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November 15, 2019

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

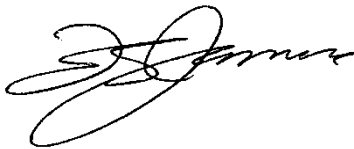
RE: Project No. 3698674
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
John Hart Generating Station Replacement Project
PUBLIC Semi-Annual Progress Report No. 12
April 2019 to September 2019 (Report)

BC Hydro writes in compliance with Commission Order No. C-2-13, to provide its public Report. Commercially sensitive and contractor-specific information has been redacted pursuant to section 42 of the *Administrative Tribunals Act* and Part 4 of the Commission's Rules of Practice and Procedure.

A confidential version of the Report is being filed with the Commission only under separate cover.

For further information, please contact Geoff Higgins at 604-623-4121 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,



Fred James
Chief Regulatory Officer

Gh/af/rh

Enclosure

Copy to: BCUC Project No. 3698674 (John Hart Generating Station Replacement Project) Registered Intervener Distribution List.

John Hart Generating Station Replacement Project

Semi-Annual Progress Report No. 12

F2020 Six Month Period

April 2019 to September 2019

PUBLIC

Table of Contents

1	Introduction	1
2	Project Status	2
2.1	General Project Status Since the Last Semi-Annual Progress Report.....	3
2.2	Major Accomplishments, Work Completed and Key Decisions	5
2.2.1	Government Agency Approvals	5
2.2.2	Construction.....	6
2.3	Key Project Agreement Developments, Challenges and Issues	9
2.3.1	Progress Payments under the Project Agreement.....	9
2.3.2	Contract Management	10
2.4	Plans During the Next Six Months	12
2.5	Site Photographs.....	12
3	Project Schedule	12
3.1	Project Agreement Target and Commercial Operation Dates	12
4	Project Costs	14
4.1	Project Cost Summary	14
4.2	BC Hydro Construction Payments to Project Co	14
4.3	Project Co Payments to BC Hydro during Construction	15
5	Material Project Risks.....	15

List of Tables

Table 1	Project Status Dashboard	4
Table 2	Status of Required Leave to Commence Construction (LCC)	5
Table 3	Status of Decommissioning Authorizations and Permits	6
Table 4	Project Co Work Schedule'	13
Table 5	Total Project Expenditure Summary (\$ million) (Public Version)	14
Table 6	Material Project Risks.....	16

Appendices

Appendix A	Site Photographs
Appendix B	Project Co Direct (Progression) Payments to Date
	PUBLIC

- Appendix C Project Progression of Eligible Costs
PUBLIC
- Appendix D Detailed Project Expenditures
PUBLIC
- Appendix E Progression of Availability Payments
PUBLIC
- Appendix F Key Contractual Terminology
- Appendix G Key Performance Indicator Methodology

1 Introduction

1 The John Hart Generating Station Replacement Project (**the Project**) was initiated
2 to address the risks of: 1) the deteriorating condition and reliability of the existing
3 generating equipment and facilities; 2) the failure of the powerhouse superstructure
4 and wood stave penstocks in the event of a major earthquake; and 3) environmental
5 impact of flow interruptions on the Campbell River. The Commission issued a
6 Certificate of Public Convenience and Necessity (**CPCN**) for the Project in
7 February 2013. In December 2013, the Board of Directors approved full
8 Implementation phase funding. In February 2014, the Board of Directors approved
9 the execution of the Project Agreement and associated commitments to construct
10 the replacement John Hart facility (**the Facility**).

12 The Project is being built under a Design-Build-Finance-Rehabilitate (**DBFR**)
13 procurement model where the successful proponent, InPower BC General
14 Partnership (**Project Co**), is responsible for design, construction and then asset
15 management, which involves planning and managing the maintenance of the new
16 assets, during the 15 years following construction. BC Hydro remains the operator of
17 the assets during the period and BC Hydro Operations' staff will perform the
18 maintenance work.

19 Under the DBFR procurement model, Project Co is financing 40 per cent of the
20 construction costs and all of their management costs during construction. These
21 Project Co costs get paid back to Project Co via monthly Availability Payments
22 (**Availability Payments**) over the 15 years following construction. There are two
23 components to the Availability Payments; the first component is debt repayment of
24 the costs financed by Project Co during construction and the second component is
25 for asset management services that Project Co will provide for the first 15 years.

26 The Availability Payments started in May 2018 when the first new Generating
27 Unit / Low Level Commercial Asset (**GU/LL Asset**) came in-service in May 2018 and

1 they will end in October 2033. This repayment period is called the Availability Term
2 **(the Availability Term)**. The Project Agreement includes a schedule of Maximum
3 Availability Payments for each month of the Availability Term.

4 There are two parts to the Availability Term. The Bridging Period **(the Bridging**
5 **Period)** is the first part and the Services Period **(the Services Period)** is the second
6 part.

7 The Bridging Period started at the beginning of the Availability Term, with the first
8 GU/LL asset coming in service as noted above, and will end at Service
9 Commencement **(Service Commencement)**. Service Commencement is a
10 contractually defined term which marks the transition point for the site from
11 construction to Operations; after Service Commencement, BC Hydro Operations
12 staff will begin performing the Project Co prescribed maintenance of the Facility.

13 The second part of the Availability Term, after Service Commencement, is called the
14 Services Period. It ends at the end of the Availability Term in October 2033. Total
15 Completion **(Total Completion)** is another contractually defined term which marks
16 completion of asset Performance Verification Testing and of construction and
17 decommissioning work (with acceptable deficiencies as allowed under the Project
18 Agreement).

19 **2 Project Status**

20 This Semi-Annual Progress Report No. 12 **(Report No. 12)** provides information
21 concerning the Project from April 1, 2019 to September 30, 2019 (the Reporting
22 Period). Report No. 12 follows the Project report methodology laid out in British
23 Columbia Utilities Commission **(BCUC or Commission)** Order No. G-68-14 except
24 for the Key Performance Indicator Methodology changes which are outlined in
25 [Appendix G.](#)

1 **2.1 General Project Status Since the Last Semi-Annual Progress**
2 **Report**

3 Key project testing to confirm the plant capacity, plant energy and common conduit
4 head loss guarantees are now complete. Preliminary indications are that the targets
5 were met. BC Hydro is waiting for the final report.

6 On June 6, 2019, Service Commencement was officially attained and BC Hydro
7 Operations is now maintaining the new Facility at Project Co's direction. Since that
8 date, the interface between BC Hydro Operations and Project Co for execution and
9 reporting of Service work has been developing favorably. This was tested from
10 mid-July through mid-August 2019 during a Facility planned outage for deficiency
11 work.

12 Learnings from this planned outage were applied to further improve communication
13 paths and standard work processes between Operations and Project Co. In addition,
14 the Annual Maintenance Instructions provided by Project Co (largely from GE) were
15 tested for the first time, with improvements identified which will be implemented for
16 the next large (four to six week) planned deficiency and maintenance outage in
17 July/August 2020.

18 During the 2019 July/August deficiency outage, BC Hydro saw an opportunity to
19 inspect the tunnels, which we did with no material issues noted.

20 The assets have continued to perform well to date with acceptable levels of outages
21 for testing and maintenance over the six month period. See [Appendix E](#), Progression
22 of Availability Payments, for further details on asset availability during the Services
23 Period and Availability Payments made to date.

24 Decommissioning work has advanced significantly with an estimated 87 per cent of
25 the work completed as of September 30, 2019. See section [2.2.2.5](#) for further
26 details.

27 [Table 1](#) provides a Project Status dashboard for the Reporting Period.

1 **Table 1 Project Status Dashboard**

2 ● Green: No Concerns; ● Amber: Some Concerns but in Control; ● Red: Serious Concerns

Status as of:		September 30, 2019
Overall Assessment	●G	BC Hydro is now receiving beneficial use of the assets, all of the Project risk-drivers were met early, and the assets are all performing well to-date.
Schedule	●G	The Total Completion Target Date of August 13, 2019 was missed due to ongoing work related to decommissioning, deficiencies, and outstanding documentation. Indications are that trailing work could go into early 2020. However, there is little negative impact to BC Hydro from these delays. The overall Project ISD was ahead of schedule; the last GU/LL Assets were in service under budget and 2.5 months early in November 2018.
Cost	●G	The total Project cost is forecast is \$1,002 million, \$48 million less than the Board approved P50 Expected Amount of \$1,050 million. See section 4 for more details on Project Costs.
Environment	●R	Environment is red because there were two minor but reportable environmental incidents in the Reporting Period. See further details in section 2.3.2.5. Project Co has now confirmed that the First Island Flow Split test ¹ , which was discussed in the last Progress Report, showed minimal change to the pre-construction conditions as per the requirements of the Project Agreement. Environmental management at site continues to be done very well with no significant issues.
Risks	●G	BC Hydro is managing some contract risks as outlined in section 2.2.2.1. Contingency for these risks has been retained within the current forecast Project cost.
Safety	●G	There were no Major or Moderate injuries during the reporting period. There were two WorkSafeBC inspections with no issues were noted. Project Co's safety record remains top-quartile in the industry. Refer to section 2.3.2.6.

- 3 ● The Board approved contractual Target Total Completion Date in August 2019 is nine months later than the
4 pre-financial close CPCN baseline schedule date of November 2018.
- 5 ● The post-financial close, Board approved (P50 Expected Amount and the Authorized Amount) cost range for
6 the Project is \$1,050 million to \$1,118 million. The Expected Amount is \$110 million more than the
7 Design-Bid-Finance-Rehabilitate P50 amount of \$940 million but within the CPCN Design-Bid-Build range of
8 \$1,014 million to \$1,159 million.

¹ The 'First Island Flow Split Test', which was completed in early June, tested the split of water flow around First Island immediately downstream of the tailrace outlet to ensure preservation of fish habitat and recreational use requirements.

2.2 Major Accomplishments, Work Completed and Key Decisions

2.2.1 Government Agency Approvals

2.2.1.1 Construction Approvals

The final requirement related to construction, the Leave to Commence Operation (LCO),² was granted in June 2019. The table below shows the timing of Approvals.

Table 2 Status of Required Leave to Commence Construction (LCC)

LCC No.	Authorization to Proceed	Status In Progress Report No. 11	Current Status
LCC1	Civil Works	Received Jul 2014	Received Jul 2014
LCC2	Intake Works	Received Oct 2014	Received Oct 2014
LCC3	Tailrace Rock Plug	Received Jul 2015	Received Jul 2015
LCC4	Tailrace Rock Plug Removal	Received Dec 2016	Received Dec 2016
LCC5	Intake Cofferdam Removal	Received Apr 2017	Received Apr 2017
LTCD1 (Previously LCC6)	Commence Diversion and Use of Water	Received Feb 2018	Received Feb 2018
N/A	<i>Water Sustainability Act</i> section 93 Order (Alteration of a Dam)	Received Oct 2018	Received Oct 2018
N/A	Navigation Protection Act Authorization	Received Oct 2018	Received Oct 2018
LCO	Leave to Commence Commercial Operations	Anticipated Jun 2019	Received Jun 2019

2.2.1.2 Decommissioning Approvals

There were no new decommissioning Approvals in the reporting period. The following table lists the authorizations and permits that were previously obtained to support decommissioning work.

² LCO marks acceptance of the work done, and was not required for commencement of commercial operation.

**Table 3 Status of Decommissioning
Authorizations and Permits**

Authorization / Permit	Status In Progress Report No. 10	Current Status	Comments
Authorization for Alteration of a Dam	NA	Received Oct 2018	Required to plug the intakes
Notification For Works In And Around Water	NA	Received Oct 2018	
Temporary Water Use	NA	Received Oct 2018	
Leave to Commence Decommissioning	Anticipated winter 2018/2019	Received Dec 2018	Originally part of the LCO. This was separated, as noted in BCUC Progress Report No 10, to allow decommissioning to start without waiting for the LCO.
Disposal of Treated Water	NA	Received Jan 2018	

2.2.2 Construction

2.2.2.1 BC Hydro Contract Management

Submittals

BC Hydro continues to process all submittals in accordance with the timeline requirements as laid out in the Project Agreement.

Quality

The Project team is closely monitoring Project Co's progress towards closing deficiencies. Project Co is incented to progress deficiencies in order to obtain their Decommissioning Payment as noted in section [1](#) and section [2](#).

Issues and Risks

During the reporting period a number of claims were settled. The settlement amount of [REDACTED] is included in the actuals to date. The settlement, dated June 2019, closed the following notices of potential claims:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

One claim has moved into the dispute resolution process as specified under the Project Agreement. [REDACTED]

[REDACTED]

There are four remaining notices of potential claims from Project Co:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

There is no change to these items since the last Progress Report No. 11.

2.2.2.2 Project Co Management, Engineering, and Design

Design activities are fully completed.

Final documentation items such as as-built drawings and operations and maintenance manuals; and commissioning reports are still ongoing.

2.2.2.3 Procurement and Manufacturing

There are no ongoing procurement and manufacturing activities.

2.2.2.4 Construction & Commissioning

The Performance Verification Testing has been completed and BC Hydro is awaiting the final report.

Balance of Plant items were largely completed in the reporting period. Items that were contingent on prior completion of certain decommissioning components, such as security systems near the decommissioned tailrace and old powerhouse, are now progressing.

2.2.2.5 Decommissioning

Removal of the wood and steel penstocks is now complete and contaminated soils along the alignment have been removed and disposed as planned with no environmental incidents. The actual volume of contaminated soil was less than the baseline in the Project Agreement. The final volumes are still being calculated but it is estimated that this will result in approximately [REDACTED] savings. This savings is reflected in the current Project total cost forecast. (See [Appendix D](#)) Restoration in the woodstave penstock corridor is also nearing completion.

The two Existing Surge Towers being removed were felled on July 12 and July 25, 2019 with no issues.

The plugging of the Existing Intakes and plug leakage tests, dismantling and disposal of the felled Existing Surge Towers, and demolishing and levelling the Existing Powerhouse were also completed.

Remaining activities include restoration of land impacted by construction staging, and restoration of the Canyon View Trail. The latter item includes securing the Existing Powerhouse slope, constructing a tailrace viewing area, paving the Existing Powerhouse area, and erecting new fencing. Two totem poles will be added to the tailrace viewing area to acknowledge the depth of First Nations spiritual, cultural, and physical presence in the area, and our commitment to a lasting relationship with the First Nations. A totem ceremony will be scheduled before the close of the Project.

2.3 Key Project Agreement Developments, Challenges and Issues

2.3.1 Progress Payments under the Project Agreement

Under the terms of the Project Agreement, there is a maximum amount that Project Co can invoice for Eligible Costs (**Eligible Costs**) each month. Eligible Costs are all direct construction costs properly and reasonably invoiced by the Design-Builder to Project Co for design and construction for the original scope of work. The total commitment to Project Co for Eligible Costs under the Project Agreement remains unchanged.

BC Hydro has provided a table in [Appendix B](#) which shows the Maximum Eligible Costs amount that can be billed each month under the Project Agreement, the actual amounts approved to date, and the monthly and cumulative variances.

[Appendix C](#) shows the summary of the work breakdown for the work to be completed by Project Co, the total Eligible billing allowed for each category, and the

approved value (and corresponding percentage) of the work completed to date for each category.

As discussed in section [1](#), BC Hydro pays Project Co 60 per cent of the progressed (billed) Eligible Amounts as Progress Payments. The remaining 40 per cent of the Eligible Amounts (along with the fixed amount for Project Co's Interest During Construction (**IDC**)),³ and the fixed amount for Project Co Ineligible Costs (**Ineligible Costs**)⁴ are booked as a liability (debt) on BC Hydro's balance sheet which will be repaid to Project Co through the Availability Term.

2.3.2 Contract Management

2.3.2.1 BC Hydro Initiated Changes and Impact to Cost and Schedule

There have been no material BC Hydro initiated changes that have impacted overall cost or schedule to date.

2.3.2.2 Material Changes to the Project Agreement and Exercise of Project Agreement Rights

There were no material changes to the Project Agreement in the Reporting Period.

2.3.2.3 Changes to Project Financing Arrangements

There have been no changes to Project financing arrangements since Financial Close.

2.3.2.4 Project Reserve Draws

There have been no Project reserve draws to date.

2.3.2.5 Material Environmental Incidents

There were two minor but reportable environmental incidents in July 2019:

³ As estimated at financial close of the Project Agreement for the portion of the costs being financed by Project Co.

⁴ Project Co indirect or 'ineligible' costs include bidding fees, insurance during construction, and Project Co overhead costs during construction.

- The first incident was an exceedance of permitted contaminant level limits for treated water discharge. This was reported to Ministry of Environment. There were no environmental impacts as the contaminant levels in the receiving environment were compliant. The water treatment operation is now completed for this project; and
- The second incident was a ramp rate violation which occurred during the tunnel dewatering and was reported as required to the Comptroller of Water Rights. BC Hydro also reported the incident to the Department of Fisheries and Oceans and the Ministry of Forests, Lands and Natural Resource Operation as a courtesy. No fisheries impacts were observed as the river levels did not drop below seasonal low flows observed in earlier days.

There were three other minor incidents, with no environmental impacts, that were reported as a courtesy as indicated below:

- In April 2019, turbid water entered Elk Falls Park from the Project site. This was reported to BC Parks. The turbid water was contained in a drainage ditch;
- In June 2019, a ramp rate violation occurred during the flow transfer from the Generating Units to the Bypass Valves at the beginning of the outage window. This was a very brief incident so the average rate over the prescribed period did not exceed the authorised ramp rate under the water licence. This was reported to the Department of Fisheries and Oceans and the Ministry of Forests, Lands and Natural Resource Operations. Lessons learned and valve operational data collected during this incident will be used to refine valve operational procedure to avoid future ramp rate violations; and
- In September 2019, five litres of biodegradable hydraulic oil spilled from a hose on an excavator. This was reported to BC Parks. The affected soil was removed for disposal offsite.

2.3.2.6 Material Safety Incidents

There have been no lost time injuries to date on the Project. There were no Minor or Moderate injuries in the reporting period.

There were two WorkSafeBC inspections during the reporting period with no orders.

The Project's safety statistics continue to be industry-top-quartile. Project Co's life-to-date All-Injury-Frequency statistic at the end of September 2019 was 0.59 with 3.75 million Project Co hours worked to date. The calendar-year-to-date All-Injury-Frequency statistic is 0.00.

2.4 Plans During the Next Six Months

The plans for the next six months include:

- Completion of decommissioning;
- Deficiency management; and
- Planning for and advancing Project close-out activities.

2.5 Site Photographs

Refer to [Appendix A](#) for photographs.

3 Project Schedule

3.1 Project Agreement Target and Commercial Operation Dates

The updated work schedule is shown in [Table 4](#) on the next page.

Table 4 Project Co Work Schedule^{5, 6}

John Hart Generating Station Replacement Project					2018												2019												2020											
Activity Name	Start	Finish	Previous Report's Finish	Variance - Previous Report	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	J	F	M	A	M	J	J	A	S	O	N		
John Hart Generating Station Replacement Project	03-Feb-14 A	22-Oct-19	13-Aug-19	-48	22-Oct-19, John Hart Generating Station Replacement Project																																			
Original Contractual Milestones	02-May-18 A	22-Oct-19	13-Aug-19	-70	22-Oct-19, Original Contractual Milestones																																			
Contractual-Asset-ISD#1 - Power Tunnel with either Low Level Outlet or 1st Unit		02-May-18 A	02-May-18	0	Contractual-Asset-ISD#1 - Power Tunnel with either Low Level Outlet or 1st Unit																																			
Contractual-Asset-ISD#2 - 1st or 2nd Unit		21-Jul-18 A	21-Jul-18	0	Contractual-Asset-ISD#2 - 1st or 2nd Unit																																			
Contractual-Asset-ISD#3 - Remaining Assets (2nd Unit, 3rd Unit & Bypass) & Switchyard		10-Oct-18 A	10-Oct-18	0	Contractual-Asset-ISD#3 - Remaining Assets (2nd Unit, 3rd Unit & Bypass) & Switchyard																																			
Total Completion Date		22-Oct-19*	13-Aug-19	-70	Total Completion Date																																			
Project Milestones	02-May-18 A	09-Nov-18 A	09-Nov-18	0	09-Nov-18 A, Project Milestones																																			
1st ISD - Asset - Power Tunnel & Low Level Outlet		02-May-18 A	02-May-18	0	1st ISD - Asset - Power Tunnel & Low Level Outlet																																			
2nd ISD - Asset - 1st Unit		21-Jul-18 A	21-Jul-18	0	2nd ISD - Asset - 1st Unit																																			
3rd ISD - Asset-Set - 2nd Unit		26-Oct-18 A	26-Oct-18	0	3rd ISD - Asset-Set - 2nd Unit																																			
3rd ISD - Asset-Set - 3rd Unit		05-Nov-18 A	05-Nov-18	0	3rd ISD - Asset-Set - 3rd Unit																																			
3rd ISD - Asset-Set - Bypass System		09-Nov-18 A	09-Nov-18	0	3rd ISD - Asset-Set - Bypass System																																			
Engineering	03-Feb-14 A	14-May-19 A	14-May-19	0	14-May-19 A, Engineering																																			
Intake Design	15-Apr-14 A	21-Nov-17 A	21-Nov-17	0	21-Nov-17 A, Intake Design																																			
Power Tunnel Design	25-Feb-14 A	06-Apr-18 A	06-Apr-18	0	06-Apr-18 A, Power Tunnel Design																																			
Powerhouse Design	29-Feb-14 A	14-Jun-18 A	14-Jun-18	0	14-Jun-18 A, Powerhouse Design																																			
Bypass System Design	24-Mar-14 A	07-Apr-17 A	07-Apr-17	0	07-Apr-17 A, Bypass System Design																																			
Tailrace System Design	03-Feb-14 A	30-May-18 A	30-May-18	0	30-May-18 A, Tailrace System Design																																			
Switchyard System Design	09-Mar-14 A	04-Jul-17 A	04-Jul-17	0	04-Jul-17 A, Switchyard System Design																																			
Existing Facilities Design	03-Jan-17 A	14-May-19 A	14-May-19	0	14-May-19 A, Existing Facilities Design																																			
Procurement	08-Sep-14 A	23-Nov-17 A	23-Nov-17	0	23-Nov-17 A, Procurement																																			
Unit 1, 2 & 3 Supply	09-Mar-15 A	23-Nov-17 A	23-Nov-17	0	23-Nov-17 A, Unit 1, 2 & 3 Supply																																			
Unit 1, 2 & 3 Design	08-Sep-14 A	24-Aug-17 A	24-Aug-17	0	24-Aug-17 A, Unit 1, 2 & 3 Design																																			
Construction and Commissioning	25-Aug-14 A	22-Oct-19	13-Aug-19	-48	22-Oct-19, Construction and Commissioning																																			
Intake Construction & Commissioning	25-Aug-14 A	28-Apr-18 A	28-Apr-18	0	28-Apr-18 A, Intake Construction & Commissioning																																			
Power Tunnel Construction & Commissioning	29-Jul-15 A	29-Apr-18 A	29-Apr-18	0	29-Apr-18 A, Power Tunnel Construction & Commissioning																																			
Powerhouse Construction & Commissioning	08-Jan-15 A	01-Feb-19 A	01-Feb-19	0	01-Feb-19 A, Powerhouse Construction & Commissioning																																			
Bypass System Construction & Commissioning	11-Sep-17 A	09-Nov-18 A	09-Nov-18	0	09-Nov-18 A, Bypass System Construction & Commissioning																																			
Tailrace Construction & Commissioning	23-Feb-15 A	12-Apr-18 A	12-Apr-18	0	12-Apr-18 A, Tailrace Construction & Commissioning																																			
Switchyard Construction & Commissioning	30-Jun-17 A	05-Nov-18 A	13-Aug-19	282	05-Nov-18 A, Switchyard Construction & Commissioning																																			
Decommissioning Construction & Commissioning	12-Dec-18 A	22-Oct-19	09-Aug-19	-74	22-Oct-19, Decommissioning Construction & Commissioning																																			

⁵ Variances from the previous quarter are workday variances.

⁶ Note that the Total Completion forecast date of October 22, 2019 was the last official date received from Project Co. This date is delayed. BC Hydro is waiting for a revised forecast from Project Co.

4 Project Costs

4.1 Project Cost Summary

[Table 5](#) below provides a summary of:

- The Board approved Project Cost, the current forecast Project Cost and the variance between the two; and
- The plan to date amounts based on the Board approved cost schedule, the actual costs to date and the variance between the two.

**Table 5 Total Project Expenditure Summary
(\$ million) (Public Version)**

Description	Board Approved (Plan)	Forecast	Forecast vs Plan	Plan to Date	Actuals to Date	Actuals vs Plan to Date
Total Project Co Costs ⁷	781	772	(9)	781	768	(13)
<i>BC Hydro Costs Including Contingency</i>	187	171	(16)	187	161	(26)
<i>BC Hydro loadings</i>	82	59	(23)	82	59	(23)
Total Owner's Costs	269	230	(39)	269	220	(49)
P50 Project Cost ⁸	1,050	1,002	(48)	1,050	988	(62)
Project Reserve	68	-	(68)	-	-	-
Authorized Project Cost	1,118	1,002	(116)	1,050	988	(62)

Further variance explanations are provided in the (confidential) cost breakdown in the confidential filing of the more detailed cost breakdown in [Appendix D](#).

4.2 BC Hydro Construction Payments to Project Co

In addition to the fixed amount for Progress Payments for the planned Project scope, BC Hydro must also pay Project Co for Design Development Changes and for Change Notices and Innovation Proposals that are accepted by BC Hydro.

⁷ The total Project Co Costs include the cost to decommission existing John Hart facilities.

⁸ The Project Cost excludes Net Book Value write-downs and costs related to Impact Benefit Agreements.

The net cost of Project Changes and Design Development Changes to date is approximately [REDACTED]. These are being paid within the current Project forecast amount.

There have also been two accepted Innovation Proposals, Innovation Proposal 001 and Innovation Proposal 003. Innovation Proposal 001 was paid in 2016 (refer to Semi-Annual Progress Report No.6 for more detail). Innovation Proposal 003 was agreed and paid in April 2018 (refer to Semi-Annual Progress Report No.10 for more detail).

4.3 Project Co Payments to BC Hydro during Construction

Project Co must pay BC Hydro for disruptions caused by Project Co to availability of either the Existing Units and/or the completed new Commercial Assets. During the Bridging Period, these payments were called 'Remittances' and they are netted off of the implementation Progress Payments and are included in Project implementation costs (**Remittances**). During the 15-year Services Period, these payments are being netted off of the Availability Payments.

As of September 30, 2019, [REDACTED] had been netted off the Progress Payment Amounts for minor outages related to construction and commissioning. Another [REDACTED] in outstanding payments from Project Co to BC Hydro for outages during construction and commissioning has been accrued and included in BC Hydro's actuals to date.

5 Material Project Risks

This section describes the material Project risks that have potential to impact the Project by [REDACTED].

Four of the financial risks reported in the last Progress Report (No. 11) are now believed to have less than the [REDACTED] threshold potential impact and they have therefore been removed from the table below. These are: 1. 'Change in

Requirements and/or Performance Specifications’; 2. ‘Event Triggers Operational Requirement during Construction’; 3. ‘Retained Scope of Work’; and 4. ‘Supervening Event Occurs’. The risk item ‘Environmental Event during Construction or Decommissioning’ has also been removed from this section as this risk has largely passed and the likelihood of a material environmental incident at this point is considered remote.

Note that the residual consequence and residual probability levels for the remaining risks are reflected in the retained contingency in the updated Project cost forecast.

Table 6 Material Project Risks

Risk Event/ Description	Risk and Response Summary	Residual Consequence ⁹	Residual Probability
Geotechnical Issue (Amended)	<p>There was a risk that geotechnical conditions encountered at site could be determined to be outside planned expectations.</p> <p>To treat this risk for horizontal sections of water conveyance tunnels, the Project Agreement outlines a baseline of rock conditions. Determination that there is exceedance of these conditions in the horizontal water conveyance tunnels would result in a differing site condition compensation event.</p> <p>For all other areas (intake, powerhouse, tailrace, adits, and access tunnels), Project Co carries the risk of as found conditions if geotechnical conditions encountered at site are outside planned expectations. In such an event, the Project schedule may be delayed and there is a risk of Project Co default or a formal dispute as defined in the Project Agreement.</p> <p>Status: The excavation portion of the Tunnel Work was completed in June 2017. [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p>[REDACTED]</p> <p>(Medium)</p>	<p>[REDACTED]</p> <p>(Possible)</p>

⁹ The residual consequence is the anticipated total consequence regardless of which budget it is paid from. All or part of any consequences would be covered first from existing budgets and then from contingency before using Project Reserve.

Risk Event/ Description	Risk and Response Summary	Residual Consequence ⁹	Residual Probability
	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>		
<p>Owner's Costs (management of contract dispute / resolution, and/or step-in) <i>(no change)</i></p>	<p>Due to the cost of managing a contract dispute and/or managing BC Hydro's step-in rights under the Project Agreement, owner's costs may be increased and/or the Project schedule may be delayed.</p> <p>This risk has been managed through the procurement process which selected an experienced Design-Builder with the competence to deliver large hydropower projects. [REDACTED]</p> <p>[REDACTED]</p> <p>There is also an Independent Certifier who reviews and signs off on monthly progress payments and the Commissioning Notices to Operate (CNOs). BC Hydro is a knowledgeable owner proactively managing the contract and submittals to mitigate claims.</p> <p><i>Status:</i></p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p>[REDACTED]</p> <p>(Medium)</p>	<p>[REDACTED]</p> <p>(Possible)</p>

John Hart Generating Station Replacement Project

Semi-Annual Progress Report No. 12

Appendix A

Site Photographs

Figure A-1 Existing Powerhouse and surge towers before removal



Figure A-2 Removal of the Existing Powerhouse



Figure A-3 1st Surge Tower Removal

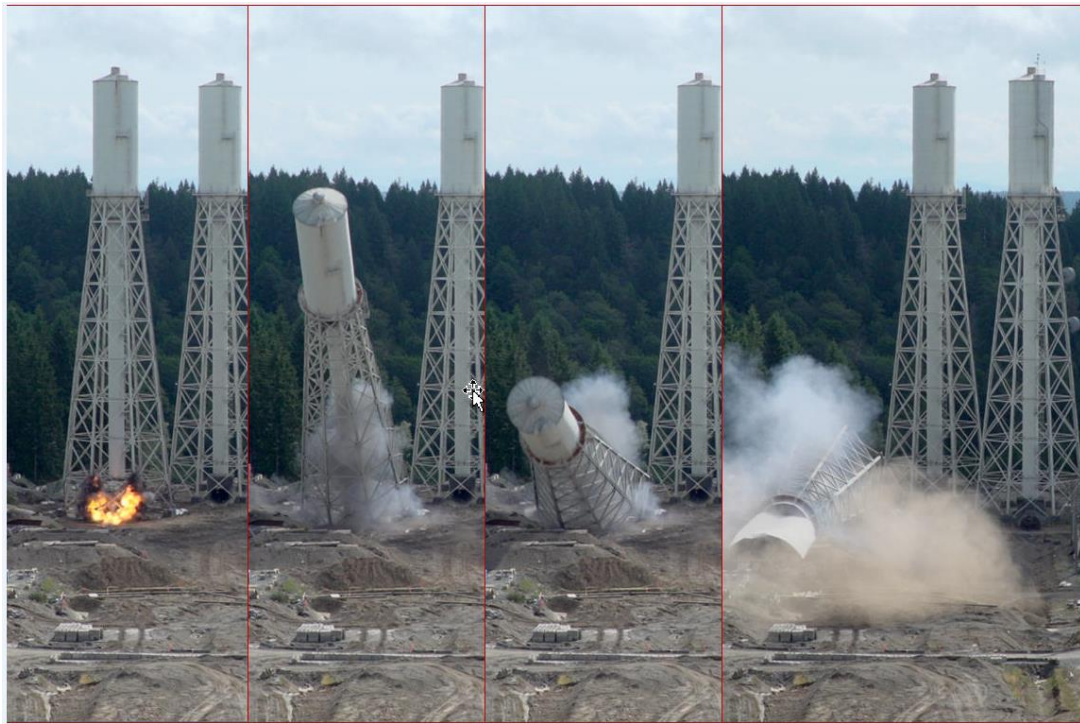


Figure A-4 2nd Surge Tower Removal



Figure A-5 Existing Powerhouse & 2 Surge Towers removed



Figure A-6 Canyon View Trail design and lookout from the Existing Powerhouse area

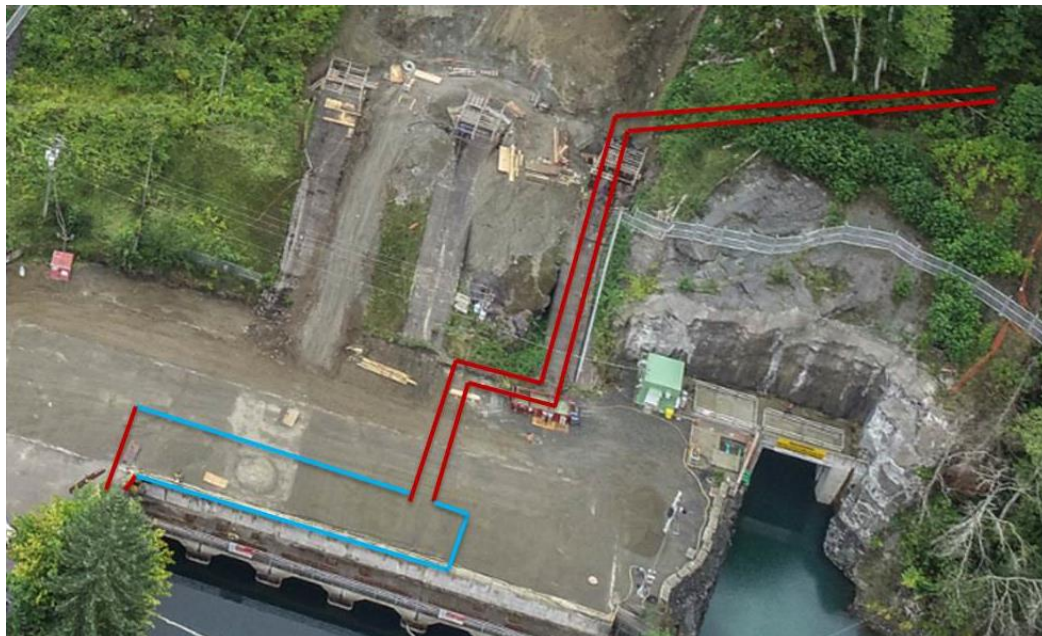


Figure A-7 Tweet shows ongoing environmental management



John Hart Generating Station Replacement Project

Semi-Annual Progress Report No. 12

Appendix B

Project Co Direct (Progression) Payments to Date

PUBLIC

REDACTED

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Semi-Annual Progress Report No. 12

Appendix C

Project Progression of Eligible Costs

PUBLIC

REDACTED

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Semi-Annual Progress Report No. 12

Appendix D

Detailed Project Expenditures

PUBLIC

REDACTED

REDACTED

REDACTED

REDACTED

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Semi-Annual Progress Report No. 12

Appendix E

Progression of Availability Payments

PUBLIC

Section [1](#) explained that there are two distinct periods in the Availability Term called: 1) the Bridging Period (**the Bridging Period**); and 2) the Services Period (**the Services Period**).

During the Bridging Period, the maximum possible Availability Payments were multiplied by a Ramp Rate percentage which depended on the number of Commercial Assets in Commercial Operation.

[Table E-1](#) below outlines the original Target Dates for the GU/LL Assets and the Bypass System; the Revised Target Dates for the GU/LL Assets under Innovation Proposal 001; the added interim date of October 10, 2018 for the completion of the automation of the Bypass System; the actual Commercial Operation Dates for the GU/LL assets; the actual completion date of the automation of the automation of the Bypass System; and the Ramp Rate attained with each Commercial Asset coming in service.

Table E-1 Project Agreement ISDs

Contractual Ramp Rate Item No. and Associated Incremental Ramp Rate (%) ¹	Original Target Commercial Operation Dates and GU/LL Assets	Revised Target Commercial Operation Dates and GU/LL Assets following Innovation Proposal 001	Actual / Forecast Commercial Operation Dates	Status and Comments ²²
1 (█%)	May 2, 2018 1 st GU	May 2, 2018 Tunnel and LLO OR Tunnel and 1 st GU	May 2, 2018 (Actual) Tunnel and LLO	Met
2 (█%)	Jul 21, 2018 2 nd GU	Jul 21, 2018 1 st unit (if LLO 1 st) OR 2 nd unit (if a GU was 1 st)	Jul 21, 2018 (Actual) 1 st GU	Met

¹ The Ramp Rate percentage is multiplied by the value, in the relevant month, in the schedule of Availability Payments which is included in the Project Agreement.

² Met” means attained on or before the Target Date, ‘Late’ means completed but not attained on or before the Target Date, ‘On Track’ means it is forecasting to occur on or before the Target Date, ‘Missed’ means not completed and the Target Date has passed.

Contractual Ramp Rate Item No. and Associated Incremental Ramp Rate (%) ¹	Original Target Commercial Operation Dates and GU/LL Assets	Revised Target Commercial Operation Dates and GU/LL Assets following Innovation Proposal 001	Actual / Forecast Commercial Operation Dates	Status and Comments ²²
3 (█%)	Oct 10, 2018 3 rd GU & Service Commencement	Oct 10, 2018 Remaining unit(s) & Service Commencement	Oct 26, 2018 (Actual) 2 nd GU	Late
			Nov 5, 2018 (Actual) 3 rd unit	Late
			Mar 29, 2019 (Actual) Completion of the Original Conditions Precedent for Service Commencement (Renamed 'Interim Service Commencement')	Late
4 (█%)	Feb 1, 2019 Bypass System	Feb 1, 2019 Target Bypass System Completion Date for the last Ramp Rate Increment Remained Unchanged	Feb 1, 2019 (Actual) = the later of Bypass System completion (Nov 9, 2018) and February 1, 2019	Met
(No Ramp Rate increment)	N/A	Partial Repayment of the increment to Innovation Proposal 001 for automated Bypass System completion delays beyond Oct 10, 2018	Nov 9, 2018 (Actual)	Late
N/A	Aug 13, 2019 Project Total Completion	Aug 13, 2019	BC Hydro is waiting for a new forecast date from Project Co	Missed
N/A	Oct 9, 2033 Service Period End	Oct 9, 2033	Oct 9, 2033	Fixed end-date

The table below shows the Availability Payments paid to Project Co to September 30, 2019.

Table E-2 Availability Payments to Project Co³
(\$ million)

Date	Maximum Non-indexing Payment	Maximum Indexing Payment	Maximum Total Payment	Cost of Delays to In-Service Dates ²²	Availability Deductions ²²	Total Loss Availability Payments ⁴	Net Paid to Project Cost
May '18– Mar '19	26.2	4.2	30.5	(4.3)	-	(4.3)	26.2
Apr '19	3.1	0.6	3.7	NA	-	-	3.7
May '19	3.1	0.6	3.7	NA	-	-	3.7
Jun '19	3.1	0.6	3.7	NA	-	-	3.7
Jul '19	3.1	0.6	3.7	NA	(0.1)	(0.1)	3.6
Aug '19	3.1	0.6	3.7	NA	(0.1)	(0.1)	3.6
Sep '19	3.1	0.6	3.7	NA	-	-	3.7
Total	44.7	7.9	52.6	(4.3)	(0.1)	(4.4)	48.2

³ Minor addition errors occur due to rounding.

⁴ The lost Availability Payments are a savings to BC Hydro but they do not show up as a credit in the Project capital cost. They show up as a write-off of part of the debt provision on the BC Hydro balance sheet for the money owing to Project Co for the portion of the construction costs they financed.

John Hart Generating Station Replacement Project

Semi-Annual Progress Report No. 12

Appendix F

Key Contractual Terminology

Below are explanations of key contractual terminology and acronyms used in this report.

- **Actual Commercial Operation Date** is the later of the Target Commercial Operation Date and the date on which all of the conditions precedent to Commercial Operation of the applicable Commercial Asset(s) have been satisfied as certified by the Independent Certifier.
- **Availability Payments** are the payments from BC Hydro to Project Co during the Availability Term to repay the costs financed by Project Co during the Implementation (construction) Phase and for asset management fees. These payments started when the first commercial asset attained Commercial Operation in May 2018 and they will end in October 2033.
- The **Availability Term** is the period when Availability Payments are made and it encompasses both the Bridging and the Services Periods. It started in May 2018 and ends in October 2033.
- **Bridging Period** is the duration between: 1) the time that the first GU/LL Asset attains Commercial Operation; and 2) the time that the last GU/LL Asset is in Commercial Operation and all Conditions Precedent to Service Commencement have been met. During the majority of the Bridging Period, both the Existing and the new Facility are in operation.
- **Bypass System** – is the automatic system that controls three pressure-reducing ‘bypass valves’ to restore flow to the river in event of a Unit outage. The term bypasses is used to refer to the individual bypass valves which were initially manually operable.
- **Commercial Assets** are the Generating Unit/ Low Level (GU/LL) Assets, the conditions precedent to Service Commencement, and automatic operability of the Bypass System.

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- A **Commercial Asset's Operation Date** is the later of when the relevant Commercial Asset is completed and the Target Date for that asset. This is the date that the Ramp Rate percentage increment of the Availability Payments related to that asset can start being paid to Project Co.
 - **Comptroller** – Comptroller of Water Rights.
 - **Conditions Precedent** to Service Commencement are the things that must be complete under the Project Agreement before the Services Period can start. This includes all assets being in service, Balance of Plant work, BC Hydro staff training, and submittal of key documentation.
 - **CPCN** – Certificate of Public Convenience and Necessity
 - **DBFR** (Design-Build-Finance-Rehabilitate) is the Procurement Model for the Project. Under this model, BC Hydro holds one contract with the consortium InPower BC (Project Co) which then has subcontracts with the suppliers and vendors. Under this model, Project Co is financing part of the construction costs and will only get paid for these costs in the 15 years after construction. The 'Rehabilitate' component of this model is that Project Co retains a significant amount of the asset quality risk during the first 15 years and must meet specific asset condition assessment criteria every four years. Project Co will also provide asset management services during this 15 year period.
 - **Effective Date** means the date of the Project Agreement between BC Hydro Power Authority and InPower BC General Partnership. The Effective Date was February 25, 2014.
 - **Eligible Costs** are all costs properly and reasonably invoiced by the Design-Builder to Project Co for design and construction for the original scope of work.

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- **EFRS** – The Environmental Flow Release System, providing flows of 4 cm to 10 cm into the Elk Falls Canyon to meet operational Water Use Plan obligations.
 - **Existing Facility** means the original John Hart Generating Station, including the Existing Powerhouse, Existing Penstocks, Existing Intake, Existing Surge Towers, Existing Tailrace, Existing Intake Control Building (Concrete), Existing Intake Control Building (Steel), Existing Intake Gates, Existing Site Office Building, Existing Units, Substation, Dams, Spillway and all associated buildings, structures, facilities, systems, monitoring instruments and other infrastructure, as it existed on the Effective Date.
 - **Existing Units** are the old generating units in the Existing Facility.
 - **Facility** means the new hydro-electricity generating facilities, including the Power Intake, Water Conveyances, Generating Units, Powerhouse, any modifications to the Dams, any modifications or improvements to other portions of the Existing Facility (to the extent incorporated into the design of the Facility), and all associated buildings, structures, tunnels, shafts, roads and infrastructure and all other civil, structural, mechanical, electrical, instrumentation and other equipment and systems to be designed, constructed, procured or otherwise provided by Project Co pursuant to the Project Agreement.
 - **Generating Units** are the new units in the new powerhouse. This term refers to all machinery and equipment making up a new complete and independent hydro-electric generator including the water passages, Turbine, Generator, Unit Transformer, protection and control system and replacements thereof.
 - **GU/LL Asset** means any one of the three Generating Units (**GUs**) or the Low Level Outlet (**LLO**) (including the Environmental Flow Release System and manual operability of the bypasses).

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- **Ineligible Costs** means the indirect or ‘ineligible’ costs include bidding fees, insurance during construction, and Project Co overhead costs during construction.
 - **KPI** – Key Performance Indicator.
 - **LLO** – the Low Level Outlet valve, which includes the Environmental Flow Release Valve and the bypasses (with manual operability). The Low Level Outlet Valve is capable of providing up to 40 cm into the upper Elk Falls canyon.
 - The **LLO System** includes the Low Level Outlet, the Environmental Flow Release System and the automated Bypass System.
 - **PPM** – Project and Portfolio Management
 - **Progress Payments** are the payments for progression of Implementation works.
 - **The Project** is the John Hart Generating Station Redevelopment Project.
 - **Project Co** means InPower BC General Partnership.
 - The **Ramp Rate** is the percentage increment of the Availability Payments that Project Co becomes entitled to as the Commercial Operation Dates for the Commercial Assets are attained. The Ramp Rate is multiplied by the relevant month’s value in the schedule of Availability Payments which is included in the Project Agreement. This determines the Availability Payment amount that Project Co will receive.
 - **Remittances** means a payment from Project Co to BC Hydro for specific events such as non-availability of the GU/LL assets during the Bridging Period.
 - **Service Commencement** is when the Bridging Period ends and the Services Period begins. This occurs either on October 10, 2018 or when all of the GU/LL

assets are in Commercial Operation and all of the Conditions Precedent to Service Commencement have been met, whichever is later. The key difference at Service Commencement is that the Facility is handed over to BC Hydro operations and BC Hydro's crews will be used in maintenance and operation of the Facility.

- **Services Period** starts at Service Commencement and ends on October 9, 2033. During this period, Project Co provides asset management services and retains asset quality risk. The other key difference at Service Commencement is that BC Hydro's crews will be used in maintenance and operation of the Facility.
- **Target Commercial Operation Dates** (for the Commercial Assets) and the **Target Service Commencement Date** are the earliest possible dates that the percentage of the Availability Payments related to each Commercial Asset can start.

Total Completion marks completion of construction and decommissioning on the Project, with deficiencies or trailing costs as allowed under the Project Agreement.

John Hart Generating Station Replacement Project

Semi-Annual Progress Report No. 12

Appendix G

Key Performance Indicator Methodology

The table below outlines the Key Performance Indicator Methodology. Performance Indicators for Safety, Environment, and Risk are in process of being reviewed internally against practice standards and newer criteria may be released in future reports. The original methodology from 2014 is also included at the end of this appendix.

Indicator	Red	Amber	Green
Overall Project Health (amended)	Serious Concerns – if cost or schedule are red or some of the sub-components are red Original BCUC methodology: Serious Concerns – if any of the sub-components are red	Some concerns– if cost or schedule are amber or some of the sub-components are amber or red with low risk Original BCUC methodology: Some Concerns but in control	No Concerns – if cost or schedule are green or some of the sub-components are green or amber with low risk Original BCUC methodology: No Concerns – all sub-components are green
Schedule – In-Service-Dates (amended, less stringent than the original BCUC filed methodology but more reflective to the current Project Status)	Project is forecasting to miss the Works Completion Date which is the Target Commercial Operation (In-Service) Date of February 1, 2019 as included in the original plan. Original BCUC methodology: red if any of the ISDs were forecast to be missed and the Project team had interpreted this to be against the revised dates after innovation Proposal 001 which moved the last ISD up from February 1, 2019 to October 10, 2018.	Revised Text: Project is forecasting to miss or has missed one of the interim Target Commercial Operation (In-Service) Dates or risk is seen to the final Target Commercial Operation Date of February 1, 2019. For missed interim dates, schedule will only be marked amber in the report this is first reported and then the indicator will be marked green again for the same event if it is passed. Original BCUC methodology: amber if the Project is forecasting to miss a work progress item, ISDs for key assets are not at risk	All other cases.

Indicator	Red	Amber	Green
Cost (amended, more stringent than the original BCUC filed methodology)	Project actual or forecast costs exceed the expected (P50) budget of \$1,050 million by greater than 5 per cent or > \$100k. Original BCUC methodology: <i>Project is forecast to exceed the Upper Bound of the Project (\$1,118 million).</i>	Project actual or forecast costs exceed the expected P50 budget of \$1,050 million by < 5 per cent or < \$100k or a new issue or event has arisen, or risk associated with an existing issue or event has increased, and as a result BC Hydro wishes to signal that there is significant risk of the cost indicator going red in the future. Original BCUC methodology: <i>Forecast to complete exceeds the P50 budget (1,050 million) and a draw on Board Project Reserve is required.</i>	All other cases.
Environmental	As a result of an Environmental related issue or event: <ul style="list-style-type: none"> • The project is forecasting to miss a Commercial Asset ISD or Service Commencement; • The project is forecasting to exceed its Expected Cost; • An external reportable environmental incident has occurred; • A violation of environmental regulation or law, or of a condition of an Environmental Assessment Certificate, or of an environmental condition of a CPCN has occurred; • An Environmental incident(s) has occurred which would be rated at a consequence level of S3 or greater under the project delivery risk matrix; • the shareholder or regulator is directing BC Hydro with respect to the project in a manner that causes 1 or 2 above; or 	A new Environmental related issue or event has arisen, or The risk associated with an existing Environmental related issue or event has increased, which results in a 50 per cent or more probability that this indicator will be red in the future. Original BCUC methodology: <i>A new reportable environmental related issue or re-occurring environmental issue identified in audits.</i>	All other cases.

Indicator	Red	Amber	Green
	<ul style="list-style-type: none"> An adverse reputational impact is forecast. A reportable incident is an incident which BC Hydro is required by law or regulation to report to the regulator or agency. <i>Original BCUC methodology: A violation of environmental regulation or law, multiple environmental incidents have occurred with adverse impact to BC Hydro's reputation forecast.</i>		
Risks (No change)	Material risks previously identified have materialized with treatment plan(s) in place; New material risk(s) materialized, treatment plans in place. The Project is forecasting to exceed the Upper Bound of \$1,118 million.	Project risks have materialized and been treated. The Project is forecasting to be within the Upper Bound of \$1,118 million.	Material risks identified, up-to-date treatment plan developed. Lower ranked risks are monitored and addressed.
Safety (No change)	Serious contractor safety performance issues reported that have resulted in a lost time injury. (no change)	Re-occurring safety performance issues or poor audit results requiring mitigation. Treatment plan(s) developed and implemented.	All other cases.

Negotiated Key Performance Indicator methodology filed with the BCUC in 2014

	Red	●	Amber	●	Green	●
Overall	Serious Concerns – if any of the sub-components are red		Some Concerns but in Control		No Concerns – all sub-components are green	
Schedule – In Service Dates	Project is forecasting to miss ISD for one or multiple assets specified in the Project Agreement (per Table 2)		Project is forecasting to miss a Project Agreement work progress item (per Table 3), the contractor has taken action to rectify, ISDs for key assets are not at risk		All other cases - ISD expected to be met	
Cost	Project is forecast to exceed the Upper Bound of the Project (\$1,118 million)		Forecast to complete exceeds P50 budget (\$1,050 million) and a draw on Board Project Reserve is required		Forecast to complete is expected to be within P50 cost amount (\$1,050 million ¹)	
Environmental	A violation of environmental regulation or law, multiple environmental incidents have occurred with adverse impact to BC Hydro's reputation is forecast		A new reportable environmental related issue or re-occurring environmental issues identified in audits.		All other cases	
Risks	Material risks previously identified have materialized, with treatment plan(s) in place; New material risk(s) materialized, treatment plan(s) in place. The Project is forecasting to exceed the Upper Bound of \$1,118 million		Project risks have materialized and treated. The Project is forecasting to be within the Upper Bound of \$1,118 million		Material risks identified, up-to-date treatment plan developed. Lower ranked risks are monitored and addressed	
Safety	Serious contractor safety performance issues reported that has resulted in a lost time injury		Re-occurring safety performance issues or poor audit results requiring mitigation. Treatment plan(s) developed and implemented		All other cases	