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August 14, 2023

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

Dear Patrick Wruck:

**RE: Project No. 1599245
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Bridge River 1 Units 1 to 4 Generator Replacement Project
PUBLIC Semi-Annual Progress Report No. 2
January 1, 2023 to June 30, 2023 (Semi-Annual Report)**

BC Hydro writes in compliance with Commission Order No. C-6-22 and G-310-22, to provide Semi-Annual Progress Report No. 2 for the Project. 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 Joe Maloney at bchydroregulatorygroup@bchydro.com.

Yours sincerely,



Chris Sandve
Chief Regulatory Officer

fk/rh/om

Enclosure

**BC Hydro Bridge River 1 Units 1 to 4
Generator Replacement Project**

Semi-Annual Progress Report No. 2

January 2023 to June 2023

PUBLIC

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1 Background

1.1 Project Overview

The Bridge River Generation System is located in the Coast Mountains of southern British Columbia, northeast of Pemberton and west of Lillooet. It was built between 1948 and 1960 and is a cascading system that includes three facilities: the La Joie Facility, the Bridge River Facility, and the Seton Facility, which collectively contribute approximately 5% of BC Hydro's total annual hydroelectric generation. The Bridge River Facility is the largest of the facilities in the Bridge River Generation System and consists of Terzaghi Dam, Carpenter Reservoir, Bridge River 1 Generating Station (**BR1**) and Bridge River 2 Generating Station (**BR2**).

At BR1, the generators and governors are in unsatisfactory and poor condition respectively, the exciters are approaching end-of-life and the control systems are obsolete. These Bridge River generating units are the primary means for BC Hydro to manage water flows in Lower Bridge River. The generating units at the Bridge River 1 Facility have been de-rated and the reduced elevation of the Downton reservoir has challenged BC Hydro's ability to manage flows within the Water Use Plan (**WUP**) Order target flow schedule. Failure to manage water flows within the 2011 Bridge River – Seton WUP Order target flow schedule can impact fish, fish habitat and the St'át'imc Nation's values.

The BR1 Project (the **Project**) will replace the Unit 1 to 4 generators, governors, exciters, and control systems. The Project will improve the reliability of generating Units 1 to 4, improve BC Hydro's ability to manage water flows to comply with the WUP Order target flow schedule, and meet commitments in the 2011 Agreements and the 2019 High Flow Settlement Agreement with the St'át'imc Nation.

1.2 BCUC Application and Decision

On July 23, 2021, British Columbia Hydro and Power Authority (**BC Hydro**) filed an application with the British Columbia Utilities Commission (**BCUC**) seeking a

1 Certificate of Public Convenience and Necessity (**CPCN**) for the Project
2 (**Application**).¹ At the time of the Application, the Project had a total cost estimate
3 range of \$207.1 million to \$326.3 million, with an expected In-Service Date of
4 July 2030.

5 On October 11, 2022, the BCUC issued Decision and Order No. C-6-22, granting
6 BC Hydro a CPCN for the Project subject to the following conditions:

- 7 a. Consistent with BC Hydro commitments to the
8 St'át'imc Nation, with respect to in-season flow management
9 decisions to facilitate the construction of the BR1 Project,
10 BC Hydro shall work with the Joint Planning Forum
11 consistent with the mutually agreed to Terms of Reference
12 established between BC Hydro and the St'át'imc Authority
13 and give due consideration to water level and flow impacts
14 and water needs related to: Fish and fish habitat; Wildlife
15 and wildlife habitat; Soil erosion; St'át'imc use of the land
16 and resources in the area; and St'át'imc cultural activities in
17 the area; and
- 18 b. Consistent with BC Hydro's commitments to the
19 St'át'imc Nation, BC Hydro, in collaboration with the Tsal'alh
20 and SCC, will make best efforts to ensure compliance,
21 monitoring and enforcement of the Bridge River Contract
22 Worker Conduct Requirements and the Bridge River Internal
23 Review Procedure for Code of Conduct Violations.

24 In Appendix A to Decision and Order No. C-6-22, the BCUC directed BC Hydro to
25 file semi-annual progress reports and also a Material Change report in the event of a
26 change to BC Hydro's plan as set out in the Application that would reasonably be
27 expected to have a significant impact on the Project.

28 BC Hydro files Progress Report No. 2 (**Report**), which provides an update on the
29 Project covering the period from January 1, 2023, to June 30, 2023, (**Reporting**
30 **Period**). The Report complies with project reporting requirements for semi-annual

¹ The Application was a joint application for the Project and for the Bridge River Transmission Project pursuant to Order G-246-20. Order C-6-22 discussed here is for the Project only. The review and decision for the Bridge River Transmission Project is subject to further process.

1 progress reports as outlined in Appendix A to Decision and Order No. C-6-22.
2 During the Reporting Period, BC Hydro has no material changes to report pursuant
3 to Order No. C-6-22.

4 **2 Project Status**

5 **2.1 General Project Status**

6 [Table 1](#) provides a high-level status update for the Project.

7 **Table 1 Project Status Dashboard²**

8 **🟢 Green: No Concerns; 🟡 Amber: Some Concerns but in Control; 🔴 Red: Serious Concerns**

Status as of:		June 30, 2023
Project Status	🟢	The Project has completed Definition phase and started Implementation phase. The Project is on track to meet the first unit In-Service Date, forecasted for May 2027.
Safety	🟢	There were no safety incidents during this Reporting Period.
Scope	🟢	There were no material changes in Project scope during this Reporting Period.
Schedule	🟢	Completion of all Definition phase deliverables and endorsement from the BC Hydro Gate Board, and approval from the BC Hydro Board of Directors to proceed to Implementation phase was completed in June 2023. The public Request for Proposals for the replacement Unit 1 to 4 Generators closed mid-February 2023, evaluation of the received bids was completed, and a preferred bidder was identified.
Cost	🟢	Project First Full Funding was approved by the Board of Directors in June 2023. The updated cost estimate continues to be within the range presented in the CPCN application for the Project.
First Nations	🟢	Engagement continues with the St'at'imc Nation on the Bridge River Access and Accommodations study (this study is for all projects on the Bridge River system) to develop recommendations for worker accommodation and transportation of workers, equipment, and materials to and from the site during construction.
Stakeholder Engagement	🟢	There were no new issues identified during this Reporting Period. Regular contact is maintained with external stakeholders through meetings, presentations, open houses, semi-annual newsletters and delegations to local governments.
Environment	🟢	There were no new issues identified during this Reporting Period.

² The presented key performance indicators are BC Hydro's internal indicators of project health that reflect performance against BC Hydro-approved scope, schedule, and cost.

2.2 Major Accomplishments and Work Completed

The following activities were completed during the Reporting Period:

- Completed all preliminary design activities for the replacement Unit 1 to 4 generators, governors, exciters, and control systems;
- Developed an updated Preliminary Design Estimate that will include contract pricing for the replacement Unit 1 to 4 generators; and
- Completed all Definition phase deliverables and obtained endorsement from the BC Hydro Gate Board and approval, including Implementation Phase funding, from the BC Hydro Board of Directors to proceed to the Implementation phase.

2.2.1 Procurement Activities

BC Hydro initiated procurement for the design, supply and installation of the replacement Unit 1 to 4 generators in Definition phase. The public Request for Proposals (**RFP**) for the replacement Unit 1 to 4 generators was issued to BC Bid in August 2022 and closed in February 2023. The evaluation process has been completed and BC Hydro is preparing for negotiations with a preferred bidder.

BC Hydro has not commenced any other procurement activities for the Project in this Reporting Period.

2.2.2 Contract Management Activities

There has been no equipment supply or site construction contracts awarded to date.

2.2.3 Engineering and Design

During the Reporting Period, the following engineering work was completed:

- All preliminary design activities for the replacement Unit 1 to 4 generators, governors, exciters, and control systems were completed;
- An updated Preliminary Design Estimate was completed;

- 1 • The project engineering team completed the evaluation of the Generator RFP
2 bids; and
- 3 • A draft of the specification for the Generator Floor Fire Protection System was
4 completed.

5 **2.2.4 Construction Activities**

6 There have been no construction activities undertaken to date.

7 **2.2.5 Environment and Archaeology**

8 There are no reportable environmental incidents and no archaeological finds or
9 issues for the Project to date.

10 Environmental activities and issues at the end of the Reporting Period are:

- 11 • Outages required for replacement of BR1 generating units were reviewed and
12 endorsed by the Joint Planning Forum;³
- 13 • As the BR1 generating station equipment has insulating oil containing PCBs,
14 management and disposal of hazardous waste including PCBs, Lead, Silica,
15 and Asbestos will be required during the Implementation phase;
- 16 • An archaeological overview assessment has been completed for the Project
17 area and confirmed the Project is situated on terrain with high archaeological
18 potential. An Archaeological Impact Assessment will be required in advance of
19 any ground disturbance activities such as for access roads or laydown areas;
20 and
- 21 • An Environmental Management Plan (**EMP**) has been drafted. The EMP will be
22 reviewed by the St'at'imc Nation before it is finalized.

³ The Joint Planning Forum reviews the plans for capital and maintenance projects in the Bridge River System. BC Hydro and St'at'imc each have three representatives on the forum.

1 **2.2.6 First Nations**

2 Engagement continued with the St'át'imc Nation on the Bridge River Access and
3 Accommodation study that will lead to recommendations for worker accommodation,
4 as well as transportation of workers, equipment, and materials to and from the site
5 during construction. This engagement included an open house and technical
6 working group meeting in June 2023. Input from these engagement sessions will be
7 included in the study and development of evaluation criteria as well as options for
8 assessing access and accommodation options. Further engagement is being
9 planned for the fall of 2023.

10 The RFP for the Units 1-4 generator replacement was posted in August 2022 and
11 included a minimum set aside amount to be awarded to the St'át'imc Nation
12 Designated Businesses. The St'át'imc Nation representatives were involved in site
13 visits and vendor information sessions related to the RFP.

14 **2.2.7 Public Engagement**

15 Regular engagement is maintained with the Squamish Lillooet Regional District
16 (**SLRD**), District of Lillooet, both the Bridge River and Lillooet Economic Advisory
17 committees and other external stakeholders through semi-annual newsletters and
18 delegations to local governments to discuss both the Project and the overall capital
19 Project work on the Bridge River System.

20 During this Reporting Period, three public open houses were held (Lillooet,
21 Gold Bridge and online), at which information and updates on the Project as well as
22 the Bridge River Access and Accommodation study underway for the Bridge River
23 area were presented. No questions were raised about the project. There was one
24 request for an open house in Seton Portage. A public open house is being planned
25 for that area in the fall of 2023.

26 Meetings took place with the Lillooet Chamber of Commerce and the SLRD Area B
27 Director in both February 2023 and May 2023 as part of BC Hydro's Bridge River

1 Access and Accommodation study. Questions raised related to the Project were
2 regarding worker accommodations, worker overflow into Lillooet and the travel plan
3 for those workers between Lillooet and Tsal'alh. Plans are to have workers stay in
4 existing accommodations in Tsal'alh. Any change to that approach would be
5 communicated to stakeholders and the public.

6 A presentation to the SLRD board took place on June 2023 and no questions were
7 raised directly relating to the Project.

8 Planning is underway for the next phase of public engagement leading up to
9 construction, which includes possible site tours for local elected officials, an open
10 house in the fall of 2023, and construction notifications as needed.

11 **2.2.8 Regulatory, Permits, and Authorizations**

12 There were no permitting or authorization applied for and/or obtained during the
13 Reporting Period.

14 **2.3 Project Challenges**

15 There have been no material Project challenges during the Reporting Period.

16 **2.4 Plans for Next Six Months**

17 BC Hydro plans to undertake the following activities in the next Reporting Period:

- 18 • Complete negotiations and award a contract with the preferred bidder for the
19 replacement Unit 1 to 4 generators;
- 20 • Complete system design for the replacement Unit 1 to 4 generators; and
- 21 • Finalize the specifications and issue a Request for Quotations (**RFQ**) for the
22 Generator Floor Fire Protection System.

3 Scope Change Summary

There was no approved change in scope during this Reporting Period.

BC Hydro recommended not to include the Turbine Energy Dissipation Device described in Table 5-1 in section 5.2.1 of the Application, in the expected cost of the Project. Instead, advanced delivery of generating equipment for the second and fourth units was considered a more effective risk mitigation for a unit out of service event. The budget to supply a Turbine Energy Dissipation Device was assigned to a special reserve. The risk mitigation change will be reviewed by the Joint Planning Forum.

Once any changes to the Project scope and any impacts on Project cost and schedule are confirmed and approved and if the changes to Project scope, cost and schedule constitute a “material change”, BC Hydro will file a Material Change Report either in the next progress report or within 30 days of the change being approved by the appropriate authority within BC Hydro, whichever is earlier.

4 Project Schedule

[Table 2](#) below provides the forecast dates for the Project major milestones as of June 30, 2023, and a comparison to the Project Major Milestones provided in Table 5-5 of the Application. Variances are explained in section [4.1](#).

1
2

Table 2 Project Major Milestones as of June 30, 2023

Row No.	Description of Major Milestone	Estimated Date in Application	Actual Current Forecast	Status and Comments
1	BC Hydro files BR1 Project Application	Jul 2021	Jul 2021	Completed
2	Public Procurement Bidding for Generators Closed	Mar 2022	Feb 2023	Completed
3	Expected BCUC Decision Date	Jul 2022	Oct 2022	Completed
4	Implementation Phase Funding Approval	Apr 2023	Jun 2023	Completed
5	Award Contract for Generator Replacement	Jul 2023	Sep 2023	Delayed
6	First Generating Unit Asset In-Service Date	May 2027	May 2027	On Track
7	Second Generating Unit Asset In-Service Date	May 2028	May 2028	On Track
8	Third Generating Unit Asset In-Service Date	May 2029	May 2029	On Track
9	Fourth Generating Unit Asset In-Service Date	May 2030	May 2030	On Track
10	BR1 Project In-Service Date	Jul 2030	Jul 2030	On Track
11	BR1 Project Complete	May 2031	May 2031	On Track

3
4

4.1 Schedule Variance Explanation for Forecast as of June 30, 2023

5
6

Table 3 Schedule Variance Explanation for Forecast as of June 30, 2023

Row No.	Explanation	Variance
5	Due to requests from proponents, closure of the Request for Proposals (RFP) was delayed. The work effort required to complete the evaluation of received RFP bids was longer than originally planned.	2 months

7

5 Project Cost

8

5.1 Project Cost Summary as of June 30, 2023

9 On June 28, 2023, BC Hydro issued a letter to the BCUC in compliance with BCUC
10 Decision and Order No. C-6-22, to provide “[a] report explaining any variances
11 between the Authorized Cost of \$326.3 million for the BR1 Project filed in the
12 Application and the amount approved by BC Hydro’s Board of Directors, within

1 30 days of final approval of the BR1 Project.” The letter indicated that on
2 June 8, 2023, BC Hydro’s Board of Directors approved Implementation Funding for
3 the BR1 Project and that there was no variance between the Authorized Cost of
4 \$326.3 million as filed in the Application and the amount approved by the Board.

5 [Table 4](#) provides the actual costs incurred to the end of the Reporting Period
6 (June 30, 2023). The table also provides the Project’s forecasted Expected Amount
7 and Authorized Amount as of June 30, 2023, and a comparison to the Project Cost
8 Range Breakdown provided in Table 5-3 of the Application.

9 Variances greater than \$1.0 million between the Project Cost Range Breakdown
10 provided in Table 5-3 of the Application ([Table 4](#), column A) and the Project’s
11 forecast as of June 30, 2023 ([Table 4](#), column B) are explained in section [5.1.1](#).

1 **Table 4 Project Expenditure Summary – Application, Forecast and Actual Cost as of June 30, 2023**

Row No.	Description	Estimate Analysis			Forecast Analysis					Actuals Analysis		
		A	B	C	D	E	F	G	H	I	J	K
		CPCN Application filed Jul 23, 2021 (\$M)	Implementation Approval Jun 22, 2023 (\$M)	Variance to Application (\$M)	Prior Report Forecast Dec 30, 2022 (\$M)	Current Forecast at Jun 30, 2023 (\$M)	Variance to Prior Report (\$M)	Variance to Application (\$M)	Variance to Application (%)	Actuals to Jun 30, 2023 (\$M)	% of Current Forecast (%)	% of Application (%)
		B-A			E-D	E-A	G/A		I/E	I/A		
1	Pre-Implementation Phase Costs											
	Excludes Interesting During Construction and Capital Overhead											
	Implementation Phase Costs											
	Direct Construction Costs											
2	Generator 1st Unit											
3	Generator 2nd Unit											
4	Generator 3rd Unit											
5	Generator 4th Unit											
6	Governor (all units)											
7	Exciter (all units)											
8	Controls (all units)											
9	Balance of Plant (all)											
10	Total Direct Construction Costs											
	Indirect Construction Costs											
11	Project Management											
12	Engineering & Design											
13	Indigenous Relations											
14	Environment, Stakeholders & Properties											
15	Procurement & Quality Assurance											
16	Legal Costs											
17	Total Indirect Construction Costs											
18	Total Implementation Phase Costs											
	(Before Contingency & Loadings)											
19	Contingency											
20	Capital Overhead (COH)											
21	Interest During Construction (IDC)											
22	BC Hydro Expected Amount	243.4	275.9	32.5	248.6	275.9	27.3	32.5	13.4	14.6	5.3	6.0
23	Project Reserve	82.9	50.4	-32.5	82.9	50.4	-32.5	-32.5	-39.2	0	0.0	0.0
24	BC Hydro Authorized Amount	326.3	326.3	0.0	331.5	326.3	-5.2	0.0	0.0	14.6	4.5	4.5

2

1 **5.1.1 Project Cost Variance Explanation**

2 The Preliminary Cost Estimate prepared to support the Application was updated in
3 April 2023 for the Implementation phase, First Full Funding request. By updating the
4 cost estimate, escalation and project loadings changed for all the line items. The
5 previous cost estimate was based on April 2021 dollars; the current cost estimate is
6 based on February 2023 dollars.

7 [Table 5](#) below provides the reasons for the variances between the costs submitted in
8 the Application dated July 23, 2021, and the forecast costs as of June 30, 2023.

9 **Table 5 Cost Variance Explanation for Forecast**
10 **as of June 30, 2023**

Row in Table 4	Explanation	Total Variance (\$ million)
2	•	
3	•	
4	•	
5	•	
7	•	
12	•	
14	•	

Row in Table 4	Explanation	Total Variance (\$ million)
19	•	
20	•	
21	•	
23	•	

1 **5.2 Summary of Individual Contracts Exceeding \$3.0 million**

2 The public Request for Proposals for the replacement Unit 1 to 4 generators closed
3 on February 8, 2023. No other material contracts have been awarded by the end of
4 the Reporting Period.

5 **6 Project Risks**

6 This section describes the material⁴ Project risks that have the potential to impact
7 the Project and provides an update on the status of the risk and treatments provided
8 in sections 7.3 to 7.5 of the Application, where applicable.

9 Over the life of the Project, risks and associated risk treatments are and will be
10 identified, analyzed, monitored, and reviewed, in accordance with BC Hydro’s
11 project management practices and procedures.

⁴ BC Hydro defines ‘material’ in this case to be any risk with a pre-treatment risk level in the Executive Risk zone, as identified in the Project Delivery Risk Matrix, which was provided in Appendix O of the Application.

1

Table 6 Summary of Material Project Risks and Treatments

From Application dated July 23, 2021						Updated for Reporting Period ending June 30, 2023			
1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.3.1	Active	Regulatory proceeding impacting the Project schedule. A BCUC Order being issued later than expected or a BCUC Order declining to issue a CPCN for the BR1 Project. BC Hydro is requesting a decision from the BCUC on whether to grant a CPCN for the Project by no later than July 2022.	Financial Loss	10 Probability: Possible (L6) Severity: \$10 M to \$100 M (S4)	9 Probability: Remote (L5) Severity: \$10 M to \$100 M (S4)	Closed	<ul style="list-style-type: none"> Comprehensive Application Overall system view and the economic value of the Bridge River System Regulatory schedule that allows for a decision by July 2022 Including a three-month schedule contingency to mitigate impact from the regulatory proceeding 	<ul style="list-style-type: none"> Complete Complete Complete Complete 	Not Applicable
7.3.2	Active	Bid Price Uncertainty from a Changing Generator Supply Market The public procurement process for generators will seek bids from multiple generator suppliers. Due to the changing generator supply market, including fluctuations in commodity pricing for steel and copper, as well as the remoteness of the Bridge River area, there is a risk that bidding suppliers may not accurately estimate the scope and risks associated with the generator replacement work.	Financial Loss	11 Probability: Likely (L7) Severity: \$10 M to \$100 M (S4)	9 Probability: Possible (L6) Severity: \$1 M to \$10 M (S3)	Closed	<ul style="list-style-type: none"> Estimating analysis of the anticipated range for the replacement generator contract pricing and assigning a special reserve for market risks Notify the market of the opportunity so that bids are received from a range of proponents, leading to competitive prices Market sounding activities (RFI) in advance of the request for proposal process Site visits for bidders to ensure the location remoteness will be accounted in bid pricing Familiarizing proponents with BC Hydro's practices and performance expectations through a Request for Information Comprehensive criteria for bid pricing evaluation Bid period for the public procurement process in the Definition so that competitive market pricing for the replacement generators can be available at the same time as the preliminary cost estimate 	<ul style="list-style-type: none"> Complete Complete Complete Complete Complete Complete 	Not Applicable

From Application dated July 23, 2021						Updated for Reporting Period ending June 30, 2023			
1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.3.3	Active	<p>Project Resources Contracting or Transmitting COVID 19</p> <p>There is a diminishing risk that a resource or resources working on the Project contracts and/or transmits COVID-19.</p> <p>This could have negative impact on the health of workers or contractors assigned to the BR1 Project. Sick or isolating workers may result in a delay in completing critical BR1 Project activities.</p>	Safety	<p>10</p> <p>Probability: Likely (L7)</p> <p>Severity: Temporary Disability (S3)</p>	<p>8</p> <p>Probability: Remote (L5)</p> <p>Severity: Temporary Disability (S3)</p>	Closed	<ul style="list-style-type: none"> Following BC Hydro's Pandemic Response Plan which complies with the Government of B.C and Government of Canada guidelines and requirements Sharing BC Hydro's Pandemic Response Plan with the St'at'imc Nation, local governments, stakeholders and the public Proactively keeping Project resources, the St'at'imc Nation, local governments, stakeholders and the public informed about BC Hydro's response to the pandemic and plans for critical and supporting functions 	<ul style="list-style-type: none"> Complete Complete Complete 	Not Applicable
7.4.1	Identified	<p>Extension of Duration of Planned Outages</p> <p>There is a risk that contractor performance, construction delays or unanticipated events extend the required duration of planned outages, which may lead to higher flows down Lower Bridge River that exceed the WUP Order flow targets and impact fish and fish habitat.</p>	Reputational	<p>11.5</p> <p>Probability: Fairly Likely (L6.5)</p> <p>Severity: Loss of trust - regulator and/or shareholder (S5)</p>	<p>11</p> <p>Probability: Possible (L6)</p> <p>Severity: Loss of trust - regulator and/or shareholder (S5)</p>		<ul style="list-style-type: none"> Completing an outage impacts analysis and share with the St'at'imc Nation, Comptroller of Water Rights and public stakeholders Schedule planned outages after the break in period for the newly replaced generators at BR2 Schedule one planned outage per year to avoid outage overlap Start planned outages in late spring / early summer, after the spring freshet Perform constructability, staging reviews, and pre-assembly prior to starting the planned outages Include commercial terms in supply and installation contracts Assign a special reserve to account for supplementary environmental mitigation and monitoring costs 	<ul style="list-style-type: none"> Planned Planned Complete Planned Planned Planned Complete 	

From Application dated July 23, 2021						Updated for Reporting Period ending June 30, 2023			
1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.4.2	Identified	<p>Fire Occurring in Work Area</p> <p>There is a risk that a fire may occur in the work area as a result of construction activities involving exposed flames as the space does not have automatic fire suppression.</p>	Safety	<p>11</p> <p>Probability: Possible (L6)</p> <p>Severity: Fatality (S5)</p>	<p>7</p> <p>Probability: Remote (L5)</p> <p>Severity: Treatment by Medical Professional (S2)</p>		<ul style="list-style-type: none"> Installing an automatic fire suppression system to protect the area of the generating station where construction activities will be carried out. Installation will be completed prior to starting construction activities; and Requiring that all hot work procedures (e.g., welding, brazing, etc.) be completed in compliance with approved hot work permits. A hot work permit will require workers to have a fire watch monitoring safety hazard during these higher risk activities. 	<ul style="list-style-type: none"> Planned Planned 	
7.4.3	Identified	<p>Increased Safety Incidents due to Constrained Layout</p> <p>The Bridge River 1 Generating Station has a constrained layout and a small assembly space. The station building also includes offices for the workers that operate and maintain the generating station which will be in use throughout the Implementation phase as at least three of the generating units will be operating regularly. There is a risk of increased safety incidents that may result in worker injury, disability or a fatality from having workers and contractors performing operating, maintenance, and construction activities in adjoining or overlapping work areas.</p>	Safety	<p>11</p> <p>Probability: Possible (L6)</p> <p>Severity: Fatality (S5)</p>	<p>8</p> <p>Probability: Possible (L6)</p> <p>Severity: Fatality (S5)</p>		<ul style="list-style-type: none"> BC Hydro assuming the role of Prime Contractor and assigning a BC Hydro Site Safety Coordinator to set the tone and culture for site safety and to maintain overall co-ordination and control of the site Contractually requiring each contractor to develop Safety Management Plans, Safe Work Procedures and Emergency Response Plans before starting site work activities; Conducting daily safety meetings, safe work observations and ongoing safety audits of each contractor to ensure compliance with WorkSafeBC regulations, the contractor's safety management system and other agreed standards and controls for occupational health and safety systems Developing an Owner's Safety Plan and Occupational Health Identification Risk Assessment that will manage expectations related to known safety hazards. 	<ul style="list-style-type: none"> Planned Planned Planned Planned 	

From Application dated July 23, 2021						Updated for Reporting Period ending June 30, 2023			
1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.4.4	Identified	<p>Project In-Service Date Delayed</p> <p>Due to scheduling constraints, multiple interdependent activities will take place concurrently. This creates a potential risk that the target Project In-Service Date milestone could be missed.</p> <p>This may result in a delay in completing equipment replacements and continued exposure to the reliability issues with the existing generator equipment.</p>	Financial Loss	<p>10.5</p> <p>Probability: Fairly Likely (L6.5)</p> <p>Severity: \$10 M to \$100 M (S4)</p>	<p>9</p> <p>Probability: Possible (L6)</p> <p>Severity: \$1 M to \$10 M (S3)</p>		<ul style="list-style-type: none"> Developing detailed management plans for procurement, construction, quality, environment and safety activities that clearly explain how the equipment will be manufactured, supplied, assembled, installed, commissioned and tested Dividing the project scope into work packages and detailed activity lists to decrease exposure to unplanned work Structuring and sequencing work activities in a manner that ensures the critical schedule path is understood and optimized Assigning a dedicated BR1 Project scheduler to manage progress by frequently reviewing planned versus actual progress, resolving critical schedule path issues and employing a BC Hydro resource at the manufacturing facilities to oversee supplier's work and recovery plans, as required Incorporating appropriate schedule contingencies to provide insurance for schedule risks Employing site trade resources from unions within the collective agreement between Columbia Hydro Constructors and the Allied Hydro Council, which contains a no-strike clause and provisions to address working conditions 	<ul style="list-style-type: none"> Planned Complete Planned Planned Planned Planned 	

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1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.4.5	Identified	<p>Cost Increase</p> <p>The complexity of the BR1 Project and the Bridge River System, the brownfield nature of the site, the required environmental monitoring, and the public procurement process creates the potential for additional cost risk impacts beyond those included in the BR1 Project Expected Cost Estimate. Actions will be implemented to reduce the likelihood of these cost risks materializing and reserves will be included in the BR1 Project Authorized Cost Estimate to mitigate these cost risks, if realized.</p>	Financial Loss	<p>10.5</p> <p>Probability: Fairly Likely (L6.5)</p> <p>Severity: \$10 M to \$100 M (S4)</p>	<p>9</p> <p>Probability Possible (L6)</p> <p>Severity: \$1 M to \$10 M (S3)</p>		<ul style="list-style-type: none"> Incorporating recent experience gained from the replacement of Units 5, 6, 7 and 8 at the Bridge River 2 Generating Station as well as comparable projects implemented at other BC Hydro facilities Conducting a detailed cost analysis using range estimating techniques (i.e., a Monte Carlo simulation) that consider differing levels of uncertainty for each scope item to inform the contingency in the Expected and Authorized Cost Estimates Incorporating appropriate special reserves relating to known cost risks in the BR1 Project. Special reserves will only be accessible if those specific risks materialize 	<ul style="list-style-type: none"> Planned Complete Complete 	
7.4.6	Identified	<p>Shortage of Accommodation</p> <p>There is a potential for the workforce required at site during construction to exceed the available local accommodations in the Seton Portage – Shalalth area due to multiple concurrent Bridge River Generation System projects. This may result in reduced productivity associated with longer commute times to/from Lillooet, which will result in a reduction in overall productivity and cause delays in meeting schedule milestones.</p>	Financial Loss	<p>10</p> <p>Probability: Possible (L7)</p> <p>Severity: \$1 M to \$10 M (S3)</p>	<p>8.5</p> <p>Probability Fairly Likely (L6.5)</p> <p>Severity: \$100 K to \$1 M (S2)</p>		<ul style="list-style-type: none"> Prioritizing local accommodations for primary workers most likely to impact the schedule Securing accommodations at hotels in Lillooet for supplementary workers and visitors Assisting contractors with accommodation management and local vacancy listings As required, entering into a pre-arranged commercial agreement for reserved use of the local Lil'tem Hotel operated by the Tsah'alh Development Corporation The Bridge River Access and Accommodation study for LaJoie Dam Improvement Project and other Bridge River capital projects is underway. This project has provided information on our estimated worker demand. This study was initiated after the application filing. 	<ul style="list-style-type: none"> Planned Planned Planned Planned Planned 	

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1	2	3	4	5	6	7	8	9	10
Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.4.7	Identified	<p>Space Constraints Resulting in Delays</p> <p>There is insufficient space in the Bridge River 1 Generating Station service bay to accommodate dismantling of the existing generators and the pre-assembly and / or installation of the replacement generators, in addition to required regular operating and maintenance activities.</p> <p>The space constraints may result in delays to site construction activities. These delays could cause the sequencing of activities within specific areas to be modified, leading to unproductive downtime.</p>	Financial Loss	<p>10</p> <p>Probability: Likely (L7)</p> <p>Severity: \$1 M to \$10 M (S3)</p>	<p>9</p> <p>Probability: Possible (L6)</p> <p>Severity: \$1 M to \$10 M (S3)</p>		<ul style="list-style-type: none"> Conducting an equipment pre-assembly, dismantling and installation sequence analysis to determine the best equipment staging arrangement with respect to the available floor space and the floor loading capacities Utilizing the service bay in the adjacent Bridge River 2 Generating Station for generator component pre-assembly activities 	<ul style="list-style-type: none"> Planned Planned 	
7.4.8	Identified	<p>Health and Safety</p> <p>The influx of temporary workers and contractors in the Seton Portage – Shalalth area could lead to impacts on the health and safety of local communities.</p>	Safety	<p>10</p> <p>Probability: Possible (L6)</p> <p>Severity: Temporary Disability (S4)</p>	<p>8</p> <p>Probability: Very Unlikely (L4)</p> <p>Severity: Temporary Disability (S4)</p>		<ul style="list-style-type: none"> Proactively working with the community of Tsal'alh and the Joint Steering Committee as well as Contractors and Union Halls to increase awareness of evolving temporary worker changes and to help advance planning, preparation, coordination and communication Requiring all temporary workers to comply with a Bridge River Code of Conduct so that a basic set of rules to maintain civil behavior are followed and so that conflict with local residents is reduced. Divergence from Code of Conduct behaviors will be grounds for discipline and BC Hydro may exercise its rights under the Code of Conduct to direct workers off the work site 	<ul style="list-style-type: none"> Planned Planned 	

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Section in Application	Risk Status	Description of Risk Event and Consequence	Consequence Type	Risk Level	Residual Risk Level	Risk Status	Risk Treatments (Identified in the Application or New)	Treatment Status	Residual Risk Level
7.4.9	Identified	<p>Credit Failure of Contractor</p> <p>During the public procurement process, BC Hydro will seek bids from a wide range of generator suppliers. There is a potential for some of the suppliers to be under financial strain.</p> <p>There is a risk that a supplier might experience credit failure after being awarded a contract and subsequently be unable to eventually deliver on contractual obligations, which may lead to schedule delays and cost overruns.</p>	Financial Loss	<p>10</p> <p>Probability: Possible (L6)</p> <p>Severity: \$10 M to \$100 M (S4)</p>	<p>7</p> <p>Probability: Possible (L6)</p> <p>Severity: \$10 K to \$100 K (S1)</p>		<ul style="list-style-type: none"> Assessing the credit history and financial situation of suppliers prior to appointing a preferred proponent Performing assessments of a supplier's financial capacity and credit rating, where appropriate, prior to awarding any contract. Requiring performance security in the form of performance and labour and materials bonds or a letter of credit and a third-party guarantee. 	<ul style="list-style-type: none"> Planned Planned Planned 	
7.4.10	Identified	<p>Damage to Generating Station during Construction</p> <p>The nature of the existing powerhouse building foundation and the seismic performance of the Bridge River 1 Generating Station means that a seismic event could cause significant damage to the generating station.</p> <p>Significant damage to the generating station during construction stage may result in minor injuries, disability, or a fatality to workers, contractors, and/or the public in or near the generating station.</p>	Safety	<p>9</p> <p>Probability: Very Unlikely (L4)</p> <p>Severity: Fatality (S5)</p>	<p>9</p> <p>Probability: Very Unlikely (L4)</p> <p>Severity: Fatality (S5)</p>		<ul style="list-style-type: none"> Developing an Interim Dam Safety Risk Management Plan describing any surveillance and/or safety risk measures required during construction Following the Bridge River Emergency Action Plan in the event of an earthquake. By following the Bridge River Emergency Action Plan, the consequences of an earthquake event during the BR1 Project are similar to current operational earthquake risks and are considered tolerable 	<ul style="list-style-type: none"> Planned Planned 	