Chris Sandve
Chief Regulatory Officer
bchydroregulatorygroup@bchydro.com

April 23, 2024

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. 1599385
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
CPCN for the Lower Mainland Reactive Power Reinforcement Project (Project)
Contingency Plan

BC Hydro writes, in accordance with the Commission's directive in Decision and Order G-20-24, that BC Hydro provide a contingency plan to manage the need for reactive power on its transmission system in the interim until a more permanent solution is achieved (**Contingency Plan**). BC Hydro provides the attached Contingency Plan in compliance with the Commission's directive.

The Contingency Plan sets out BC Hydro's interim approach to its reactive power needs. It provides information on how BC Hydro plans to:

(i) Maintain voltage control for the Metro Vancouver Regional Transmission System;

(ii) Manage reactive power on BC Hydro's transmission system to maintain the transfer capability of the Interior to Lower Mainland Transmission System; and

(iii) Relieve voltage constraints to support load growth in the Central Fraser Valley Transmission System.

Substation Upgrades

As set out in the Contingency Plan, in the part of the Contingency Plan that sets out BC Hydro's plan to address the reactive power needs on the Central Fraser Valley Transmission System, BC Hydro intends to install one +125 MVAr shunt capacitor bank at the Clayburn Substation and one +125 MVAr shunt capacitor bank at the McLellan Substation, along with the necessary related ancillary equipment (**Substation Upgrades**). These Substation Upgrades are necessary and are the most effective and economical way to relieve voltage constraints on the Central Fraser Valley Transmission System as a result

of the load growth in the region. BC Hydro intends to begin construction of the Substation Upgrades in July or August of 2024.

The Substation Upgrades were part of the overall scope of the Lower Mainland Reactive Power Reinforcement Project (**Project**). The Commission, through Decision and Order G-20-24, denied a Certificate of Public Convenience and Necessity (**CPCN**) for the Project. While the Substation Upgrades are part of the Contingency Plan, once in service, they will also provide a longer-term solution for the reactive power needs of the Central Fraser Valley System.

BC Hydro plans to proceed with the Substation Upgrades as part of the Contingency Plan, for the following reasons:

- The need to manage the reactive power on its transmission system, including the Central Fraser Valley System, has been established and accepted by the BCUC in its Decision and Order G-20-24;[1]
- BC Hydro identified three feasible alternatives for the Project to meet the needs identified in its Lower Mainland Reactive Power Reinforcement Project Application to manage the reactive power needs of the Metro Vancouver Regional Transmission System, the Interior to Lower Mainland Transmission System, and the Central Fraser Valley System. As set out in the Application, the supply of additional reactive power through the installation of shunt capacitor banks at Clayburn and McLellan Substations was a necessary component to relieve voltage constraints on the Central Fraser Valley Transmission System under each of the three feasible alternatives in the Application, and the associated costs of the Central Fraser Valley solution were common to each of the feasible alternatives. As such, the Substation Upgrades would be part of any solution to manage the reactive power on BC Hydro's transmission system and do not affect the comparison of costs of the feasible alternatives in the Application in relative terms;
- The Substation Upgrades do not affect the decision to continue or stop operating the Burrard Synchronous Condenser Station **(BSY)** or the potential costs associated with stopping operations at BSY;[2] and
- BC Hydro has determined that it does not have any other means to relieve voltage constraints on the Central Fraser Valley Transmission System, and therefore must proceed with the Substation Upgrades as part of the Contingency Plan. There are no other reactive power resources on BC Hydro's system that can supply the necessary

1 Commission Decision, page 40.

2 Chapter 3, section 3.4, starting on page 3-6 of the Application. For a detailed breakdown of the scope proposed at Clayburn Substation please refer to section 4.2.1.1, starting on page 4-4 of the Application. For a detailed breakdown of the scope proposed at McLellan Substation please refer to section 4.2.1.3. starting on page 4-11 of the Application.

reactive power to meet the reactive power needs of the Central Fraser Valley Transmission System.[3]

BC Hydro intends to begin construction of the Substation Upgrades in July or August of 2024. The estimated Authorized Cost for the Substation Upgrades is $48.9 million. Accordingly, under the 2018 Capital Filing Guidelines, if the Substation Upgrades were an independent project and not part of the Contingency Plan, they would not usually require a CPCN application prior to the commencement of construction.[4]

BC Hydro submits that the information in the Application proceeding, in the Contingency Plan and summarized above demonstrates that the Substation Upgrades should proceed as part of the Contingency Plan.

BC Hydro is not seeking and does not believe a BCUC Order is required to enable BC Hydro to proceed with the Substation Upgrades. However, for clarity, BC Hydro suggests that the BCUC could confirm acceptance of BC Hydro's Contingency Plan, if it is satisfied that BC Hydro has met the requirements of the directive.

Confidentiality

BC Hydro requests that certain information in the Contingency Plan be held confidential until the BCUC determines otherwise in accordance with Part IV of the BCUC's Rules of Practice and Procedure. BC Hydro has redacted information related to commercially sensitive cost estimates, which could prejudice BC Hydro's position in future negotiations. This request is consistent with BC Hydro's request for confidentiality in the Application, to which the BCUC directed that the confidential exhibits be kept confidential until the BCUC determines otherwise.[5] On appropriate undertakings, as contemplated by the BCUC's Rules of Practice and Procedure, BC Hydro can make this information available to interveners who have signed the confidentiality undertaking. BC Hydro reserves the right to object to a request for access to confidential information on a case by case basis.

For further information, please contact Joe Maloney at bchydroregulatorygroup@bchydro.com.

---

3 Exhibit B-9, BCOAPO IR 1.2.1.

4 The Expenditure Threshold for when a CPCN application is required for a power system project is currently $100 million.

5 Commission Decision, pages 40-41.

Yours sincerely,

Chris Sandve
Chief Regulatory Officer

dj/ll

Enclosure

BC Hydro
Power smart

BC Hydro CPCN for the Lower Mainland Reactive Power Reinforcement Project

Contingency Plan

PUBLIC

Table of Contents

1 Introduction

BC Hydro applied for a Certificate of Public Convenience and Necessity (**CPCN**) for the Lower Mainland Reactive Power Reinforcement Project (**Project**). In Decision and Order G-20-24, the British Columbia Utilities Commission (**the Commission**) denied granting a CPCN for the Project **(the Decision)**.[1]

In the Decision, the Commission accepted the need:

(i) To maintain voltage control for the Metro Vancouver Regional Transmission System;

(ii) To manage reactive power on BC Hydro's transmission system to maintain the transfer capability of the Interior to Lower Mainland Transmission System; and

(iii) To relieve voltage constraints to support load growth in the Central Fraser Valley Transmission System.[2]

However, the Commission did not accept BC Hydro's methodology for assessing the feasible alternatives due to concerns regarding the decision-making process, as well as the need for further information regarding the decommissioning and remediation of the entire BSY site.

The Commission encouraged BC Hydro to continue its efforts to develop, and, in due course, reapply as required for approval of one or more projects to address the needs to manage reactive power on its transmission system or, alternatively, BC Hydro is at liberty to file another CPCN application for the Project that addresses the deficiencies identified in the Commission's Decision.[3]

The Commission also directed BC Hydro to file a contingency plan to manage the need for reactive power on its transmission system during the interim period before

[1] Commission Decision, page i, pages 27-29, pages 38-39, and page 40.
[2] Commission Decision, page i, page 9, and page 40.
[3] Commission Decision, page 40.

more permanent solutions can be put in place to manage the need.[4] BC Hydro is filing this Contingency Plan to comply with this direction.

This Contingency Plan sets out how BC Hydro will address each of these three distinct needs identified above until 2028. BC Hydro has used 2028 as the end date for this Contingency Plan because BC Hydro currently considers this a reasonable period of time before more permanent solutions can be put in place to manage these needs (the **Contingency Period**).[5]

This Contingency Plan addresses each of the three reactive power needs identified above until 2028 as follows:

1. **To maintain voltage control for the Metro Vancouver Regional Transmission System**, BC Hydro needs to have three reliable Burrard Synchronous Condenser Station (**BSY**) synchronous condenser units available, along with relying on operating procedures, to absorb reactive power from the system during the Contingency Period until a more permanent solution is in place. This solution is conceptually similar to the Hybrid Alternative identified in the Lower Mainland Reactive Power Reinforcement Project Application (**the Application**). However, since the Contingency Period is currently limited to 2028 instead of the end date of 2035 under the Hybrid Alternative, BC Hydro has limited expenditures to those required to maintain the necessary BSY units until the end of 2028;

[4] "The Panel also directs BC Hydro to file, within 90 days of the date of this decision, its contingency plan to manage the need for reactive power on its transmission system in the interim." (Commission Decision, page 40).

[5] BC Hydro may adjust the anticipated length and actions under the Contingency Period if it appears necessary to do so in the future. BC Hydro is still considering what long-term solutions are necessary to address the Metro Vancouver and Interior to Lower Mainland needs in consideration of the Commission's Decision. BC Hydro will provide an update in a subsequent filing or as part of a Revenue Requirements application, likely in 2027. As discussed in section 4 below, the Contingency Plan to address the Central Fraser Valley need is the same as the long-term solution proposed in the Application. When this solution is put in place, BC Hydro presently expects the Central Fraser Valley needs will be addressed until approximately 2041.

2. **To manage reactive power on BC Hydro's transmission system to maintain the transfer capability of the Interior to Lower Mainland Transmission System**, BC Hydro also needs to have at least three synchronous condenser units available at BSY to supply reactive power to the system until a more permanent solution is in place. As set out above, continuing to rely on BSY past 2025 is conceptually similar to the Hybrid Alternative identified in the Application but adjusted to match the Contingency Period; and

3. **To relieve voltage constraints to support load growth in the Central Fraser Valley Transmission System**, BC Hydro needs to install a +125 MVAr shunt capacitor bank at the Clayburn Substation and a +125 MVAr shunt capacitor bank at the McLellan Substation, along with related ancillary equipment. This is the same solution that was proposed in the Application to supply the necessary reactive power to the Central Fraser Valley System. Importantly, this solution was consistent across all feasible alternatives that were assessed.

As set out below, the expected cost of the Contingency Plan is approximately $77.4 million.[6]

The remainder of this Contingency Plan is structured as follows:

- Section 2 sets out the need to maintain voltage control for the Metro Vancouver Transmission System and the Contingency Plan to meet this need;
- Section 3 sets out the need to manage reactive power on BC Hydro's transmission system to maintain the transfer capability of the Interior to Lower Mainland Transmission System and the Contingency Plan to meet this need; and

[6] This is the total expected cost of the Contingency Plan, including $34.2 million for the continued operation of BSY (refer to section 2) and $43.2 million for the Central Fraser Valley (refer to section 4).

- Section 4 sets out the need to relieve voltage constraints to support load growth in the Central Fraser Valley Transmission System and the Contingency Plan to meet this need.

2 The Contingency Plan to Maintain Voltage Control on the Metro Vancouver Regional Transmission System

BC Hydro needs to absorb reactive power during low load conditions on the Metro Vancouver Regional Transmission System to avoid high voltage conditions that could damage critical transmission equipment.[7] To meet this need, BC Hydro requires equipment that can absorb the necessary reactive power to control voltages on the Metro Vancouver System.

To meet this need, BC Hydro presently relies on the capability of the existing three operating synchronous condensers units at BSY to absorb reactive power on the Metro Vancouver System, along with emergency operating procedures.[8]

To meet the continuing need to absorb reactive power to control voltage on the Metro Vancouver Regional Transmission System during the Contingency Period, BC Hydro will continue to rely on BSY. There are no other additional reactive power resources that can meet the need to absorb reactive power on the Metro Vancouver System during the Contingency Period. While BC Hydro has other reactive power resources on its system that are capable of absorbing reactive power, these resources are not capable of addressing the Metro Vancouver need on their own.[9]

In the Application, BC Hydro identified that, under a Base Case scenario, BC Hydro would need to have the equivalent of four BSY synchronous condensers available to absorb reactive power on the Metro Vancouver System during low load conditions (i.e., four units at -50 MVAr for a total of -200 MVAr) during the Contingency

7 Commission Decision, page 9.
8 Exhibit B-1, page 2-11 to page 2-12; Exhibit B-9, BCOAPO IR 1.6.1.
9 Exhibit B-9, BCOAPO IR 1.2.1.

Period.[10,11] Under the Mandatory Reliability Standards (**MRS**) sensitivity cases in the Application (e.g., Sensitivities #1 to #4) for the long-term planning horizon, BC Hydro indicated that it also needed the equivalent of all four BSY synchronous condenser units available to maintain voltage control for the Metro Vancouver Regional Transmission System.[12]

However, BC Hydro can accommodate the reactive power needs outlined in the MRS scenarios discussed above by utilizing emergency operating procedures (such as taking a line out of service) in place of a fully functioning synchronous condenser unit during the Contingency Period.

As a result, due to the incremental costs of having four BSY synchronous condenser units available, discussed further below, BC Hydro's Contingency Plan to address the reactive power needs of the Metro Vancouver Transmission System is to ensure that there are at least three reliable synchronous condenser units available at BSY throughout the Contingency Period and to continue to rely on emergency operating procedures (i.e., take lines out of service if necessary) to control voltages on the Metro Vancouver System.

Due to the age and condition of the three existing synchronous condenser units that are currently online at BSY (Unit 1, Unit 3, and Unit 4), there is a significant risk that the unit in the worst condition (Unit 3) will fail between now and the end of the Contingency Period.[13] As a result, BC Hydro has scheduled major maintenance and a condition assessment of Unit 3 in the spring of 2025. Following this condition

[10] Exhibit B-1, page 2-20, Table 2-2, and Appendix E-1.

[11] Please note, the Commission's recent decision on BC Hydro Updated 2021 Integrated Resource Plan has triggered the need for a new transmission study. This study could impact the dates in the Application. However, the new transmission study cannot begin until after a Western Electricity Coordinating Council audit is completed which is scheduled to take place in September and October of 2024. Notwithstanding that a new transmission study will not be complete until sometime in 2025 and BC Hydro believes that the dates in the Application (e.g., Appendix E-1, Appendix E-2, Table 2-2, and pages 2-20 to 2-21) continue to be appropriate for the purpose of this Contingency Plan.

[12] Exhibit B-1, page 2-21, Table 2-2, and Appendix E-1.

[13] Failure is anticipated due to previously identified issues with Unit 3 requiring re-wedging along with rewinding of the stator and rotors for continued reliable and safe operation (Exhibit B-9, BCOAPO IR 1.7.1.).

assessment, BC Hydro will either refurbish Unit 3 or, if Unit 3 is found to be in a critical condition, BC Hydro will instead make any necessary repairs to BSY Unit 2, which is presently offline, to place it back into service at an estimated cost of approximately $7.5 million. This is because, if Unit 3 is found to be in critical condition, the estimated cost of refurbishing Unit 3 so that it can operate reliability is approximately $12 million.[14]

The capital costs required to ensure three BSY units are available during the Contingency Period are estimated to be $8.1 million.[15] In addition, it is expected that approximately $26.1 million in operating and maintenance costs will be incurred during the Contingency Period.

Table 1 below provides a breakdown of the anticipated capital and operating and maintenance costs during the Contingency Period.[16]

Table 1 BSY Expenditure Table

Activity	Capital Costs ($ millions)	Operating Costs ($ millions)	Spend Year
Sustaining Operating and Maintenance[17]		**6.5**	Fiscal 2025
Sustaining Operating and Maintenance		**5.4**	Fiscal 2026
Unit 3 Major Maintenance		1	Fiscal 2026
Unit 4 Major Maintenance		1	Fiscal 2026
Buntzen Pumphouse Backup Power Supply Installation[18]	0.6		Fiscal 2026

[14] This does not include already scheduled major maintenance work to continue the operation of Unit 3.

[15] Expenditures related to existing active capital investments at BSY are not listed. The approved expected cost for other small capital projects to continue to operate BSY is $3.2 million. These are costs associated with projects that were already scheduled to occur prior to the BCUC's decision and are not impacted by the decision.

[16] The capital costs shown in Table 1 are planning allowances produced for future projects for capital planning purposes. There is a high degree of uncertainty associated with planning allowances. The costs shown in Table 1 assume that Unit 3 is found to be in critical condition and that BC Hydro proceeds with the refurbishment of Unit 2.

[17] Such as operating and maintenance personnel, materials, and services.

[18] The Buntzen Pumphouse provides cooling water to the BSY units. Cooling water is critical for unit reliability. The existing backup power supply to Buntzen Pumphouse is not reliable and, with the importance of BSY over the Contingency Period, BC Hydro has elected to replace the backup power supply.

Activity	Capital Costs ($ millions)	Operating Costs ($ millions)	Spend Year
Sustaining Operating and Maintenance		**6.1**	Fiscal 2027
Unit 2 Refurbishment[19]	7.5		Fiscal 2026 to Fiscal 2027
Sustaining Operating and Maintenance		**6.1**	Fiscal 2028
Total	**8.1**	**26.1**	

As indicated above, in an attempt to minimize costs during the Contingency Period, BC Hydro is planning to rely on the remaining three BSY units (i.e., Units 1, 2 and 4 assuming should Unit 3 is found to be in critical condition) and emergency operating procedures[20] to meet the reactive power needs of the Metro Vancouver Regional Transmission System rather than incurring the costs of maintaining four available BSY units (i.e., an incremental $12 million in capital costs and the associated costs required to sustain operation and maintenance for Unit 3).

If BC Hydro was required to operate BSY past 2028, the operating and maintenance costs associated with running BSY would continue to be incurred at a similar rate, with potential additional capital costs depending on the timeline.

BC Hydro will also need to retain BSY staff for a longer period than previously anticipated. This may increase Operations, Maintenance, and Administration costs due to pending retirements, retention measures, additional training, and developing staff for approximately three more years of operation during the Contingency Period.

[19] The costs associated with refurbishing Unit 2 may not occur, depending on the results of the Unit 3 major maintenance and condition assessment taking place in the spring of 2025. However, based on previous inspections of Unit 3, BC Hydro expects that it is likely that these costs will need to be incurred. As a result, they have been included in the expenditure table.

[20] Exhibit B-9, BCOAPO IR 1.17.2.

3 The Contingency Plan to Maintain the Transfer Capability of the Interior to Lower Mainland Transmission System

BC Hydro also needs to manage reactive power to maintain the transfer capability of the Interior to Lower Mainland Transmission System.[21]

In the Application, BC Hydro identified that under the Base Case scenario, BC Hydro would need to replace the full reactive power capacity at BSY to supply reactive power (i.e., up to +400 MVAr with all four units in operation) by 2031 to support the necessary transfer capability on the Interior to Lower Mainland Transmission System.[22]

To meet the reactive power needs of the Interior to Lower Mainland Transmission System during the Contingency Period, BC Hydro needs equipment capable of supplying reactive power to the system. BC Hydro needs to continue to rely on the synchronous condenser units at BSY to maintain the transfer capability of the Interior to Lower Mainland Transmission System during the Contingency Period. While there are other reactive power resources available on BC Hydro's system, there are no other reactive power resources that can supply the necessary reactive power to maintain the transfer capability of the Interior to Lower Mainland Transmission System.[23]

At this time, BC Hydro anticipates that it will be able to meet the demand for firm transmission requirements on the Interior to Lower Mainland Transmission System during the Contingency Period with three BSY units in operation, which will maintain our compliance with MRS. As set out in section 2 above, to achieve this, BC Hydro intends to either refurbish BSY Unit 3 or, if Unit 3 is found to be in a critical condition,

21 Commission Decision, page 9.
22 Exhibit B-1, page 2-20 to 2-21, Table 2-2; Appendix E-1.
23 Exhibit B-9, BCOAPO IR 1.2.1.

BC Hydro will instead make any necessary repairs to BSY Unit 2, which is presently offline.

The costs associated with continuing to operate and maintain BSY during the Contingency Period to provide the necessary resources to maintain the transfer capability of the Interior to Lower Mainland System are set out in section 2 above. There are no additional costs associated with maintaining the transfer capability of the Interior to Lower Mainland Transmission System.

4 The Contingency Plan to Relieve Voltage Constraints to Support Load Growth in the Central Fraser Valley Transmission System

BC Hydro also requires additional reactive power resources to supply the necessary reactive power to relieve voltage constraints to support load growth in the Central Fraser Valley Transmission System.[24]

Under the Reference load scenario in the Application, new resources are required to supply additional reactive power to the Central Fraser Valley Transmission System by 2026 and additional resources will be needed to supply reactive power to the Central Fraser Valley by 2033.[25] Under other load scenarios for High Winter and High Summer load conditions this latter date is advanced to 2027.[26]

To meet the need to supply additional reactive power to relieve voltage constraints on the Central Fraser Valley Transmission System, BC Hydro needs to have the necessary equipment available to supply the required additional reactive power to relieve the voltage constraints in the Central Fraser Valley. BC Hydro does not

[24] Commission Decision, page 9.
[25] Exhibit B-1, page 2-27.
[26] Exhibit B-1, Appendix E-2, page 33 of 38.

presently have any additional reactive power equipment that can supply the required additional reactive power.[27]

As a result, BC Hydro will install one +125 MVAr shunt capacitor bank at the Clayburn Substation and one +125 MVAr shunt capacitor bank at the McLellan Substation, along with the necessary related ancillary equipment (**Substation Upgrades**),[28] to meet the Central Fraser Valley need. BC Hydro intends to begin construction of the Substation Upgrades in July or August of 2024, with target in-service dates of March 2026 and October 2026 respectively.

This is the same solution to meet the need to supply additional reactive power to the Central Fraser Valley Transmission System that was identified in the Application and was part of the overall scope of the Project. As set out in the Application, the supply of additional reactive power through the installation of the shunt capacitor banks at Clayburn and McLellan Substations was a necessary component to meet the Central Fraser Valley need under each of the feasible alternatives. The Central Fraser Valley aspect of the former Project also does not affect a decision to stop operating BSY or the potential costs associated with stopping operations at BSY.[29]

While the Substation Upgrades are part of the Contingency Plan, once in service, they will also provide a longer-term solution for the reactive power needs of the Central Fraser Valley System. With the Substation Upgrades BC Hydro does not

[27] Continuing to operate BSY does not relieve the voltage constraint issues in the Central Fraser Valley due to the distance between BSY and the Central Fraser Valley Transmission System (Exhibit B-12, BCUC IR 2.33.1.1).

[28] During the proceeding, BCOAPO submitted that BC Hydro should have included distribution-connected shunt capacitors as an alternative using BC Hydro's structured analysis approach. As addressed in BC Hydro's Reply Argument, installing shunt capacitors on BC Hydro's transmission system is more effective and economical. Please see BC Hydro's Reply Argument at paragraphs 31-32.

[29] Refer to Chapter 3, section 3.4, starting on page 3-6 of the Application. For a detailed breakdown of the scope proposed at Clayburn Substation please refer to section 4.2.1.1, starting on page 4-4 of the Application. For a detailed breakdown of the scope proposed at McLellan Substation please refer to section 4.2.1.3. starting on page 4-11 of the Application.

anticipate that any significant additional capacitive resources will be needed in the Central Fraser Valley until 2041.[30]

The estimated Project Cost Range for the Substation Upgrades to meet the need for reactive power to address load growth on the Central Fraser Valley Transmission System is $39.1 million to $48.9 million. The Project Cost Range is based on an Expected Cost[31] of $43.2 million. The Authorized Cost[32] is $48.9 million, which includes a Project Reserve of $5.7 million. The Implementation phase accuracy range is estimated to be +14% and +10%.[33]

The Expected Cost estimate is based on the Preliminary Design and conforms to AACEI Class 3 cost estimate requirements.

The Project Cost Range includes life-to-date costs and forecast direct construction costs, indirect construction costs, contingency and reserves, escalation, interest during construction, and capital overhead.

Table 2 below provides a summary of the Project Cost Range.[34]

Table 2 CFV Major Costs Table

Row No.	Description	Cost Estimate ($ million)[35]
	Pre-Full Implementation Phase Costs[36]	
1	Identification	[redacted]
2	Definition	[redacted]

30 Exhibit B-9, BCOAPO IR 1.13.1.

31 The Expected Cost is defined as the estimated cost at the P50 confidence level, as defined in AACE International Recommended Practice 10S 90, which indicates "an expected 50% probability that the final result will be less than (more favorable) or equal to the P50 value."

32 The Authorized Cost is equivalent to the estimated cost at P90 confidence level plus any Special Reserves. A P90 confidence level indicates an expected 90% probability that the final result will be less than or equal to the P90 value.

33 This accuracy range applies to the Expected Cost for Implementation Phase only.

34 BC Hydro has redacted commercially sensitive information which could prejudice BC Hydro's position in future procurements and contract negotiations.

35 Numbers may not add up due to rounding.

36 Excluding contingency, escalation, Interest During Construction, Capital Overhead.

Row No.	Description	Cost Estimate ($ million)[35]
3	Partial Implementation[37]	[redacted]
4	**Total Pre-Full Implementation Phase Costs**	[redacted]
	Remaining Implementation Phase Costs[36]	
	Remaining Implementation Phase Direct Construction Costs	
5	McLellan Substation	[redacted]
6	Clayburn Substation	[redacted]
7	Ingledow Substation[38]	[redacted]
8	**Total Remaining Implementation Phase Direct Construction Costs**	[redacted]
	Remaining Implementation Phase Indirect Construction Costs	
9	General Management	[redacted]
10	Engineering & Design	[redacted]
11	**Total Remaining Implementation Phase Indirect Construction Costs**	[redacted]
12	**Total Remaining Implementation Phase Costs**	[redacted]
13	**Total Before Contingency & Loadings**	[redacted]
14	Contingency	[redacted]
15	Escalation	[redacted]
16	Capital Overhead	[redacted]
17	Interest During Construction	[redacted]
18	**BC Hydro Expected Amount**	**$43.2**
19	Project Reserve	$5.7
20	**BC Hydro Authorized Amount**	**$48.9**

[37] Partial Implementation Phase consists of [redacted] direct construction costs, and [redacted] indirect construction costs.

[38] The cost associated with Ingledow Substation is to carry out the telecommunication scope of work planned under the Lower Mainland Reactive Power Reinforcement Project, which includes but is not limited to adding a secondary interbuilding fiber cable and Teleprotection equipment. The addition of capacitor banks at Clayburn and McLellan Substation makes it necessary to modify the existing remedial action scheme (**RAS**) circuits at Ingledow in order to send pulse signals to Clayburn and McLellan.