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Sent via email/eFile

<b>BC HYDRO SUPPLY CHAIN APPLICATIONS PROJECT</b>
<b>PHASE 2 EXHIBIT A-4</b>

Mr. Fred James  
Chief Regulatory Officer  
Regulatory & Rates Group  
British Columbia Hydro and Power Authority  
16th floor, 333 Dunsmuir Street  
Vancouver, BC V6B 5R3  
bhydroregulatorygroup@bhydro.com

**Re: British Columbia Hydro and Power Authority – Supply Chain Applications Project Phase Two – Project No. 1598975 – British Columbia Utilities Commission Information Request No. 1**

Dear Mr. James:

Further to your October 12, 2018 filing of the above-noted application, please find enclosed British Columbia Utilities Commission Information Request No. 1. In accordance with the regulatory timetable, please file your responses no later than Tuesday, January 15.

Sincerely,

*Original signed by:*

Patrick Wruck  
Commission Secretary

/ad  
Enclosure



British Columbia Hydro and Power Authority  
Supply Chain Applications Project Phase Two Verification Report

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**INFORMATION REQUEST NO. 1 TO BRITISH COLUMBIA HYDRO AND POWER AUTHORITY**

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## A. INTRODUCTION AND REGULATORY REVIEW

- 1.0 **Reference:** **INTRODUCTION AND REGULATORY REVIEW**  
**Exhibit B-1 (Application), Section 1.5.3, pp. 1-13 to 1-14; Section 3.3, p. 3-18**  
**Supply Chain Applications project reporting**

On pages 1-13 to 1-14 of the Application, BC Hydro states:

BC Hydro proposes to file the Project's final completion report three months after receiving Board of Director's approval of the SCA Project's [Supply Chain Applications Project] final completion report. The final completion report will include a breakdown of the final costs of the SCA Project, updated benefit tracking information, and provide a detailed explanation and justification of any material cost, benefit, scope, and schedule variances.

In addition, on page 3-18 of the Application, BC Hydro states:

As part of its project-specific progress reporting, BC Hydro will provide updates on the benefits realization monitoring plan, which will include updates on planned baselines, metrics, and measures for tracking the realization of benefits.

- 1.1 Please provide the expected amount of time (i.e. length of time) between the in-service date of the project and the receipt of the Board of Director's approval.
- 1.1.1 If the expected amount of time is greater than three months, please discuss whether BC Hydro would be amenable to filing the SCA Project's final completion report with the BCUC three months after the in-service date of the project (i.e. absent Board of Director's approval). If not, please explain why not.
- 1.2 Please clarify whether or not BC Hydro intends to report on the realization of the SCA Project benefits beyond the final completion of the project in March 2021 (i.e. benefits tracking results).
- 1.2.1 If no, please explain why not.
- 1.2.2 If yes, please discuss the expected timing, content and proposed review process for this reporting.

## B. PROJECT COST

- 2.0 **Reference:** **PROJECT COST**  
**Exhibit B-1, Section 2.1, pp. 2-1 to 2-2; Section 2.3.1.3, pp. 2-11 to 2-12; BC Hydro**  
**Supply Chain Applications Project Application (Phase One Application), Exhibit B-1,**  
**Section 2.4.3, p. 2-18**  
**Revised project cost range**

On page 2-1 of the Application, BC Hydro states:

Based on the results of the Definition Phase activities, the revised estimated cost range for the SCA Project is \$71.3 million to \$79.3 million (Revised Project Cost Range). The lower end of the Revised Project Cost Range is the Expected Cost estimate (Expected Cost), while the upper end of the Revised Project Cost Range is the Authorized Cost estimate (Authorized Cost)....

On pages 2-11 to 2-12 of the Application, BC Hydro states that the Expected Cost has been assigned an estimating accuracy range of +15 percent / -10 percent similar to that in the Phase One Application. BC Hydro explains, "[w]hile the SCA Project has advanced considerably since the Phase One Application,

an AACEI Class 3 estimating accuracy range is still appropriate given the size and complexity of the SCA Project.”

On page 2-18 of the Phase One Application, BC Hydro stated that “[t]he low end of the Project Cost Range is known as the Lower Bound cost estimate. The Lower Bound cost estimate is calculated by discounting the sum of the future direct costs plus the 20 percent contingency by the lower end of the estimating accuracy range (-10 percent) as described in section 2.4.1.”

- 2.1 Please discuss whether BC Hydro would consider it appropriate to establish a lower bound cost estimate of the SCA Project and of the Implementation Phase capital expenditures which is calculated in a manner consistent with the Lower Bound cost estimate calculation described in the Phase One Application.
  - 2.1.1 If no, please explain why not.
  - 2.1.2 If yes, please provide the calculations for a lower bound cost estimate of the items above which includes a breakdown between capital and operating costs that is similar to Table 2-5 in the Phase One Application.
- 2.2 Please elaborate on why BC Hydro considers that the estimating accuracy range of the Expected Cost should continue to be +15 percent / -10 percent given the current stage of the SCA Project.
  - 2.2.1 Please discuss whether BC Hydro would consider it appropriate to assign a narrower cost estimating accuracy range to the Expected Cost. Why or why not?

3.0 **Reference: PROJECT COST**  
**Exhibit B-1, Section 1.3.4, p. 18; Section 2.2.1, p. 2-4; Table 2-2, p. 2-7**  
**Expected cost to the end of the Definition Phase**

On page 1-8 of the Application, BC Hydro states that on September 27, 2018, BC Hydro’s Board of Directors authorized the SCA Project to proceed with Implementation Phase activities up to the incremental increased value of \$15 million in advance of a BCUC Decision.

On page 2-4 and in Table 2-2 of the Application, BC Hydro states that as of August 31, 2017 the Expected Cost to the end of the Definition Phase for the SCA Project is \$25.4 million and the actual recorded cost (including interest during construction) is \$24.0 million. BC Hydro estimates that the future project cost through to the end of the Definition Phase is \$1.4 million.

- 3.1 Please confirm, or explain otherwise, that the Definition Phase is now complete.
  - 3.1.1 If confirmed, please provide an update to Table 2-2 through to the end of the Definition Phase with the actual recorded costs of the SCA Project. Please include explanations for any variances.
  - 3.1.2 If not confirmed, please provide BC Hydro’s current estimate of the future project costs (capital and operating) for the remaining Definition Phase activities, including the amount out of the \$1.4 million which has been spent since the filing of the Application.

4.0 **Reference: PROJECT COST**  
**Exhibit B-1, Section 2.2.1.1, p. 2-5; Table 2-2, p. 2-7; Phase One Application, Exhibit B-1, pp. 1-7 and 1-9**  
**Definition Phase draws on contingency**

On page 2-5 of the Application, BC Hydro states that at the end of the Definition Phase, the SCA Project drew on contingency of \$1.5 million of the forecasted \$2.3 million in the Phase One Application. Of the \$1.5 million, \$0.8 million was to “cover increases in the System Integrator’s Definition Phase Costs” and

\$0.7 million was to cover “additional BC Hydro internal cost due to the additional time required to complete Design Stage activities and transition to the Implementation Phase.”

On page 1-7 of the Phase One Application, BC Hydro stated “[w]hile BC Hydro has not executed the Master Services Agreement with the System Integrator, it has received firm pricing from its preferred proponent....”

On page 1-9 of the Phase One Application, BC Hydro stated it:

[o]nce BC Hydro receives an Order accepting the capital costs to the end of the Definition Phase, BC Hydro would execute the Master Services Agreement and the initial statements of work with the System Integrator to undertake the preliminary design and the balance of the Definition Phase activities.”

- 4.1 Please explain why the System Integrator’s Definition Phase Costs increased given that BC Hydro received firm pricing from its preferred proponent in the Phase One Application.
- 4.2 Please provide a breakdown of the \$0.8 million used to cover increases in the System Integrator’s costs into operating costs and capital costs.
- 4.3 Please provide a breakdown of the \$0.7 million in additional BC Hydro internal cost into operating costs and capital costs.
- 4.4 Please include a detailed explanation of the work completed by the System Integrator and BC Hydro, and why it was needed.

5.0 **Reference: PROJECT COST Exhibit B-1, Section 2.3.1.1, pp. 2-8 to 2-10; Table 2-3, p. 2-9 Direct future SCA Project cost for the Implementation Phase**

On page 2-8 of the Application, BC Hydro states:

Similar to the approach used when preparing the cost estimate in the Phase One Application, the Implementation Phase forecast costs have been developed using a bottom up approach based on the fixed-price contract between BC Hydro and the System Integrator; the contract between BC Hydro and the Quality Assurance Advisor; and an estimate for the cost of BC Hydro’s resources.

On page 2-9 the Application, BC Hydro states:

The forecast direct cost for the Implementation Phase is \$37.9 million (\$31.5 million capital cost and \$6.4 million operating cost). This is \$6.6 million higher than the forecast direct cost of \$31.3 million (\$27.9 million capital cost and \$3.4 million operating cost) for the Implementation Phase included in the Phase One Application. As detailed in Table 2-3 below, the \$6.6 million variance is due to an increase in the contract between BC Hydro and the System Integrator and in BC Hydro’s internal costs, due to changes in the SCA Project’s schedule and a need for additional resources dedicated to the SCA Project.

The following table is shown on page 2-9 of the Application:

**Table 2-3 Future Direct Cost Variance Breakdown (\$ million)**

Variance Explanation	Cost Variance (\$ million)
Change in System Integrator Contract	3.4
Change in BC Hydro’s Internal Cost	3.2

- 5.1 Please clarify why there is a change in the System Integrator Contract for direct future Implementation Phase costs given that it was a fixed-price contract for the project.
  - 5.1.1 Please provide a detailed breakdown of the \$3.4 million variance including: a description of the change, rationale for the change, and the dollar impact (e.g. operating cost, capital cost) of the change.
- 5.2 Please provide a detailed breakdown and explanation of the \$3.2 million change in BC Hydro’s Internal Costs. Please indicate the changes which are operating costs versus capital costs.

Further on page 2-9 of the Application, BC Hydro states:

The underlying driver for the increase in the Implementation Phase direct costs is an overall increase in the complexity and understanding of the solution, which has led to an increase in the project schedule and estimated resource levels that will be required to complete it... and the changes to the project schedule, respectively.

- 5.3 Please elaborate on what is meant by the “overall increase in the complexity and understanding of the solution” (e.g. details of the specific aspects of the SCA Project which are more complex or which BC Hydro obtained a greater understanding of during the Design Phase).
- 5.4 Since initiating the Implementation Phase, please identify if there has there been or there is anticipated to be any additional changes with respect to the complexity or understanding of the solution that would impact the cost of the project.

6.0 **Reference: PROJECT COST**  
**Exhibit B-1, Section 2.3.1.2, p. 2-11; Table 2-4, p. 2-11**  
**Interest During Construction (IDC)**

On page 2-11 of the Application, BC Hydro states:

IDC on the Implementation Phase cost is currently estimated at \$2.3 million with the interest rates in Table 2-4 (column C) applied to the direct cost accumulated in each fiscal year to Fiscal 2022.

BC Hydro provides Table 2-4 as follows:

**Table 2-4 IDC Rates from Fiscal 2016 to Fiscal 2022**

<b>A</b>	<b>B</b>	<b>C</b>
<b>Fiscal Year</b>	<b>Phase One Interest Rates (%)</b>	<b>Verification Report Interest Rates (%)</b>
2016	4.1	4.05
2017	4.05	4.05
2018	4.12	4.05
2019	4.23	4
2020	4.41	3.86
2021		3.83
2022		3.61

- 6.1 Please provide an explanation for the changes in interest rates in Table 2-4 for fiscal years 2016, 2018, 2019 and 2020 between the Phase One Application and the current Application.
  - 6.1.1 Please quantify the impact that the interest rate changes above had on the estimated \$2.3 million interest accumulated over the life of the SCA Project.

7.0 **Reference: PROJECT COST**  
**Exhibit B-1, Section 2.3.2, p. 2-12; Appendix E, p. 8**  
**Authorized Cost**

On page 2-12 of the Application, BC Hydro states that the Authorized Cost of the SCA Project is \$79.3 million.

On page 8 of the September 2018 Board Briefing Memo and Certified Resolution (Appendix E), Board resolution 4 states “The Capital Projects Committee be and is hereby authorized to approve expenditures in excess of the Expected Cost up to the Authorized Amount.”

7.1 Please explain the role, responsibility and composition of the Capital Projects Committee.

8.0 **Reference: PROJECT COST**  
**Exhibit B-1, Table 2-7, p. 2-15; Appendix F, Tab B1**  
**Table 2-7**

In Table 2-7 on page 2-15 of the Application, BC Hydro states in row AI that total Incremental Interest During Construction on the project reserves is \$1.3 million (column F).

In Table 2-7 in Appendix F, Tab B1 of the Application, BC Hydro states that total Incremental Interest During Construction on the project reserves is \$0.2 million (column F).

8.1 Please clarify whether Table 2-7 provided on page 2-15 of the Application or Table 2-7 provided in Appendix F, Tab B1 of the Application is correct with respect to row AI. Please provide either a corrected Table 2-7 for page 2-15 of the Application or for Appendix F, Tab B1 of the Application, as appropriate.

9.0 **Reference: PROJECT COST**  
**Exhibit B-1, Section 2.3.2.2, pp. 2-13 to 2-14; Table 2-7, p. 2-15; Section 2.4, p. 2-17;**  
**Appendix F, Tab E1 and E2**  
**Other SCA Project costs**

On page 2-17 of the Application, BC Hydro states:

In addition to the costs described above, the SCA Project is anticipated to incur incremental annual operating and capital costs of between \$2.3 million and \$3.4 million to provide ongoing business support and sustainment. This amount includes costs not reflected in the Phase One Application, such as ongoing Supply Chain business unit support and sustainment costs, including headcount reduction costs. The Phase One Application had ongoing IT-only support and sustainment costs of between \$1.8 million to \$2.9 million.

In addition, BC Hydro presented in Appendix F, Tab E1 and Tab E2 the Technology Ongoing Costs and Ongoing Business Costs, respectively related to the SCA Project.

BCUC staff copied the following table from Appendix F, Tab E2:

Input	Value	Override
A	In-service fiscal year:	F20
B	In-service quarter:	Q4
C	Sustainment Team Hand-Off	2020-07-01
D	Asset life:	10
E	Benefits until:	2029-11-15
	F21 Total Resource Cost	\$ 109,571
	F22 Total Resource Cost	\$ 508,589
	F23 Onwards Total Resource Cost	\$ 219,143
	Estimated Headcount Reduction Costs	\$ 195,079

- 9.1 Please explain what is meant by “ongoing Supply Chain Business Unit Support and Sustainment Costs, including headcount reduction costs” (e.g. nature of the costs, including why they are not included in the costs provided in Table 2-7 - Total SCA Project).
- 9.1.1 Please explain how these costs were estimated, and the information used to support these estimates.
- 9.1.2 Please explain why certain costs “such as ongoing Supply Chain business unit support and sustainment costs” in the \$2.3 million to \$3.4 million were not included in the Phase One Application.
- 9.2 Please reconcile the incremental annual operating costs and capital costs of between \$2.3 million and \$3.4 million to the amounts provided in Appendix F (Tab E1 and E2).
- 9.3 Please provide an explanation for how BC Hydro determined the F21, F22 and F23 Onwards Total Resource Costs which are outlined in red in the table above. Please include an explanation for the variability in the expected annual Total Resource Costs between F21 and F23, and why the costs are expected to remain constant from F23 onwards.
- 9.4 Please provide an explanation for how BC Hydro determined the Estimated Headcount Reduction Costs which are outlined in green in the table above.
- 9.5 Please explain why Estimated Headcount Reduction Costs are added to the Non-Inflated Annual Operating Costs (row M) for F22 and for F22 only.

## C. PROJECT BENEFITS AND NET PRESENT VALUE (NPV) ANALYSIS

- 10.0 **Reference:** PROJECT BENEFITS AND NPV ANALYSIS  
Exhibit B-1, Section 3.2.1, pp. 3-4 to 3-5; Appendix H, p. 64  
Validation and review approach

On page 3-4 and 3-5 of the Application, BC Hydro states the following:

As summarized in the Benefits Report [Appendix G], the following approach was used to complete the review and update the benefits of the SCA Project:

- **Step 1:** Document Review and Analysis - Reviewed existing documentation and validated capability gap assessments against design stage outputs to assess benefits for completeness, reasonableness to measure, and likelihood of realization;
- **Step 2a:** Stakeholder Validation - Conducted interviews with SCA Project stakeholders to confirm assumptions and inputs for forecasted quantitative and qualitative benefits and measurement;
- **Step 2b:** Industry Peer and Benchmark Comparison – Compared forecasted benefits to the measurement of benefits realized by industry peers for key benefits to assess realization timeframe and ratio and identify any changes to the benefits that might be necessary; and

- **Step 3:** Tested benefits with BC Hydro stakeholders to confirm reasonableness of findings and developed a detailed report to summarize confirmed benefits, key performance indicators, assumptions, gaps, risks, and any other additional considerations.

On page 64 of Appendix H of the Application, PricewaterhouseCoopers (PwC) and BC Hydro note that the following stakeholders were consulted:

## Stakeholders Consulted

### Procurement

- Phillip Li
- Irene Liang
- Sven Rowaert
- Kiernan Dixon
- Leonardo Luna
- Mayukh Debnath
- Haroon Raza
- Randle Levetsovitis
- Allan Chu

### Work Management

- Wayne Martel
- Michael Watson
- Rowen Espina
- Janice Yick

### Change Management

- Valerie Johnson

### Finance

- Brian Plunkett
- Danielle Rogers

### Project Management and System Integration

- Maryna Korsei
- Ben Setiawan
- Zaheer Shivji
- Carsten Buehner
- Harold Schellekens
- Hugh Smith
- George Simpson
- Jon Trask
- Robbin Yang

### Projects

- Fred Jongeneel
- Rebecca Yunker
- Darlene Blackall

### Materials Management and Quality

- Darren Gebert
- Greg Kowal
- Joe Googel
- Ken MacPherson
- Luciana Nunes
- Maicon Costa
- Alexandre Matthee
- Jeff Kennedy

### Data and Reporting

- Tim Kikkert
- Diego Mendez
- Tania Cernezal
- Mirjana Petrovic

### Other

- Tania Dashko
- Joseph Sathianathan
- Michael O'Grady
- Wayne Nichiporik

- 10.1 Please explain what criteria (e.g. department, role, years of experience in role, user frequency with supply chain, etc.) PwC and BC Hydro used to select the stakeholders listed on page 64 of Appendix H of the Application.
  - 10.1.1 Please confirm, or explain otherwise, that the stakeholders listed on page 64 of Appendix H of the Application were consulted in both Step 2a and Step 3 of the approach used to review/update the SCA Project benefits.
  - 10.1.2 Please discuss whether there were any stakeholders that BC Hydro intended to consult but was unable to consult.
    - 10.1.2.1 If yes, please discuss the work that was performed to address the missing stakeholders' point of view.
- 10.2 Please provide details on the criteria used for identifying and selecting industry peers with respect to Step 2b of the approach used to complete the review/update the SCA Project benefits. Please provide the name(s) the industry peers selected.
- 10.3 Please discuss, with rationale, which "key benefits" were used for benchmark comparison (i.e. Benefit No. or Benefit ID) in Step 2b of the approach used to complete the review and update of the SCA Project .
  - 10.3.1 Please provide the key findings from the industry peers and benchmark comparison, and discuss how the findings impacted the benefits and/or expected quantified benefits (if applicable).
- 10.4 Please explain the benefits testing process that was applied in Step 3 of the approach used to review/update the SCA Project benefits and clarify whether this testing was completed for all benefits or for a selection of benefits.

10.4.1 Please provide the key findings from the benefits testing process, and discuss how the findings impacted the benefits and/or expected quantified benefits (if applicable).

11.0 **Reference:** **PROJECT BENEFITS AND NPV ANALYSIS**  
**Exhibit B-1, Section 3.2.2, Table 3-2, p. 3-7**  
**Changes to identified benefits**

On page 3-7 of the Application BC Hydro provides Table 3-2:

**Table 3-2 Changes to Identified Benefits**

<b>Benefit ID</b>	<b>Benefit Name</b>	<b>Change</b>	<b>Category (Cost/ Effort/ Risk)</b>
92	Reduced spend due to systematic communication of change in the demand	New	Cost
102	Improved visibility of excess project material	New	Cost
103	Improved reel return management	New	Cost
104	Reduction in inventory obsolescence write-offs	New	Cost
60	Reduction of expedited purchasing on non-stock material	Removed	Cost
66	Reduced cost to compile spend reports	Removed	Effort
93	Inventory process effort reduction	New	Effort
94	Reduction of efforts to process manual POs	New	Effort
96	Reduction of effort to process manual change requests	New	Effort
97	Reduced effort for scheduler via improved material visibility	New	Effort
100	Reduced effort with system blocks on closing charge codes with open orders	New	Effort
105	Reduction in project forecasting effort	New	Effort
13	Reduced effort by streamlining demand management on long-lead time items	Removed	Effort
15	Effort reduction through automated inventory level management	Removed	Effort
23	Reduced effort via evaluated receipt settlement (ERS)	Removed	Effort
35	Reduced effort via centralized kitting	Removed	Effort
44	Reduced effort to execute material return from projects	Removed	Effort
56	Eliminate maintenance of duplicate work orders in PassPort	Removed	Effort
98	Reduced risk of receiving and paying for non-compliant material	New	Risk

11.1 Please discuss how the changes to the identified benefits listed in Table 3-2 of the Application impacted BC Hydro’s assessment that the SCA Project will close the 13 identified capability gaps in BC Hydro’s current supply chain system and processes. If there was no impact, please explain why not.

12.0 **Reference: PROJECT BENEFITS AND NPV ANALYSIS**  
**Exhibit B-1, Section 3.2.3, pp. 3-8 and 3-10; Section 3.2.4, p. 3-13; Table 3-3, p. 3-10;**  
**Appendix F, Tab F1**  
**Expected quantified benefits (Expected Benefits)**

On page 3-8 of the Application BC Hydro states:

The following assumptions were also used in the analysis:

- (i) Based on a more refined analysis, BC Hydro has estimated that an average of 65 per cent of cost reduction benefits will be attributable to capital activities, with the remaining average of 35 per cent being attributable to operating and financing activities. In the Phase One Application 76 per cent of cost benefits were attributed to capital activities and 24 per cent to operating activities, based on an analysis of historical spend information. Benefits relating to financing activities were not included in this capital/operating allocation.

Based on the projected allocation of effort reduction impacts to specific parts of the organization as a result of the Design work done to date, an average of 65 per cent of effort reduction benefits are attributable to capital activities and 35 per cent to operating activities. In the Phase One Application, the allocation of effort reduction benefits was assumed to be 40 per cent capital and 60 per cent operating, based on the portion of BC Hydro's total labour costs incurred for capital versus operating activities;

- 12.1 Please explain which benefits (i.e. Benefit No. or Benefit ID) were affected by the change in the percentage of cost reduction benefits attributable to capital activities and operating activities as described on page 3-8 of the Application. Please explain why the identified benefits were affected and quantify the impact.
- 12.2 Please explain which benefits (i.e. Benefit No. or Benefit ID) were affected by the change in the percentage of effort reduction benefits attributable to capital activities and operating activities as described on page 3-8 of the Application. Please explain why the identified benefits were affected and quantify the impact.

In Table 3-3 on page 3-10 of the Application, BC Hydro summarizes the changes in the benefits by the capability gap addressed between the mid-scenario benefits in the Phase One Application and the Expected Benefits forecast in this Application.

On page 3-13 of the Application, BC Hydro states that a refinement of the approach in the Application compared to the Phase One Application "is the distinction between Expected Benefits and the expected monetized benefits (Monetized Benefits)" of the SCA Project.

- 12.3 Please provide a table similar to Table 3-3 on page 3-10 of the Application, which summarizes the changes in the benefits by the capability gap addressed between the mid-scenario benefits in the Phase One Application and the Monetized Benefits forecast in this Application.
  - 12.3.1 Please provide an explanation for any significant annual variances.

On page 3-11 of the Application, BC Hydro states the following:

The Expected Benefits for capability gap No. 2 increased by \$10.3 million annually. This increase is as a result of a change in the underlying approach to Benefit ID No. 5 – "Reduced Cost Due to Active Contract & Supplier Management." Benefit ID No. 5 quantifies BC Hydro's increased ability to better manage contracts and suppliers to ensure anticipated contract benefits are fully realized, do not erode, and are increased over time. In the Phase One Application, BC Hydro had forecasted the value of this

benefit as a reduction of 0.5 per cent of overall spend based on its improved ability to negotiate commercial terms with better data and visibility to demand. PwC advised taking a broader focus to quantify the benefits from active contract and supplier management not only to negotiate better terms, but also to mitigate value leakage. The benchmarked range for savings from the elimination of cost leakage from contract non-compliance was determined to be between 0.5 per cent and 3 per cent in a PwC study. BC Hydro and PwC determined that a reduction of 1.5 per cent, which is just below the mid-point, is achievable and reasonable.

- 12.4 Please explain how BC Hydro and PwC determined that a reduction of 1.5 percent for savings from the elimination of cost leakage from contract non-compliance is “achievable and reasonable.”
- 12.5 Please provide the details of the companies that make up the “benchmark range” in the referenced PwC study and discuss how these companies have comparable business practices to BC Hydro.
- 12.6 Please explain whether the reduction of 1.5 percent for savings from the elimination of cost leakage from contract non-compliance is equally applied to complex and non-complex contracts.
- 12.6.1 If yes, please explain why equal application is considered reasonable.
- 12.6.2 If no, please explain how the 1.5 percent is applied to complex and non-complex contracts.
- 12.7 Please provide revised NPV of discounted cash flows and revenue requirements of the SCA Project based on the value of Benefit ID No. 5 as a reduction of 0.5 percent of overall spend (i.e. same as the Phase One Application).

In Tab F1 of Appendix F of the Application, with respect to Benefit ID 80 “Reduced efforts for AP via less work being performed with no PO,” BC Hydro states in Column G that there was no calculation of the Quantified Benefit for this benefit in the Phase One Application because “[s]tatistics on how many multi touch items are due to missing PO are not available at this time.”

- 12.1 Please provide an update on BC Hydro’s ability to calculate a Quantified Benefit and Monetized Benefit of Benefit ID 80 at this time and provide the benefit amounts, if available.

13.0 **Reference: PROJECT BENEFITS AND NPV ANALYSIS  
Exhibit B-1, Section 3.2.4, p. 3-14; Appendix F, Tab F1  
Monetized Benefits**

On page 3-14 of the Application, BC Hydro states that it has “estimated the number of reductions in full time equivalent (FTEs) positions that could be made without introducing new risks and negatively impacting the business” as part of its approach to estimating how much of the Expected Benefits can be monetized.

- 13.1 Please provide the number of estimated FTE positions that can be reduced and a breakdown of the FTEs (e.g. by position and department).

On page 3-14 of the Application, BC Hydro states that it has “discounted each discrete effort benefit value at the same rate to arrive at a monetized value at the benefit level.” [emphasis added]

Further, BC Hydro states “[o]verall, BC Hydro estimates it can monetize approximately 18 per cent of the realizable value of the effort reduction Expected Benefits.” [emphasis added]

In Appendix F, Tab F1 – Benefits List, BC Hydro provides the Phase 2 Monetized Benefits in Column U.

13.2 Please explain how BC Hydro determined the rate used to discount each discrete effort benefit to arrive at its monetized value and provide the discount rate used.

13.3 Please clarify the meaning of the statement “[o]verall, BC Hydro estimates it can monetize approximately 18 per cent of the realizable value of the effort reduction Expected Benefits” given that the each discrete effort benefit was discounted at the same rate.

13.3.1 If certain benefits were discounted using a different rate from that which is provided in response to IR 13.2 above, please identify the benefits and, for each identified benefit: a) provide a step-by-step explanation of the methodology used to calculate the “Phase 2 Monetized Benefit” in Column U of Tab F1 and b) explain why the methodology is appropriate.

14.0 **Reference:** **PROJECT BENEFITS AND NPV ANALYSIS**  
**Exhibit B-1, Section 2.4, p. 2-17; Section 3.3, pp. 3-17 to 3-18; Appendix G, p. 6;**  
**Appendix I-1, pp. 1-29; BC Hydro Inquiry of Expenditures related to the adoption of**  
**the SAP Platform (SAP Inquiry), Exhibit B-3, Attachment 17, p. 1**  
**Benefits tracking process**

On page 3-17 of the Application, BC Hydro states that there are two primary documented outputs of a pilot program initiated by BC Hydro’s Technology group in the fall of 2017 to address a gap in its information technology (IT) benefits realization process– an outcome model and a benefits tracking sheet, where “the outcome model is a roadmap of all initiatives, contributions, outcomes, assumptions and risks associated with the IT-enabled business change.”

Further, BC Hydro states “[a]s the IT benefits realization program is still in the pilot phase and the SCA Project is substantially underway, the [SCA] Project is currently utilizing only the benefits tracking sheet to track and measure progress towards achieving the forecasted benefits.”

14.1 Please clarify whether the benefits tracking sheets are being used during the Implementation Phase of the SCA Project.

14.2 Please discuss when the “outcome model” is expected to be applied to the SCA Project, if at all.

On page 3-18 of the Application, BC Hydro states that it will prepare a tracking sheet “for every effort reduction benefit with an annual Expected Benefit above \$500,000 at stabilization, and for every cost reduction benefit. At this materiality limit, BC Hydro will be tracking the twelve benefits that comprise approximately 96 per cent of the total Expected Benefits and 99 percent of the total Monetized Benefits.”

14.3 Please clarify whether BC Hydro will prepare a benefit tracking sheet for: i) every cost reduction benefit (i.e. no materiality limit); or ii) every cost reduction benefit with an annual Expected Benefit above \$500,000 at stabilization.

14.4 Please explain how BC Hydro determined a threshold of \$500,000 of annual Expected Benefit is appropriate for the tracking sheets.

14.5 Please discuss how long (i.e. length of time) BC Hydro intends to track and measure its progress towards achieving the forecasted benefits of the SCA Project using the benefits tracking sheets and why this length of time is appropriate.

On page 6 of Appendix G of the Application, PwC states that there are twelve primary benefits from which the majority of the benefits are expected to be realized:

<i>Benefit number</i>	<i>Benefit name</i>	<i>Benefit category</i>	<i>Expected quantified benefit (000's)</i>	<i>Monetized benefit (000's)</i>	<i>Quantified benefit value compared to Phase 1 estimate</i>
5	Spend reduction through active contract and supplier management	Cost	\$16,073	\$16,073	+
7	Reduction of effort in operations managing completion of work	Effort	\$3,988	\$624	+
14	Reduced carrying costs for material via improved inventory turns	Cost	\$2,711	\$2,711	+
29	Reduction of efforts in manually performing accruals	Effort	\$1,858	\$292	+
105	Reduction in Project Forecasting Effort	Effort	\$1,121	\$175	New
102	Improved excess project material visibility	Cost	\$816	\$816	New
67	Request Standard Services via catalogue	Effort	\$596	\$93	-
2	Streamline the purchasing process via PO automation	Effort	\$537	\$84	+
16	Eliminate Manual Material Reservations at Materials Management	Effort	\$433	\$433	+
104	Reduction in inventory obsolescence	Cost	\$425	\$425	New
103	Improve reel return management	Cost	\$400	\$400	New
3	Increased Purchase Requisition Self-Service	Effort	\$358	\$56	+

On page 1 of Appendix I-1 of the Application, BC Hydro lists the twelve benefits that it will track as follows:

3.	Monitored Outcomes .....	3
3.1.	Benefit ID #5 – Cost – Spend reduction through active contract and supplier management .....	3
3.2.	Benefit ID #26 – Effort – Reduced effort to approve invoices .....	7
3.3.	Benefit ID #7 – Effort – Reduction of effort in operations managing completion of work.....	10
3.4.	Benefit ID #14 – Cost – Reduction of cost of capital through an increase in inventory turns .....	12
3.5.	Benefit ID #29 – Effort – Reduction of efforts in manually performing accruals.....	14
3.6.	Benefit ID #105 – Effort – Reduction in project forecasting effort .....	16
3.7.	Benefit ID #102 – Cost – Improved excess project material visibility .....	18
3.8.	Benefit ID #67 – Effort – Reduced efforts to develop scope of work via service catalogue .....	20
3.9.	Benefit ID #2 – Effort – Streamline the purchasing process via PO automation .....	22
3.10.	Benefit ID #16 – Effort – Eliminate manual material reservations at Material Management .....	23
3.11.	Benefit ID #104 – Cost – Reduction in inventory obsolescence write-offs .....	25
3.12.	Benefit ID #103 – Cost – Improved Reel Return Management .....	27

- 14.6 Please explain why BC Hydro does not propose to monitor Benefit No./ID 3 “Increased Purchase Requisition Self-Service” given that it is one of the twelve primary benefits included on page 6 of Appendix G of the Application.
- 14.7 Please explain why BC Hydro proposes to monitor Benefit No./ID 26 “Reduced Effort to Approve Invoices” given that it is not one of the twelve primary benefits included on page 6 of Appendix G of the Application.
- 14.8 Please provide the estimated annual cost of monitoring the SCA Project benefits and confirm whether or not these costs are included in the “Other SCA Project Costs” described in Section 2.4 of the Application.

In the SAP Inquiry, in Attachment 17 BC Hydro provided “Management and Accounting Policies and Procedures (MAPP) 4.1.1B.2 Project Completion and Evaluation Report Requirements” (MAPP 4.1.1B.2), which sets out BC Hydro’s requirements for the completion of a Project Completion and Evaluation Report (PCER) that complies with BC Hydro’s policies and project management best practices. The purpose of a PCER is stated to be two-fold:

1. to **show completion**, summarizing how the project was conducted from a project management perspective in terms of scope, cost & schedule, and
2. to **evaluate** the impacts and realized benefits.<sup>1</sup>

On page 7 of MAPP 4.1.1B.2, BC Hydro states that the “next scheduled review of this procedure shall occur in May 2013.”

- 14.9 Please discuss whether the policies and procedures outlined in MAPP 4.1.1B.2 remain current and are applicable to the SCA Project.
- 14.9.1 If not confirmed, please provide the policies and procedures regarding a PCER that are to be applied to the SCA Project (i.e. an updated MAPP 4.1.B.2 or other MAPP).

On page 4 of MAPP 4.1.1B.2, BC Hydro provides the Project Evaluation criteria:

#### **Impacts & Benefits Realization**

***Note:** This section only required if the project’s authorized amount exceeds the FAAP approval level of the CFO for projects without Board approval, or if specified by the Project Sponsor and Finance Lead in the Business Case. The Impacts & Benefits Realization Evaluation is to be completed by the Project Manager and team and is subject to review by the Review Team. A project that requires approval by the BC Hydro Board of Directors can only have its Impacts & Benefits Evaluation section of the PCER requirement waived by the Board of Directors.*

The Impacts and Benefits Realization table, as populated in the Business Case must be transferred to the PCER. A sample table (Project Impacts and Benefits Analysis table) is included at the back of the PCER template. Note on the table whether the impacts/benefit was achieved, any variances, and comments & status update and evaluation date, as applicable.

- 14.10 Please confirm, or explain otherwise, that the above criteria for Project Evaluation apply to the SCA Project.
- 14.10.1 If not confirmed, please explain why not and provide the Project Evaluation criteria that will apply to the SCA Project.

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<sup>1</sup> BC Hydro SAP Inquiry, Exhibit B-3, Attachment 17, p. 1.

14.11 Please confirm, or explain otherwise, that BC Hydro's proposed Benefits Tracking Process, as outlined in Section 3.3 of the Application, is in accordance with the applicable MAPP provided in response to IR 14.9.

15.0 **Reference: PROJECT BENEFITS AND NPV ANALYSIS**  
**Exhibit B-1, Section 3.4.1, p. 3-20; Table 3-6, p. 3-21; Phase One Application, Exhibit B-1, p. 2-30**  
**NPV of discounted cash flow**

On page 3-20 of the Application, BC Hydro states the following:

For this analysis, BC Hydro has run four cost and benefits scenarios:

- Base Case – Expected Cost / Monetized Benefits Scenario;
- Authorized Cost / Monetized Benefits Scenario;
- Expected Cost / Expected Benefits Scenario; and
- Authorized Cost / Expected Benefits Scenario.

The NPV of discounted cash flows is positive in all scenarios.

On page 2-30 of the Phase One Application BC Hydro states the following:

BC Hydro ran three cost and benefits scenarios using the information described in sections 2.4 and 2.5:

- Scenario 1 – Upper Bound cost estimate - Low Benefits;
- Scenario 2 – Mid-Range cost estimate - Mid-Range Benefits; and
- Scenario 3 – Lower Bound cost estimate – High Benefits.

15.1 Please provide the estimating accuracy range of the Expected Benefits and Monetized Benefits.

15.2 Please discuss why BC Hydro considers the Expected Costs / Monetized Benefits scenario to be the base case. If possible, please provide the likelihood that this scenario will be achieved.

15.3 Please explain why the 'Upper Bound cost estimate – Low Benefits' scenario included in the Phase One Application was removed from the current Application.

15.3.1 Please provide the NPV of the discounted cash flows for the 'Upper Bound cost estimate - Low Benefits' scenario.

15.3.2 Please provide the benefit percentage required to break even for this scenario.

On page 3-21 of the Application, BC Hydro provides Table 3-6 and states:

BC Hydro has also performed a breakeven analysis based on the above scenarios showing the percentage of the Expected Benefits or Monetized Benefits, as appropriate, needed to achieve to break even. Even in a breakeven scenario, the SCA Project would still be value-adding due to the number of non-monetized benefits and reduction in risk expected to be realized.

**Table 3-6 NPV of Discounted Cash Flows:  
Sensitivity and Breakeven Analysis**

Scenarios	NPV of Discounted Cash Flows (\$ million)	Benefit Percentage Required to Breakeven (%)
Expected Costs / Monetized Benefits	41.8	60
Authorized Costs / Monetized Benefits	31.9	69
Expected Costs / Expected Benefits	102.5	38
Authorized Costs / Expected Benefits	92.6	44

15.4 For clarity, please explain how to interpret the Benefit Percentage Required to Breakeven percentages shown in Table 3-6.

16.0 **Reference: PROJECT BENEFITS AND NPV ANALYSIS  
Exhibit B-1, Section 3.4.2, Table 3-7, p. 3-23; Appendix F, Tab G1 and G2  
NPV of revenue requirement**

On page 3-23 of the Application, BC Hydro provides Table 3-7 and states:

For the NPV of revenue requirements, the following additional assumptions were made:

- All project-related benefits will result in capital and operating budget reductions to be passed on to ratepayers through an incremental reduction in revenue requirements;
- SCA Project monetized benefits impacting capital will result in both lower capital expenditures and lower capital additions in the same year; and
- The amortization period of the monetized benefits impacting capital is 30 years as BC Hydro has assumed an average life of 30 years for assets procured using the new supply chain.

**Table 3-7 NPV of Revenue Requirements:  
Sensitivity and Breakeven Analysis**

Scenarios	NPV of Revenue Requirement (\$ million) (i.e., reduction to revenue requirements over time)	Benefit Percentage Required to Breakeven (%)
Expected Cost / Monetized Benefits	25.1	67
Authorized Cost / Monetized Benefits	19.4	75

16.1 Please explain the following with respect to the additional assumptions noted in the preamble above: i) how they differ from assumptions in the Phase One Application, ii) why these assumptions were not included in the Phase One Application, and iii) the basis for including these assumptions in the NPV of revenue requirements analysis at this time.

16.2 Please quantify the impact that the additional assumptions had on the NPV of the revenue requirement.

16.2.1 Please provide the information in Table 3-7 using only the assumptions in the Phase One Application.

16.3 Please explain what is meant by “All project-related benefits” in the preamble above (e.g. does this include all cost, effort and risk benefits?)

16.4 For clarity, please explain how to interpret the Benefit Percentage Required to Breakeven percentages shown in Table 3-7.

In Appendix F, Tab G1 (NPV DCF) of the Application, BC Hydro calculates Table 1: Expected Cost + Monetized Benefits, as follows:

		Monetized Benefits																	
Table 1: Expected Cost + Monetized Benefits		F16	F17	F18	F19	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30	Totals		
Expected Cost	<b>Project Costs</b>																		
	Project Capital	\$	- \$	309 \$	3,490 \$	21,417 \$	21,344 \$	1,245										\$ 47,805	
	Project Operating	\$	- \$	- \$	505 \$	2,950 \$	5,000 \$	987										\$ 8,841	
	<b>Total Project Costs</b>	\$	- \$	309 \$	3,995 \$	24,368 \$	26,344 \$	1,631										\$ 56,646	
	<b>Technology Ongoing Costs</b>																		
	Annual Tech Capital	\$	- \$	- \$	- \$	- \$	78 \$	213 \$	217 \$	221 \$	209 \$	184 \$	188 \$	192 \$	196 \$	199 \$	128 \$	2,020	
	Annual Tech O&M	\$	- \$	- \$	- \$	- \$	852 \$	2,322 \$	2,989 \$	2,416 \$	2,248 \$	1,826 \$	1,960 \$	2,006 \$	2,046 \$	2,085 \$	1,394 \$	21,968	
	<b>Total Technology Ongoing Costs</b>	\$	- \$	- \$	- \$	- \$	930 \$	2,535 \$	3,206 \$	2,638 \$	2,457 \$	2,010 \$	2,148 \$	2,198 \$	2,242 \$	2,284 \$	1,522 \$	23,988	
	<b>Ongoing Business Costs</b>																		
	Capital	\$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	
	Operating	\$	- \$	- \$	- \$	- \$	- \$	88 \$	794 \$	243 \$	247 \$	252 \$	257 \$	261 \$	265 \$	269 \$	273 \$	175 \$	2,830
	<b>Total Ongoing Business Costs</b>	\$	- \$	- \$	- \$	- \$	- \$	88 \$	794 \$	243 \$	247 \$	252 \$	257 \$	261 \$	265 \$	269 \$	273 \$	175 \$	2,830
	<b>Ongoing Cash Flow Benefits</b>																		
	Capital	\$	- \$	- \$	- \$	- \$	- \$	2,286 \$	6,935 \$	11,311 \$	15,370 \$	17,633 \$	17,986 \$	18,345 \$	18,712 \$	19,087 \$	19,462 \$	127,645	
	Operating	\$	- \$	- \$	- \$	- \$	- \$	1,201 \$	5,674 \$	5,988 \$	6,130 \$	6,324 \$	6,510 \$	6,701 \$	6,895 \$	7,093 \$	7,291 \$	67,516	
	<b>Total Benefits</b>	\$	- \$	- \$	- \$	- \$	- \$	3,487 \$	10,609 \$	17,299 \$	23,501 \$	26,957 \$	27,496 \$	28,040 \$	28,607 \$	29,179 \$	29,753 \$	195,162	
	<b>Net Savings</b>																		
	Capital Savings	\$	- \$	- \$	- \$	- \$	- \$	(78) \$	(213) \$	(217) \$	(221) \$	(209) \$	(184) \$	(188) \$	(192) \$	(196) \$	(128) \$	(2,020) \$	
	Operating Savings	\$	- \$	- \$	- \$	- \$	- \$	(852) \$	(2,322) \$	(1,933) \$	(1,016) \$	(849) \$	(595) \$	(730) \$	(744) \$	(738) \$	(736) \$	(8,583) \$	
	<b>Savings Total</b>	\$	- \$	- \$	- \$	- \$	- \$	(930) \$	(2,535) \$	(1,250) \$	(1,045) \$	(1,044) \$	(1,024) \$	(924) \$	(940) \$	(934) \$	(908) \$	(10,600) \$	
<b>Discounted Cash Flow (DCF)</b>	\$	- \$	(309) \$	(1,995) \$	(24,368) \$	(22,774) \$	(4,254) \$	117 \$	7,229 \$	14,594 \$	21,157 \$	24,547 \$	25,038 \$	25,538 \$	26,049 \$	27,542 \$	112,092		
NPV of DCF - Expected Cost + Monetized Benefits	\$																41,290		

In Appendix F, Tab G2 – (RR Analysis Inputs), BC Hydro calculates Table 1: SCA Expected Cost + Monetized Benefits as follows:

		Table 1: SCA Expected Cost + Monetized Benefits																
Fiscal Year		F16	F17	F18	F19	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30	Totals	
SCA Expected Cost	Project Capital	\$ 2,650	\$ 7,981	\$ 3,490	\$ 21,417	\$ 21,344	\$ 1,245										\$ 58,127	
	Project Operating	\$ 1,351	\$ 0	\$ 505	\$ 2,950	\$ 5,000	\$ 987										\$ 10,193	
	Project IDC	\$ 47	\$ 120	\$ 187	\$ 927	\$ 1,699	\$ -										\$ 2,979	
	Capital Addition (10 year life)					\$ 61,107												\$ 61,107
	Ongoing Capital Savings			\$ -	\$ -	\$ (98)	\$ (266)	\$ 1,995	\$ 6,658	\$ 11,028	\$ 15,083	\$ 17,339	\$ 17,686	\$ 18,040	\$ 18,401	\$ 18,877	\$ 18,887	\$ 124,753
	Ongoing Operating Savings			\$ -	\$ -	\$ (918)	\$ (2,588)	\$ (2,114)	\$ 830	\$ 3,087	\$ 5,171	\$ 6,306	\$ 6,432	\$ 6,560	\$ 6,692	\$ 6,843	\$ 8,043	\$ 37,501
	<b>Total</b>																	\$ 175,760

16.5 Please explain why the net capital and operating savings highlighted in red in Table 1 of Appendix F, Tab G1 do not agree to the net ongoing capital and operating savings highlighted in green in Table 1 of Appendix F, Tab G2 of Appendix F given that they are for the same scenario (i.e. Expected Cost + Monetized Benefits scenario).

16.5.1 Please provide revised tables for either Appendix F, Tab G1 or Tab G2 as needed, as well as a revised Table 3-7.

17.0 **Reference: PROJECT BENEFITS AND NPV ANALYSIS Exhibit B-1, Appendix F, Tab F1; Phase One Application, Exhibit B-1, Attachment F, Tab F1; Appendix H, pp. 15 to 53 Benefits list**

In Tab F1 of Attachment F in the Phase One Application, BC Hydro states that the “Years to Benefit” is 3 years and 4 years for Benefit ID 13 and Benefit ID 35, respectively.

In Tab F1 of Appendix F of the Application, the “Years to Benefit” are 5 years and 3 years, respectively, for Benefit ID 13 and Benefit ID 35.

17.1 Please explain why the number of “Years to Benefit” for Benefit ID 13 increased from 3 years to 5 years in the Application as compared to the Phase One Application.

17.2 Please explain why the number of “Years to Benefit” for Benefit ID 35 decreased from 4 years to 3 years in the Application as compared to the Phase One Application.

In Tab F1 of Attachment F in the Phase One Application, BC Hydro categorized Benefit ID 80 as a cost reduction benefit and states that the “Years to Benefit” is 5 years.

However, in Tab F1 of Appendix F of the Application, BC Hydro categorizes Benefit ID 80 as an effort reduction benefit and states that the “Years to Benefit” is 3 years.

17.3 Please explain why the categorization of Benefit ID 80 changed from a cost reduction benefit to an effort reduction benefit in the Application as compared to the Phase One Application.

17.4 Please explain why the number of “Years to Benefit” for Benefit ID 80 decreased from 5 years to 3 years in the Application as compared to the Phase One Application.

On pages 15 to 18 of Appendix H of the Application, PwC and BC Hydro list the benefits of the SCA project and classify each benefit into the following five statuses: i) Phase One – Increased; ii) Phase One – Decreased; iii) Phase Two New; iv) Phase One – No Change; and v) Phase One – Removed.

On pages 19 to 53 of Appendix H of the Application, PwC and BC Hydro prepared a Detailed Benefit Analysis for each Benefit No./ID which describe how benefits were modified from the Phase 1 filing to the Phase 2 filing of the Application in the “Rationale for Change” section.

17.5 For each benefit with a status other than “Phase One – No Change” and “Phase One – Removed” on pages 15 to 18 of Appendix H, please elaborate on the “Rationale for Change” provided in pages 19 to 58 of Appendix H with respect to the following:

- (i) 100% Benefit at
- (ii) Realization ratio; and
- (iii) Baseline assumptions/data used in the benefit calculation logic

18.0 **Reference: PwC CONCLUSION & SUMMARY ON SCA BENEFITS ANALYSIS POST DESIGN PHASE Exhibit B-1, Appendix G, p. 9 Benefits dependencies**

On page 9 of Appendix G to the Application, PwC states that the realization of benefits will be dependent on the adoption of tools available to BC Hydro, the level of change management that goes into project implementation and governance and benefits tracking. PwC states that the following dependencies are overarching to all benefits identified in the review:

- Master data management;
- Governance and benefits tracking;
- Supplier engagement;
- Demand management; and
- Change management.

18.1 Please discuss how BC Hydro will address each dependency to ensure the realization of the benefits.

**D. PROJECT SCOPE AND ACTIVITIES**

19.0 **Reference:** **DEFINITION PHASE**  
**Exhibit B-1, Section 4.2.2, p. 4-4; Section 4.3.2.2, pp. 4-7 to 4-8; Section 5.3, pp. 5-3 to 5-13**  
**Mobilization stage**

Table 4-1 on page 4-4 of the Application provides a description of the scope components outlined in the Phase One Application and a discussion of any updates that have occurred:

**Table 4-1 Scope Description and Updates**

Ref	Scope Component	Discussion of Updates
1	<b>Materials Management</b> – inventory management, forecasting and demand planning, material requirements planning, and warehouse operations for all materials.	No material change to the scope from the Phase One Application
2	<b>Purchasing</b> – purchasing processes, contract administration and invoice processing for all materials and services.	No material change to the scope from the Phase One Application. A minor change is discussed in the section on the changes to the Conceptual Design Report in the Mobilization Stage. See section <a href="#">4.3.2.2</a> .
3	<b>Integration</b> – integration of SAP Supply Chain modules with other previously implemented SAP modules (Project System, Finance & Controlling, Quality Management, and other systems such as PassPort (work management), Oracle Primavera Unifier Construction Contract Management (Unifier), and Supply Chain Workspace (sourcing, category, and contract management).	No material change to the scope from the Phase One Application. A minor change is that there is no longer a need to integrate SAP with Oracle Primavera Unifier. See section <a href="#">4.3.2.2</a> . An amount of \$0.3 million has been included in the project reserve in case integration with Unifier is required to support specific Site C processes. See section 2.3.1.1.
4	No requirement for additional hardware or user licenses to be purchased or installed for the SAP ERP Central Component.	No material change to the scope from the Phase One Application
5	Expanded use of other IT Applications designed to work with SAP: SAP Business Warehouse; Ariba; and Fiori.	No material change to the scope from the Phase One Application

On page 4-7 of the Application, BC Hydro states that the Conceptual Design Report was updated prior to its use in the Design and Implementation Planning Stage to reflect the changes to BC Hydro’s IT landscape since 2015. BC Hydro further states:

BC Hydro decided to consolidate the management of all contingent labour resources through an external managed service provider. BC Hydro selected a vendor, Flextrack Inc., to procure and manage contingent labour using a cloud-based IT system called the Vendor Management System (VMS). VMS will function as a “bolt-on” to SAP, extending its capabilities in this area, and requiring an update in the Conceptual Design Report. Prior to this change, the scope of the SCA Project included plans to expand the use of SAP’s cross-application timesheet. BC Hydro has utilized SAP’s cross-application timesheet solution for employees since the implementation of the Human Resources and Payroll components of SAP in 2011, and the SCA Project scope included expanding its use to also cover contract resources. As a result of the decision to use a managed service provider for contingent labour, this function will be performed in the Flextrack VMS.

On pages 4-7 to 4-8 BC Hydro explains that the SAP to Oracle Primavera Unifier interface has been removed from the scope:

Oracle Primavera Unifier was being developed when the Conceptual Design Report was written in 2015. The specific required interactions between Unifier and the SAP supply chain system were not known at that time. The uncertainty in the level of integration required between SAP and Unifier was identified as a technology risk in the Phase One Application. The Conceptual Design Report was updated to reflect the actual use of

Unifier, resulting in simplified conceptual interactions between Unifier and SAP. As noted in Table 4-1 above, the SAP to Unifier interface has since been removed from scope as a result of the analysis completed in the Design Stage.

In Table 4-1 BC Hydro states that “an amount of \$0.3 million has been included in the project reserve in case integration with Unifier is required to support specific Site C processes.”

On page 4-8 of the Application, BC Hydro states that it did not proceed with the Graphics Work Design Project and therefore references to it have been removed from the Conceptual Design Report. BC Hydro explains:

The Conceptual Design Report considered the Graphic Work Design Project that would combine BC Hydro’s AutoCAD and geographic information system engineering tools even though no direct interactions between the Graphic Work Design tool and SAP supply chain were expected.

On page 4-8 of the Application BC Hydro states:

Dynamic discounting is a capability within SAP’s Ariba that enables vendors, by offering BC Hydro a discount, to opt to receive payment for their invoices earlier than the stated standard payment term. As dynamic discounting has been implemented since November 2015, the reference to it was removed from the Conceptual Design Report.

19.1 For each of the following scope items please provide responses to IRs 19.1.1 to 19.1.7 below:

- (i) Selection of Flextrack VMS for the management of all contingent labour resources;
- (ii) Removal of SAP to Unifier interface;
- (iii) Removal of Graphics Work Design Project; and
- (iv) Removal of dynamic discounting.

19.1.1 Please provide a breakdown of any costs spent to date on the scope items which have been removed and discuss BC Hydro’s proposal with respect to the recovery of these costs.

19.1.2 Please discuss the reasons for removing the scope item from the SCA Project.

19.1.3 Please confirm, or explain otherwise, whether the removal of the scope item led to project cost savings.

19.1.3.1 If confirmed, please quantify and provide a breakdown of the cost savings into operating and capital costs.

19.1.3.2 If not confirmed, please explain why not.

19.1.4 Please discuss whether the removal of the scope item has impacted the project schedule. In your response, please provide details of any impacts.

19.1.5 Please discuss whether the removal of the scope item has impacted the project risks. In your response, please provide details of any risks related to the scope item and discuss any changes to the risks.

19.1.6 Please identify the Phase 1 project benefits to which the scope item was expected to have contributed.

19.1.6.1 For each benefit identified in your response to IR 19.1.6, please quantify the contribution.

19.1.6.2 If the scope item was not anticipated to impact any of the project benefits, please explain why not.

19.1.7 Please explain and quantify how the removal of the scope item has impacted the Phase 2 project benefits.

19.2 Please explain why the Graphic Work Design Project was originally considered. Please comment on the objectives and the resulting benefits that were anticipated from the interactions between the Graphic Work Design tool and SAP supply chain applications.

19.3 Please clarify whether the objectives and the benefits identified in your response to IR 19.2 are to be achieved through other aspects of the Project.

19.3.1 If not, please explain why not.

19.4 Given that the integration of SAP to Unifier is not required for the SCA Project, please explain the reasons why it may be required for the Site C project.

19.5 In the event that the integration of SAP to Unifier is required for the Site C project, please explain at what point in the SCA Project schedule BC Hydro would expect to decide that the interface is required.

19.6 In the event that the integration of SAP to Unifier is required for the Site C project, please explain how the amount of \$0.3 million was determined. In your response, please provide a breakdown of the \$0.3 million according to key work activities.

19.7 In the event that the integration of SAP to Unifier is required for the Site C project, please confirm, or otherwise explain, whether the project schedule includes a contingency period for the work.

19.7.1 If confirmed, please quantify the time allocated.

19.7.2 If not confirmed, please explain how the scope of work will be incorporated into the existing project schedule.

On page 5-6, Item 4 in Table 5-1 discusses the risk relating to the interface between SAP and the Unifier Construction Contract Management:

No.	Risk Category	Risk Status	Risk Event / Threats	Phase One Application			Verification Report		
				Mitigation Plans	Mitigation Status	Probability and Impact	Updated Mitigation Plans & Mitigation Assessment	Mitigation Status	Probability and Impact
4	Technology	Active, Updated	Interfaces to be developed between SAP and Unifier Construction Contract Management are new to BC Hydro, leading to unclear business needs?	BC Hydro will monitor this risk and potentially reduce the scope of the Unifier Construction Contract Management interface if the risk of successful deployment is determined to be too great. Also, BC Hydro will utilize existing and well supported interface technologies.	Planned	Medium probability, low impact.	Analysis completed during Design Stage determined that this interface is not required and it has been removed from scope. Some residual risk remains that the interface will be reintroduced based on Site C specific requirements. Specific reserve amount included in estimate.	Monitoring	Low probability. Impact estimated at \$0.3 million.

19.8 Please discuss the likelihood that the SAP to Unifier interface will be required for the Site C project.

19.9 In the event that the SAP to Unifier interface is required for the Site C project, please discuss the possible risks to the project.

20.0 **Reference:** **IMPLEMENTATION PHASE WORK**  
**Exhibit B-1, Section 2.3.2.1, p. 2-13; Section 4.4, p. 4-11 to 4-12; Section 5.3, pp. 5-3 to 5-13; Appendix K-3, p. 9; Appendix L-2, p. 21;**  
**Phase One Application, Exhibit B-4, CEC IR 1.32.1;**  
**Implementation Phase Work**

On pages 4-11 to 4-12 of the Application, BC Hydro provides descriptions of the major activities to be completed during the Implementation Phase. BC Hydro states:

2. Development of the detailed design, including functional and technical specification documents, writing of custom program code, and testing that the code executes correctly. A portion of the writing of custom program code is currently planned to be undertaken offshore. If this approach proves to be infeasible, incremental funding has been estimated and is included in the Authorized Cost estimate for the SCA Project. An amount has been included in the project reserve covering known risks and is described in Table 2-3 and section 2.3.2;

On page 2-13 of the Application, BC Hydro states:

As discussed in the Phase One proceeding, BC Hydro plans to have a portion of the development work done offshore. The advantages of this model include lower cost and 24-hour development cycle due to having resources in another time zone. The Implementation Phase risk that the offshore development model proves to be infeasible, although substantially mitigated through activities undertaken in the Design Stage, is still outstanding as shown in Table 2-4. The amount reserved to mitigate it remains the same as in the Phase One Application.

BC Hydro provides Table 2-5 which indicates that a Project Reserve of \$1.0 million is in place in the event that the offshore development model proves to be infeasible.

**Table 2-5 Project Reserve Component for Known Risks (\$ million)**

#	Components addressing the following known risk items	Amount
1	Offshore development model proves to be infeasible	1.0
2	Unifier to SAP interface may be required to support specific Site C processes	0.3
<b>P</b>	<b>Total Implementation Phase Known Risk Reserve</b>	<b>1.3</b>

In response to Commercial Energy Consumers Association of British Columbia’s (CEC) information request (IR) 1.32.1<sup>2</sup>, BC Hydro provided a detailed explanation of the offshore development model risk:

BC Hydro considers the following risks to be possible with the proposed offshore development model:

- Privacy restrictions under the Freedom of Information and Protection of Privacy Act (FOIPPA) and significant overhead to address FOIPPA requirements;
- Issues with quality of deliverables;
- Improperly interpreted requirements and design due to little or no ability to ask clarifying questions;

<sup>2</sup> Phase One Application, Exhibit B-4, CEC IR 1.32.1

- Potential for communication issues. Remote delivery does not facilitate discussion and early identification of issues and defects;
- Poor coordination of individual development streams resulting in additional effort to integrate the developed code into BC Hydro environment;
- Lack of transparency and visibility into development progress and the resulting potential issues; and
- Model may require BC Hydro team members to travel overseas for an extended duration, with the associated costs and the need to backfill critical team members.

On page 9 of Appendix K-3, KPMG states:

BC Hydro is internally evaluating the potential for offshore delivery. BC Hydro should evaluate the risks posed with an offshore delivery model which include resource capabilities, availability and ability to deliver required deliverables within the project timeframe

On page 21 of Appendix L-2, BC Hydro states:

BC Hydro is working with the SI to assess the requirements and delivery model to support offshore development (including the risk items identified by KPMG). It is anticipated that a recommendation will be brought to the Steering Committee in March for approval. While offshore development does include certain risks, it also has several advantages that reduce other risks.

- 20.1 Please provide details of the activities undertaken in the Design Stage to substantially mitigate the risks associated with the offshore development model. In your response, please comment on the risks identified in response to CEC IR 1.32.1, risk items identified by KPMG and any additional risks identified by BC Hydro.
- 20.2 Please explain how the \$1.0 million reserve component for the offshore development was determined and provide a breakdown of the amount according to work activity.
  - 20.2.1 Please confirm whether BC Hydro reviewed the appropriateness of the reserve amount as part of the Design and Implementation Planning Stage.
    - 20.2.1.1 If yes, please provide details of the review undertaken and explain why the reserve amount is the same as in the Phase One Application (\$1.0 million) despite activities undertaken in the Design Phase.
    - 20.2.1.2 If not, please explain why not.
- 20.3 Please explain whether a contingency or reserve has been included in the project schedule in the event that the offshore development model proves to not be feasible.
- 20.4 Please discuss the factors that would lead to BC Hydro considering the offshore development model as not feasible.

On page 5-8, Item 7 in Table 5-1 discusses the risk relating to the proposed offshore development model:

No.	Risk Category	Risk Status	Risk Event / Threats	Phase One Application			Verification Report		
				Mitigation Plans	Mitigation Status	Probability and Impact	Updated Mitigation Plans & Mitigation Assessment	Mitigation Status	Probability and Impact
7	Project Delivery	Active, Updated	Proposed offshore development model is determined to be impractical or ineffective. As discussed in section 2.3.2.1, the benefits of offshore development include, but not limited to, lower cost and a 24-hour development cycle due to having resources in another time zone.	Decision point in Definition Phase to determine if privacy concerns relating to data access adequately met.  Development of detailed work procedures to mitigate quality risks associated with offshore development  Incremental funding included in Project Reserve.	Future  Future  Completed	Medium probability; impact estimated at \$1 million.	Decision made during Definition Phase to proceed with partial offshore development model based on review of Security Privacy and PwC work procedures.  Initial review of PwC procedures completed during Definition Phase assessment. Detailed procedures to be finalized in early Realization Stage.  Some residual risk remains that off-shore development will prove to be ineffective or produce low quality outputs. Reserve of \$1 million included in Implementation Phase estimate to cover cost of completing additional development on-shore.	Completed  In progress  Monitoring	Low probability; impact estimated at \$1 million.

- 20.5 Please explain what is meant by “partial offshore development model”. In your response, please discuss any changes made to the development model since the Phase One Application.
- 20.6 Please explain what aspects of the model will be developed onshore and which will be developed offshore.
- 20.7 Please discuss what impacts, if any, the “partial offshore” model would have on the estimated risk impact of \$1 million.

**E. PROJECT RISK**

21.0 **Reference: IMPLEMENTATION PHASE ASSESSMENT OF RISKS AND RISK MITIGATION Exhibit B-1, Section 5.3, pp. 5-3 to 5-13; Implementation Phase Work**

On page 5-3 of the Application, BC Hydro states that one new risk has been identified during the Definition Phase. BC Hydro explains:

The only newly identified risk is the potential for low data quality and/or data not being ready according to the Project Schedule. The main type of data relevant to this risk is information on BC Hydro’s contracts. If this risk materializes, it would not impact project costs, but could result in increased operating cost pressures as BC Hydro works to increase the data quality and availability; any impact to the project schedule due to this risk would be addressed through the project schedule contingency.

- 21.1 Please explain why, in the event that the above risk were to materialize, there would be no impact on cost.
- 21.2 In the event that the above risk was to materialize, please discuss the anticipated impact on the project schedule. Please comment on whether the project schedule contingency would be sufficient to address this risk.

On page 5-4, BC Hydro provides Table 5-1 titled Implementation Phase – Risks and Risk Mitigation Summary. Item 15 in the table refers to the newly identified risk:

No.	Risk Category	Risk Status	Risk Event / Threats	Phase One Application			Verification Report		
				Mitigation Plans	Mitigation Status	Probability and Impact	Updated Mitigation Plans & Mitigation Assessment	Mitigation Status	Probability and Impact
14	Project Delivery	Active, Updated	Poor quality of delivery by SI	Comprehensive procurement exercise to select qualified vendors  Establish a strong contract with incentives for good quality delivery  Strong Project and Contract Management  Robust Quality Management Plan	Complete  In Progress  In Progress  In Progress	Medium probability, high impact	Strong Master Services Agreement established.  Contract management, project management, and quality management procedures being updated to reflect lessons learned from work completed to date on the project.  See above	Complete  In Progress  In Progress	Medium probability, high impact
15	Project Delivery	New	Low data quality and or data not being ready according to Project Schedule				Continue detailed assessment and planning of data conversion requirements in early Realization  Alignment of the data conversion tasks with business transition and resource plans	In Progress  Planned	Medium Probability, medium impact

21.3 Please provide further information on the proposed mitigation strategy for Item 15.

On page 5-7, Item 6 in Table 5-1 discusses the risk relating to the regulatory process:

No.	Risk Category	Risk Status	Risk Event / Threats	Phase One Application			Verification Report		
				Mitigation Plans	Mitigation Status	Probability and Impact	Updated Mitigation Plans & Mitigation Assessment	Mitigation Status	Probability and Impact
5	Project Delivery	Inactive	Adverse or Delayed British Columbia Utilities Commission Order	Comprehensive Application; propose a schedule that facilitates a decision by August 2017.  Incremental funding included in Project Reserve as described in section 2.4.2, Table 2-4.	In progress  Completed	Potential impact will vary depending on date and wording of British Columbia Utilities Commission decision.	N/A  Despite a longer decision timeline than planned, no draw on the Project Reserve was necessary.	Completed  N/A	Risk has passed
6	Project Delivery	Active, Updated	Requirement to undertake a protracted regulatory process in order to proceed with Implementation phase work	Comprehensive Application; propose a schedule that facilitates a decision by April 2018.  Incremental funding included in Project Reserve as described in section 2.4.2, Table 2-4	In progress  Completed	Potential impact will vary depending on date and wording of British Columbia Utilities Commission decision.	Board of Directors resolution passed enabling the project to proceed with Implementation Phase activities for up to six months while the regulatory approval process continues in parallel. Some residual risk remains that delay may be required if regulatory process extends beyond six months.	Monitoring	Low probability. High impact

BC Hydro states that the resolution passed by the Board of Directors enables the project to proceed with Implementation Phase activities for up to six months while the regulatory approval process continues in parallel.

By Order G-229-18 dated December 3, 2018, the BCUC established the remaining regulatory timetable for the review of the Application, which includes one round of BCUC and intervener information requests to BC Hydro and written final and reply arguments.

21.4 Please discuss BC Hydro's current plans with respect to proceeding with Implementation Phase activities given the regulatory timetable established by Order G-229-18.

21.5 Please explain any impacts that the regulatory process and timetable established by Order G-229-18 has on the project. In your response, please comment on the project risks, costs and schedule.

22.0 **Reference: SEPTEMBER 2018 BOARD BRIEFING MEMO AND CERTIFIED RESOLUTION  
Exhibit B-1, Appendix E, p. 5;  
Risks**

On page 5 of the September 2018 Board Briefing Memo and Certified Resolution (Appendix E), BC Hydro states:

In the Phase One application, the overall risk level for the project was assessed as moderate. Many of the risks identified in the Phase One application have been mitigated through actions taken during the Design Stage.

22.1 Please provide the overall risk level for the project at this time. In your response, please explain how the risk level was determined.

## **F. PROJECT SCHEDULE**

23.0 **Reference: PROJECT SCHEDULE  
Exhibit B-1, Section 6.3, p. 6-4;  
Updated major milestones and key activities**

On page 6-4 of the Application, BC Hydro states:

The updated project schedule (**Project Schedule**) has been developed in consideration of the project's preliminary design and updated project activities. The Target In-service Date is based on the planned SCA Project schedule of activities required to bring the technical solution into service. The Committed In-service Date includes a four month schedule contingency, which covers changes to the SCA Project within BC Hydro's control, such as additional time for testing the solution. Changes to the SCA Project that impact the project schedule and are outside of BC Hydro's control have not been reflected in this contingency.

23.1 Please provide examples of what changes to the SCA Project would be considered outside of BC Hydro's control.

- 24.0 **Reference:** **PROJECT SCHEDULE**  
**Exhibit B-1, Section 2.3.1.1, pp. 2-9, Table 2-3; Section 6.3.2, pp. 6-5 to 6-6;**  
**SCA Project schedule changes**

On page 6-5 of Chapter of the Application, BC Hydro states:

In the Phase One Application, BC Hydro stated that the planned project completion date was the end of July 2020. As outlined in section 6.3.1, the planned project completion date is now March 2021. The change in the planned project completion date is due to a combination of the longer time to complete the Definition Phase described in section 6.2 above and over two additional months added to the Implementation Phase schedule, for a total of an eight month delay.

- 24.1 Please quantify the cost impacts of the eight month delay to the project completion date. In your response please reference any impacts on the cost variances provided in Table 2-3 and identify whether the cost impacts affect capital or operating.
- 24.2 Please confirm whether the Phase One schedule included a 4 month contingency period.
- 24.2.1 If confirmed, please discuss the purpose of the contingency period.
- 24.2.2 If confirmed, please discuss whether some or all of the 4 month contingency period could have been used to mitigate the impacts of the 8 month delay.

- 25.0 **Reference:** **PROJECT SCHEDULE**  
**Exhibit B-1, Appendix Q, p. 1;**  
**SCA Project – project stages and major milestones**

On page 1 of Appendix Q, BC Hydro provides a summary of the project stages and major milestones. November 2019 is stated to be the “End of warranty period (Stabilization).”

- 25.1 Please confirm, or otherwise explain, that the warranty period referenced is in relation to the System Integrator’s services.
- 25.1.1 If not confirmed, please provide the following information:
- i. The purpose of the warranty;
  - ii. The provider of the warranty;
  - iii. Any risks to the project beyond the warranty period; and
  - iv. Any risks to the warranty period in the event that the project is behind schedule.