1.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

18 **8.1.1 Flexible and Staged Approach**

19 The LTAP aims to ensure that BC Hydro will continue serving its customers in a cost-
20 effective manner within acceptable risk bounds. The LTAP seeks to commit to additional

3.1.1 Please describe the acceptable bounds of risk.

RESPONSE:

BC Hydro recognizes that it operates in an uncertain environment. Through the actions identified in the Long Term Acquisition Plan (LTAP), BC Hydro seeks to cost-effectively manage the risks associated with those uncertainties. As discussed in Section 3.1 of the 2006 Integrated Electricity Plan (IEP), key uncertainties and their associated risks include:

- **Load growth and the risk that load growth exceeds expectations;**
- **Features of BC Hydro's existing system and its operations, including inflow water variability, and risk of insufficient energy;**
- **Natural gas and electricity market uncertainty and risks that prices increase;**
- **Future regulatory and public policy developments, such as potential future greenhouse gas (GHG) regulation and related mitigation cost risks;**
- **Independent Power Producer (IPP) development including type of resource and location and the risk that the type and location of resources require significant capacity and transmission support;**
- **Demand Side Management (DSM) deliverability and risk that the response to DSM is less than planned or required;**
- **Transmission supply and the risk that this long lead time resource faces construction delays and permitting problems; and**
- **Relative cost and performance of various technologies both now and in the future.**

<u>Risk Analysis, Ranges and Metrics</u>

The 2006 IEP has not defined a specific risk metric that encompasses all relevant risk factors and has not therefore set specific bounds of acceptable risk. Rather,

the 2006 IEP uses different tools (scenario, sensitivity and qualitative analysis) to consider these key risks as they vary according to whether the risk impacts and probabilities can be quantified. These methods are described briefly below:

1. Quantitative Assessment

In terms of risk analysis, the 2006 IEP portfolio analysis is a scenario analysis to measure how portfolios (derived to measure certain extremes posited through planning objectives and key planning questions) and their characteristics perform under key planning uncertainties. The 2006 IEP incorporates sensitivity analysis to test cost risk across a single variable or resource option. For example, five GHG offset cost scenarios, three natural gas price scenarios, five electricity price scenarios and three capital cost scenarios were used to test risks. Scenario and sensitivity analysis are used to:

- **Identify the low-cost portfolios under a range of alternative futures;**
- **Determine the resources, or resource combinations, that consistently yield robust portfolios – those that perform well given a broad range of future conditions;**
- **Evaluate the impact of various resource strategies on portfolio cost (e.g., diversified versus coal, Green Energy-dominated portfolios); and**
- **Test alternative resource strategies and planning criteria.**

2. Qualitative Assessment

Chapter 3 in the 2006 IEP presents the qualitative analysis of risks that cannot be easily quantified. These include: the future development of U.S. gas and electricity markets (including U.S. energy policy); current transmission system constraints and future transmission developments; IPP deliverability risk and the effects of community concerns and environmental and social regulation; and DSM deliverability risk. The conclusions drawn from this qualitative assessment are summarized in Section 3.7 of the 2006 IEP and include:

- **The prospect of continued price volatility and risk of relying on short-term spot markets;**
- **The importance of recognizing the potential for government-imposed GHG emission costs;**
- **The need to take a proactive approach to acquiring new supply which allows time for the resolution of development challenges; and**
- **The uncertainty with respect to deliverability of DSM at identified levels.**

Please refer to the response to BCUC IR 1.25.1 (Exhibit B-6-1) for a description of how these risks were incorporated into the LTAP.

Managing the Risk

The 2006 IEP analysis and the high level prioritization of resource acquisitions identified in Section 7.4 of the 2006 IEP present BC Hydro's high level view as to the appropriate strategy for acquiring new resources, recognizing the range of risks identified in the 2006 IEP.

At a more detailed level, each of the proposed LTAP resource programs and projects contains a risk mitigation plan, which identifies risks associated with such project or program and presents BC Hydro's strategy for managing the project-specific risks. Examples of the risk mitigation plans in the LTAP are provided in Sections 8.4.2.3, 8.4.4.3 and 8.4.7.3 for Energy Efficiency (EE) 3, 4 and 5, the 2007 Call and Revelstoke Unit 5 respectively.

Finally, BC Hydro's plans to manage risks that are related with the combined effects of the LTAP are addressed in the contingency plans that are presented in Section 8.6 of the LTAP.

1.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

18 **8.1.1 Flexible and Staged Approach**

19 The LTAP aims to ensure that BC Hydro will continue serving its customers in a cost-
20 effective manner within acceptable risk bounds. The LTAP seeks to commit to additional

3.1.2 Please provide for each risk dimension any quantitative measures or ranges, which help define the bounds

RESPONSE:

Please refer to the response to CEC IR 3.1.1.

2.0 Reference: Exhibit B1-E, Page 8-6, Lines 18 to 21

18 Figure 8-2 and Figure 8-4 indicate that reliance on Burrard's energy and capacity
19 contribution will be replaced by F2014. This will occur only to the extent that new supply
20 from calls is cost-effective. Table 8-1 provides a summary of the load requirements and
21 planned supply for both the first and second ten-year periods.

3.2.1 Does this mean that Burrard could be available to supply energy and capacity after 2014 (1) if required, and or if cost effective?

RESPONSE:

Yes.

2.0 Reference: Exhibit B1-E, Page 8-6, Lines 18 to 21

18 Figure 8-2 and Figure 8-4 indicate that reliance on Burrard's energy and capacity
19 contribution will be replaced by F2014. This will occur only to the extent that new supply
20 from calls is cost-effective. Table 8-1 provides a summary of the load requirements and
21 planned supply for both the first and second ten-year periods.

3.2.2 Is Burrard therefore part of the contingency plans should certain risks be realized?

RESPONSE:

The LTAP actions and plans move in a direction to remove BC Hydro's reliance on Burrard's energy and capacity contributions over the long term. The contingency plans discussed in Section 8.6 of the LTAP do not include Burrard as a specific contingency. However, as stated in the 2006 IEP, Section 7.2.4.6 (Burrard Conclusions), Burrard cannot be replaced until alternative resources are in place. In this regard, a failure to implement the LTAP plan will result in a need to maintain Burrard, which by default could be considered a contingency plan.

3.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

> 22 As reflected in Section 8.6, BC Hydro has included Contingency Plans in the LTAP
> 23 which would keep Revelstoke Unit 6 or Mica Unit 5 available to be advanced to F2015.
> 24 The rationale for this advance is set out in Sections 8.4.8 and 8.6.

3.3.1 Given that the costs of all of this additional capacity are very economic by comparison to various alternatives could these projects be advanced for the purpose of selling the capacity to the market?

RESPONSE:

BC Hydro has proposed to perform Investigation phase work on both Revelstoke Unit 6 and Mica Unit 5 in F2007. This work would include the identification of any benefits of advancing one or both of these units.

3.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

22 As reflected in Section 8.6, BC Hydro has included Contingency Plans in the LTAP
23 which would keep Revelstoke Unit 6 or Mica Unit 5 available to be advanced to F2015.
24 The rationale for this advance is set out in Sections 8.4.8 and 8.6.

3.3.2 What is the likely forecast value of capacity in the market and would such and advancement of the projects likely be profitable?

RESPONSE:

There may be sufficient benefits from capacity related products such as resource adequacy sales, system and trade benefits, ancillary services etc., as well as plant energy efficiency gains, that could make advancement of one or both units attractive. The analysis to quantify such benefits has not been completed. As identified in Section 8.4.8 of the LTAP, this is one of the reasons behind BC Hydro's determination request with respect to the funding necessary to initiate the Investigation phase work related to both units.

3.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

> 22 As reflected in Section 8.6, BC Hydro has included Contingency Plans in the LTAP
> 23 which would keep Revelstoke Unit 6 or Mica Unit 5 available to be advanced to F2015.
> 24 The rationale for this advance is set out in Sections 8.4.8 and 8.6.

3.3.3 Has BC Hydro looked at advancing these projects and asking Powerex to sell the capacity until it is likely needed?

RESPONSE:

Please refer to the responses to CEC IRs 3.3.1 and 3.3.2.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.1 Please confirm that the DSM anticipated in the planning forecast periods are based on the previous CPR studies and not on an expectation of what may come from the current CPR studies being undertaken or in fact future ones not yet planned but likely to occur in the next 20 years.

RESPONSE:

Confirmed.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.2 Does BC Hydro anticipate that there will be additional DSM identified from current studies and future studies?

RESPONSE:

The 2007 Conservation Potential Review (CPR) and other studies are expected to identify additional potential for electricity conservation. As a result, BC Hydro anticipates that additional DSM resources will be identified.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.3 Please confirm that the 2006 Call quantities of energy are for the EPAs awarded and not for the estimated energy after attrition.

RESPONSE:

No, the F2006 Call quantities of firm energy shown in Table 8-2 are for the estimated energy for the awarded Electricity Purchase Agreements net of attrition and outages. It also includes the Brilliant Expansion 2 Project.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.4 In preparing the Load Resource Balances why does BC Hydro include only identified and scheduled DSM and Resource Smart initiatives, while targeting unknown supply from the call processes? Would it not make more sense to anticipate potential outcomes from other sources as well as from the call process?

RESPONSE:

In preparing load-resource balances in general, BC Hydro employs a similar approach to characterizing future DSM and IPP supply. As there is a wide range of potential DSM initiatives and IPP projects, and specific projects are determined during the LTAP implementation of each program (e.g., through the Definition phase design of EE 3, 4 and 5 and through the Implementation of the 2007 Call), BC Hydro does not have sufficient information to anticipate which specific resources would be developed. In the case of Resource Smart projects, BC Hydro uses project-specific information as the list of projects is bounded (limited to Heritage resources) and any projects that are advanced are within BC Hydro's direct control.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.5 The DSM energy savings have a very long ramp up period. Is it possible to advance the DSM achievement with additional expenditures?

RESPONSE:

In some cases where there are very long ramp up periods, it is possible to advance DSM achievement with additional utility DSM expenditures. Please refer to the responses to BCUC IRs 1.54.1 to 1.54.5 (Exh. B-6-2).

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.6 Do the DSM savings anticipate any changes to rate design such as might flow from the Conservation Research Initiative being pursued by BC Hydro?

RESPONSE:

The DSM savings associated with EE 3, 4 and 5 anticipate a variety of potential DSM measures, which measures will likely include rate design changes. Specific rate design changes, along with other measures, will be considered in Definition phase work on EE 3, 4 and 5.

4.0 Reference: Exhibit B1-E, Page 8-11, Figure 8-2

3.4.7 Might future changes to rate designs provide cost effective new DSM savings and is that why BC Hydro is researching and investigating these options?

RESPONSE:

Rate design changes can be a cost-effective means of achieving DSM savings in certain applications. BC Hydro is investigating rate design options for that reason.

5.0 Reference: Exhibit B1-E, Page 8-16, Table 8-4

3.5.1 No further LD projects appear to be planned beyond 2012. Is this the case in the plan?

RESPONSE:

No further Load Displacement (LD) projects are planned under LD2 after 2012. Table 8-4 shows the expected savings from the EE2 and LD2 programs.

5.0 Reference: Exhibit B1-E, Page 8-16, Table 8-4

3.5.2 Does BC Hydro anticipate seeking more LD projects in the future beyond those shown in the plan?

RESPONSE:

BC Hydro may pursue LD projects if opportunities are identified. The Definition phase work for EE 3, 4 and 5 may identify more LD projects beyond those contained within LD2.

6.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

- In F2007, initiate a new CPR. In contrast to the 2002 CPR, this CPR will consider technologies that may become available further into the future and identify potential electricity savings that could be achieved through operational or behavioural changes. The results will be used to support the development of new DSM initiatives and will contribute to the profiling of additional DSM resources in future IEPs.

3.6.1 Are the additional resources referred to above included in the DSM forecasts used for the load resource balance?

RESPONSE:

No, additional DSM resources that might be identified in the 2007 CPR were not included in the 2006 IEP. As set out at page 8-21 of the Amended LTAP (Exh. B1-E), the results of the 2007 CPR will be used to support development of new DSM initiatives and will contribute to the profiling of additional DSM resources in future IEPs.

6.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

- In F2007, initiate a new CPR. In contrast to the 2002 CPR, this CPR will consider technologies that may become available further into the future and identify potential electricity savings that could be achieved through operational or behavioural changes. The results will be used to support the development of new DSM initiatives and will contribute to the profiling of additional DSM resources in future IEPs.

3.6.2 Please confirm that cost effectiveness of DSM resources included in the plan where measured against significantly lower incremental marginal costs of power purchases than those evident in the 2006 Call.

RESPONSE:

Confirmed.

The F2006 Call results reinforce BC Hydro's selection of DSM as the first priority resource in Section 7.4 of the 2006 IEP.

6.0 Reference: Exhibit B1-E, Page 8-2, Lines 19 to 20

- In F2007, initiate a new CPR. In contrast to the 2002 CPR, this CPR will consider technologies that may become available further into the future and identify potential electricity savings that could be achieved through operational or behavioural changes. The results will be used to support the development of new DSM initiatives and will contribute to the profiling of additional DSM resources in future IEPs.

3.6.3 Would BC Hydro expect that the incremental marginal cost of purchases in the 2006 call set a context for considerably more cost effective DSM resources to be identified?

RESPONSE:

Yes, BC Hydro would expect that the incremental marginal cost of purchases in the F2006 Call would set a context for more cost-effective DSM resources to be identified.

7.0 Reference: Exhibit B1-E, Page 8-24, Lines 19 to 20

19 • Replace Burrard firm energy (6,100 GWh/y) to the extent it is cost-effective to do so.

3.7.1 What criteria are used to determine the point at which it is cost effective to replace Burrard firm energy?

RESPONSE:

Please refer to the response to BCUC IR 4.451.3.

7.0 Reference: Exhibit B1-E, Page 8-24, Lines 19 to 20

19 • Replace Burrard firm energy (6,100 GWh/y) to the extent it is cost-effective to do so.

3.7.2 What criteria are used to determine the point at which it is cost effective to replace Burrard capacity?

RESPONSE:

Please refer to the response to BCUC IR 4.451.3.

8.0 Reference: Exhibit B1-E, Page 8-51, Lines 26 to 28

- DSM programs and Resource Smart projects will be compared to the appropriate prices established through calls and market forecasts to ensure continued relative cost effectiveness.

3.8.1 Has the 2006 Call incremental marginal cost of purchases been compared to the costs of (1) additional DSM, (2) additional Resource Smart (3) other additional potential sources for meeting the load supply balance or is this something yet to occur?

RESPONSE:

The 2006 IEP analysis compared the cost of additional DSM, Resource Smart and the resource options from the 2005 Resource Options Report. The analysis determined that the 5900 GWh/y of DSM, as identified at page 8-50 of the LTAP, is cost-effective. The price discovery from the F2006 Call supports that conclusion.

Going forward, BC Hydro expects it will identify additional DSM or Resource Smart projects that would be considered cost-effective, taking the results of the F2006 Call as additional context.

The 2007 CPR and other studies are expected to identify additional DSM resources that will inform the Definition phase of EE 3, 4 and 5, including changing volumes. These studies are not likely to impact the 2007 Call but could impact the 2009 Call, depending on the magnitude of such additional DSM and the time required for its implementation.

Resource Smart projects are typically refurbishment projects that incrementally provide small amounts of energy when compared to the 2007 and 2009 Call volumes. To the extent that material amounts of new Resource Smart electricity supply is identified, such new amounts may affect future call volumes.

In either case, the results of the above initiatives would be expected to be incorporated into subsequent LTAPs.

8.0 Reference: Exhibit B1-E, Page 8-51, Lines 26 to 28

26 • DSM programs and Resource Smart projects will be compared to the appropriate
27 prices established through calls and market forecasts to ensure continued relative
28 cost effectiveness.

3.8.2 Is it possible that additional DSM and Resource Smart may be more cost effective that the marginal cost of the last increment of acquisition included in the 2006 Call?

RESPONSE:

Please refer to the response to CEC IR 3.8.1.

8.0 Reference: Exhibit B1-E, Page 8-51, Lines 26 to 28

26 • DSM programs and Resource Smart projects will be compared to the appropriate
27 prices established through calls and market forecasts to ensure continued relative
28 cost effectiveness.

3.8.3 For the future calls planned for 2007 and 2009 has BC Hydro yet anticipated what additional cost effective resources might be available from DSM and Resource Smart and to what degree they might change those calls?

RESPONSE:

Please refer to the response to CEC IR 3.8.1.

8.0 Reference: Exhibit B1-E, Page 8-51, Lines 26 to 28

26 • DSM programs and Resource Smart projects will be compared to the appropriate
27 prices established through calls and market forecasts to ensure continued relative
28 cost effectiveness.

3.8.4 Does BC Hydro believe it is relevant to compare the 2006 Call incremental cost of supply to the anticipated costs of Site C? Has this been done?

RESPONSE:

The levelized unit costs for Site C were provided in response to SCCBC IR 1.22.2 (Exhibit B-10). The Provincial Cabinet will decide whether to proceed to Stage 2 or to cancel or defer further work on the project.

9.0 Reference: Exhibit B1-E, Page 8-60, Lines 20-23

> 20 BC Hydro plans to proceed with its LTAP actions and to participate with the BCTC on
> 21 the 5L83 development. BC Hydro will coordinate usage of the CE with Powerex to
> 22 ensure that the CE are only marketed on a short-term basis such that their usage may
> 23 be reserved for future BC Hydro Contingency Plans.

3.9.1 What is the estimated lost value of restricting the CE to short-term because of this contingency reserve?

RESPONSE:

Please refer to the response to BCUC IR 1.186.1 (Exhibit B-6-4).

9.0 Reference: Exhibit B1-E, Page 8-60, Lines 20-23

> 20 BC Hydro plans to proceed with its LTAP actions and to participate with the BCTC on
> 21 the 5L83 development. BC Hydro will coordinate usage of the CE with Powerex to
> 22 ensure that the CE are only marketed on a short-term basis such that their usage may
> 23 be reserved for future BC Hydro Contingency Plans.

3.9.2 Has BC Hydro evaluated whether or not this is the most cost effective contingency option?

RESPONSE:

The Canadian Entitlement (CE) is a resource that Powerex sells into the markets and maximizes its value. At those times when BC Hydro needs to rely on the CE, it has an opportunity cost of $10/kW-yr. Relying on the CE is an annual or even monthly decision that is made depending on the need and condition of the system. As such, it has no cost when not required. Please refer to the response to BCUC IR 1.186.1 (Exh. B-6-1). In addition, the CE is delivered into BC Hydro's largest load centre making it valuable as both a transmission Contingency and a generation capacity Contingency.

With respect to the referenced Contingency, there are few, if any Contingency resources that could come close to matching the CE's usefulness as a backstop to a delay in 5L83.