



ORDER NUMBER
G-224-24

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority
Mica Unit 1 to 4 Circuit Breakers Replacement Project

BEFORE:

T. A. Loski, Panel Chair
M. Jaccard, Commissioner

on August 20, 2024

ORDER

WHEREAS:

- A. On March 5, 2024, the British Columbia Hydro and Power Authority (BC Hydro) filed an application (Application) with the British Columbia Utilities Commission (BCUC), pursuant to section 44.2(1)(b) of the *Utilities Commission Act* (UCA), for acceptance of a schedule of capital expenditures that BC Hydro anticipates making for implementation of the Mica Unit 1 to 4 Circuit Breakers Replacement Project (Project);
- B. BC Hydro states that the proposed capital expenditures will replace obsolete generator circuit breakers, isolated phase buses and other ancillary equipment for Units 1 to 4 at BC Hydro's Mica Generating station, which is located north of Revelstoke, BC on the Columbia River, and the authorized cost of the Project at \$200.4 million (Authorized Cost);
- C. BC Hydro requests that certain information in the Application (Confidential Information) be held confidential in accordance with Part IV of the BCUC's Rules of Practice and Procedure on the basis that the information is:
 - Commercially sensitive and that significant harm or prejudice to BC Hydro's competitive or negotiating position is reasonably expected to result if the information was made public; and
 - Security-sensitive as it contains physical and cyber-security information;
- D. By Order G-101-24, dated April 5, 2024, the BCUC established a regulatory timetable for the review of the Application, which consisted of public notice, intervener registration, one round of information requests, letters of comment, and final and reply arguments;
- E. British Columbia Old Age Pensioners' Organization et al; Commercial Energy Consumers Association of British Columbia; and Residential Consumer Intervener Association registered as interveners in the proceeding; and

F. The BCUC has considered the Application, evidence and submissions in this proceeding and finds that the following determinations are warranted.

NOW THEREFORE for the reasons outlined in the decision accompanying this order, the BCUC orders as follows:

1. BC Hydro's expenditure schedule for the Project with an Authorized Cost of \$200.4 million is accepted.
2. BC Hydro is directed to file Project reports as outlined in Section 9 of the Decision accompanying this order.
3. The Confidential Information will be held confidential until the BCUC determines otherwise.

DATED at the City of Vancouver, in the Province of British Columbia, this 20th day of August 2024.

BY ORDER

Original signed by:

T. A. Loski
Commissioner

British Columbia Hydro and Power Authority
Mica Unit 1 to 4 Circuit Breakers Replacement Project

DECISION

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Executive Summary

British Columbia Hydro and Power Authority (BC Hydro) filed an application with the British Columbia Utilities Commission (BCUC) on March 5, 2024 (Application) for an order, pursuant to section 44.2 of the *Utilities Commission Act*. In the application, BC Hydro seeks acceptance of the schedule of capital expenditures for the implementation of the Mica Units 1 to 4 Circuit Breakers Replacement Project (Project) as being in the public interest. The Project scope includes the replacement of obsolete and aging generator circuit breakers, isolated phase buses and other ancillary equipment for Mica generating units 1 to 4. The authorized cost¹ of the Project is \$200.4 million and the expected cost² is \$177 million.

The BCUC established a regulatory timetable for the review of the Application, which included public notice, intervenor registration, one round of information requests, and written final and reply arguments. Three interveners registered in the proceeding: British Columbia Old Age Pensioners' Organization et al., the Commercial Energy Consumers Association of British Columbia, and Residential Consumer Intervener Association.³

The Panel finds that BC Hydro has established the need to address aging and obsolete generator circuit breakers and other ancillary equipment for Mica Units 1 to 4. The Panel considers BC Hydro's analysis of the Project alternatives to be reasonable and finds the replacement of the Unit 1 to 4 generator circuit breakers to be the only feasible alternative to meet the established Project need. The Panel accepts that the isolated phase buses are highly integrated with the generator circuit breakers, and, if the breakers are replaced, the isolated phase buses will also need to be replaced. For this reason, the Panel agrees that a replacement of isolated phase buses is required. Additionally, the Panel is satisfied that the Project scope meets the stated need of the Project. The Panel finds the Project cost and rate impact to be reasonable.

The Panel finds that BC Hydro's consultation with First Nations communities and engagement with local governments and the general public to date have been adequate. The Panel is satisfied that the Project is consistent with the applicable British Columbia energy objectives and with BC Hydro's approved Updated 2021 Integrated Resource Plan.

The Panel finds that the Project expenditure schedule is appropriate and is in the public interest. Accordingly, the Panel accepts the expenditure schedule for the Project submitted by BC Hydro with an authorized cost estimate of \$200.4 million. The Panel directs BC Hydro to file annual progress reports, a final report and material change reports as required.

¹ Authorized Cost is a BC Hydro term, based on a P90 cost estimate plus any Project reserve amounts. P90 is defined as the cost estimate that will not be exceeded 90 percent of the time.

² Expected Cost is a BC Hydro term, which is the P50 cost estimate and is based on a Preliminary Level Design and conforms to AACE International Class 3 cost estimate requirements. P50 is defined as the cost estimate that will not be exceeded 50 percent of the time.

³ Order G-101-24, dated April 5, 2024.

1.0 Introduction

On March 5, 2024, British Columbia Hydro and Power Authority (BC Hydro) filed an application (Application) with the British Columbia Utilities Commission (BCUC) pursuant to section 44.2(1)(b) of the *Utilities Commission Act* (UCA) for acceptance of a schedule of capital expenditures that BC Hydro anticipates making in respect of the Mica Units 1 to 4 Circuit Breakers Replacement Project (Project).⁴

The Mica Generating Station (Mica) is located north of Revelstoke, BC on the Columbia River and is BC Hydro's second largest generating station in its generation fleet.⁵ BC Hydro classifies Mica as a Key Facility.⁶ Mica has six generating units (Units 1 to 6), which provide an average of 7,200 gigawatt-hours (GWh) of energy per year and has a total generation capacity of 2,781 megawatts (MW). This is equivalent to approximately 16 percent of BC Hydro's average annual energy supply and approximately 25 percent of BC Hydro's total generating capacity.⁷

BC Hydro states that the objective of the Project is to maintain the reliable operation of Mica through the replacement of the existing obsolete Unit 1 to 4 generator circuit breakers that BC Hydro can no longer reliably maintain due to the lack of original equipment manufacturer support, as well as the replacement of their corresponding isolated phase buses and other ancillary equipment.⁸

The expected cost of the Project is \$177.4 million (Expected Cost), and the Project in-service date is anticipated to be November 2028.⁹ BC Hydro seeks BCUC acceptance of the Project authorized cost of \$200.4 million (Authorized Cost) as being in the public interest, pursuant to section 44.2 of the UCA.¹⁰

1.1 Regulatory Process

By Order G-101-24, dated April 5, 2024, the BCUC established a regulatory timetable for review of the Application, which included notice, intervenor registration, one round of information requests, letters of comment, and written final and reply arguments.

Three parties registered as intervenors in this proceeding: British Columbia Old Age Pensioners' Organization et al. (BCOAPO); Commercial Energy Consumers Association of British Columbia (the CEC); and Residential Consumer Intervenor Association (RCIA).¹¹

1.2 Legislative and Regulatory Framework

1.2.1 *Utilities Commission Act*

Section 44.2(1)(b) of the UCA provides that a public utility may file an expenditure schedule with the BCUC containing a statement of capital expenditures the public utility has made or anticipates making during the

⁴ Exhibit B-1, p. 1-1.

⁵ Ibid., p.2-1.

⁶ A Key Facility is a designation that BC Hydro gives to generating stations with an installed plant capacity greater than 200 MW reflecting the significance of the facility to BC Hydro's system. In aggregate, BC Hydro's seven "Key" generation facilities provide approximately 90% of BC Hydro's average annual energy supply. Exhibit B-1, p. 1-1.

⁷ Exhibit B-1, pp. 2-2 – 2-3.

⁸ Ibid., pp. 1-1, 4-2.

⁹ Ibid., p. 4-24.

¹⁰ Ibid., p. 4-16.

¹¹ Exhibit C1-1; Exhibit C2-1; Exhibit C3-1.

period addressed by the schedule.¹² The BCUC must accept an expenditure schedule filed under section 44.2 of the UCA if the BCUC considers that making the expenditures referred to in the schedule would be in the public interest.¹³ The BCUC may also accept or reject a part of a schedule.¹⁴

Section 44.2(5.1) of the UCA provides that in considering whether to accept an expenditure schedule filed by BC Hydro, the BCUC, in addition to considering the interests of persons in British Columbia who receive or may receive service from BC Hydro, must consider:

- a) British Columbia's energy objectives,
- b) the most recent of the following documents:
 - i. an integrated resource plan approved under section 4 of the *Clean Energy Act* before the repeal of that section;
 - ii. a long-term resource plan filed by BC Hydro under section 44.1 of the UCA;
- c) The extent to which the schedule is consistent with the requirements under section 19 of the *Clean Energy Act*; and
- d) If the schedule includes expenditures on demand-side measures, the extent to which the demand-side measures are cost-effective within the meaning prescribed by regulation, if any.

1.2.2 Clean Energy Act

Section 2 of the *Clean Energy Act* defines British Columbia's energy objectives.¹⁵

Section 19 of the *Clean Energy Act*, which applies to BC Hydro, addresses clean and renewable resources and provides:

19(1) to facilitate the achievement of British Columbia's energy objective set out in section 2 (c), a person to whom this subsection applies:

- a) must pursue actions to meet the prescribed targets in relation to clean or renewable resources, and
- b) must use the prescribed guidelines in planning for
 - i. the construction or extension of generation facilities, and
 - ii. energy purchases.

1.2.3 Applicable Guidelines

The following guidelines are applicable to this Application.

¹² Section 44.2(1)(b) of the UCA.

¹³ Section 44.2(3) of the UCA.

¹⁴ Section 44.2(4) of the UCA.

¹⁵ *Clean Energy Act*, section 2.

BC Hydro's 2018 Capital Filing Guidelines

BC Hydro has submitted this Application in accordance with its 2018 Capital Filing Guidelines.¹⁶ These guidelines commit BC Hydro to filing applications under section 44.2 of the UCA for capital projects that are not extensions or end-of-life facility replacements, and that have a cost estimate that exceeds \$100 million.¹⁷

BCUC's CPCN Guidelines

BC Hydro has committed to filing applications under section 44.2 of the UCA for capital projects as if they were applications for Certificates of Public Convenience and Necessity (CPCNs) and has therefore followed the BCUC's CPCN Guidelines.¹⁸ The BCUC's CPCN Guidelines provide general guidance regarding the information that should be included in a CPCN application and the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project and the issues raised by the application.¹⁹

BCUC's First Nations Information Filing Guidelines for Crown Utilities

The BCUC's 2010 First Nations Information Filing Guidelines for Crown Utilities are applicable to this Application. These guidelines identify the information that must be filed by Crown Utilities (of which BC Hydro is one) to allow the BCUC to assess whether the Crown's duty to consult First Nations has been fulfilled.²⁰

1.3 Structure of Decision

The structure of this Decision largely follows the structure of the Application and the BCUC's CPCN Guidelines:

- Section 2 addresses the need and justification for the Project;
- Section 3 addresses the alternatives for the Project;
- Section 4 addresses the Project description, include the scope of the Project;
- Section 5 addresses the cost of the Project and rate impact;
- Section 6 addresses First Nations consultation and public engagement for the Project;
- Section 7 addresses the Project's alignment with British Columbia's energy objectives, BC Hydro's long term resource plan and the *Clean Energy Act*;
- Section 8 sets out the overall determination; and
- Section 9 sets out the reporting requirements for the Project.

Relevant evidence and submissions submitted by the applicant and interveners are summarized in each section.

¹⁶ The Panel acknowledges that at the time of the Application filing, a separate proceeding was underway to review BC Hydro's updates to the 2018 Guidelines to escalate expenditure thresholds for three types of capital projects.

¹⁷ BCUC Order G-313-19, dated December 2, 2019, BC Hydro Review of the Regulatory Oversight of Capital Expenditures and Projects; <https://www.ordersdecisions.bcuc.com/bcuc/orders/en/453713/1/document.do>

¹⁸ Exhibit B-1, p. 1-16.

¹⁹ Appendix A to Order G-20-15, dated February 12, 2015, BCUC 2015 Certificate of Public Convenience and Necessity Guidelines (CPCN Guidelines), p. 1. Available at https://docs.bcuc.com/documents/Guidelines/2015/DOC_25326_G-20-15_BCUC-2015-CPCN-Guidelines.pdf

²⁰ Appendix A to Order G-51-10, dated March 18, 2010, BCUC 2010 First Nations Information Filing Guidelines for Crown Utilities, p. 3. Available at https://docs.bcuc.com/documents/Guidelines/2010/DOC_25327_G-51-10_2010-First-Nations-Information-FilingGuidelines.pdf

2.0 Project Need and Justification

As noted previously, Mica has six generating units with a total rated generation capacity of 2,781 MW, the second largest facility in BC Hydro's generation fleet. Generating Units 1 to 4 were commissioned between 1976 and 1977 and have a normal-rated capacity of 435 MW each. Units 5 and 6 were commissioned in 2015 and 2016 respectively and have a normal-rated capacity of 520 MW each.²¹

BC Hydro explains that each of Mica Units 1 to 4 consist of a number of pieces of equipment including: a turbine; a generator; a portion of the isolated phase bus between the generator and the generator circuit breaker; a generator circuit breaker; another portion of the isolated phase bus between the generator circuit breaker and the step-up transformer; and a step-up transformer.²²

The generator circuit breakers and the isolated phase buses are the last of the major original equipment at Mica with the exception of the Unit 1 to 4 turbines.²³ BC Hydro states that the generator circuit breakers and isolated phase buses are critical pieces of equipment and form the electrical connection between each of the generators and the rest of BC Hydro's system.²⁴ The generator circuit breakers perform other key functions such as synchronizing their respective generators with the power system when units are brought online, switching or interrupting normal load or fault currents, and clearing potential harmful fault currents and preventing major equipment damage.²⁵ As such, BC Hydro states that Mica cannot operate reliably without functional and dependable generator circuit breakers and isolated phase buses.²⁶

The following subsections discuss the need to address the existing generator circuit breakers and isolated phase buses for Mica Units 1 to 4.

2.1 Unit 1 to 4 Generator Circuit Breakers

BC Hydro identifies a driver for the Project is to address the aging and obsolete Unit 1 to 4 generator circuit breakers at Mica.²⁷ The existing generator circuit breakers are approximately 47 years old and have exceeded their typical design life of 40 years and expected life of 45 years.²⁸ In addition, the generator circuit breakers use air blast technology that BC Hydro states has become outdated since the 1990s and is no longer manufactured and supported by the original equipment manufacturer.²⁹ BC Hydro states that the existing Unit 1 to 4 generator circuit breakers are some of the only operating air-blast units of their type in North America.³⁰

In 2014, BC Hydro was advised by the manufacturer that the generator circuit breakers for Units 1 to 4 would be moved from "limited" status to "obsolete" status after December 31, 2019.³¹ Beyond this date, the manufacturer would no longer produce spare parts for generator circuit breakers or provide technical support in the event of an overhaul or an in-service failure. BC Hydro states that it does not have a viable means to source

²¹ Exhibit B-1, p. 2-2.

²² Exhibit B-1, p. 2-3; BC Hydro Final Argument, p. 3.

²³ BC Hydro explains that the Mica Unit 1 to 4 generators were refurbished from 2006 to 2009 and the transformers were replaced from 2015 to 2023. The Unit 1 and 2 turbine replacement project has been initiated and is still in the early project stages. Construction is roughly estimated to begin in 2031. Exhibit B-1, p. 2-4, footnote 4.

²⁴ Exhibit B-1, pp. 1-1 to 1-2.

²⁵ Ibid., p. 2-4; BC Hydro Final Argument, pp. 3-4.

²⁶ Exhibit B-1, p. 1-5.

²⁷ Ibid., p. 3-4.

²⁸ Ibid., pp. 2-5 to 2-6; Exhibit B-5, CEC IR 1.1.1.

²⁹ Exhibit B-1, p. 1-5.

³⁰ Ibid., p. 2-6.

³¹ Ibid., p. 1-5.

spare parts for all four generator circuit breakers and is not able to reliably maintain or repair them without technical support from the manufacturer.³² Further, BC Hydro states that in the event of a significant failure of any one generator circuit breaker where a repair cannot be completed, the generator would remain offline for approximately 18 to 24 months while awaiting replacement.³³

2.2 Unit 1 to 4 Isolated Phase Buses

The existing Unit 1 to 4 isolated phase buses were installed at the same time as the Unit 1 to 4 generator circuit breakers. The generator circuit breakers and isolated phase buses are located together in confined chambers in the Mica powerhouse.³⁴ Based on a 2021 condition assessment of the isolated phase bus equipment for Units 2 and 3, no major issues were identified. Based on these results, BC Hydro concluded the isolated phase buses could be reliably operated for another 10 years with proper maintenance.³⁵

However, BC Hydro states the design of the isolated phase buses is highly integrated with the generator circuit breakers for Units 1 to 4. Therefore, if the generator circuit breakers are removed and replaced, the corresponding isolated phase buses would be impacted regardless of whether BC Hydro intended to continue to use them.³⁶ BC Hydro states that the integration of new generator circuit breakers with the existing isolated phase buses would result in unacceptable procurement, reliability and constructability risks.³⁷ These risks are further detailed in Section 3 of this Decision.

Positions of the Parties

BCOAPO submits that the generator circuit breakers cannot be adequately maintained going forward and need to be replaced. BCOAPO agrees with BC Hydro that the Project would need to consider implications for the isolated phase buses given they are highly integrated with the generator circuit breakers.³⁸

Based on information provided by BC Hydro on the indoor and outdoor service life of a circuit breaker, the CEC considers the generator circuit breakers to have reached end of life.³⁹

Panel Determination

The Panel finds that BC Hydro has established the need to address the aging and obsolete generator circuit breakers for Mica Units 1 to 4. The Panel agrees with BC Hydro's assessment that the generator circuit breakers are critical pieces of equipment at Mica and at 47 years old, are beyond their design life of 40 years. Further, the Panel accepts that without manufacturer support, this equipment cannot be reliability maintained. The Panel considers that operating without dependable generator circuit breakers poses an unacceptable reliability risk at Mica, which as BC Hydro notes, is one of its key generating facilities that provides, as a whole, 25 percent of BC Hydro's total generating capacity.

The Panel accepts that the isolated phase buses are highly integrated with the generator circuit breakers and that if the breakers are to be addressed, the corresponding buses will be impacted. The Panel will discuss this further in Section 3 of this Decision.

³²Ibid, Appendix D, p. 1.

³³ Ibid, p. 3-2.

³⁴ Ibid., p. 3-5.

³⁵ Ibid., p. 2-11.

³⁶ Ibid., p. 3-5.

³⁷ Ibid., p. 2-12.

³⁸ BCOAPO Final Argument, pp. 4, 6.

³⁹ CEC Final Argument, p. 2.

3.0 Project Alternatives

BC Hydro considered three alternatives for the generator circuit breakers and two alternatives for the isolated phase buses. This section provides a summary of each alternative considered by BC Hydro and the rationale for selecting the preferred alternatives.

3.1 Alternatives for the Unit 1 to 4 Generator Circuit Breakers

BC Hydro considered three alternatives for the Unit 1 to 4 generator circuit breakers:⁴⁰

1. **Do Nothing or Defer** – Continue to operate the Unit 1 to 4 generator circuit breakers in their current condition until they fail;
2. **Refurbish** – Refurbish the Unit 1 to 4 generator circuit breakers; and
3. **Replace** – Replace the Unit 1 to 4 generator circuit breakers.

Do Nothing Alternative

This alternative is a run-to-failure strategy and would require BC Hydro to run the generator circuit breaker units to failure and replace the individual units as they fail.⁴¹ As noted in Section 2.1 of this Decision, BC Hydro states that failure of one generator circuit breaker would lead to a generator outage for 18 to 24 months while BC Hydro procures and installs a new breaker. BC Hydro states that this approach would not be feasible as it increases the reliability and economic risks for BC Hydro to unacceptable levels.⁴² As a result, BC Hydro dismissed the Do Nothing alternative as not feasible.⁴³

Refurbish Alternative

This alternative would extend the life of the generator circuit breakers for Units 1 to 4. However, the Refurbish approach was screened out as not feasible as the manufacturer no longer produces parts to support the generator circuit breakers and has withdrawn the majority of its technical support.⁴⁴ Further, BC Hydro currently only has three overhaul kits that would be able to retrofit only one of the four generator circuit breakers.⁴⁵ As a result, the Refurbish alternative was dismissed as not feasible.⁴⁶

Replace Alternative

BC Hydro states that removal and replacement of the Unit 1 to 4 generator circuit breakers is the only feasible alternative to address the reliability risks identified and to support the continued reliable operation of the Unit 1 to 4 generators.⁴⁷ The scope of this alternative includes the replacement of existing air-blast generator circuit breakers with new generator circuit breakers using modern SF6⁴⁸ technology. BC Hydro states that the Replace alternative provides the following benefits:⁴⁹

⁴⁰ Exhibit B-1, p. 3-1.

⁴¹ Ibid., p. 3-2.

⁴² Ibid., pp. 3-2 to 3-3.

⁴³ Ibid., pp. 3-2 to 3-3.

⁴⁴ Ibid., p. 3-3.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Ibid., pp. 3-3 to 3-4.

⁴⁸ BC Hydro proposes to install Sulphur hexafluoride (SF6) gas insulated and interrupting medium circuit breakers. These breakers have a design life of 40 years and will be either indoor or outdoor type.

⁴⁹ Exhibit B-1, pp. 3-3 to 3-4.

- Allow BC Hydro to maintain and repair, if necessary, the new generator circuit breakers with manufacturer parts and full technical support;
- Reduce the risk of unplanned outages and potential failures, including potential damage to other equipment; and
- Align the design of the new Unit 1 to 4 generator circuit breakers with the design of the recently installed Mica Unit 5 and 6 generator circuit breakers, which will streamline maintenance procedures.

In addition, BC Hydro states that while the Project does not increase the capacity of Mica, a supplementary benefit of the Replace alternative is that the new generator circuit breakers would have greater capacity than the existing generator circuit breakers.⁵⁰ This would allow BC Hydro to increase the capacity of Unit 1 to 4 generators in the future.⁵¹

3.2 Alternatives for the Unit 1 to 4 Isolated Phase Buses

Following BC Hydro's identification of the Replace alternative as the only feasible alternative for the Unit 1 to 4 generator circuit breakers, it considered two alternatives for the Unit 1 to 4 isolated phase buses:⁵²

1. **Defer** – Defer replacement of the Unit 1 to 4 isolated phase buses; and
2. **Replace** – Replace the Unit 1 to 4 isolated phase buses.

As discussed in Section 2.2 of this Decision, the existing isolated phase buses are highly integrated with the existing generator circuit breakers and both are located in the confined generator circuit breaker chambers. As a result, BC Hydro considers that if the generator circuit breakers are removed and replaced, the existing isolated phase buses would be impacted regardless of whether BC Hydro intended to continue to use them. For this reason, there is not a Do Nothing alternative for the isolated phase buses.⁵³

Defer Alternative

Under this alternative, BC Hydro would need to remove a portion of the existing isolated phase buses and significantly modify the remaining portions to integrate with the new generator circuit breakers. The remaining portion of isolated phase buses would be then replaced under a separate future project in approximately 10 years.⁵⁴

BC Hydro states that the Defer alternative would present unacceptable constructability, reliability, and procurement risks.⁵⁵ Each of these risks is summarized below:⁵⁶

- **Constructability Risks:** BC Hydro explains that constructability risks arise in the Defer alternative due to equipment installation issues when removing existing equipment, installing new equipment (and re-installing portions of old equipment), and integrating the new equipment with the remaining existing isolated phase buses. BC Hydro considers that construction complexity increases when contractors are forced to align existing and new isolated phase buses of differing dimensions within strict spatial constraints. Re-using equipment inside the circuit breaker chamber would require major modifications to the interface connections and removal and re-installation of adjacent equipment within the chamber.

⁵⁰ Ibid., p. 3-4.

⁵¹ Ibid., pp. 3-3 to 3-4.

⁵² Ibid., p. 3-1.

⁵³ Ibid., p. 3-5.

⁵⁴ Exhibit B-3, BCUC IR 1.1.3; Exhibit B-1, p. 3-5.

⁵⁵ Ibid., p. 3-5.

⁵⁶ Exhibit B-3, BCUC IR 1.1.1.

The limited space within the chamber is not likely to have tolerance for any major modifications and would risk damaging the removed and reused equipment.

- Reliability Risks: BC Hydro explains that reliability risks arise in the Defer alternative due to equipment integration issues. BC Hydro states that the existing isolated phase buses will have some variance in their performance and design in comparison to the new portions, making it difficult to get performance guarantees from the system as a whole. These issues create reliability risks, commissioning difficulties and future maintenance and operational issues.
- Procurement Risks: BC Hydro explains that procurement risks arise in the Defer alternative due to equipment compatibility and integration issues. BC Hydro states that contractors will not warrant or guarantee performance for a system that is only partially installed by them.

Additionally, in the event that the existing isolated phase buses were able to be retained for another ten years, there would be stranded investment costs as new replacement parts are needed on many of the existing components for this Defer alternative, such as bushings, tri-post insulators, and the cooling system, in order to make the isolated phase buses reliable.⁵⁷

As noted above, BC Hydro identifies these risks as unacceptable and as a result, screened out this alternative as not feasible.⁵⁸

Replace Alternative

This alternative involves replacing the Unit 1 to 4 isolated phase buses at the same time as the Unit 1 to 4 generator circuit breakers. BC Hydro states that this is the only feasible alternative to address the Project need. BC Hydro summarizes the following additional benefits for this alternative:⁵⁹

- Increased future system flexibility, allowing BC Hydro to realize potential capacity upgrades at Mica without requiring further isolated phase bus rework;
- New, commissioned equipment removes any age-related issues and reliability risks;
- New ancillary equipment allowing for reliable operation for the foreseeable future;
- New equipment would be installed to new codes and standards (including seismic); and
- Any asbestos and lead paint would be removed, improving the safety of the facility.

BC Hydro states that the constructability, reliability, and procurement risks associated with the Defer alternative are not present in the Replace alternative⁶⁰ as all portions of the existing isolated phase buses would be removed; therefore, there will be no equipment compatibility and performance issues.⁶¹

Further, BC Hydro completed an economic assessment to compare the Defer and Replace alternatives for Unit 1 to 4 isolated phase buses. This assessment was first undertaken in January 2020 and updated in August 2021. The results of the economic assessment concluded that in addition to the increased risks associated with the Defer alternative, the Replace alternative is also superior to the Defer alternative from a total cost, scheduling and net present value perspective.⁶²

⁵⁷ Exhibit B-1, p. 3-9.

⁵⁸ Ibid., p. 3-6.

⁵⁹ Ibid., p. 3-10.

⁶⁰ Exhibit B-3, BCUC IR 1.1.1.

⁶¹ Ibid.

⁶² Exhibit B-3, BCUC IR 1.1.3.

3.3 Selection of Preferred Alternative for the Project

Following the consideration of all three alternatives for generator circuit breaker scope and the two alternatives for the isolated phase bus scope for the Project, BC Hydro identified the replacement of both generator circuit breakers and isolated phase buses for Units 1 to 4 as the only feasible alternatives to meet the need of the Project. BC Hydro states that since there is only one feasible alternative for both the generator circuit breaker and isolated phase bus scope, it did not apply any structured decision-making weightings to the alternatives, nor were any class 4 level estimates completed for any alternatives that were screened out.⁶³

Positions of the Parties

BCOAPO agrees that replacement of the Unit 1 to 4 generator circuit breakers is the preferred alternative.⁶⁴ BCOAPO agrees with BC Hydro's assessment that refurbishment of the current circuit breakers is not feasible, due to lack of original manufacturer equipment parts and technical support.⁶⁵ While BCOAPO does not necessarily agree with the assessment that the Do Nothing alternative is not feasible (i.e. cannot technically be done), BCOAPO agrees that it results in higher reliability and economic risks.⁶⁶

BCOAPO further submits that the replacement of the isolated phase buses is the preferred alternative.⁶⁷

The CEC is satisfied that BC Hydro cannot reliably maintain the generator circuit breakers under the current situation and agrees that doing nothing would be unacceptable considering the strategic nature of the Mica generating station.⁶⁸ The CEC therefore agrees that BC Hydro's only feasible option to reduce the reliability risks identified is to replace the generator circuit breakers.⁶⁹

With regards to the isolated phase bus alternatives, the CEC states that it is confident that the Defer alternative would not offer any valuable savings to ratepayers and can be expected to cause more costs and issues than would be warranted. The CEC therefore agrees that the Defer alternative does not represent an acceptable solution.⁷⁰ While recognizing that it does not make a difference to the outcome, the CEC submits that it would have appreciated if BC Hydro provided a cost estimate to quantify the benefit of replacing the isolated phase buses at the same time as the generator circuit breakers.⁷¹

In reply to CEC, BC Hydro submits that it was not necessary to quantify the value of replacing the isolated phase buses at the same time as the generator circuit breakers as this would require advancing the design and project planning of the Defer alternative to prepare a Class 4 or Class 5 cost estimate, which would have incurred significant time, resources and costs. BC Hydro believes that undertaking this work would not be necessary or justified.⁷²

RCIA does not oppose the proposed replacement of the isolated phase buses, based on the additional evidence and analysis provided by BC Hydro in response to information requests.⁷³ However, RCIA submits that

⁶³ Exhibit B-1, p. 3-2, footnote 1.

⁶⁴ BCOAPO Final Argument, p. 7.

⁶⁵ Ibid., p. 6.

⁶⁶ Ibid.

⁶⁷ Ibid., p. 8.

⁶⁸ CEC Final Argument, p. 4.

⁶⁹ Ibid., p. 6.

⁷⁰ Ibid.

⁷¹ CEC Final Argument, p. 10.

⁷² BC Hydro Reply Argument, pp. 14–15.

⁷³ Ibid., p. 7.

BC Hydro's initial analysis of the alternatives for the isolated phase bus scope was insufficient, and provided a list of reasons to support its position, such as that: the decision-making process relies on a qualitative assessment and lacks a structured framework for the alternatives considered; the analysis did not factor in the economic value of the risks of failure of the isolated phase buses; and BC Hydro did not produce a cost estimate for the Defer alternative, among others.⁷⁴ Further, RCIA is concerned with the lack of direct economic evidence supporting the Replace alternative and recommends BC Hydro be directed to provide such evidence in future CPCN applications.⁷⁵

In reply, BC Hydro considers RCIA's list of reasons in support of its position that BC Hydro's initial analysis of the alternatives for the isolated phase bus scope was insufficient is not an accurate portrayal of BC Hydro's analysis. BC Hydro submits that many of RCIA's stated reasons are incorrect, incomplete or ignoring previous explanations from BC Hydro as to why they were not part of BC Hydro's analysis.⁷⁶ BC Hydro also believes that the information RCIA requested regarding a cost estimate and quantification of risks for the Defer alternative was not necessary or justified.⁷⁷

In reply to RCIA's recommendation for BC Hydro to be directed to provide further economic evidence in future CPCN applications, BC Hydro submits that there is no reason for the BCUC to direct BC Hydro to do so, stating that the BCUC's minimum requirements for applications are already set out in the BCUC's CPCN Guidelines, which BC Hydro generally adheres to for both CPCN and section 44.2 applications.⁷⁸

Panel Determination

The Panel finds that BC Hydro's identification and analysis of the alternatives and its assessments relating to their feasibility are reasonable.

The Panel is satisfied with BC Hydro's explanations that the Do Nothing and Refurbish alternatives for the generator circuit breakers are not feasible as these alternatives pose unacceptable reliability risks and are not feasible without manufacturer support. As such, **the Panel agrees that replacing the generator circuit breakers is the only feasible alternative to address the reliability risks identified with the existing generator circuit breakers.**

The Panel is also satisfied that the Defer alternative for the isolated phase buses is not feasible. The Panel is persuaded by BC Hydro's assessment that the Defer alternative would create unacceptable constructability, reliability and procurement risks. As such, **the Panel agrees that the Replace alternative is the only feasible alternative for the isolated phase buses.**

The Panel disagrees with RCIA that BC Hydro's analysis of the alternatives for the isolated phase buses is insufficient. Given only one feasible alternative has been identified, the Panel considers the level of detail provided by BC Hydro as part of its alternative analysis to be appropriate in these circumstances. Further, the BCUC's CPCN Guidelines include guidance for utilities to provide "a comparison of the costs, benefits, and associated risks of the project and feasible alternatives, including estimates of the value of all costs and benefits of each alternative...".⁷⁹ The Panel does not consider a Class 4 cost estimate for the Defer alternative to be

⁷⁴ RCIA Final Argument, pp. 5-7.

⁷⁵ Ibid., p. 8.

⁷⁶ BC Hydro Reply Argument, p. 5.

⁷⁷ Ibid., p. 8.

⁷⁸ Ibid., pp. 9-10.

⁷⁹ Appendix A to Order G-20-15, dated February 12, 2015, BCUC 2015 Certificate of Public Convenience and Necessity Guidelines (CPCN Guidelines), p. 4. Available at https://docs.bcuc.com/documents/Guidelines/2015/DOC_25326_G-20-15_BCUC-2015-CPCN-Guidelines.pdf.

necessary in this case as it is not a feasible alternative. The Panel also notes that BC Hydro provided an economic comparison of the Defer and Replace alternatives for the isolated phase bus scope. Given the results of the economic analysis, which show the preferred alternative to be superior from a cost and net present value perspective, the Panel is further persuaded by BC Hydro's selection of replacement as the preferred alternative for the isolated phase buses.

The Panel is not persuaded by RCIA's recommendation to direct BC Hydro to submit further economic evidence to support the assessment of alternatives in future applications. The Panel agrees with BC Hydro that the BCUC's CPCN Guidelines set out the appropriate requirements and it is not necessary to direct BC Hydro to provide additional evidence in future applications at this time.

4.0 Project Description

The major items and scope of the Project include:⁸⁰

1. Dismantle and remove the existing Unit 1 to 4 generator circuit breakers and isolated phase buses;
2. Supply four new 16 kV, 20 kA generator circuit breakers and isolated phase buses; and
3. Install and commission new generator circuit breakers and isolated phase buses.

The Project scope also includes upgrading or installing ancillary equipment such as control panels, current transformers, voltage transformers, current limiting reactors, and disconnect switches.⁸¹ BC Hydro provided a detailed breakdown of the full Project scope in its preliminary design report, which is attached as Appendix D to the Application.⁸²

Certain items were identified as optional scope in the preliminary design report. These items include:⁸³

- modifications to the fire protection system in the circuit breaker chamber;
- rearrangement of cable trays and lighting;
- removal and reinstallation of 500 kV unit transformers; and
- replacement of reactor current transformers, station service circuit breakers, current limiting reactors, and circuit breaker chamber overhead crane.

BC Hydro states that a majority of these scope items were identified for potential replacement as they are approaching 50 years of service life. Further, BC Hydro states that it was also anticipated that removal and modifications to these assets would be necessary to accommodate access for working conditions in the confined generator circuit breaker chambers. These concerns were also highlighted by BC Hydro's contractor during their request for proposal response and subsequent contract negotiations. As a result, each of the items that were

⁸⁰ Exhibit B-1, p. 4-3.

⁸¹ Ibid., p. 1-8.

⁸² Ibid., Appendix D.

⁸³ Ibid., Appendix D, p. 13.

identified as optional scope in the preliminary design report are now part of the base scope, except for removal and re-installation of the 500 kV unit transformers.⁸⁴

In addition, BC Hydro's preliminary design report provides a summary of twenty Project end user preferences/requests⁸⁵ based on its discussion with site personnel and the Project team. Each of the twenty requests were assigned a priority of high (must have), medium (should consider), or low (nice to have). BC Hydro has included seven of the eight high priority scope items in the Project base scope with the remaining high priority item to be confirmed once the design is received from the supplier.⁸⁶

Positions of the Parties

BCOAPO agrees with BC Hydro's proposals regarding the Project's scope.⁸⁷

The CEC finds BC Hydro's project description and scope to be reasonably documented for a Project of the proposed size.⁸⁸ The CEC further submits that BC Hydro's Project planning and scope are satisfactory and therefore recommends that the BCUC accept the Project as being appropriately defined and developed.⁸⁹

RCIA considers the optional scope of work required for the generator circuit breaker and isolated phase bus replacements reasonable as these scope activities are intended to address reliability, safety, and construction risks.⁹⁰

Panel Determination

The Panel is satisfied that the scope of the Project is reasonable and meets the stated needs and objectives of the Project. The Panel is persuaded by BC Hydro's evidence regarding the need to include scope items that were originally identified as optional within the Project's base scope. The Panel agrees that the replacement of these items is necessary due to the age of the assets and integration challenges.

5.0 Project Cost and Rate Impact

5.1 Capital Cost Estimate

The Project has a total cost range of \$163.0 million to \$200.4 million, based on an Expected Cost of \$177.0 million⁹¹ and a Project Reserve of \$23.4 million. The Expected Cost estimate is based on a preliminary design and conforms to an AACE International Class 3 cost estimate requirements with an estimating accuracy range of +9.5 percent/-8 percent.⁹²

⁸⁴ Exhibit B-3, BCUC IR 1.2.2

⁸⁵ Exhibit B-1, Appendix F to Appendix D.

⁸⁶ Exhibit B-3, BCUC IR 1.3.2, 1.3.2.

⁸⁷ BCOAPO Final Argument, p. 11.

⁸⁸ CEC Final Argument, p. 7.

⁸⁹ Ibid., p. 9.

⁹⁰ RCIA Final Argument, p. 9.

⁹¹ The Expected Cost is defined as the estimated cost at a 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 (i.e. more favorable) or equal to the P50 value."

⁹² Exhibit B-1, p. 4-16.

The Expected Cost includes actual life-to-date costs and forecast direct construction costs, indirect construction costs, contingency and reserves, escalation, interest during construction and capital overhead.⁹³ BC Hydro notes that the direct construction cost estimate is based on the proposal price for the generator circuit breakers, the isolated phase buses, and ancillary equipment.⁹⁴

The Authorized Cost⁹⁵ is the sum of the Expected Cost and the Project Reserve of \$23.4 million.⁹⁶ The Project Reserve accounts for the additional financial impact of known risks to the Project and will require additional financial approval from BC Hydro's Board of Directors to access the funds.⁹⁷ The Project Reserve is a combination of two components:

1. P90 minus P50 contingency components to provide a higher level of confidence that the Project cost estimate will not be exceeded (\$18.7 million).⁹⁸
2. Special Reserve to address the following items:
 - Cost escalation rate risk for other cost items that are not part of the proposal for the supply and install of the generator circuit breakers and the isolated phase buses, given that market conditions remain uncertain and there is a risk that actual escalation rates may exceed the forecast escalation rates for the current and future years (\$1.6 million); and
 - Risk of increase in the discrete scope of replacing corroded piping headers for the fire protection system in each of the four circuit breaker chambers (\$3.1 million).⁹⁹

5.2 Rate Impact

The Project will impact BC Hydro's revenue requirements, including operating costs, amortization and finance charges.¹⁰⁰ For the Expected and Authorized Cost estimates, the increase in BC Hydro's revenue requirements from the Project would be highest in fiscal 2031 at \$9.5 million and \$10.8 million respectively, and results in a cumulative incremental rate impact of 0.16 percent and 0.18 percent respectively.¹⁰¹ BC Hydro provides the rate impact analysis for the Project in Figure 1 below.

Figure 1: Cumulative Incremental Rate Impact Analysis¹⁰²

⁹³ Ibid., p. 4-17.

⁹⁴ Ibid., p. 4-19.

⁹⁵ The Authorized Cost is defined as the estimated cost at the P90 confidence level, plus the special reserve. A P90 confidence level indicates an expected 90% probability that the final result will be less than or equal to the P90 value.

⁹⁶ Exhibit B-1, p. 4-17.

⁹⁷ Ibid., pp. 4-21 to 4-22.

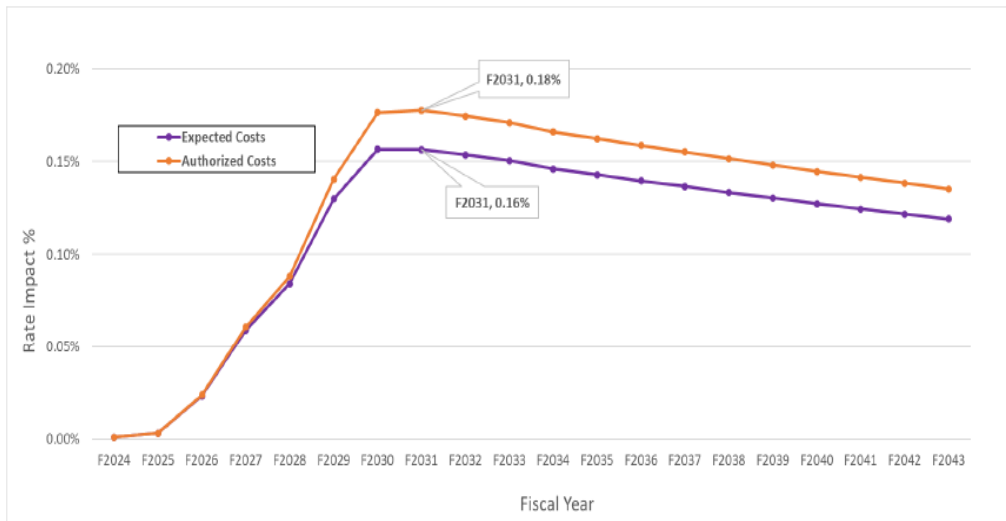
⁹⁸ Ibid., Footnote 16, pp. 4-18, 4-21.

⁹⁹ Ibid., pp. 4-18, 4-22, Exhibit B-3, BCUC IR 1.4.1.

¹⁰⁰ Exhibit B-1, p. 4-23.

¹⁰¹ Ibid., p. 4-24.

¹⁰² Ibid., Figure 4-3, p. 4-23.



Positions of the Parties

BCOAPO submits that the Project cost estimate and the associated rate impact are reasonable.¹⁰³

RCIA does not object to the use of Special Reserve funds as its use is limited to its intended purposes and BC Hydro is not permitted to repurpose the funds for general project expenditures.¹⁰⁴ RCIA did not provide other specific submissions relating to BC Hydro’s cost estimate or rate impacts.

The CEC finds the Project to be appropriately costed and the rate impact to be appropriately determined.¹⁰⁵

Panel Determination

The Panel finds the Project cost estimate to be reasonable, including the Expected and Authorized Cost amounts. The capital cost estimate is consistent with the AACE International Class 3 cost estimate requirements and is thus in alignment with the BCUC’s CPCN Guidelines. We also note that the CEC and BCOAPO consider the Project cost estimate to be reasonable.

The Panel finds the approach for release of the Project Reserve to be reasonable, namely, the requirement for approval from the BC Hydro Board. We accept that this provides for appropriate due diligence and governance of investments above the Expected Cost of the Project including contingency.

The Panel also finds that the cumulative incremental rate impact provided by BC Hydro is reasonable.

6.0 Project Consultation and Engagement

BC Hydro has undertaken consultation and engagement activities with First Nations communities, stakeholders and the public with respect to the Project. The following subsections provide an overview of BC Hydro’s consultation and engagement activities with potentially affected First Nations communities, local governments and the public.

¹⁰³ BCOAPO Final Argument, p. 11.

¹⁰⁴ RCIA Final Argument, Section 5, PDF p. 10.

¹⁰⁵ CEC Final Argument, p. 11.

6.1 First Nations Consultation

The Project is located at BC Hydro's Mica Generating Station, which is approximately 137 km north of Revelstoke, BC. Based on the Province's Consultative Area Database, the Project is proposed to take place within the consultative boundaries of the following potentially affected First Nations:¹⁰⁶ ʔaḡam (St Mary's Band), ʔakisḡ nuk First Nation, Adams Lake Indian Band, Ktunaxa Nation Council Society, Skwl'ax te Secwepemcúl'ecw, Lower Similkameen Indian Band, Neskonlith Indian, Band, Okanagan Indian Band, Okanagan Nation Alliance, Penticton Indian Band, Shuswap Band, Simpcw First Nation, Spltasin First Nation, Tobacco Plains Indian Band, Upper Nicola Band, and Yaqan nuʔkiy (Lower Kootenay Band).

In April of 2021, BC Hydro shared an initial Project notification with all potentially affected First Nations noted above. In August 2023, BC Hydro shared a Project update, a review of Project alternatives, information regarding the regulatory process and schedule, as well as next steps. BC Hydro then shared a draft of the environmental and socio-economics report and a draft environmental management plan for feedback and comments in September and November 2023, respectively, followed by a draft of the First Nations Consultation and Public Engagement Chapter of this Application for feedback and comments in December 2023.¹⁰⁷

By the date of filing the Application (March 2024), BC Hydro had received inquiries regarding the environmental and archeological impacts of the Project from four First Nations: the Okanagan Indian Band, Skwl'ax te Secwepemcúl'ecw, Spltasin First Nation and the Simpcw First Nation. In its responses to these inquiries, BC Hydro noted that the Project has no anticipated environmental impacts as it takes place within the existing footprint of Mica. Further, BC Hydro confirmed that the Project activities would not result in ground disturbance or anticipated impacts to archaeological materials.¹⁰⁸

During the proceeding, BC Hydro provided the following updates on its consultation activities:¹⁰⁹

- In March 2024, BC Hydro met with Okanagan Indian Band to discuss the updated capacity funding agreement, to include the review of the draft Environmental Management Plan and Environmental and Socioeconomic Effects Report with reviews in process.
- In April 2024, the Skwl'ax te Secwepemcúl'ecw requested a status update on the Project and expressed an interest in actively participating in the consultation process. BC Hydro is working to set up a meeting in response.

BC Hydro confirms that there are no outstanding concerns from any of the identified First Nations regarding the Project. BC Hydro states that it will continue to consult with all potentially impacted First Nations and will respond to all questions, comments, and concerns.¹¹⁰

BC Hydro considers the Project to have minimal, if any, incremental impact on any Aboriginal rights and title. BC Hydro notes that the Project will replace certain electrical equipment within the existing property boundary of the Mica generating station and inside the Mica powerhouse. Further, the Project will not require ground disturbance, and potential impacts to wildlife and wildlife habitat and to archaeological resources, are not anticipated.¹¹¹

¹⁰⁶ Exhibit B-1, p. 5-4.

¹⁰⁷ Ibid., p. 5-19.

¹⁰⁸ Ibid.

¹⁰⁹ Exhibit B-3, BCUC IR 1.5.1.

¹¹⁰ Ibid.

¹¹¹ Exhibit B-1, p. 5-16.

BC Hydro submits that it has meaningfully engaged with all potentially affected First Nations at a level that has met or exceeded requirements prescribed by the *Haida* spectrum.¹¹²

6.2 Public Engagement

BC Hydro has identified the following stakeholders that are in the vicinity of the Mica Generating Station:¹¹³

- Member of the Legislative Assembly: Doug Clovechok, Columbia River-Revelstoke;
- Municipal government: City of Revelstoke, Mayor and Council;
- Regional government: Columbia-Shuswap Regional District, Director David Brooks-Hill, Area B; and
- General public as required.

BC Hydro notified the municipal, regional, and provincial elected officials about the Project in October 2023.¹¹⁴ BC Hydro states that the public engagement for the Project is minimal as the work is taking place at the Mica generating station and will have very limited impact on local communities due to its remote geographic location. As a result, BC Hydro has not undertaken broad public engagement for the Project.¹¹⁵

Positions of the Parties

BCOAPO and the CEC submit that BC Hydro's consultation regarding the Project is adequate.¹¹⁶

RCIA references BC Hydro's updates provided during the proceeding regarding consultation activities are still underway with the Skw'ax te Secwepemcúl'ecw and the Okanagan Indian Band. RCIA submits that subject to the completion of consultation activities, BC Hydro's consultation and public engagement efforts to date, appear to be reasonable.¹¹⁷

In reply to RCIA's submission, BC Hydro submits that it does not need to complete or further report on First Nations consultation or its stakeholder engagement activities before the BCUC's decision on the expenditure schedule for the Project.¹¹⁸ BC Hydro further confirms that to date, no issues or concerns have been raised about the Project by First Nations or public stakeholders. BC Hydro will continue to consult with all potentially impacted First Nations and will respond to all questions, comments, and concerns. BC Hydro also commits to continue to keep the appropriate public stakeholders informed about the Project and will address any questions or concerns that may arise.¹¹⁹

Panel Determination

The Panel finds that BC Hydro's consultation with First Nations communities to date has been adequate and is in alignment with the BCUC's 2010 First Nations Information Filing Guidelines for Crown Utilities. We are satisfied that BC Hydro has properly identified First Nations that may be potentially affected by the Project and note that BC Hydro has committed to continuing to consult with First Nations for the remainder of the Project. In addition, we accept BC Hydro's assessment that the Project will have minimal, if any, incremental adverse

¹¹² Ibid., pp. 5-17, 5-22.

¹¹³ Ibid., p. 5-23.

¹¹⁴ Ibid., p. 5-24.

¹¹⁵ Ibid., pp. 5-24 to 5-25.

¹¹⁶ BCOAPO Final Argument, p. 12; CEC Final Argument, p. 12.

¹¹⁷ RCIA Final Argument, p. 11.

¹¹⁸ BC Hydro Reply Argument, p. 16.

¹¹⁹ Ibid., pp. 17-18.

impacts on Aboriginal rights or title largely because the Project occurs within an existing BC Hydro facility and is not expected to have archeological impacts. We accept BC Hydro’s assessment that the scope of consultation for the Project falls at the low end of the *Haida* spectrum. BC Hydro has provided information and Project updates to all potentially affected First Nations, and engaged with each interested First Nation to the full extent requested and will continue to do so as the Project moves forward.

The Panel finds that BC Hydro’s engagement with local governments and local communities to date has been adequate and considers that BC Hydro has made reasonable efforts to date to contact parties who may be affected by the Project.

With respect to RCIA’s submission, BC Hydro notes its intention to continue to consult and engage with all relevant parties including municipal and regional governments, First Nations and the general public. BC Hydro further submits that no concerns remain outstanding. Based on these submissions, the Panel is satisfied with BC Hydro’s updates on consultations to date and its commitment to ongoing communications with all potentially affected parties as the Project advances.

7.0 Provincial Energy Objectives, the Integrated Resource Plan, and the *Clean Energy Act*

As noted in Section 1.2.1 of this Decision, Section 44.2(5.1) of the UCA provides that in considering whether to accept an expenditure schedule filed by BC Hydro, the BCUC, in addition to considering the interests of persons in British Columbia who receive or may receive service from BC Hydro, must consider:

- a) British Columbia’s energy objectives,
- b) the most recent of the following documents:
 - i. an integrated resource plan approved under section 4 of the *Clean Energy Act* before the repeal of that section;
 - ii. a long-term resource plan filed by BC Hydro under section 44.1 of the UCA,
- c) the extent to which the schedule is consistent with the requirements under section 19 of the *Clean Energy Act*, and
- d) if the schedule contains expenditures on demand-side measures, the extent to which the demand-side measures are cost-effective within the meaning prescribed by legislation.

BC Energy Objectives

BC Hydro identifies eight of British Columbia’s energy objectives, as set out in section 2 of the *Clean Energy Act*, that the Project supports:

Table 1: British Columbia’s Energy Objectives¹²⁰

Energy Objective	Commentary
(a) to achieve electricity self-sufficiency	By completing the work described in the Application, BC Hydro will maintain the reliable operation of the Mica Generating Station.
(c) by 2030, to ensure that 100% of the electricity generated in British Columbia and supplied to the integrated grid is generated from clean or renewable resources, and to ensure that the	

¹²⁰ Ibid., pp. 1-24 to 1-25. Table prepared by the BCUC.

Energy Objective	Commentary
infrastructure necessary to transmit that electricity is built	
(e) to ensure the authority's ratepayers receive the benefits of the heritage assets and to ensure the benefits of the heritage contract under the <i>BC Hydro Public Power Legacy and Heritage Contract Act</i> continue to accrue to the authority's ratepayers	By completing the work described in the Application, BC Hydro will be able to continue to reliably operate a heritage asset.
(f.2) to ensure that increases to the BC Hydro's rates do not exceed cumulative inflation	BC Hydro is planning to and expects to be able to manage the incremental rate impact, as set out in section 4.5 of the Application, within the cumulative inflation target.
(k) to encourage economic development and the creation and retention of jobs	The Project will result in contracting opportunities and positive economic benefits, as set out in Chapter 4, sections 4.3.2, 4.3.3, and 4.3.4 of the Application.
(m) to maximize the value, including the incremental value of the resources being clean or renewable resources, of British Columbia's generation and transmission assets for the benefit of British Columbia	By completing the work described in the Application, BC Hydro will maintain the reliable operation of Mica Generating Station, BC Hydro's second largest generation facility.
(n) to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia	By completing the work described in the Application, BC Hydro will reduce the probability of needing to import power from another utility, while also maximizing the likelihood of having the ability to operate in a surplus and export power to other utilities.
(o) to achieve British Columbia's energy objectives without the use of nuclear power	By completing the work described in the Application, BC Hydro will ensure the reliable operation of Mica Generating Station, a hydroelectric facility.

Integrated Resource Plan

BC Hydro filed its Updated 2021 Integrated Resource Plan (Updated 2021 IRP) on June 15, 2023, which was accepted by the BCUC on March 6, 2024.¹²¹ BC Hydro states that the Updated 2021 IRP assumes the Project has been approved and put into operation to maintain the reliable operation of the Mica Generating Station.¹²²

Section 19 of the *Clean Energy Act*

¹²¹ G-58-24, dated March 6, 2024.

¹²² Exhibit B-1, p. 1-25.

Section 19 of the *Clean Energy Act*, which applies to BC Hydro, addresses clean and renewable resources. BC Hydro states that at this time, there are no prescribed targets or guidelines under section 19 of the *Clean Energy Act*.¹²³ BC Hydro states, however, that the Project is consistent with and will aid BC Hydro in continuing to achieve British Columbia's energy objective set out in section 2(c) of the *Clean Energy Act*.

Positions of the Parties

Intervenors made no submissions on BC's energy objectives or alignment with BC Hydro's Integrated Resource Plan.

Panel Determination

The Panel finds that the Project aligns with the applicable BC energy objectives, notably energy objectives (a) achieving electricity self-sufficiency, (c) generating electricity from clean or renewable resources, (e) ensuring ratepayers benefit from heritage assets and (k) encouraging economic development and jobs, as well as objectives (f.2), (m), (n) and (o). In addition, the Panel considers the Project to be consistent with BC Hydro's Updated 2021 IRP, which is its most recently filed long term resource plan.

In the Panel's view, subsections 44.2(5.1) (c) and (d) of the UCA are not applicable to this Application: there are no prescribed targets or guidelines under section 19 of the *Clean Energy Act*, and the Project does not include expenditures related to demand-side measures.

8.0 Overall Determination

BC Hydro submits that making the expenditures in the Project expenditure schedule is in the public interest and should be accepted by the BCUC.¹²⁴

Position of the Parties

BCOAPO and the CEC find BC Hydro's proposed Project expenditure schedule to be in the public interest.¹²⁵ The CEC submits that the proposed expenditure schedule is necessary, and that BC Hydro has provided a fulsome review and discussion of the Project in this proceeding.¹²⁶

RCIA did not provide overall submissions on the proposed expenditure schedule; however, it submits that the evidence supports the need for isolated phase bus replacements at the same time as circuit breaker replacements.¹²⁷

Panel Determinations

Pursuant to section 44.2(3) of the UCA, the Panel accepts the expenditure schedule for the Project submitted by BC Hydro with an Authorized Cost estimate of \$200.4 million.

¹²³ Ibid., p. 1-26.

¹²⁴ BC Hydro Final Argument, p. 1.

¹²⁵ CEC Final Argument, p. 1; BCOAPO Final Argument, p. 13.

¹²⁶ CEC Final Argument, pp. 12-13.

¹²⁷ RCIA Final Argument, p. 7.

In Section 2 of this Decision, the Panel found that the Project is needed to address the aging and obsolete generator circuit breakers for generating Units 1 to 4 at the Mica Generating Station and that these assets, along with the isolated phase buses, are critically important to the continued reliability of the Mica Generating Station.

In Section 3 of this Decision, the Panel found that BC Hydro appropriately selected the replacement alternatives for both the generator circuit breakers and the isolated phase buses.

In Sections 4 and 5 of this Decision, the Panel identified that the scope of the Project is reasonable and meets the stated needs and objectives of the Project and found the Project cost estimate and rate analysis to be reasonable.

In Section 6, the Panel found that BC Hydro's consultation with First Nations communities, stakeholders and the public to date has been adequate. In Section 7, the Panel found that the Project aligns with the applicable BC energy objectives and that the Project is consistent with BC Hydro's Updated 2021 IRP.

Accordingly, **the Panel finds that the expenditure schedule is in the public interest.**

The Panel directs BC Hydro to provide ongoing reporting to the BCUC for the duration of the Project, as detailed in Section 9 of this Decision.

9.0 Project Reporting

The Panel directs BC Hydro to provide the following reports for the Project:

1. Annual Progress Reports

Each report is required to detail:

- **Actual costs incurred to date compared to the Project cost breakdown table estimate provided in Table 4-3 of the Application, including the use of Project Reserve, if accessed, highlighting variances with an explanation of variances greater than 30 percent for any row number or line item;**
- **Updated forecast of costs, highlighting the reasons for costs that are forecast to have variances greater than 30 percent for any row number or line item; and**
- **The status of identified risks noted in Chapter 6 of the Application, highlighting the status of identified risks, changes in and additions to risks, the options available to address the risks, the actions that BC Hydro is taking to deal with the risks and the likely impact on the Project's schedule and cost.**

BC Hydro must file annual progress reports within 45 days of the end of each annual reporting period, with the first report covering the period ending September 30, 2025.

2. Material Change Reports

A material change (Material Change) is a change in BC Hydro's plan for the Project that would reasonably be expected to have a significant impact on the schedule, cost or scope, such that:

- **Schedule** – There is a delay in the forecast project in-service date of November 2028 provided in Table 4-5 of the Application;
- **Cost** – The Authorized Cost of the Project is forecast to exceed the BC Hydro Authorized Amount of \$200.4 million provided in row 16 of Table 4-3 of the Application; or
- **Scope** – There are one or more changes to the Project deliverables and the work required to create those deliverables or the main components of the Project scope detailed in Chapter 4 of the Application.

In the event of a Material Change, BC Hydro must file a Material Change report with the BCUC explaining the reasons for the Material Change, BC Hydro’s consideration of the Project risk and the options available, and actions BC Hydro is taking to address the Material Change. BC Hydro must file the Material Change report within 30 days of the Material Change occurring or within 30 days of the appropriate approval authority within BC Hydro being informed of a potential material change, whichever is earlier.

3. Final Report

A Final Report is due the earlier of one month after review by BC Hydro’s Board of Directors, or 24 months after the project in-service date. The report is to include:

- The final cost of the Project, including a breakdown of the final costs; and
- A comparison of the final costs to the estimates provided in Table 4-3 of the Application and an explanation for any material cost variances that exceed 10 percent for any of the cost items provided in Table 4-3 of the Application.

DATED at the City of Vancouver, in the Province of British Columbia, this 20th day of August 2024.

Original signed by:

T. A. Loski
Panel Chair/Commissioner

Original signed by:

M. Jaccard
Commissioner

British Columbia Hydro and Power Authority
Mica Unit 1 to 4 Circuit Breakers Replacement Project

LIST OF ACRONYMS

Acronym	Description
Application	BC Hydro's application to the BCUC for acceptance of a schedule of capital expenditures for the Mica Units 1 to 4 Circuit Breakers Replacement Project
Authorized Cost	The sum of the expected cost and project reserve
BC Hydro	British Columbia Hydro and Power Authority
BCOAPO	British Columbia Old Age Pensioners' Organization et al.
BCUC	British Columbia Utilities Commission
CEC	The Commercial Energy Consumers Association of British Columbia
CPCN	Certificate of Public Convenience and Necessity
Expected Cost	the estimated cost at a P50 confidence level
Mica	Mica Generating Station, located north of Revelstoke BC
Project	Mica Units 1 to 4 Circuit Breakers Replacement Project
RCIA	Residential Consumer Intervener Association
UCA	<i>Utilities Commission Act</i>
Updated 2021 IRP	BC Hydro's Updated 2021 Integrated Resource Plan

British Columbia Hydro and Power Authority
Mica Unit 1 to 4 Circuit Breakers Replacement Project

EXHIBIT LIST

Exhibit No.	Description
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COMMISSION DOCUMENTS

A-1	March 13, 2024 – Appointing the Panel for the review of the BC Hydro Mica Units 1 to 4 Circuit Breakers Replacement Project
A-2	April 5, 2024 – BCUC Order G-101-24 establishing a regulatory timetable
A-3	April 25, 2024 – BCUC Information Request No. 1 to BC Hydro
A-4	CONFIDENTIAL – April 25, 2024 – BCUC Confidential Information Request No. 1 to BC Hydro

APPLICANT DOCUMENTS

B-1	PUBLIC – March 5, 2024 - BRITISH COLUMBIA HYDRO AND POWER AUTHORITY (BC HYDRO) - Mica Units 1 to 4 Circuit Breakers Replacement Project
B-1-1	CONFIDENTIAL – March 5, 2024 - BC Hydro Confidential Mica Units 1 to 4 Circuit Breakers Replacement Project
B-2	April 16, 2024 – BC Hydro submitting confirmation of public notice
B-3	PUBLIC – June 13, 2024 – BC Hydro submitting responses to BCUC Information Request No. 1
B-3-1	CONFIDENTIAL – June 13, 2024 – BC Hydro submitting confidential responses to BCUC Information Request No. 1
B-4	CONFIDENTIAL – June 13, 2024 – BC Hydro submitting responses to BCUC confidential Information Request No. 1
B-5	PUBLIC – June 13, 2024 – BC Hydro submitting responses to Interveners Information Request No. 1
B-5-1	CONFIDENTIAL – June 13, 2024 – BC Hydro submitting confidential responses to Interveners Information Request No. 1

INTERVENER DOCUMENTS

- C1-1 April 25, 2024 – **BRITISH COLUMBIA OLD AGE PENSIONERS’ ORGANIZATION, COUNCIL OF SENIOR CITIZENS’ ORGANIZATIONS OF BC, ACTIVE SUPPORT AGAINST POVERTY, DISABILITY ALLIANCE BC, AND TENANT RESOURCE AND ADVISORY CENTRE (BCOAPO)** – Request to intervene by Irina Mis
- C1-2 May 9, 2024 – BCOAPO submitting Information Request No. 1 to BC Hydro
- C2-1 April 25, 2024 – **COMMERCIAL ENERGY CONSUMERS OF BC (CEC)** – Request to intervene by David Craig
- C2-2 May 9, 2024 – CEC submitting Information Request No. 1 to BC Hydro
- C3-1 April 25, 2024 – **RESIDENTIAL CONSUMER INTERVENER ASSOCIATION (RCIA)** – Request to intervene by Abdulrahman Abomazid
- C3-2 April 26, 2024 – RCIA submitting Confidentiality Declaration and Undertaking Forms
- C3-3 May 9, 2024 – RCIA submitting Information Request No. 1 to BC Hydro