appendix A to that Order;
- N. By letter dated September 2, 2011, BC Hydro requested an amendment to the Regulatory Timetable:
- to permit a round of IRs from the Commission and Interveners to test BC Hydro's Evidentiary Update, which was submitted in response to the June 2011 Government panel report entitled "Review of BC Hydro";
 - to test BC Hydro's rebuttal evidence addressing aspects of Kwantlen First Nation's evidence submitted on July 29;
 - to extend the time to respond to a Commission information request for further clarification.

In this same letter, BC Hydro revised its request for the CPCN to be issued on the basis of an Expected Amount of \$728.6 million, and not the originally requested Authorized Amount of \$856.9 million.

BC Hydro canvassed and heard no objections to the proposed amendment from Interveners;

**BRITISH COLUMBIA
UTILITIES COMMISSION**

**ORDER
NUMBER C-5-12**

3

- O By Order G-159-11 dated September 14, 2011, the Commission approved BC Hydro's request to amend the Regulatory Timetable as set out in Appendix A to that Order;
- P. By letter dated September 26, 2011, BC Hydro advised that the Procedural Conference placeholder was not required. By letter dated September 27, 2011, the Commission determined that the Procedural Conference was not warranted and the review of the Application would proceed in accordance with the Regulatory Timetable as per Appendix A to Order G-159-11;
- Q. By letter dated January 3, 2012, the Commission received a request from counsel for the Kwantlen First Nation seeking leave to file limited submissions in response to the reply argument filed by BC Hydro (Sur-Reply);
- R. By letter dated January 5, 2012, BC Hydro stated its view that although the Kwantlen failed to justify its Sur-Reply, BC Hydro will not oppose the Kwantlen Sur-Reply application provided that BC Hydro is afforded the opportunity to reply to the Kwantlen Sur-Reply by January 11, 2012;

BC Hydro shared a draft copy of this letter with the Association of Major Power Consumers of B.C. (AMPC), British Columbia Old Age Pensioners' Organization (BCOAPO) and the Commercial Energy Consumers Association of BC (CEC) because all three of these customer interveners took a position on the adequacy of consultation with Kwantlen and recommended these groups be given an opportunity to make submissions with respect to the Kwantlen Sur-Reply. BC Hydro copied its letter to all registered Interveners;

- S. By letter dated January 5, 2012, the Commission granted the Kwantlen leave to file its Sur-Reply and established deadlines for AMPC, BCOAPO and the CEC to submit responses to the Sur-Reply by January 9, 2012, and BC Hydro to provide its reply by January 11, 2012;
- T. Responses were received on the subject of the Sur-Reply by letter from AMPC, CEC and BC Hydro by the due dates;
- U. On February 2, 2012, the BC Government enacted amendments (Amendments) to: (1) the Electricity Self-Sufficiency Regulation issued under the *Clean Energy Act*, and (2) Special Direction No. 10 to the British Columbia Utilities Commission (Amended SD 10) issued under the *Utilities Commission Act*;
- V. By letter dated February 8, 2012, BC Hydro submitted its view of the effect of these Amendments on the Project-related CPCN public interest test, and suggested a process for Interveners to provide their submissions and for BC Hydro to reply to those submissions;
- W. By letter dated February 9, 2012, the Commission wrote to registered Interveners accepting BC Hydro's proposed process for review of the Amendments;
- X. Interveners submitted their views on the effect of the Amendments by February 13, 2012, and BC Hydro replied to those views by February 15, 2012, in accordance with the Commission's due dates.
- Y. The Commission has reviewed and considered the Application, the evidence and the submissions presented on the Application, and has determined, as set out in the Decision issued concurrently with this Order, that the Project is in the public interest and that a CPCN should be issued to BC Hydro for the Project, subject to the conditions and directions set out in this Order.

**BRITISH COLUMBIA
UTILITIES COMMISSION**

**ORDER
NUMBER C-5-12**

4

NOW THEREFORE the Commission orders as follows:

1. A CPCN is granted to BC Hydro for the Project as set out in the Application.
2. BC Hydro is directed to file with the Commission semi-annual progress reports on the Project schedule, costs with a comparison to the Expected Amount set out in the Application and any variances or difficulties that the Project may be encountering. The form and content of the semi-annual progress reports will be consistent with other BC Hydro capital project progress reports filed with the Commission. The semi-annual progress reports will be filed within 45 days of the end of each reporting period.
3. BC Hydro is directed to reflect in its semi-annual progress reports on the Project that the Commission has approved only a Basic Expected Amount of \$640.6 million, which excludes Capital Overhead (COH). This amount is to be supplemented in the future as COH rates are approved by the Commission from time to time in its decisions on BC Hydro's Revenue Requirement Applications, to arrive at a Total Expected Amount.
4. BC Hydro is directed to include in its semi-annual progress reports on the Project, detailed reporting on its ongoing consultation with First Nations, similar to the Revelstoke Unit 5 Project Quarterly Reports.
5. BC Hydro is directed to file a final report within six months of the end or substantial completion of the Project. The final report is to include a complete breakdown of the final costs of the Project, a comparison of these costs to the Expected Amount set out in the Application and provide an explanation of all material cost variances.

DATED at the City of Vancouver, in the Province of British Columbia, this 30th day of March 2012.

BY ORDER

Original signed by:

M.R. Harle
Panel Chair/Commission

**BRITISH COLUMBIA
UTILITIES COMMISSION**

**ORDER
NUMBER C-5-12**

4

NOW THEREFORE the Commission orders as follows:

1. A CPCN is granted to BC Hydro for the Project as set out in the Application.
2. BC Hydro is directed to file with the Commission semi-annual progress reports on the Project schedule, costs with a comparison to the Expected Amount set out in the Application and any variances or difficulties that the Project may be encountering. The form and content of the semi-annual progress reports will be consistent with other BC Hydro capital project progress reports filed with the Commission. The semi-annual progress reports will be filed within 45 days of the end of each reporting period.
3. BC Hydro is directed to reflect in its semi-annual progress reports on the Project that the Commission has approved only a Basic Expected Amount of \$640.6 million, which excludes Capital Overhead (COH). This amount is to be supplemented in the future as COH rates are approved by the Commission from time to time in its decisions on BC Hydro's Revenue Requirement Applications, to arrive at a Total Expected Amount.
4. BC Hydro is directed to include in its semi-annual progress reports on the Project, detailed reporting on its ongoing consultation with First Nations, similar to the Revelstoke Unit 5 Project Quarterly Reports.
5. BC Hydro is directed to file a final report within six months of the end or substantial completion of the Project. The final report is to include a complete breakdown of the final costs of the Project, a comparison of these costs to the Expected Amount set out in the Application and provide an explanation of all material cost variances.

DATED at the City of Vancouver, in the Province of British Columbia, this 30th day of March 2012.

BY ORDER



M.R. Harle
Panel Chair/Commission

BACKGROUND AND REGULATORY PROCESS

The Applicant

BC Hydro is a Crown Corporation established in 1962 under the *Hydro and Power Authority Act*. BC Hydro is mandated to generate, distribute, and sell electricity; upgrade its power sites; and purchase power from, or sell power to, a firm or person. BC Hydro is the largest electric utility in BC, serving over 94 per cent of the provincial population. BC Hydro is charged with the responsibility of, among other things, owning and operating the generation and storage Heritage Assets set out in Schedule 1 to the *Clean Energy Act (CEA)*, including the Ruskin Facility.

BC Hydro is an agent of Her Majesty the Queen in right of the Province of B.C. The B.C. Minister of Finance is the fiscal agent of BC Hydro. BC Hydro has the financial capacity to undertake the Project and other large projects by means of: borrowing guaranteed by the Province; borrowing directly from the Province; and funds generated internally from the operation of its business. Moody's Investors Service and Standard & Poor's Corporation rated BC Hydro bonds as Aaa and AAA respectively. The rating from the Dominion Bond Rating Service is AA High.

BC Hydro has been responsible for the planning, design, and construction of generation and distribution facilities since 1962. BC Hydro was also responsible for these functions with respect to the transmission system until 2003, when responsibility was transferred to British Columbia Transmission Corporation (BCTC). As per Part 7 of the *CEA*, BC Hydro and BCTC were integrated effective July 5, 2010 and BC Hydro resumed responsibility for the planning, design, and construction of the transmission system.

Between 2007 and 2010, BC Hydro placed a total of five generation facility upgrades into service, each of which had a capital cost of over \$50 million. These projects are: Revelstoke Unit 5; Mica Generator Stator Replacement (Units 1-4); Peace Canyon Generator Stator Replacement and Rotor Modification (Units 1-4); Aberfeldie Redevelopment; and Coquitlam Dam Seismic Improvement.

The Project Team is composed of full time BC Hydro employees and consultants who have extensive experience in all aspects of project delivery for major hydroelectric facilities, from design through to completion. Their collective experience includes past BC Hydro projects, including the Ruskin Facility-related Stage 1 Ruskin Dam Safety Right Abutment Upgrade and other such projects, as well as major projects prior to joining BC Hydro. (Exhibit B-1, pp. 1-16 to 1-18)

The Order Sought

BC Hydro requested that a Certificate of Public Convenience and Necessity (CPCN) be granted for the Project as proposed because, among other things: (1) the Project aligns with and advances

several of the “British Columbia’s energy objectives” set out in Section 2 of the *CEA*; and (2) the Project is in the interests of persons in B.C. who receive or who may receive service from BC Hydro. Applying for a CPCN for the Project is consistent with BC Hydro’s Capital Project Filing Guidelines (Guidelines). The rationale for applying for a CPCN for the Project pursuant to subsection 46(1) of the *UCA* was stated as follows:

Ruskin Generating Station has been in operation since 1930. As a result, pursuant to subsections 45(2)(a) and (b) of the *UCA*, BC Hydro has a deemed CPCN to operate the Ruskin GS, and to construct and operate extensions to the Ruskin GS such as the Powerhouse rehabilitation/replacement.

However, due to its condition the Powerhouse must either be rehabilitated/replaced or replaced with another electricity resource. In addition, the Powerhouse Work would result in an increase in the equipment efficiency and energy amount of approximately 28 GWh/year for a total of 334 GWh/year of firm energy and an increase of 9 MW of capacity for a total of 114 MW of dependable capacity. The rehabilitation/replacement of the Powerhouse is an “extension” as that term is used in section 45 of the *UCA* for two reasons – a facility requiring either rehabilitation/replacement or replacement with another electricity resource, and an increase in capacity rating and energy generation.

The Upper Dam Work, Right Abutment Work and Left Abutment Work are driven by seismic/safety issues and will not raise the level of Hayward Lake Reservoir, and therefore are not extensions.

Considering that the extent of work being undertaken at the Powerhouse and continued operation of the Powerhouse is a major factor in determining the options undertaken for the Upper Dam Work, Right Abutment Work and Left Abutment Work, BC Hydro is filing for a CPCN for the entire Project.

On February 22, 2011, BC Hydro requested that a CPCN be granted on the basis of, among other things, the Authorized Amount of \$867.4 million. On September 21, 2011 BC Hydro submitted an amendment to its Application seeking to revise the CPCN amount from the Authorized Amount down to the Expected Amount of \$718.1 million. BC Hydro stated the “expenditures in excess of the Expected Amount up to the Authorized Amount require the prior approval of the Board Capital Projects Committee. Accordingly, given that approval is required for expenditures above the Expected Amount, it is more appropriate that the CPCN be granted on the basis of the Expected Amount.”

BC Hydro also stated that “should a CPCN be granted for the Project as proposed, BC Hydro’s semi-annual reports to the BCUC will track Project costs against the Expected Amount, and expenditures in excess of the Expected Amount could be subject to a prudency review in a future Revenue Requirements Application (RRA) proceeding.”

BC Hydro is seeking a Commission order that provides as follows:

A CPCN is granted to BC Hydro for the Project as described in the Application.

BC Hydro is directed to file with the Commission semi-annual progress reports on the Project schedule, costs with a comparison to the Expected Amount as set out in the Application and any variances or difficulties that the Project may be encountering. The form and content of the semi-annual progress reports will be consistent with other BC Hydro capital project progress reports filed with the Commission. The semi-annual progress reports will be filed within 45 days of the end of each reporting period.

BC Hydro is directed to file a final report within six months of the end or substantial completion of the Project. The final report is to include a breakdown of the final costs of the Project, a comparison of these costs to the Expected Amount set out in the Application and provide an explanation of all material cost variances.

The Regulatory Process

On February 24, 2011, Commission Order G-34-11 established a Written Public Hearing and Regulatory Timetable for the review of the Application consisting two rounds of information requests. By way of Commission Orders G-65-11, G-76-11, G-116-11 and G-159-11, the Regulatory Timetable was amended to accommodate various delays requested by the Applicant and registered Interveners, which resulted in an overall 6 month delay of the proceeding. The actual milestone dates are summarized below:

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|--|----------------------------|
| Filing of Application | Tuesday, February 22, 2011 |
| BC Hydro hosted Application Workshop | Monday, February 28, 2011 |
| Intervener/Interested Party Registration | Thursday, March 10, 2011 |
| BCUC Information Request (IR) No. 1 | Thursday, March 10, 2011 |
| Intervener IR No. 1 | Friday, March 18, 2011 |
| Participation Assistance/Cost Award Budget Submissions | Wednesday, March 23, 2011 |
| BC Hydro responses to BCUC and Intervener IR No. 1 | Wednesday, April 20, 2011 |
| Ruskin Site Tour | Tuesday, April 26, 2011 |

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|--|-------------------------------|
| BCUC and Intervener IR No. 2 | Wednesday, May 18, 2011 |
| BC Hydro responses to BCUC IR No. 2 and Intervener IR No. 2 | Thursday, June 16, 2011 |
| Kwantlen Evidence | Friday, July 29, 2011 |
| IR's in Relation to Kwantlen Evidence | Thursday, August 11, 2011 |
| Commission Panel IR's | Friday, September 2, 2011 |
| Kwantlen Response to Information Requests | Wednesday, September 14, 2011 |
| BC Hydro Rebuttal Evidence, Evidentiary Update and response to Exhibits A-13 and A-14 | Wednesday, September 21, 2011 |
| IR's on BC Hydro Rebuttal Evidence/Evidentiary Update/and Exhibit A-13 and A-14 responses | Friday, October 7, 2011 |
| BC Hydro responses to IR's on BC Hydro Rebuttal Evidence/Evidentiary Update/and Exhibits A-13 and A-14 responses | Friday, November 4, 2011 |
| BC Hydro Final Written Submission | Friday, November 25, 2011 |
| Intervener Final Written Submission | Monday, December 12, 2011 |
| BC Hydro Written Reply Submission | Friday, December 23, 2011 |
| Kwantlen Sur-Reply | Thursday, January 5, 2012 |
| AMPC, BCOAPO, CEBC Reply to Kwantlen Sur-Reply | Monday, January 9, 2012 |
| BC Hydro Reply to Kwantlen Sur-Reply | Wednesday, January 11, 2012 |
| BC Hydro Supplemental Submission | Wednesday, February 8, 2012 |
| Intervener Supplemental Submission | Monday, February 13, 2012 |
| BC Hydro Supplemental Reply | Wednesday, February 15, 2012 |

LIST OF ACRONYMS

| | |
|----------------------------------|--|
| 2008 Kennedy and Bouchard Report | Ethnography by Bouchard and Kennedy entitled “An Evaluation of First Nations’ Aboriginal Rights and Title Interests in the Vicinity of the Ruskin Dam” written in 2008 |
| 2011 Matsqui Report | Ethnography entitled “An Examination of Matsqui Traditional Territory, A Literature Review” written by Kennedy and dated 2011 |
| AMPC | Association of Major Power Customers of British Columbia |
| B&V Report | The Black and Veatch Report “Ruskin Hydroelectric Facility Minimum Cost Analysis Study” |
| BC Hydro | British Columbia Hydro and Power Authority |
| BCOAPO | British Columbia Old Age Pensioners Organization |
| BCSEA | British Columbia Sustainable Energy Association |
| BCUC, Commission | British Columbia Utilities Commission |
| CEA | <i>Clean Energy Act</i> |
| CEBC | Clean Energy Association of British Columbia |
| CEC | Commercial Energy Consumers Association of British Columbia |
| CGAAP | Canadian Generally Accepted Accounting Principles |
| CMP | Construction Management Plan |
| COH | Capital Overhead |
| CPCN | Certificate of Public Convenience and Necessity |
| CWR | Controller of Water Rights |
| EAO | Environmental Assessment Office |
| EHRs | Equipment Health Ratings |
| EMF | electric and magnetic fields |
| GIS | gas insulated switchgear |
| HADD | harmful alteration, disruption or destruction of fish habitat |

LIST OF ACRONYMS

| | |
|----------------|--|
| HTG | Hul'qumi'num Treaty Group |
| IDC | interest during construction |
| IEEE 693 | Electrical and Electronics Engineering Recommended Practice for Seismic Design of Substations standard 693 |
| IFRS | International Financial Reporting Standards |
| ILM | Interior to Lower Mainland Transmission Project |
| IPPs | BC Electricity Market – Independent Power Producers |
| IRs | Information Requests |
| KCBL | Klohn Crippen Berger Ltd. |
| Kwantlen | Kwantlen First Nation |
| Kwikwetlem | Kwikwetlem First Nation |
| LOA | Limits of Approach |
| Matsqui | Matsqui First Nation |
| McLaren Report | “Report on Kwantlen Occupation and Land Use in <i>Sxeyθ’qs</i> and the Surrounding Region” edited by Duncan McLaren, dated June 20, 2011 |
| MDE | Maximum Design Earthquake |
| MOE | Ministry of Environment |
| MOU | Memorandum of Understanding |
| MRCC | Mission Regional Chamber of Commerce |
| MW | megawatts |
| NBCC | National Building Code of Canada |
| NPV | net present value |
| PMF | Probable Maximum Flood |
| Project | Ruskin Dam and Powerhouse Upgrade Project |

LIST OF ACRONYMS

| | |
|---------------------------------|--|
| Regulation | Electricity Self-Sufficiency Regulation |
| Ruskin Facility | Ruskin Generating Station and Ruskin Dam |
| Ruskin Powerhouse or Powerhouse | Ruskin Generating Station |
| RW Beck Report | R.W. Beck, Inc. November 2010 report entitled “Ruskin Power Plant Assessment Report” |
| SD 10 | Special Direction No. 10 |
| SN | Stó:lō Nation |
| SSSMP | Site Specific Safety Management Plan |
| STC | Stó:lō Nation Tribal Council |
| TDG | Total Dissolved Gas |
| U1, U2 | Turbine-Generator Units 1 and 2 |
| U3 | Unit 3 |
| <i>UCA</i> | <i>Utilities Commission Act</i> |
| UEC | Levelized unit cost of energy |