BC Hydro
Power smart

Site C Clean Energy Project

Quarterly Progress Report No. 31

F2024 Second Quarter

July 1, 2023 to September 30, 2023

PUBLIC

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1 Executive Summary

1.1 Overview and General Project Status

Site C will be the third dam and hydroelectric generating station on the Peace River in northeastern British Columbia (**B.C.**). Once complete, Site C will provide 1,100 megawatts of capacity, and produce about 5,100 gigawatt hours of energy per year – enough to power the equivalent of 450,000 homes or 1.7 million electric vehicles per year in B.C.

The Site C dam site as seen in September 2023.

Construction on Site C began on July 27, 2015.

Quarterly Progress Report No. 31 covers the period July 1 to September 30, 2023 (**the reporting period**).

As of September 30, 2023, the Site C Project (**the Project**) is approximately 82% complete. BC Hydro remains on track to complete the Project within the budget ($16 billion) and schedule (final unit in-service date of 2025), which were approved in 2021.

The overall Project health status remains “amber” as a number of potential risks remain, as outlined in this report. BC Hydro continues to work collaboratively with the Project Assurance Board, special advisor Peter Milburn, Ernst & Young Canada, the Technical Advisory Board, and independent international dam experts to actively manage ongoing Project risks. The Technical Advisory Board and independent international dam experts continue to review and confirm that the Project designs are appropriate, safe and serviceable over the long operating life of Site C.

During the reporting period, the Project made considerable progress on many dam site work fronts, including the earthfill dam, generating station, approach channel, spillways, and tailrace. Of significant note, the Project reached a major milestone at the end of July with the completion of the earthfill dam to the elevation required to enable reservoir filling. Further, the tunnel conversion process, which was one of the key remaining construction activities required for reservoir filling, was also completed during this reporting period. Tunnel conversion involved installing four large rings inside one of the two tunnels diverting the Peace River around the dam site, to restrict the flow of water through the tunnel.

The Project remains on track to achieve the approved schedule, which includes the first generating unit to be placed in service by December 2024 (first unit in service), and all six generating units in service by the end of 2025 (final unit in service).

Based on the construction progress achieved to date and revised contractual schedules, there is a possibility that reservoir filling could start in late fall 2023. This would also provide an opportunity to achieve first unit in service earlier than planned. The timeline for reservoir filling depends on construction progress, meeting the

operational requirements of the BC Hydro system, weather constraints, and the continued compliance with environmental regulations. As of September 30, 2023, BC Hydro had received all required regulatory approvals to commence reservoir filling. There continues to be uncertainty related to achieving the contractual schedules, and there are identified risks that could adversely affect these schedules. The risks related to achieving an earlier reservoir fill are higher than the risks related to achieving the approved schedule.

The time available to complete the remaining scopes of work is expected to be sufficient for the Project to meet the Project's approved schedule.

The following sections discuss highlights from the reporting period and some of the current risks facing the Project.

1.2 Construction Progress

Considerable progress was made on the Project during the busy summer construction season. This included work to advance the key activities required to complete the tunnel conversion process and prepare the site for reservoir filling.

During the reporting period, the earthfill dam was completed to the elevation required to enable reservoir filling. Approximately 15.5 million cubic metres of materials were placed in the dam since dam construction began in 2021. The remaining work involves capping the dam and building permanent dam access roads across it for crews to travel on once the Project comes into operation. The conveyor system that transported glacial till material used in the construction of the core of the earthfill dam ceased operations in September 2023 upon completion of the earthfill dam.

For the generating station and spillways, the concrete placements are approximately 99% complete. The powerhouse concrete is 98% complete, the intakes headworks concrete is complete, and the spillways concrete is nearing completion.

For the balance of plant work activities, the mechanical contractor continued to make good progress constructing the powerhouse drainage and dewatering systems, and the systems were completed in the reporting period. The electrical contractor commenced installation of the electrical station service in the powerhouse, intakes, and spillways. In addition, the contractor has installed the isolated phase bus and transformers that will connect unit 1 and unit 2 generators to BC Hydro's electrical system. Architectural work in the operations building is progressing and the heating, ventilation and air conditioning work continues. The installation of the fire protection system is also continuing. The permanent upstream fishway is on schedule to be in service for spring 2024.

Construction continued on the right bank foundation enhancements, which address the geotechnical issues that were identified in the bedrock foundation on the Project's right bank. The installation of 96 large diameter concrete-filled vertical steel piles, to further extend the foundation deeper into the bedrock, and the installation of the powerhouse pile caps are now complete. As of September 30, 2023, approximately 85% of the approach channel waterproofing, including bedrock surface excavations, cleaning, installation of waterproofing lining materials, reinforced concrete placements, grouting and granular fill placements, had been completed. Ongoing reviews by the Technical Advisory Board and the two independent, world-leading dam experts continue to confirm that the design of the foundation enhancements meets the highest safety standards and international best practices.

The scope of work for the turbines and generators includes the complete design, supply, installation, testing and commissioning of six turbines, generators, governors and exciters. During the reporting period, the contractor continued working on all six units. The majority of the components for unit 1 have been installed and the unit is scheduled to be ready for the start of commissioning when the penstocks can be filled with water.

The turbine spiral case flexible couplings leakage risk has significantly reduced since the unsuccessful hydrostatic pressure test of the unit 1 coupling in June and July 2023. The contractor has modified the unit 1 coupling to a half-welded design and once painting is complete in early November, the turbine will be ready to be watered up. The installation of the unit 2 turbine and generator is progressing well and is expected to be ready for the start of commissioning by late winter 2023/24; this is due to the decision to switch the design of the flexible coupling to the half-welded design that was implemented on unit 1.

1.3 Upholding Commitments to the Environment, Indigenous Nations and Local Communities

During the reporting period, BC Hydro continued to uphold its commitments to the environment, Indigenous Nations and local communities.

BC Hydro continued to engage, build relationships and find solutions together on topics that are most important to the Indigenous Nations affected by Site C.

BC Hydro continued to secure the appropriate permits, authorizations and leaves to commence construction required for the Project. As of September 30, 2023, 627 of the estimated 665 provincial and federal permits and authorizations have been received. This includes all required regulatory approvals to commence reservoir filling.

Work advanced in the areas of environmental monitoring and assessment, as well as in the Project's fish and wildlife habitat, vegetation management and heritage programs. During the reporting period, the temporary fish passage facility passed more than 6,700 fish upstream, and since the start of this year's operation in April 2023, the facility has passed more than two times the total number of fish passed in the 2021 and 2022 operating seasons combined.

Environmental compliance on the Project remains high. During the reporting period, more than 14,000 environmental compliance inspections were completed by BC Hydro, with a compliant and partial compliant result of 99% across all contractors and works areas.

Indigenous Engagement

BC Hydro continues to advance economic opportunities for First Nations through capacity building and procurement opportunities. Since the beginning of the Project, approximately $757 million in Site C procurement opportunities have been awarded to companies designated by Indigenous Nations, pursuant to BC Hydro's Indigenous Procurement Policy. Working on the Site C Project has helped businesses designated by Indigenous Nations to build and grow their reputations, expand the scale of their operations, and develop new expertise to compete in the regional economy.

BC Hydro has continued to work with Indigenous Nations on a variety of initiatives. During the reporting period, BC Hydro's Indigenous Relations team hosted five tours of the dam site and future reservoir area with Indigenous community members. These tours are a meaningful opportunity for Indigenous Nations to see the Project firsthand and to prepare for the changes caused by reservoir filling. BC Hydro also met with Indigenous Nations to discuss fish consumption and methylmercury monitoring.

BC Hydro continued to work with Indigenous Nations on development of the future cultural centre. The cultural centre project is an important accommodation for the cultural impacts of Site C. The facility will showcase local Indigenous culture and history in the region, and store and display many of the artifacts uncovered during the construction of Site C. The participating Nations have agreed on a conceptual design for the facility, and support exploring an option to renovate the existing

worker accommodation lodge. BC Hydro is currently evaluating the cost estimates for this option before proceeding to develop the detailed design.

BC Hydro has invited Indigenous Nations to participate in discussions and provide recommendations for the permanent naming of the Site C assets. In September 2023, five Indigenous Nations participated in a Site C naming workshop.

In September 2023, 472 Indigenous people were working on the Site C Project, which represents approximately 10% of the total workforce.

Local communities

BC Hydro continued to engage with local communities, elected officials and stakeholders. The Regional Community Liaison Committee, comprised of local elected officials and local Indigenous communities, met on September 13, 2023, for a Project update. BC Hydro also continued to implement its construction communications program, which includes updating the Project website with current information, photos and videos of construction activities, as well as providing information to stakeholders.

During the reporting period, BC Hydro distributed approximately $14,000 to two non-profit organizations in the Peace Region through the Generate Opportunities (**GO**) Fund and as of September 30, 2023, 89 projects had received nearly $780,065 since the fund was launched.

1.4 Indigenous Burials

During the reporting period, consultations continued with impacted Indigenous Nations regarding site-specific plans for the management of two identified burial sites located within the future reservoir area, which have been registered as heritage sites under the *Heritage Conservation Act*.

After a multi-year search effort to locate the potential graves at one of the two locations, which was conducted in collaboration with Indigenous Nations, no remains were found. Nations have made their final visits to this site in advance of the site being inundated during reservoir filling.

In July 2023, the single confirmed burial within the reservoir area was relocated to a safe location for temporary storage outside of the inundation zone. Subsequent to the reporting period, in October 2023, the burial was relocated to its permanent final resting place. Indigenous elders and community members were present for ceremonies during both movements, and the work was done under the supervision of Indigenous monitors.

1.5 Property Acquisitions

Property acquisitions required for the Project remain on track. The land and rights required for reservoir filling have been acquired. During the reporting period, further acquisitions were completed for some of the land required within the first year of reservoir operations. Land and rights will be required from a further five landholdings within the first year of reservoir operations.

1.6 Inflationary Pressures

Over the past year, inflationary pressures have had impacts to the Project's costs in areas including contract related costs for higher labour and fuel costs in excess of the amounts to be borne by the contractors, and contract amendments and change orders subject to current market pricing. Going forward, inflation continues to be a risk for future contract change orders, procurements, and the Project's interest during construction costs. In addition, beyond inflationary cost impacts, supply chain challenges are a risk that could potentially cause schedule delays.

1.7 Project Status Dashboard for the Quarter

BC Hydro, with oversight from the Project Assurance Board, is focused on completing the Site C Project within the 2021 approved budget of $16 billion and the final unit in-service date in 2025, or earlier, without compromising on safety, scope and quality. To report on Project status, BC Hydro uses a dashboard system where key Site C Project areas are classified as red (at risk), amber (moderate issues) or green (on target).

The Project Status Dashboard as of September 30, 2023, is provided in Table 1. There were no changes to the performance indicators from the previous quarter (as of June 30, 2023).

Table 1 Project Status Dashboard

● On Target ● Moderate Issues ● At Risk

Status as of:		September 30, 2023
Overall Project Health	●	As of September 30, 2023, the overall Project health remained "amber." The Project is approximately 82% complete and work continues to advance, however, there are still potential risks remaining. BC Hydro continues to review, assess, mitigate, manage and monitor potential risks to the Project.
Safety	●	Safety status remained "amber" as of September 30, 2023. During the reporting period, the Project experienced the busiest summer construction season since the Project started, with multiple contractors and work fronts operating across the dam site, and a strong focus on work in and around the powerhouse. In July 2023, more than one million hours were worked, a peak for the Project. As compared to the same period in 2022, the Project safety performance metrics during the reporting period for lost time injury frequency and all injury frequency remained consistent, and there was a slight improvement in serious incident frequency. Compared to the previous quarter, there was a slight improvement for lost time injury frequency and serious incident frequency, and a slight increase in all injury frequency. WorkSafeBC imposed a penalty against BC Hydro on Site C related to WorkSafeBC orders the Project received in July 2022 for first aid and prime contractor responsibilities in the Site C powerhouse. BC Hydro takes health and safety responsibilities and orders from WorkSafeBC very seriously, and since July 2022, BC Hydro has worked to ensure it is compliant with the WorkSafeBC requirements related to prime contractor responsibilities and first aid.

Status as of:		September 30, 2023
Scope	🟡	Scope status remained "amber" as of September 30, 2023. Provisions are included in the Project plans for potential scope adjustments for site conditions and interfaces. As construction progresses, there remains a risk of design changes due to unknown field conditions.
Schedule	🟡	Schedule status remained "amber" as of September 30, 2023. The Project is currently on schedule to achieve the approved 2025 final unit in-service date and is approximately 82% complete. Based on the construction progress achieved to date and revised contractual schedules, there is a possibility that reservoir filling could start in late fall 2023. This would also provide an opportunity to achieve first unit in service earlier than planned. There continues to be uncertainty related to achieving the contractual schedules, and there are identified risks that could adversely affect these schedules. The risks related to achieving an earlier reservoir fill are higher than the risks related to achieving the approved schedule. The time available to complete the remaining scopes of work is expected to be sufficient for the Project to meet the approved schedule.
Cost	🟡	Cost status remained "amber" as of September 30, 2023. Potential cost risks remain, as detailed in this report. As of September 30, 2023, the life-to-date actual costs are $12.4 billion, which results in an estimated $3.6 billion of remaining costs based on the forecast of $16 billion.
Quality	🟢	The quality status for the Project continued to be "green" as of September 30, 2023, indicating that the work generally conforms to the requirements of the drawings and specifications. When a quality issue is identified during the course of construction, BC Hydro and its contractors work to rectify the issue to ensure that the quality of the completed work achieves the quality specifications. The Technical Advisory Board and independent international dam experts continued to review and confirm that the Project designs are appropriate, safe and serviceable over the long operating life of Site C.
Regulatory, Permits and Tenures	🟢	The regulatory, permits and tenures indicator status remained "green" as of September 30, 2023. Overall, BC Hydro continued to be issued permits and authorizations in accordance with construction timelines. As of September 30, 2023, 627 of the estimated 665 provincial and federal permits and authorizations required for the Project have been received and are actively being managed.

Status as of:		September 30, 2023
Environment	🟡	The Project environment status remained "amber" as of September 30, 2023, due to the unresolved April 2022 potentially acid-generating rock Environmental Assessment Office order and a warning letter received on September 26, 2022. BC Hydro worked with the B.C. Environmental Assessment Office to address the order and letter. BC Hydro has conducted local government, Indigenous Nations and regulator consultation on proposed amendments to the Site C Construction Environmental Management Plan to clarify that the current approaches to managing potentially acid-generating rock provide adequate environmental protection. The revised Construction Environmental Management Plan was submitted to the Environmental Assessment Office for their final review and they responded to that submission with several clarifying questions. As of September 30, 2023, a reply to their questions had not yet been submitted. Additionally, BC Hydro is developing final treatment plans for potentially acid-generating sites that will not be addressed through dam construction or the creation of the reservoir.
Procurement	🟡	The procurement indicator status remained "amber" as of September 30, 2023, due to the remaining right bank foundation enhancements procurements that still need to be negotiated. The majority of the Project's commercial agreements are in place, with a few remaining commercial agreements for smaller scopes of work expected to be awarded by the spring 2024.
Indigenous Relations	🟡	The Indigenous Relations indicator status remained "amber" as of September 30, 2023. BC Hydro has a mandate from the Government of British Columbia to reach Project or impact benefit agreements with the 10 Indigenous groups that are most impacted by Site C. Eight of 10 agreements are fully executed and in implementation. BC Hydro has a standing offer to negotiate with the remaining two First Nations that have not signed agreements related to the Site C Project. BC Hydro also maintains a working relationship with those Nations through ongoing consultations and engagement. BC Hydro has completed consultations with impacted First Nations regarding options and site-specific plans for managing identified burial and cultural sites impacted by reservoir filling, in particular in the Halfway River and Cache Creek / Bear Flats areas.
Stakeholder Engagement	🟢	The stakeholder engagement indicator status remained "green" as of September 30, 2023. BC Hydro continues to work with the communities, regional district and stakeholder groups on the implementation of various community agreements.

1.8 Significant Project Updates for the Quarter

Significant Project updates that occurred between July 1 to September 30, 2023, include the following:

July 2023

- The realignment of Highway 29 was completed. All six segments, spanning approximately 30 kilometres from Hudson's Hope to Fort St. John, were officially open to traffic. Refer to section 3.1.8 for more information.

August 2023

- The earthfill dam was completed to the elevation required to enable reservoir filling. Refer to section 3.1.2 for more information.
- Construction began on a new shallow water fish habitat at Wilder Creek.
- Final vegetation clearing began in the Watson Slough area.

September 2023

- Tunnel conversion, which was one of the major milestones required to enable reservoir filing, was completed. Refer to section 3.1.1 for more information.
- Decommissioning work was completed on the old sections of Highway 29 that will no longer be used. Refer to section 3.1.8 for more information.
- Construction of the erosion protection slabs in the tailrace channel downstream of the powerhouse was completed.

Refer to Appendix A for site construction photos from the reporting period and refer to Appendix B for a list of work completed since the Project commenced in 2015.

1.9 Post-Reporting Period Update

Subsequent to the reporting period, on November 14, 2023, BC Hydro confirmed that the process to start reservoir filling on the Site C project will begin, on schedule, in 2024.

BC Hydro had been working on the option of starting reservoir filling this fall, one year earlier than scheduled. However, there were some critical work areas that still needed to be completed before reservoir filling could begin, including the approach channel, spillway gates and powerhouse intake gates. With winter weather and colder conditions setting in, the window to safely begin reservoir filling was coming to a close. As a result, BC Hydro made the prudent decision to stay on track with its current Project schedule.

Work on the Site C Project will continue to advance on schedule and be ready for filling to begin next fall. The Project remains on-track to achieve first power in 2024, have all six generating units in-service by 2025, and be completed within the approved 2021 budget.

2 Safety and Security

During this reporting period, the Project experienced the busiest construction season since the Project started, with numerous contractors and work fronts operating across the dam site, and a strong focus on work in and around the powerhouse. As compared to the same period in 2022, the Project safety performance metrics during the reporting period for lost time injury frequency and all injury frequency remained consistent, and there was a slight improvement in serious incident frequency. As compared to the previous quarter, there was a slight improvement for lost time injury frequency and serious incident frequency, and a slight increase in all injury frequency.

From a work hour perspective, there was a 13% increase in work hours for the 12-month period ending September 2023, compared to the same period ending September 2022 (10.3 million hours compared to 9.15 million hours). Notably, there were more than one million hours worked in July 2023.

2.1 COVID-19 and Respiratory Illness

As a result of a couple of COVID-19 variants circulating in B.C., Provincial Health has issued enhanced mask requirements for health care settings. These mask requirements have been implemented by the Site C onsite medical clinic. BC Hydro is following its communicable disease plan on the Project, providing health information to all contractors and workers, and continuing to support cleaning and hand washing protocols in the worker accommodation.

Subsequent to the reporting period, the onsite clinic received a supply of the latest COVID-19 and seasonal flu vaccines from Northern Health to administer at site. Northern Health expects employers to follow their communicable disease plans and is not considering any new directives for industrial projects in the northern region.

2.2 Tunnel Conversion Safety Planning

The tunnel conversion safety planning initiative, which began in 2022, aimed to establish a comprehensive safety program for a complex and high-risk project with strict regulatory requirements and tight schedules due to permit and weather limitations. Key safety concerns included tunnel structural integrity, water isolation, air quality, confined space restrictions, and emergency response. Collaboration between BC Hydro’s Site C teams and stakeholders led to effective tunnel conversion safety plans.

The scope of work was completed ahead of schedule with good quality and safety results, credited to effective planning, leadership, and collaboration.

2.3 WorkSafeBC Decision on BC Hydro Administrative Penalty

WorkSafeBC imposed a penalty against BC Hydro on Site C related to WorkSafeBC orders the Project received in July 2022 for first aid and prime contractor responsibilities in the Site C powerhouse. At that time, WorkSafeBC found that BC Hydro failed to fulfill the prime contractor responsibility to ensure the contractor had an effective ventilation system in place at all times, as well as non-compliant contractor first aid procedures in the powerhouse. There were no injuries or safety incidents related to the orders or penalty.

BC Hydro takes health and safety responsibilities and orders from WorkSafeBC very seriously. Since July 2022, BC Hydro has worked to ensure it is compliant with the WorkSafeBC requirements related to prime contractor responsibilities and first aid.

In September 2023, BC Hydro filed a review of the orders and penalty with WorkSafeBC. A decision on the review is expected in March 2024.

2.4 Powerhouse Air Quality

Site C Construction Management has been working with safety teams, industrial hygienists, and contractors to achieve good air quality throughout the powerhouse. Early in the construction of the powerhouse (2019), the generating station and spillways civil works contractor established an engineered ventilation system that achieved one fresh air exchange per hour in the powerhouse. When the powerhouse was handed over to BC Hydro in late 2022, the construction works had progressed substantially (including enclosure of the powerhouse), and the ventilation system has continued to be modified.

The current construction ventilation system is monitored on an ongoing basis by Project industrial hygienists, who recently calculated the system was achieving up to three fresh air exchanges per hour. This result exceeds regulatory compliance and enhances worker safety.

2.5 Summary of Safety Performance Metrics

From July 2015 through September 2023, more than 57 million work hours have been completed across the Project, with no fatalities and one permanent partial disabling injury in August 2017.[1]

During the reporting period, there were 18 serious safety incidents. These consisted of nine near misses with the potential for a serious injury, eight incidents that resulted in a worker injury (note that not all of these injuries required medical attention treatment), and one serious injury requiring surgical intervention.

In addition, there were 243 non-serious incidents recorded during this period. Of these, 54 incidents were classified as near misses, with the potential for causing harm. Of the remaining 189 incidents, 166 involved injuries that required first aid, 22 required medical attention, and one lost time injury.

A near miss is defined as an incident that could have resulted in an injury but did not because of effective hazard barriers or the person was out of harm's way/missed. BC Hydro considers near miss reporting as indicative of an effective and transparent safety culture and strongly encourages all contractors and employees to report near misses.

Table 2 reflects safety performance results for the Project, including all contractors and all sub-projects.

[1] In June 2018, an injured worker received a permanent partial disability award from WorkSafeBC due to a lost time injury incident in August 2017. BC Hydro reclassified this incident as a permanent disabling injury after receiving an update on the WorkSafeBC award in June 2018. The incident is identified as a serious injury in the BC Hydro Incident Management System.

Table 2 Summary of Site C Safety Metrics

	Reported July 1, 2023 to September 30, 2023[2]	Reported Since Inception (July 27, 2015 to September 30, 2023)[2]
Fatality[3]	0	0
Permanently Disabling Injury[4]	0	1
Serious Incidents[5]	18	200
Lost Time Injuries[6]	1	49
All-Injury Incidents[7] (Lost Time Injuries[6] and Medical Attention Requiring Treatment[8])	25	367

2.6 Safety Performance Frequency Metrics

To assess safety performance over time, the Project considers key safety metrics in the context of the total amount of hours worked (frequency), which corrects for the volume of work.

Table 3 summarizes these key safety metrics by quarter, for a rolling 12-month average.

2 Numbers are subject to change due to timing of when data is retrieved and when the injury is categorized.

3 Excludes any non-occupational incidents.

4 A permanently disabling injury is one in which someone suffers a probable permanent disability.

5 Serious incidents are any injury or near miss with a potential for a fatality or serious injury.

6 Lost time injuries are those where a worker (employee or contractor) misses their next shift (or any subsequent shift) due to a work-related injury/illness. If a worker only misses work on the day of the injury, it is not considered a lost time injury.

7 All-injury incidents include all work-related medical attention requiring treatment, lost time injuries, and fatalities.

8 Medical attention requiring treatment is where a medical practitioner has rendered services beyond the level defined as “diagnostic or first aid” and the worker (employee or contractor) was not absent from work after the day of the injury. Services beyond diagnostic/first aid include (but are not limited to) receiving stitches, a prescription, or any treatment plan such as physiotherapy or chiropractic.

Table 3 Summary of Safety Performance Frequency Metrics (2022 vs 2023)

	January – December 2022 (Rolling 12-Month Average)				January – December 2023 (Rolling 12-Month Average)			
	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec
Serious Incident Frequency	0.70	0.82	1.07	1.17	1.24	1.13	1.01	n/a
Lost Time Injury Frequency	0.11	0.09	0.11	0.11	0.17	0.16	0.12	n/a
All Injury Frequency	1.27	1.17	1.18	1.22	1.18	1.11	1.18	n/a

The serious incident frequency (adjusted for work hours) for this reporting period was 1.01, compared to 1.07 for the same period in 2022. It is important to note the Project also achieved a significant improvement in serious incident frequency compared to the previous two reporting periods this year (1.24 and 1.13 respectively). The serious incidents this quarter may be attributed to the higher volume of work involving higher-risk hazards, such as working at heights, near machinery/equipment with moving parts, near energized high-voltage lines and equipment, in confined spaces, and near heavy equipment. BC Hydro routinely shares safety performance results with Project contractors to help identify where corrective actions are required.

All serious safety incidents were investigated by the appropriate employers, and BC Hydro and contractor senior management participated in a review of these serious incident investigations. Mitigations and other corrective actions have been implemented to minimize the recurrence of similar incidents.

For this reporting period, the all-injury frequency was unchanged as compared to the same period in 2022. More than half of these injuries were lacerations, contusions, and fractures requiring medical treatment. In response to these injuries, the contractors involved conducted a “Safe Hands” campaign. They also introduced a

new policy for the use of retractable knives and removed all other utility knives from the construction site, with the aim of reducing laceration injuries.

Managing lost time injuries and return-to-work programs remains a priority for contractors.

Refer to Appendix C, Figure C-1 for a graphic summary of Site C safety performance metrics, including both BC Hydro employees and project contractors.

2.7 Regulatory Inspections and Orders

WorkSafeBC, under the authority of the *Worker's Compensation Act*, is the primary regulator with jurisdiction over safety for the Project. WorkSafeBC oversees worker safety (employee and contractor) for the Project, both on and off the dam site. The Ministry of Energy, Mines and Low Carbon Innovation is the regulatory authority for worker safety on any work fronts subject to the *Mines Act*, including West Pine Quarry, Portage Mountain Quarry, Wuthrich Quarry, and Area E. As of this reporting period, the Project no longer has any work in the Wuthrich Quarry, and as a result, responsibility for Wuthrich Quarry has been transferred to the Ministry of Transportation and Infrastructure.

As shown in Table 4, from July to September 2023, WorkSafeBC issued 11 regulatory inspection reports and six regulatory orders to the Project. Of the 11 WorkSafeBC inspection reports, nine were 'clean sheets' with no orders. There was also one regulatory inspection and two orders issued from the Ministry of Energy, Mines and Low Carbon Innovation during this reporting period.

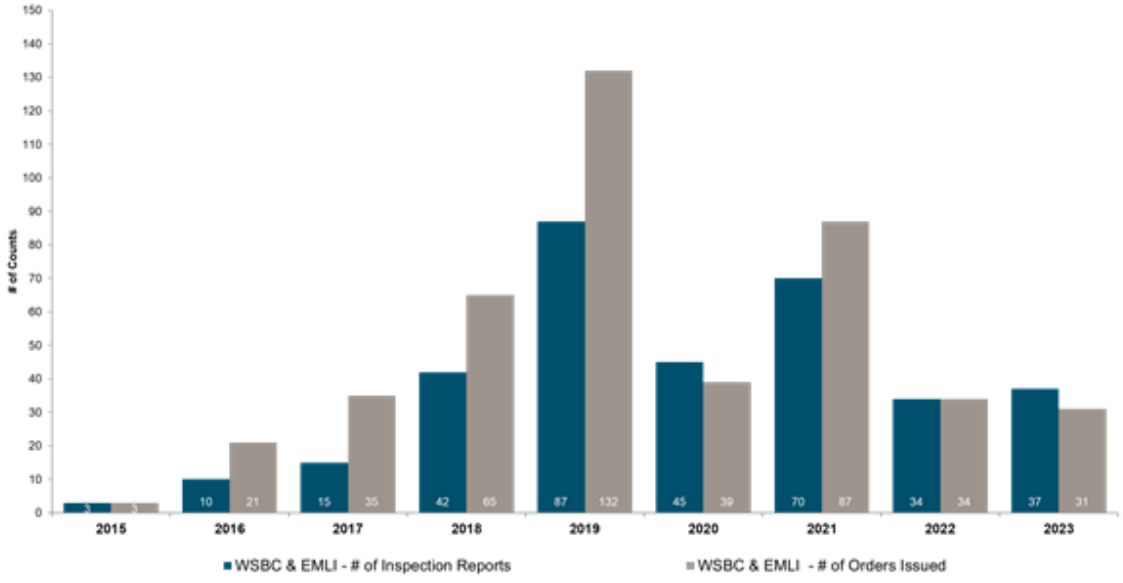
Table 4 Safety Regulatory Inspection and Orders

	Reported July 1 to September 30, 2023[9]	Reported Since Inception (July 27, 2015 to September 30, 2023)[9]
Regulatory Inspections	12	343
Regulatory Orders	8	447

Figure 1 shows the number of regulatory inspections and orders issued for the Project since 2015.

Refer to Appendix C, Table C-1 Safety Regulatory Inspections and Orders for a summarized listing of the regulatory inspection reports.

Figure 1 WorkSafeBC and Ministry of Energy, Mines and Low Carbon Innovation Regulatory Inspections and Orders, July 2015 to September 2023



[9] Numbers are subject to change due to timing of when data is retrieved and when the injury is categorized.

3 Construction, Engineering, Quality Management, and Assets In Service

3.1 Construction

Construction of the Project continued to advance during the reporting period, including work to advance key activities required to complete the tunnel conversion process and prepare the site for reservoir filling. There continues to be uncertainty related to achieving the contractual schedules, and there are identified risks that could adversely affect these schedules. The time available to complete the remaining scopes of work is expected to be sufficient for the Project to meet the Project's approved schedule.

3.1.1 Tunnel Conversion and Reservoir Filling

Tunnel conversion work began on June 15, 2023 and was completed in early September 2023. Subsequent to the reporting period, the tunnel gates and stop logs were reopened to allow the Peace River to resume flowing through the now-converted tunnel.

Before BC Hydro is able to proceed with reservoir filling, all regulatory requirements must be met and each of the following key construction activities must be sufficiently complete. Further information on the progress related to each of these construction activities is provided in the following sections.

Dam Site

- The earthfill dam, approach channel and spillways (including some gates);
- Right bank foundation enhancements;
- Modifications to the right bank cofferdam; and
- Tunnel conversion.

Off Dam Site

- Clearing of the Site C reservoir;
- Realignment of Highway 29; and
- The Hudson's Hope shoreline protection berm.

3.1.2 Main Civil Works

During the reporting period, construction activities took place in the approach channel and on the right bank and earthfill dam as described below.

Approach Channel

As of September 30, 2023, approximately 85% of the approach channel waterproofing, including bedrock surface excavations, cleaning, installation of waterproofing lining materials, reinforced concrete placements, grouting and granular fill placements, has been completed.

Right Bank Drainage Tunnel

The main civil works contractor continues to progress the work in the right bank drainage tunnel. During the reporting period the contractor completed the installation of a concrete wall, the permanent lining of the powerhouse tunnel, and the repair and installation of numerous drains.

Earthfill Dam

In July, the earthfill dam was completed to the elevation required to enable reservoir filling. Approximately 15.5 million cubic metres of materials were placed to construct the dam since dam construction began in 2021, and it stands about 60 metres tall (the height of a 20-storey building), stretches more than one kilometre across the Peace River and is about 500 metres wide at its base. The remaining work involves capping the dam and building permanent dam access roads across it for crews to travel on once the Project comes into operation. At the end of the reporting period,

the contractor had completed 40% of the duct banks (conduits in the ground that are used to run electrical wiring for street lighting) on the permanent dam access roads.

Conveyor Belt System

The conveyor system that transported glacial till material used in the construction of the core of the earthfill dam ceased operations in September 2023 upon completion of the material placements for the earthfill dam. The decommissioning of the conveyor belt system is in progress.

Area E

Planning for the physical reclamation of the Area E pit is in progress and is expected to begin in summer 2024.

3.1.3 Generating Station and Spillways

During the reporting period, construction progressed on the generating station and spillways civil works, cranes and hydromechanical equipment as described in the following sections.

Generating Station and Spillways Civil Works

The generating station and spillways civil works contract includes the delivery of civil works associated with the powerhouse, intakes, penstocks and spillways.

Overall, by concrete volume, the generating station and spillways civil works were approximately 99% complete as of September 30, 2023.

Powerhouse

The powerhouse concrete is 98% complete and is expected to be complete by end of October.

Intakes Headworks

As of September 30, 2023, concrete placements for all intakes were complete.

Penstocks

The flexible couplings (penstock sections that allow the penstocks to expand and contract) are being redesigned to fully meet BC Hydro's specification requirements. The installation of the alternative flexible couplings is forecast to begin in December.

Penstock coating is forecast to be complete in December.

Spillways

The contractor has completed nearly 99% of the spillways concrete. Work on the concrete structures to enclose the mechanical systems for the gates continues to progress. The spillways concrete is forecast to be complete in November.

Cranes

The headworks gantry crane was placed into service in September 2023. All large cranes have now been commissioned.

Hydromechanical Equipment

Intake operating gates have been positioned for all units with the exception of unit 4 and unit 5. Unit 4 and unit 5 are scheduled to be positioned in October 2023. The hydraulic equipment is being completed after the intake gates are positioned. Gate commissioning is also scheduled to commence in October.

Spillway operating gates 1, 2, and 3 are assembled. Work continues related to the cladding (for heating), electrical, hoists, and seals. Commissioning is scheduled to begin in late October 2023.

Low-level operating gates 2 and 3 have been lowered into position. The remaining low-level gates are planned to be positioned in October. The hydraulic equipment is being completed after the gates are positioned. Gate commissioning is also scheduled to commence in October.

The draft tube maintenance gates are complete.

3.1.4 Right Bank Foundation Enhancements

As of September 30, 2023, ongoing reviews by the Technical Advisory Board and the two independent, world-leading dam experts continued to confirm that the design of the foundation enhancements, located on the Project's right bank, meet the highest safety standards and international best practices.

During the reporting period, construction continued on the right bank foundation enhancements, which address the geotechnical issues that were identified in the bedrock foundation on the Project's right bank. Construction of the right bank foundation enhancements commenced in 2021 and the work completed to September 30, 2023, includes:

- The installation of 48 large diameter concrete-filled vertical steel piles located within the spillways;
- The installation of 48 large diameter concrete-filled vertical steel piles located downstream of the powerhouse;
- The completion of approximately 85% of the approach channel waterproofing, including bedrock surface excavations, cleaning, installation of waterproofing lining materials, reinforced concrete placements, grouting and granular fill placements; and
- The installation of the enhancements to the erosion protection downstream of the large diameter piles.

The enhancements to the approach channel are on track to be completed in late fall 2023.

3.1.5 Balance of Plant

The balance of plant contracts are split between three contractors and include the following scopes of work: (1) mechanical; (2) electrical (includes architectural, heating, ventilation, and air conditioning, and fire detection and protection work); and (3) permanent upstream fishway and other out structures.

The mechanical and electrical work progressed inside the powerhouse in the areas available to the contractors, which includes most sections of the upstream generator floor, the downstream generator floor, the operations building, the mechanical floor and the draft tube and dewatering levels in the powerhouse.

The mechanical contractor continued to make good progress constructing the powerhouse drainage and dewatering system, and completed the system in July 2023. Commissioning of the drainage system was completed to support the tailrace filling activities.

The electrical contractor continued installation of the electrical station service in the powerhouse, intakes, and spillways. In addition, the contractor has installed the isolated phase bus and transformers that will connect unit 1 and unit 2 generators to the BC Hydro’s electrical system.

Architectural work in the operations building is progressing and the heating, ventilation and air conditioning work continues. The installation of the fire protection is also continuing.

The permanent upstream fishway and other out structures contractor has continued concrete placements at the fishway and is planning to complete the balance of the concrete placements in 2023. The permanent upstream fishway is on schedule to be in service for spring 2024.

3.1.6 Turbines and Generators

The scope of work for turbines and generators includes the complete design, supply, installation, testing and commissioning of six turbines, generators, governors and exciters.

During the reporting period, the contractor continued working on all six units. The majority of the components for unit 1 have been installed and the unit is scheduled to be ready for the start of commissioning when the penstocks can be filled with water.

The turbine spiral case flexible couplings leakage risk has significantly reduced since the unsuccessful hydrostatic pressure test of the unit 1 coupling in June and July. The contractor has modified the unit 1 coupling to a half-welded design and once painting is complete in early November, the turbine will be ready to be watered up.

The installation of the unit 2 turbine and generator is progressing well and is expected to be ready for the start of commissioning by early spring 2024; this is due in part to the recent decision to switch the design of the flexible coupling to the half-welded design selected on unit one.

The turbines and generators for units 4, 5 and 6 were delayed due to a now-resolved quality issue related to nonconforming concrete placements, but are still expected to meet the approved schedule.

3.1.7 Transmission

The assembly of the transmission towers continued for the three one-kilometre-long, 500 kilovolt transmission lines connecting the Site C substation to the Site C powerhouse. Subsequent to the reporting period, in October 2023, one transmission tower was installed on top of the intake structures, the remaining two towers are expected to be installed in spring 2024.

The installation of the first transmission line is scheduled to be complete in early 2024, with the remaining two lines expected to be completed in 2024.

3.1.8 Highway 29 and Hudson's Hope Shoreline Protection Berm

The highways sub-project includes the construction of approximately 30 kilometres of highway and five new bridges along Highway 29; construction of a shoreline protection berm within the District of Hudson's Hope to protect against bank erosion due to reservoir wind waves and water table rise; the development and operation of the Portage Mountain Quarry, which supplied riprap and filter materials for highway and berm construction; and the construction of recreational facilities at Halfway River, Lynx Creek, and Hudson's Hope.

During the reporting period, a significant milestone was reached with the completion of the Highway 29 realignment work. All six segments of the realigned highway, spanning approximately 30 kilometres from Hudson's Hope to Fort St. John, and the five new bridges, are now officially open to traffic.

The following reflects progress to September 30, 2023:

Cache Creek

At the end of the reporting period, all work had been completed and the contractor demobilized from the site. Decommissioning work for the Cache Creek segment was completed during the reporting period.

Halfway River

The Halfway River segment opened to traffic on March 30, 2023. Temporary cover plates have been installed on the existing expansion joints on the bridge to make them safe for bicycles; the permanent expansion joints are anticipated to be installed in fall 2023.

The construction of an intersection for the Halfway River boat launch began in July 2023 and is expected to be completed in the fall of 2023.

Decommissioning work for the Halfway River segment was completed during the reporting period.

Farrell Creek

All construction and decommissioning work was completed within the reporting period.

Lynx Creek

Construction at Lynx Creek was completed during the reporting period.

Construction of the Lynx Creek boat launch, with the exception of completion works, which is dependent on the completion of reservoir filling, was completed during the reporting period.

Decommissioning work for the Lynx Creek segment was substantially completed during the reporting period, including all work within the reservoir inundation area. The remaining decommissioning work is expected to be complete by late fall 2023.

Portage Mountain Quarry

All production of riprap for Highway 29 and the Hudson's Hope berm was completed and the focus is now on the implementation of quarry reclamation.

Reclamation of the Portage Mountain Quarry started in August and is expected to continue until summer 2024.

Hudson's Hope Shoreline Protection Berm

The shoreline protection berm was completed in November 2022. Construction on the D.A. Thomas recreation area began in summer 2023, and is expected to be

complete in late summer 2024. The recreation area will include a day use area, floating jetty, and improved access road.

Halfway River East Boat Launch

Work on the Halfway River boat launch continued during the reporting period and is expected to be complete by fall 2023.

3.1.9 Reservoir

The following reflects progress to September 30, 2023:

Middle Reservoir, Halfway River Drainage and Western Reservoir

Clearing activities are complete. Road deactivation activities remain to be completed. One animal buffer area was cleared in late summer 2023.

Other Reservoir Work

The scope of other reservoir work includes infrastructure relocations as well as environmental offset works. The majority of this work is now complete.

Construction on the final fish habitat site situated at Wilder Creek began in late summer 2023 and is expected to be complete by December 2023.

3.1.10 Site Operations and Infrastructure

The site operations and infrastructure section of this report includes updates for the reporting period on the construction and operations of the worker accommodation and debris management structures.

Worker Accommodation

The total capacity of the worker accommodation, including camp operations staff, is 2,350 as of September 30, 2023. With the small decrease in the level of construction activities happening on site during the third quarter of 2023, the worker

accommodation facility has seen a slight decrease in occupancy, with room utilization averaging about 85% for the reporting period.

With many of the construction activities on site nearing completion, BC Hydro is looking at options to decommission the worker accommodation camp facilities. BC Hydro has engaged a third-party consultant to initiate a market sounding to ascertain potential interest in the acquisition of some or all of the camp assets at fair market value. This initiative is intended to support a key objective of the Project, which is to have all or most of the camp assets successfully repurposed to reduce the potential for landfill waste.

Debris Management

There are three debris management structures on the Moberly and Peace Rivers to capture and prevent debris from entering the diversion tunnels and provide coverage for all headpond elevations.

During the reporting period, all three debris management structures operated normally.

Transition planning for the management of the permanent debris management facility is underway.

Fish Habitat Creation on the Peace River

The construction of a fish habitat area, located adjacent to an island on the Peace River downstream of the dam site, is ongoing.

All fish habitat work, including site reclamation, is expected to be complete by fall 2023. The planting of deciduous and coniferous species will be completed in 2024.

Howe Pit

The contractor remobilized in June 2023 to complete drainage works and reclamation activities at Howe Pit. This work is now complete.

The Ministry of Transportation and Infrastructure completed hauling and stockpiling slab and granular pavement recovered from the Highway 29 decommissioning project for use in surfacing the final dam site roads.

3.2 Engineering

The Site C engineering team is responsible for defining the Project's design requirements, preparing the Project designs and contract specifications, and ensuring the safety and quality of the assets. The team consists of in-house design specialists from BC Hydro and a range of external consultants from engineering firms who are responsible for the various design components.

3.2.1 Main Civil Works

A major milestone was achieved in July 2023 when the dam reached the elevation required to enable reservoir filling. Support for the main civil works contract continued during the reporting period supporting excavations, foundation mapping, approach channel lining and grouting, and instrumentation reading and interpretation. Instrumentation monitoring in the reporting period has indicated positive results with respect to dam stability and has confirmed that the dam foundation is responding to dam fill placements as predicted.

Detailed geological mapping of the excavations in the approach channel continued and is nearing completion. This geological information will continue to be used to update the design parameters for the site geology and foundations.

3.2.2 Right Bank Foundation Enhancements

During the reporting period, value engineering activities continued in support of improvements to the design to optimize construction within the tailrace and tailrace

channel. Work included revisions to the riprap design to support the right bank cofferdam removal, which is required for potential spilling, and is a critical component for the commencement of reservoir filling.

BC Hydro continued to engage the independent international dam experts, Technical Advisory Board and other subject matter experts to provide oversight of activities associated with the design of the foundation enhancements and construction of the Project. Refer to section 3.2.7 for a summary of the Technical Advisory Board meetings.

3.2.3 Large Cranes, Hydromechanical, and Turbines and Generators

During the reporting period, the focus continued to be on supporting equipment installation activities at site, manufacturing activities offsite, vendor submittal reviews and integration design.

3.2.4 Generating Station and Spillways, Balance of Plant, and Equipment Supply

During the reporting period, work focused on the production of record drawings for the powerhouse and intakes, along with supporting construction with the review of submittals for the powerhouse, intakes, penstocks, and spillways.

The balance of plant scope of work continued with the preparation and issuance of the issued-for-construction drawings for the balance of plant mechanical; electrical (includes architectural, heating, ventilation, and air conditioning, and fire detection and protection work); and permanent upstream fishway and other out structures contract packages as needed to support integration design for the contractor's design components. The balance of plant team also continued to support construction activities for these contracts, including the review of the technical submittals and contractor design drawings, and performing additional factory acceptance testing and factory visits for the diesel generator contract.

Engineering design and fabrication has started to ramp down for the BC Hydro designed protection and control systems. With issued-for-construction drawings now being provided by contractors for contractor-designed, supplied, and installed equipment, a major focus for the engineering team is integration design and integrated testing for BC Hydro protection and control systems that interface with contractor supplied equipment.

Overall, the detailed engineering on the generating station and spillways is complete, and the design of the right bank foundation enhancements is now 100% complete.

3.2.5 Transmission

During the reporting period, engineering support continued to be provided to complete substation and transmission line record drawings and provide construction support to the transmission lines that will connect the Site C substation to the Site C powerhouse.

3.2.6 Highway 29

Engineering support continued to prepare record drawings and issue certificates of conformance for all highway segments.

3.2.7 Technical Advisory Board and Independent International Dam Experts

A series of video conferences with the Technical Advisory Board occurred during the reporting period. The Technical Advisory Board issued a report (No. 26) in August 2023. Refer to Appendix E for the Technical Advisory Report No. 26.

3.3 Quality Management

BC Hydro continues to implement the Site C Quality Management Plan in order to achieve the quality objectives of the Project. During the reporting period, the Project team continued its activities to support the Project quality plan, including:

- Ongoing meetings with the quality management teams of key manufacturers and the site contractors to address quality issues as they arise;
- Performing quality audits of the site contractors;
- Participating in witness points and hold points at manufacturer's facilities; and
- Continuing with monthly quality performance indicator assessments for each sub-project.

When a quality issue is identified during the course of construction, BC Hydro and its contractors continue to work to rectify the issue to ensure that the quality of the completed work achieves the quality specifications.

3.3.1 Quality Nonconformance Management

The identifying and reporting of nonconformances continues to be an important part of quality management on Site C.

Table 5 summarizes quality nonconformity instances during the reporting period.

Table 5 Quality Management Nonconformity Report (NCRs) Metrics Reporting Period – July 2023 to September 2023

Contract	NCRs Reported July 1 to September 30, 2023	NCRs Closed July 1 to September 30, 2023	NCRs Reported as of September 30, 2023	NCRs Closed as of September 30, 2023	NCRs Open as of September 30, 2023
Main Civil Works	13	16	2,070	2,052	18
Turbines and Generators (total = manufacturing + installation)	101 (=5+96)	143 (=22+121)	1,221 (=642+579)	1,094 (=630+464)	127 (=12+115)
Generating Station and Spillways Civil Works	91	120	1,725	1,649	76

For the main civil works subproject, the quality of the main dam construction continued to be good and there were no significant quality issues identified during the reporting period. The review and collation of the quality documentation for the earthfill dam is in progress.

The quality of the constructed works in the generating station and spillways and intake structures continued to be good and there were no significant quality issues to report. Manufacturing of the replacement penstock flexible coupling is advancing and BC Hydro's quality inspector continues to perform surveillance and participation in witness and hold points in accordance with the manufacturing inspection and testing plan. For diversion tunnel #2, the conversion, installation and concreting of the tunnel orifice rings was completed with no significant quality issues. For the approach channel construction, the liner installation and concreting advanced with no significant quality issues. BC Hydro and the generating station and spillways contractor continue to meet weekly to resolve deficiencies and nonconformity reports to facilitate completion of the work and handover of the structures to BC Hydro.

For the turbines and generators contract, the quality of the assembly and installation work at site continues to be good. For the turbine spiral case flexible couplings, BC Hydro and the contractor finalized the details of a design modification to the

unit 1 coupling housing to improve the stiffness and roundness of the housing. These modifications were implemented to the coupling housing in September 2023 and the coupling seals are expected to be re-installed in October 2023. BC Hydro continues to meet with the turbines and generators contractor on a weekly basis to discuss upcoming inspections, quality issues and the overall quality assurance program.

For the electrical and mechanical balance of plant, there were no significant quality issues during the reporting period.

3.4 Assets In Service

Before all major pieces of equipment and assets are placed into service on the Project, inspecting, testing, and commissioning activities are completed to ensure that all components are fit for service and safe to transition to operations.

The pre-commissioning testing includes offline testing of individual pieces of equipment. Once the offline testing is completed, BC Hydro prepares and signs a Commissioning Notice to Energize, which states that the asset is safe to connect to the BC Hydro transmission grid and the online testing can commence. At the conclusion of the online testing, the signing of a Commissioning Notice to Operate formalizes the handover of the asset from the Project team to BC Hydro Operations. The commissioning process undertaken for the earthfill dam and associated assets will form part of the comprehensive dam safety and reservoir filling plan.

Once assets are placed in service, BC Hydro Operations is responsible for the long-term operations and maintenance of the equipment and assets.

As of September 30, 2023, the following permanent assets have been placed into operational service on the Project:

- Site C substation;

- 500 kV gas-insulated switchgear expansion at the Peace Canyon substation; and
- Two new 500 kV transmission lines that connect the Site C substation to the Peace Canyon substation.

4 Project Schedule

4.1 Project In-Service Dates

BC Hydro is currently on track to achieve the approved final unit in-service date in 2025.

Table 6 shows the status of key Project milestones in relation to the approved final unit in-service date in 2025.

Table 6 In-Service Dates

Description	In-Service Dates based on Approved Budget and Schedule (June 2021)[10]	Status
5L5 500 kV Transmission Line	October 2020	Complete
Site C Substation	October 2020	Complete
5L6 500 kV Transmission Line	July 2023	Complete
Unit 1 (first power)	December 2024	On Track
Unit 2	February 2025	On Track
Unit 3	May 2025	On Track
Unit 4	July 2025	On Track
Unit 5	September 2025	On Track
Unit 6	November 2025	On Track

BC Hydro and its contractors have agreed to contractual schedules that could result in reservoir filling in fall 2023 and first power earlier than planned without compromising safety, quality and commitments to the environment and Indigenous Nations. However, meeting this earlier timeframe remains subject to risks and

[10] In-service dates based on Treasury Board's approval of the revised budget and schedule in June 2021.

depends on construction progress, meeting the operational requirements of the Peace River system, the continued compliance with environmental regulations, weather constraints and obtaining all remaining regulatory approvals.

5 Project Governance, Costs and Financing, and Risk

5.1 Project Governance

During the reporting period, activities supporting Project governance included:

- The BC Hydro Board of Directors continued to meet on a monthly basis to provide governance, financial approvals of committed contracts over $75 million (and their related changes), and received updates on Project progress and key remaining risks;
- The Project Assurance Board continued to meet monthly to provide independent due diligence and oversight of the Site C Project to enable the Project to be fit for purpose and to be completed safely, on time and on budget;
- The commercial sub-committee of the Project Assurance Board continued to meet monthly to provide oversight on claims management, commercial strategy and contractual negotiations;
- The Technical Advisory Board continued to provide technical expertise and guidance to the Project Assurance Board and support to the Project team;
- Ernst & Young Canada continued to provide independent oversight for the Project, specifically with risk management, which included reviewing Project risks and the analysis for the schedule and costs for the Project, and the evaluation of commercial management;
- Special advisor Peter Milburn continues to work with the Project to ensure that his recommendations, which have all been implemented, continue to be sustained; and

- In September 2023, Mr. Milburn and a representative from Ernst & Young Canada held a site visit to observe construction progress and meet Project team members.

Subsequent to the reporting period, in October 2023, the BC Hydro Board of Directors and Site C Project Assurance Board participated in a site tour to observe construction progress.

5.2 Project Budget Summary

As of September 30, 2023, the life-to-date actual costs are $12.4 billion, which results in an estimated $3.6 billion of remaining costs based on the forecast of $16 billion. The Project remains on track to be completed within the 2021 approved $16 billion budget. BC Hydro, with oversight from the Project Assurance Board, continues to actively manage the Project budget and potential Project risks for the remaining work.

5.3 Project Expenditure Summary

Table 7 includes a breakdown of the $16 billion Project budget, approved in June 2021, by key work area, life-to-date actual expenditures to September 30, 2023, and the remaining budget.

Table 7 Project Budget by Key Work Area ($ million)

Description	Project Budget[11]	Actuals, Life-to-Date (as of September 30, 2023)	Remaining Budget (as of September 30, 2023)
Dam, Power Facilities and Associated Structures and Transmission[12]	8,258	7,231	1,027
Off Dam Site Works, Direct Construction Supervision and Site Services[13]	2,895	2,269	626
Total Direct Construction Cost	**11,153**	**9,500**	**1,653**
Indirect Costs[14]	2,082	1,469	613
Total Construction and Indirect Costs	**13,235**	**10,969**	**2,266**
Interest During Construction and Contingency	2,765	1,417	1,348
Total	**16,000**	**12,386**	**3,614**

Table 8 provides a summary of the approved total Project budget, the current forecasts, and related variances. The table also presents the cumulative plan and actual costs to September 30, 2023, and the related variances. The plan amount reflects the Project budget of $16 billion approved in June 2021 and the related preliminary forecasted annual spend at that time.

11 The total Project budget was approved in June 2021 by Treasury Board.

12 Key items included are river diversion infrastructure, earthfill dam and related works, spillways, powerhouse, generation equipment and transmission and substation work.

13 Key items included are highway re-alignment and reservoir related work, direct construction supervision, and site services such as worker accommodation.

14 Key items included are mitigation and compensation programs, development and regulatory costs, project management, engineering and other support services such as Project controls, contracts management, environmental, and Indigenous relations.

Table 8 Total Project Budget Compared to Forecast to Completion and Life-to-Date Plan Compared to Actuals to September 30, 2023 ($ million)

	Total Project			Life-to-Date (LTD) to September 30, 2023		
Description	**Budget**	**Forecast to Completion**	**Variance**	**Plan**	**Actual**	**Variance**
Total Construction & Indirect Costs	13,235	13,235	0	11,755	10,969	786
Interest During Construction and contingency	2,765	2,765	0	1,773	1,417	356
Total	**16,000**	**16,000**	**0**	**13,528**	**12,386**	**1,142**

Details of the variances between life to date actual and plan are in Appendix H.

Table 9 provides a Fiscal 2024 summary, for the plan, actual cost and related variance based on the 2023/24 to 2025/26 Service Plan.

Table 9 2023/24 to 2025/26 Service Plan Fiscal 2024 Plan Compared to Actuals ($ million)

Description	2023/24 to 2025/26 Service Plan, Fiscal 2024	Actuals, Fiscal 2024	Variance
Total Project	1,370	1,366	4

Details of the variances between actual and plan are in Appendix H.

5.4 Site C Project Financing

Most of BC Hydro's capital projects, including the Site C Project, are debt financed. The Site C Project costs are included as part of BC Hydro's overall borrowing and included in the Government of B.C.'s budget and fiscal plan. The debt and related interest costs are managed corporately by BC Hydro.

5.5 Material Project Risks and Opportunities

Material project risks and opportunities are identified and reviewed by BC Hydro management and the Project Assurance Board on an ongoing basis. Project risks are uncertain events that, if they occur, could result in a negative impact or loss to a

project. Similarly, opportunities are uncertain events that, if they occur, could result in a positive impact, or benefit, to a project.

As the Project progresses through implementation phase, the Project risks and opportunities will continue to evolve.

The criteria for selecting which risks and opportunities to include in internal and external reporting include both objective and subjective measures; these criteria have been utilized to select the risks and opportunities included in this report.[15]

Refer to Table 10 and Table 11 for a list of the material Project risks and opportunities as of September 30, 2023.

Table 10 Material Project Risks

Risk Description	Impact and Response Plan Summary
Safety incident resulting in a fatality or disabling injury	**Impact:** Serious worker injury or fatality; Project delays and associated costs. **Response**: Continue to monitor safety performance through BC Hydro's field-based Safe Work Observations program and ongoing safety management and analytics; support continuous improvements to the Safe Work Observations program to reinforce safety behaviours in the field; continue to share safety learnings; work with Project contractors on more collaborative safety incident investigations and track/follow-up on corrective actions; work with WorkSafeBC and contractors on safety equipment and process audits and programs focused on high hazard work activities at site; conduct joint safety planning workshops for upcoming work scopes; and continue to include safety in BC Hydro and contractor onboarding orientations to promote and encourage a strong safety culture across the Project.

[15] The risks and opportunities included in Table 10 and Table 11 are grouped thematically. The lists do not include risks and opportunities that are subject to confidentiality obligations or solicitor-client privilege, or that disclose commercially sensitive information relating to matters that are currently outstanding, including procurements and negotiations that are in progress at the time of this report, the disclosure of which would be harmful to BC Hydro's commercial interests.

Risk Description	Impact and Response Plan Summary
Wildfire on or off site	**Impact:** Injuries and fatalities, impacts to construction site, work stoppages and delay to the Project schedule. **Response:** Work closely with B.C. Wildfire Service, ensure the contractor fire brigade on site is prepared and available, ensure timely support from the Fort St. John Fire Department off site, and conduct fire safety assessments and implement recommendations.
Adits or right bank drainage tunnel may need additional structural support post reservoir filling	**Impact:** Requirement for additional structural support, resulting in additional costs. **Response**: Design additional support as required and implement measures to address as-found conditions.
Penstock flexible couplings do not perform as expected	**Impact:** Schedule delays and/or additional costs. **Response**: Ongoing modification and on-site testing of the couplers. Implement alternative design and supply as needed.
Right bank foundation enhancements at approach channel require additional work	**Impact**: Impacts to contractors' existing scopes of work and schedule due to the right bank foundation enhancements, resulting in cost and schedule impacts. **Response:** Rely on the schedule change terms of existing contracts to proceed with any required change orders for the right bank foundation enhancements work scope, which will minimize the risks to existing contractors' scopes of work.
Additional effort required to comply with mandatory reliability standards	**Impact:** Mandatory reliability standards require the implementation of cyber security and physical security measures in the Site C powerhouse. Additional reliability standards may result in additional work and costs. **Response**: A Site C mandatory reliability standards Steering Committee meets regularly to review requirements. A project manager has been assigned to implement measures as required.
First unit commissioning delay	**Impact**: Delay to unit 1 in-service and potential additional costs. **Response:** A commissioning plan has been developed. The plan is being implemented with commissioning activities starting as early as possible.
Shortage of rip rap supply impacts construction	**Impact**: Additional rip rap required due to higher-than-expected wastage during handling and additional in-place rip rap density requirement. **Response**: Secure additional production and transportation, explore solutions to minimize waste.
Generating station and spillways hydromechanical equipment supply specification is different from that of installer	**Impact:** Schedule delay, rework, equipment damage, claims from sub-contractor. **Response:** BC Hydro will facilitate integration between the original equipment manufacturer and the installation contractor to resolve any differences.

Risk Description	Impact and Response Plan Summary
Work deferred until after reservoir fill results in additional costs	**Impact:** Deferred work results in additional costs as the work will be more difficult after the reservoir is filled. **Response:** Negotiating with contractor to develop mitigation plans.
Roof deficiency causes intake room water ingress	**Impact:** The intake gate controller, AC station service and DC station service cannot be installed due to the lack of water protection. **Response:** Divert water and isolate water ingress.
Lack of access to work area impacts onsite transmission towers schedule	**Impact:** Delay to schedule and increased costs. **Response:** Coordinate scheduling with contractor construction management teams to obtain access into intake deck.
Project contractors unable to attract and retain key management personnel	**Impact**: Exposure to schedule delays and additional costs, which could also be associated with meeting safety, environment, engineering, or quality requirements. **Response**: Monitor Project contractors' resource levels, turnover, and key role vacancies; continue to collaborate with Project contractors on the availability of key personnel.
Project contractors cannot attract and retain sufficient skilled craft workers	**Impact:** Contractors may not be able to adequately source, supply, attract, and retain sufficient Project labour including leaders in the hourly craft workforce such as forepersons, lead hands and senior journeypersons due to workforce demographics, increased competition for labour from other major projects, and the requirement for specialized workers. This may result in potential impacts to schedule, safety, productivity, and cost. **Response**: Contractors provide labour sourcing and supply plans, provide advance notice of foreign workers, and participate in local job fairs. BC Hydro encourages and facilitates capacity-building initiatives and monitors employee turnover rates and labour conditions on other projects.
Risk of contractor claims	**Impact**: Increased construction management and contract management effort required to respond to and investigate claims; settlement of claims may result in increased costs. **Response**: Ensure sufficient commercial management resources in place, proactively resolve claims as received, and ensure commercial management procedures are in place and are being followed.
Project pays higher contractors' craft labour market increases	**Impact:** Increased labour market pressures could result in industry benchmarks exceeding the contracted baseline, resulting in Project cost increases. **Response**: Follow the contractual provisions related to labour escalation rates.

Risk Description	Impact and Response Plan Summary
Higher interest during construction on Project than planned due to increases in weighted average cost of debt rates	**Impact**: Although BC Hydro hedges debt based on BC Hydro's approved hedging strategy, risk remains for fluctuations in short-term interest rates which are not hedged and due to the regulatory accounting for realized gains / losses on hedges during the current Revenue Requirement Application period. These could result in higher interest during construction for the Project than budgeted. **Response**: BC Hydro is implementing its approved hedging strategy and closely manages the annual expenditures and the schedule for first power in-service, which is when the majority of the interest during construction will cease on the Project.
Increasing regulatory requirements relating to management of potentially acid-generating rock	**Impact**: Potential cost implications and schedule impacts. **Response**: Clarify any new regulatory requirements and/or non-compliances and ensure all potentially acid-generating rock locations have a suitable environmental prescription that mitigates the risk of acidic water.
Negative project media coverage	**Impact:** Increased scrutiny of Site C and negative public attention. **Response:** Proactive communication to support media briefings, and respond to coverage as needed.
Operational requirements cannot support reservoir fill schedule	**Impact:** Delays the initiation of reservoir fill. **Response:** Consider alternative means to address operational constraints.
Remaining diversion tunnel equipment cannot be removed in a timely manner during reservoir filling	**Impact:** Potential for environmental and safety incidents during the removal of tunnel gate components. **Response:** Drain hydraulic fluid from the equipment prior to reservoir filling.

1 **Table 11 Material Project Opportunities**

Opportunity Description	Impact and Response Plan Summary
Lower interest during construction due to timing of Project expenditures	**Impact**: Lower Project interest costs than the amount budgeted. **Response:** Monitor Project expenditure timing and manage expenditures effectively.

6 Key Procurement and Contract Developments

6.1 Key Procurements

The vast majority of the major Site C contracts have been awarded. The remaining procurements on the Project are summarized in Table 12.

Table 12 Remaining Major Project Procurements and Delivery Models

Component	Contract	Procurement Model	Anticipated Timing
Reclamation Program	Multiple seeding supply contracts and reclamation contracts to be awarded over three to four years	Design-Bid-Build	2024 season: • Four planting packages identified; one package awarded and one package deferred to 2025. • Two reclamation packages identified; one package awarded. 2025 season: • Three planting packages (including the deferred package from 2024 season) identified; procurement will start in 2024. • Two reclamation packages identified; procurement will start in 2024. 2026 season: • Six planting packages identified; procurement will start in 2025.

6.2 Major Construction Contracts Exceeding $50 Million

Since inception of the Project, 14 major construction contracts have been awarded that exceed $50 million in value, as shown in Table 13. The contract values reflect the current value including executed approved changes to the end of the reporting period.

All construction contracts have been procured and awarded in accordance with BC Hydro procurement policies.

Table 13 Major Project Construction Contracts Awarded

Contract	Contract Value at September 30, 2023[16] ($ million)	Contract Execution Date
Site Preparation: North Bank	60	July 2015
Worker Accommodation	693	September 2015
Main Civil Works[17]	3,310	December 2015
Turbines and Generators	536	March 2016
Transmission and Clearing	92	October 2016
Quarry and Clearing	164	February 2017
Generating Station and Spillways Civil Works[18]	2,957	March 2018
Hydromechanical Equipment	73	April 2018
Transmission Line Construction	139	May 2018
Clearing and Aggregates	73	December 2018
Highway 29	379	October 2019
Balance of Plant Mechanical	74	July 2021
Balance of Plant Electrical (includes balance of plant architectural; heating, ventilation, and air conditioning; and fire detection and protection work)	251	September 2021
Balance of Plant Permanent Upstream Fishway and Other Out Structures	94	January 2022

6.3 Contracts Exceeding $10 Million

For open contracts procured and awarded in excess of $10 million, refer to Appendix F.

[16] Contract value reflects the current value including executed change orders to the end of the reporting period. Contract values are rounded to the nearest million.

[17] Includes some of the scope of work for the right bank foundation enhancements.

[18] Includes some of the scope of work for the right bank foundation enhancements.

6.4 Contract Management

6.4.1 Material Changes to the Major Contracts

The main civil works contract is a unit price contract and as such variations in quantities and design are expected over the term of the contract. Since contract award in December 2015, the main civil works contract value has increased by $1.56 billion to reflect approved changes to September 30, 2023. These approved changes include work for the right bank foundation enhancements.

The generating station and spillways contract is also a unit price contract and, as such, variations in quantities and design are expected over the term of the contract. Since contract award in March 2018, the generating station and spillways contract value has increased by $1.35 billion to reflect approved changes to September 30, 2023. These approved changes include work for the right bank foundation enhancements.

7 Indigenous Engagement

Pursuant to the Environmental Assessment Certificate and Federal Decision Statement, BC Hydro is required to engage with 13 Indigenous Nations with respect to the construction stage of the Project. This consultation includes the provision of information on construction activities, support for the permit review process, and review and implementation of mitigation, monitoring and management plans, and permit conditions.

BC Hydro continues to advance economic opportunities for Indigenous Nations through capacity building and procurement opportunities. Approximately $757 million in Site C procurement opportunities have been awarded to companies designated by Indigenous Nations since the beginning of the Project, pursuant to BC Hydro’s Indigenous Procurement Policy. Working on the Site C Project has helped businesses designated by Indigenous Nations to build and grow their reputations,

expand the scale of their operations, and develop new expertise to compete in the regional economy.

During the reporting period BC Hydro has continued to work with Indigenous Nations. BC Hydro's Indigenous Relations team hosted five tours of the dam site and future reservoir area with Indigenous community members. These tours are a meaningful opportunity for Indigenous Nations to see the Project first hand and to prepare for the changes caused by reservoir filling.

BC Hydro also met with Indigenous Nations to discuss fish consumption and methylmercury monitoring.

In July 2023, the single confirmed burial within the reservoir area was relocated to a safe location for temporary storage outside of the inundation zone. Subsequent to the reporting period, in October 2023, the burial was relocated to its permanent final resting place. Indigenous elders and community members were present for ceremonies during both movements, and the work was done under the supervision of Indigenous monitors.

BC Hydro continued to work with Indigenous Nations on development of the future cultural centre. The cultural centre project is an important accommodation for the cultural impacts of Site C. The facility will showcase local Indigenous culture and history in the region, and store and display many of the artifacts uncovered during the construction of Site C. The participating Nations have agreed on a conceptual design for the facility, and support exploring the option to renovate the existing worker accommodation lodge. BC Hydro is currently evaluating the cost estimates for this option before proceeding to develop the detailed design.

BC Hydro has invited Indigenous Nations to participate in the naming of Site C. Participation in the naming of Site C provides the opportunity to acknowledge the impacts of the Project on Treaty 8 Rights and cultural interests, and contributes to

reconciliation. In September 2023, five Indigenous Nations participated in a Site C naming workshop, and discussions are ongoing to decide on a recommendation regarding the permanent name for Site C.

In September 2023, 472 Indigenous people were working on the Site C Project, which represents approximately 10% of the total workforce.

8 Litigation

The details of open proceedings as of September 30, 2023, are summarized in Table 14.

Table 14 Litigation Status Summary

Description		Date
B.C. Supreme Court: Treaty Infringement Claims		
West Moberly First Nations	Civil claim filed.	January 15, 2018
	Settlement of claims related to Site C.	June 24, 2022
B.C. Supreme Court: Civil Claims		
Building and Construction Trades Council	Civil claim filed. No steps have been taken in litigation that require a response from BC Hydro.	March 2, 2015
Michael Acko, etal (Residents of Old Fort community)	Civil claim filed.	January 18, 2021
	Response to claim filed.	September 8, 2021
Allianz Global Risks US Insurance Company, etal	Civil claims filed. Claims were filed by BC Hydro to preserve BC Hydro's rights to claim under Site C property insurance for losses related to left bank tension crack events and the rockfall event near a diversion tunnel inlet portal.	February 5, 2021 July 13, 2021
Vezer Industrial Professionals Canada Ltd.	Civil claim served. No steps have been taken in litigation that require a response from BC Hydro.	March 29, 2022
Armitage	Civil claim filed. Response to claim filed.	October 24, 2022 January 5, 2023

Description		Date
B.C. Supreme Court: Civil Claims – *Expropriation Act*		
Property owners	Of 18 notices of claims filed to keep open each plaintiffs' rights to claim further compensation under the *Expropriation Act,* six have been resolved during this period and 12 remain active. No requirement for BC Hydro to file responses as of this reporting period.	July 2019 to September 2023

9 Permits and Government Agency Approvals

9.1 Background

BC Hydro continues to be issued permits and authorizations in accordance with its construction timelines. As of September 30, 2023, 627 of the estimated 665 provincial and federal permits and authorizations required throughout the life of the Project had been obtained and are actively being managed. This includes all required regulatory approvals to commence reservoir filling.

Multiple conditions are attached to each permit or authorization, which cover subjects such as air quality, water quality, fish and aquatics, wildlife, heritage, health and safety, construction environmental management and Indigenous Nations consultation. As of September 30, 2023, all required conditions and submissions have been met in accordance with the schedule and requirements of the conditions.

9.2 Federal Authorizations

Site C requires federal authorizations under the *Fisheries Act* (issued by Fisheries and Oceans Canada) and the *Canadian Navigable Waters Act* (formerly *Navigation Protection Act*) (issued by Transport Canada). All major federal authorizations for construction and operation of the Site C dam and reservoir were received in July 2016.

Additional *Canadian Navigable Waters Act* approvals and notifications for discrete works in the reservoir (e.g., shoreline works, debris booms and Highway 29 bridges) are being issued at the regional level. As of September 30, 2023, a total of 138 federal approvals have been received and are actively being managed. Eight future approvals are planned.

9.3 Provincial Permits

Site C requires provincial permits primarily under the *Land Act*, *Water Sustainability Act*, *Forest Act*, *Wildlife Act*, *Heritage Conservation Act*, and *Mines Act*. These permits include investigative permits, licences to occupy land, water licence approvals, leaves to commence construction and leaves to construct, and licences to cut vegetation, among others.

As of September 30, 2023, 484 of the estimated 516 provincial permits and approvals that are required throughout the life of the Project had been obtained and are actively being managed. These include permits for the dam site area, worker accommodation, Highway 29 realignment and decommissioning of the existing highway sections that are being realigned, transmission line and eastern, middle, and western reservoir, fish habitat enhancement sites, and reservoir filling. Future provincial permits are being planned for the operation of the generating station and the permanent upstream fishway.

9.4 Environmental Assessment Certificate

Compliance with the Project conditions in the Environmental Assessment Certificate is regularly monitored, and evidence is collected by various federal and provincial regulatory agencies, the Independent Environmental Monitor, BC Hydro and contractors.

As with any large construction project, refinements to the design are expected. As of September 30, 2023, BC Hydro has requested, and received from the Environmental

Assessment Office, 11 amendments to the Project's Environmental Assessment Certificate to reflect changes in the Project design. The amendments have not resulted in any material impacts to the cost of the Project.

BC Hydro received one additional Environmental Assessment Certificate Amendment on July 28, 2023. Amendment No. 11 allows certain temporary structures to remain in place during reservoir filling. Each structure will be assessed by a Qualified Environmental Professional and will be left in place only if doing so will result in less or equal risk of harm to fish and fish habitat than removing the structure.

BC Hydro is currently complying with all requirements of the Environmental Assessment Certificate amendments.

All amendments and amendment requests are posted on the Environmental Assessment Office website.

10 Environment

10.1 Mitigation, Monitoring and Management Plans

The Environmental Assessment Certificate and Federal Decision Statement conditions require the development of environmental management, mitigation and monitoring plans, as well as the submission of annual reports on some of these plans.

10.2 Project Environmental Compliance

Environmental compliance on the Project remains high. During the reporting period, 14,338 environmental compliance inspections were completed by BC Hydro, with a compliant and partial compliant result of 99% across all contractors and work areas.

During the reporting period, BC Hydro responded to one information request (remote inspections) by the Environmental Assessment Office and one site inspection by the

Impact Assessment Agency of Canada. No inspection reports were issued in the period.

Resolution of 2018 Stormwater Release Event

On July 31, 2023, BC Hydro and the main civil works contractor appeared in B.C. Provincial Court related to a stormwater event that occurred in 2018. During the event in 2018, over the course of a 24-hour period, the controlled release of approximately four million litres of water into the Peace River was taken to protect the water management infrastructure and ensure the structural integrity of the holding ponds.

At this appearance, the main civil works contractor entered a guilty plea to the charge of depositing a deleterious substance under the *Fisheries Act*. The court accepted the plea and entered a conviction on that charge. Under the terms of the Court's order, the main civil works contractor will pay a fine to the Government of Canada's Environmental Damages Fund. In its order, the Court recommended that the fine be used for the purpose of conservation and protection of fish or fish habitat or the restoration of fish habitat in the Peace River region. All charges related to the failure to report in a timely manner were stayed, including the charges against BC Hydro. All charges related to the 2018 release event have now been resolved.

10.3 Potentially Acid-Generating Rock Management

The Project's Construction Environmental Management Plan has a well established potentially acid-generating rock management plan that employs a variety of recognized techniques to identify, test, monitor and treat, if necessary, any potentially acid-generating rock during construction. Any potentially acid-generating rock sites located within the reservoir will be rendered inert once the reservoir is filled. Any potentially acid-generating rock sites remaining outside the reservoir post construction will be addressed through location specific prescriptions provided by qualified environmental professionals.

The April 2022 Environmental Assessment Office order related to potentially acid-generating rock exposures has necessitated revisions to the Construction Environmental Management Plan. The revision process began in October 2022, and included a 30-day consultation period, which was initiated on April 11, 2023. During the 30-day consultation period, comments were received from Environment Canada, to which a response was issued in June. Comments were also received from Natural Resources Canada after the 30-day consultation period, to which a response was issued in July.

BC Hydro summarized the responses and any additional feedback received from Environment Canada, Natural Resources Canada and Indigenous groups and submitted the summary to the Environmental Assessment Office on August 9, 2023. On September 15, the Environmental Assessment Office responded with their own set of clarifying questions and feedback.

Subsequent to the reporting period on October 5, 2023, BC Hydro responded to the Environmental Assessment Office questions and feedback, and BC Hydro has not yet received a response as to whether the revisions and replies to their clarifying questions were acceptable.

In parallel with these revisions, this order has accelerated the need to consider potential mitigation options for potentially acid-generating rock exposures on the dam site that will not be covered by the reservoir. For this, the Project is seeking engineered design options and cost estimates for a subset of the potentially acid-generating rock exposures across the Project that will not be covered by the reservoir or that have been identified in past Environmental Assessment Office inspection reports. Results of these efforts will be summarized in future progress reports.

The Environmental Assessment Office has indicated it will not pursue enforcement against the April 2022 order while the Construction Environmental Management Plan revisions are underway.

10.4 Heritage

In the reporting period, the heritage program provided guidance on the identified Indigenous sites of importance, planned and commenced pre-construction archaeological impact assessment field work, and provided ongoing heritage support for Project construction. The scope of the heritage program is significantly smaller than in previous years since there are few new work areas requiring archaeological assessment.

During the reporting period, two new *Heritage Conservation Act* permits or amendments were received and one *Heritage Conservation Act* permit amendment was submitted. Three *Heritage Conservation Act* archaeological reports were submitted to the B.C. Archaeology Branch and First Nations. No archaeological or palaeontological heritage chance finds were identified or reported by contractors during the reporting period.

10.5 Temporary Fish Passage Facility

During the reporting period, the temporary fish passage facility operators passed more than 6,772 fish upstream, and since start of this year’s operation in April 2023, the facility has passed more than two times the total number of fish passed in the 2021 and 2022 operating seasons combined. The temporary fish passage facility is expected to continue operation for the 2023 season through to October 31, 2023.

10.6 Wetland Compensation Plan

Between July and September 2022, BC Hydro rebuilt aging water control infrastructure at three historically constructed wetlands. By doing so, 175 hectares of wetlands were preserved that would otherwise have been lost and BC Hydro is able

to credit these 175 hectares against the overall Site C wetland compensation requirements. During the reporting period, BC Hydro initiated and completed work to restore a fourth existing wetland at Scott Lake.

10.7 Greenhouse Gas Monitoring

In October 2022, BC Hydro began collecting data to support a pre-reservoir fill greenhouse gas (**GHG**) emission study. Three locations upstream of the dam site were selected for terrestrial flux-chamber measurements, and soil organic carbon and vegetation sampling. Monitoring at these three locations continued through the reporting period. This pre-reservoir fill information will be used to augment reservoir GHG monitoring data to support net GHG emissions calculations for the reservoir.

10.8 Agricultural Mitigation and Compensation Plan

There were no new BC Hydro Peace Agricultural Compensation Fund grants issued during this reporting period. As of September 30, 2023, the fund has distributed more than $2.7 million to 82 projects.

11 Employment and Training Initiatives and Building Capacity Initiatives

11.1 Labour

Since the beginning of the Project, unions that have participated in the construction of Site C are listed in Table 15.

Table 15 Participating Unions

Union
Construction Maintenance and Allied Workers (**CMAW**)
Christian Labour Association of Canada (**CLAC**), Local 68
Canada West Construction Union (**CWU**)
Construction and Specialized Workers Union (**CSWU**), Local 1611
International Union of Operating Engineers (**IUOE**), Local 115
Millwrights Union, Local 2736
Ironworkers, Local 97
International Brotherhood of Electrical Workers (**IBEW**)
MoveUP, Local 378
Pile Drivers Union, Local 2404
Boilermakers, Lodge 359
United Association of Journeymen & Apprentices of the Plumbing & Pipefitting Industry of the U.S. & Canada, Local 170
Teamsters, Local 213

In addition, 10 unions affiliated with the B.C. Building Trades are signatory to the special project needs agreement for the installation of the turbines and generators.

The Site C balance of plant contractors are signatory to a special project needs agreement between the Construction Labour Relations Association and the Bargaining Council of B.C. Building Trades Unions.

11.2 Employment

Contractors submit monthly workforce data electronically to BC Hydro. Table 16 presents the monthly number of construction contractors, non-construction contractors, engineers, and Project team workers for this period.

As with any construction project, the number of workers – and the proportion from any particular location – will vary month-to-month and also reflects the seasonal nature of construction work.

Table 16 Site C Jobs Snapshot Reporting Period – July 2023 to September 2023

Month	Number of B.C. Primary Residents[19]	Total Number of Workers[20]
July 2023	3,841	5,986
August 2023	3,691	5,808
September 2023	3,475	5,442

Data is subject to change based on revisions received from the contractors.

In September 2023, there were 5,442 total workers on the Site C Project. Residents of British Columbia made up 64% of the workforce (3,475), while 20% of the workforce (904 workers) lived in the Peace River Regional District. The onsite contractor workforce number also includes 12% women (536 workers) and 10% Indigenous (472 workers). There were 310 apprentices working on the Project, which is 17% of the apprenticeable trades within the construction and non-construction workforce. These workers were working for various contractors as apprentice carpenters, electricians, millwrights, ironworkers, mechanics, boilermakers and plumbers. Refer to Appendix D for the current Site C jobs snapshot from July 2023 to September 2023 (Table D-1), the Site C apprentices snapshot from July 2023 to September 2023 (Table D-2), the current Site C job classification groupings (Table D-3), and the Indigenous inclusion snapshot from July 2023 to September 2023 (Table D-4).

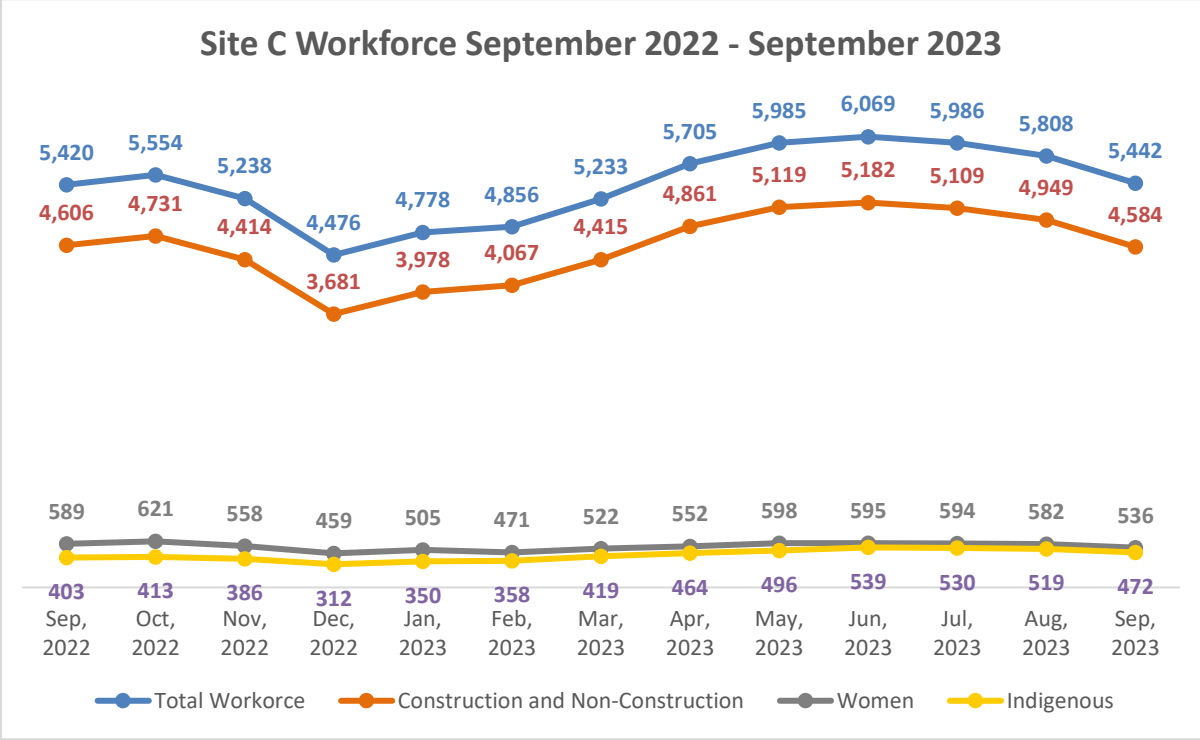
Figure 2 shows the monthly Site C workforce over the period from September 1, 2022 to September 30, 2023.

[19] Employment numbers provided by Site C contractors and consultants are subject to revision. Data not received by the Project deadline may not be included in the above numbers. Employment numbers are direct only and do not capture indirect or induced employment.

[20] Total workers include:

- Construction and non-construction contractors performing work on the Site C dam site, transmission corridor, reservoir clearing area, public roadwork, worker accommodation and services; and
- The Project team, which includes Engineers and BC Hydro construction management and other onsite and offsite personnel. An estimate is provided where possible if primary residence is not given.

Figure 2 Site C Workforce September 2022 to September 2023[21]



11.3 Training and Capacity-Building Initiatives

BC Hydro has included apprentice targets in the generating station and spillways civil works contract, the transmission lines and the substation contracts, the balance of plant contracts and the Highway 29 work procured by BC Hydro, as appropriate.

Northern Lights College Foundation continues to distribute the BC Hydro Trades and Skilled Training Bursary Awards, established in 2013. As of September 30, 2023, a total of 291 students had received bursaries, including 135 Indigenous students who have benefitted from the bursary in programs such as electrical, welding, millwright, cooking, social work, and many others.

[21] The Indigenous workers and women workers numbers are a subset of the construction and non-construction contractors workforce number.

Joint BC Hydro and Contractor Site Training

BC Hydro continued to implement the Builders Code. The Builders Code is a standard code of conduct for workers on construction sites in B.C. that defines an acceptable worksite as one that is safe and productive, where all workers work without the stress or distraction caused by discrimination, bullying, hazing, or harassment.

12 Community Engagement and Communication

12.1 Local Government and Community Engagement Activities

BC Hydro continues to advance commitments within four community agreements: the District of Chetwynd (2013), the District of Taylor (2014), the City of Fort St. John (2016), and the District of Hudson's Hope (2017). A community agreement between BC Hydro and the Peace River Regional District has yet to be finalized.

The Regional Community Liaison Committee, which is comprised of local elected officials and local First Nations communities, most recently met for its regularly scheduled quarterly meeting on September 13, 2023. Eight local governments and four local First Nations communities (McLeod Lake Indian Band, Doig River First Nation, Saulteau First Nations, and Blueberry River First Nations) as well as the two MLAs for Peace River North and Peace River South, are invited to participate as committee members. Representatives from the Project's major contractors may also attend the meetings as invited guests.

12.1.1 District of Hudson's Hope Well Water System

Under the Partnering Relationship Agreement signed with the District of Hudson's Hope in 2017, BC Hydro committed to mitigating the effects of the dam and reservoir by reconstructing or relocating affected components of the District's municipal water supply system.

As plans for the water intake replacement and pump house were being discussed, the District of Hudson's Hope decided to change from a surface water source to a well water system.

BC Hydro entered into a Water Agreement with the District of Hudson's Hope in September 2019 and provided the District of Hudson's Hope with close to $5 million to fund engineering and water experts, studies, design, construction and administration of the works. The District of Hudson's Hope was also responsible for all operations, performance, and warranty costs.

The District of Hudson's Hope new water treatment plant became operational on March 5, 2021.

After the well water facility became operational, BC Hydro was advised by the District of Hudson's Hope that it was not functioning as expected and the District of Hudson's Hope incurred additional operating costs for the supply of potable water to its residents.

The District of Hudson's Hope water treatment plant failed on July 20, 2022 and again on December 28, 2022.

In fall 2022, the District initiated a three-phase plan to switch its raw water source from the well water system to the Peace River. BC Hydro and the District of Hudson's Hope finalized an agreement that will provide funding to support the initial two phases of this plan. The District has installed a surface water intake along with upgrades to the treatment facility and is providing the community with potable water. The previous boil water advisory was rescinded in July 2023.

12.1.2 Generate Opportunities Fund

In 2016, BC Hydro launched the GO Fund to support Peace Region non-profit organizations. The GO Fund is being distributed to organizations that provide services to vulnerable populations including children, families and seniors.

The GO Fund is administered by Northern Development Initiative Trust on behalf of BC Hydro. During this reporting period, BC Hydro distributed approximately $14,000 to two non-profit organizations in the Peace Region and as of September 30, 2023, 89 projects had received nearly $780,065 since the fund was launched.

12.1.3 Community Relations and Construction Communications

BC Hydro continued to implement its construction communications program throughout the reporting period. The program includes updating and maintaining the Project website (www.sitecproject.com) with current information, photos and videos of construction activities, as well as providing information to local and regional stakeholders as required.

Community Engagement

Community Engagement to prepare for Site C reservoir filling continued during the reporting period in the Peace region. Site C Public Affairs team members attended public events to provide information and to answer questions as follows:

- North Peace Fall Fair in Fort St John area from August 18 to 20;
- Moose-FM Block Party in Fort St John on September 9; and
- Chetwynd Harvest Festival on September 9.

Construction Bulletins

Bi-weekly construction bulletins are posted on the Project website and sent by email to a web-subscriber list. There were seven construction bulletins issued this reporting period.

Public Enquiries

In total, BC Hydro received 210 public enquiries between July 1 to September 30, 2023. Table 17 shows the breakdown of some of the most common enquiry types.

In total, BC Hydro has received more than 14,400 enquiries since August 2015.

Business Liaison and Outreach

No procurement notifications were sent out during the reporting period.

Table 17 Public Enquiries Breakdown by Topic

Enquiry Type[22]	July 1 to September 30, 2023
Employment Opportunities	56
Business Opportunities	21
General Information	62
Construction Impacts[23]	5
Other[24]	66

12.2 Labour and Training Plan

In accordance with an Environmental Assessment Certificate condition, a Labour and Training Plan was developed and submitted to the Environmental Assessment Office on June 5, 2015. This plan, as well as Environmental Assessment Certificate Condition 45, includes annual reporting requirements to support educational institutions in planning their training programs to support potential workers in obtaining Project jobs in the future. This report has been issued to the appropriate training institutions in the northeast region annually since 2016. The most recent report was issued in July 2023.

22 This table is a sample of enquiry types and does not include all enquiry types received. Some enquiries received cover more than one topic.

23 The nature of the construction impact enquiries are primarily related to air quality and dust, traffic and road conditions, and safety.

24 "Other" accounts for enquiries related to a variety of other topics, such as wildlife and beavers, river closure, and tour requests.

12.3 Human Health

12.3.1 Health Care Services Plan and Emergency Service Plan

The on-site health clinic provides workers with access to primary and preventative health care and work-related injury evaluation and treatment services and is currently open seven days a week, 24 hours a day. Since opening the health clinic, there has been a total of 49,030 patient interactions. During the reporting period, there were 1,578 patient interactions, of which 360 were occupational and 1,218 non-occupational. Several preventive health themes were provided to workers during the reporting period, including information on heat awareness, dental care and hepatitis.

On September 28, 2023, the Province of B.C. announced the reinstatement of the mask mandate in health-care settings effective October 3, which includes the on-site health clinic.

Beginning in October, the health clinic will be providing the latest COVID-19 and seasonal influenza vaccines to any worker interested in receiving them.

12.4 Property Acquisitions

Property acquisitions required for the Project remain on track. The land and rights required for reservoir filling have been acquired. During the reporting period, further acquisitions were completed for some of the land required within the first year of reservoir operations. Land and rights will be required from a further five landholdings within the first year of reservoir operations.

In cases where BC Hydro acquired or expropriated land or rights for the Project under the *Expropriation Act*, notices of claim have been filed by the owners to keep open their rights to claim further compensation under the *Expropriation Act* as noted in section 8 of this report.

12.5 Plans During Next Six Months

Table 18 shows the key milestones for activities planned during the next six months, from October 2023 to March 2024.

Table 18 Key Milestones for Activities Planned During the Next Six Months (October 2023 to March 2024)

Milestone	Performance Measurement Baseline (June 2021)	Plan Date (Control Date[25])	Forecast[26]	Status[27] (Measured by Month)
All				
Burial Sites Relocation Construction Finish	March 2022	March 2022	November 2023	Late
Balance of Plant				
Powerhouse Drainage & Dewatering for Tailrace Fill Units 1-3 Complete	January 2023	June 2023	November 2023	Late
All Work in Powerhouse Bay 1 is Complete (Mechanical)	March 2023	August 2023	November 2023	Late
Permanent Fish Facility Complete (generating station and spillways contractor AFDE)	n/a	November 2023	November 2023	On Track
All Work in Powerhouse Bay 2 is Complete (Mechanical)	June 2023	October 2023	November 2023	At Risk
All Work in Powerhouse Bay 1 is Complete (Electrical)	n/a	December 2023	December 2023	On Track
Powerhouse AC Station Service for Tailrace Filling	n/a	December 2023	December 2023	On Track
All Work in Powerhouse Bay 2 is Complete (Electrical)	n/a	January 2024	January 2024	On Track
Spillway and Intake AC Station Service Complete	n/a	January 2024	January 2024	On Track
Generating Station and Spillways				
Spillway Operating Gates 1-3 Wire Rope Hoists Installed (generating station and spillways contractor AFDE)	June 2023	August 2023	November 2023	Late
Gate and Wire Rope Hoist Assembly and Installation Complete – Spillway Operating Gate 3 (generating station and spillways contractor AFDE)	June 2023	August 2023	November 2023	Late
Intake Operating Gate and High-Pressure Unit Assembly and Installation Complete - Intake Unit 4	April 2023	July 2023	November 2023	Late

[25] Control date reflects plan, adjusted for approved changes to milestone dates.
[26] As of September 30, 2023.
[27] As of September 30, 2023.

Milestone	Performance Measurement Baseline (June 2021)	Plan Date (Control Date[25])	Forecast[26]	Status[27] (Measured by Month)
Low Level Outlet Gates 4 to 6 – High Pressure Unit Installation Complete	April 2023	August 2023	November 2023	Late
Main Civil Works				
Removal of the Right Bank Cofferdam	August 2023	September 2023	November 2023	Late
Right Bank Foundation Enhancements				
Approach Channel Ready for Reservoir Filling	n/a	August 2023	October 2023	Late
Turbines and Generators[28]				
Unit 1 – Ready to Turn	May 2023	June 2023	December 2023	Late
Unit 2 – Ready to Turn	August 2023	October 2023	January 2024	Late
Unit 3 – Ready to Turn	October 2023	February 2024	February 2024	On Track
Transmission				
5L15 In-Service Date	July 2023	July 2023	December 2023	Late

As noted in Table 18, some of the required key milestones are at risk, or late. BC Hydro is working with Site C contractors to recover delays and complete all required scopes of work. BC Hydro is currently on track to achieve the approved final unit in-service date of 2025.

13 Impacts on Other BC Hydro Operations

During the reporting period, the operation of system storage at Williston Reservoir (including G.M. Shrum and Peace Canyon generating stations) was planned to meet flow releases necessary for Site C construction, and this operation continues. Water releases from the Peace Canyon generating station were maintained at or below the levels necessary for Project construction. BC Hydro maintained adequate vacant storage in Williston Reservoir to protect Site C construction works from flows that could otherwise exceed the capacity of the diversion works.

[28] The identified status reflects a comparison of the current forecast for each milestone relative to the contractual date for that milestone. The contractual milestone dates include substantial schedule float relative to the approved in-service date.

The Site C Project team continues to work closely with BC Hydro Operations on the integrated planning required in advance of filling the Site C reservoir.

BC Hydro
Power smart

Site C Clean Energy Project

Quarterly Progress Report No. 31

Appendix A

Site Photographs

Figure A-1 **The earthfill dam is complete to the elevation required to enable reservoir filling. The dam is about 20 storeys, or 60 metres, tall. It stretches one kilometre across the Peace River. Picture is looking north along the crest of the dam | July 2023**

Figure A-2 **A car-topper boat launch and recreation area is being built at the base of D.A. Thomas Road in Hudson's Hope | July 2023**

Figure A-3 **The Lynx Creek boat launch and day use area is being built near Hudson's Hope on Highway 29. A breakwater will be installed to protect the launch against waves | July 2023**

Figure A-4 **The temporary debris boom catches debris that floats down the Peace River towards the diversion inlet portals. Permanent debris management booms will be installed on the future reservoir to stop material flowing into the approach channel | August 2023**

Figure A-5 **The highway realignment at Lynx Creek is complete. Shoreline armouring is in place in preparation for reservoir filling | August 2023**

Figure A-6 **Construction continues on the approach channel that directs the flows from the Peace River to the powerhouse and spillways | August 2023**

Figure A-7 **In the future, water will go through six penstocks into the powerhouse (on right side of picture), then exit through the tailrace. The spillways on the left will safely pass flows from the reservoir | September 2023**

Figure A-8 **Crews are finishing concrete placement for the tailrace erosion protection slabs below the powerhouse. Workers are also excavating the interior of the right bank cofferdam and placing riprap | September 2023**

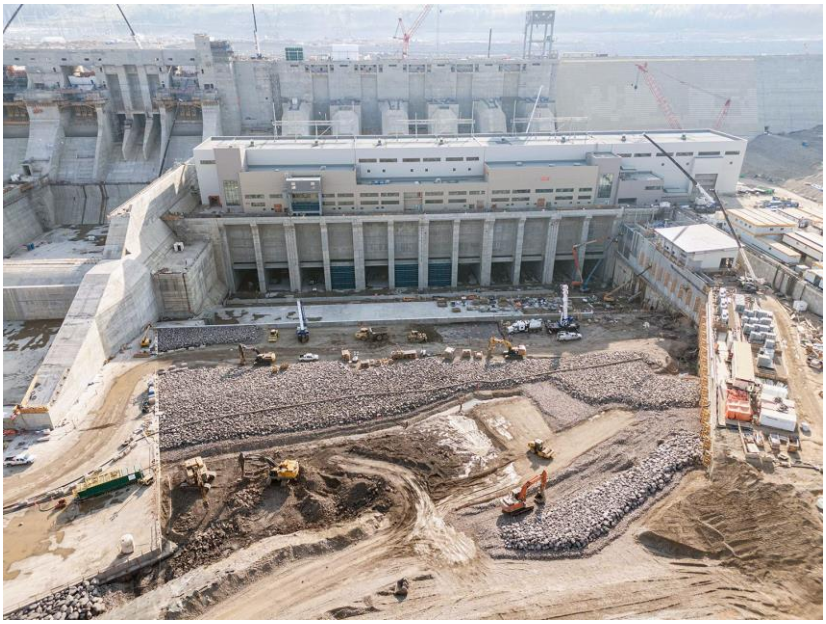


Figure A-9 **When the Site C reservoir is filled, water will flow down the approach channel and enter the powerhouse through the intakes, or the entrances to the spillways | September 2023**

Figure A-10 **Riprap is one of the many protective layers in the approach channel where water will flow from the reservoir into the powerhouse and spillways | September 2023**

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Site C Clean Energy Project

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Appendix B

Work Completed Since Project Commencement in 2015

Construction began on July 27, 2015, and is ongoing. Since the commencement of construction, the following work has been completed:

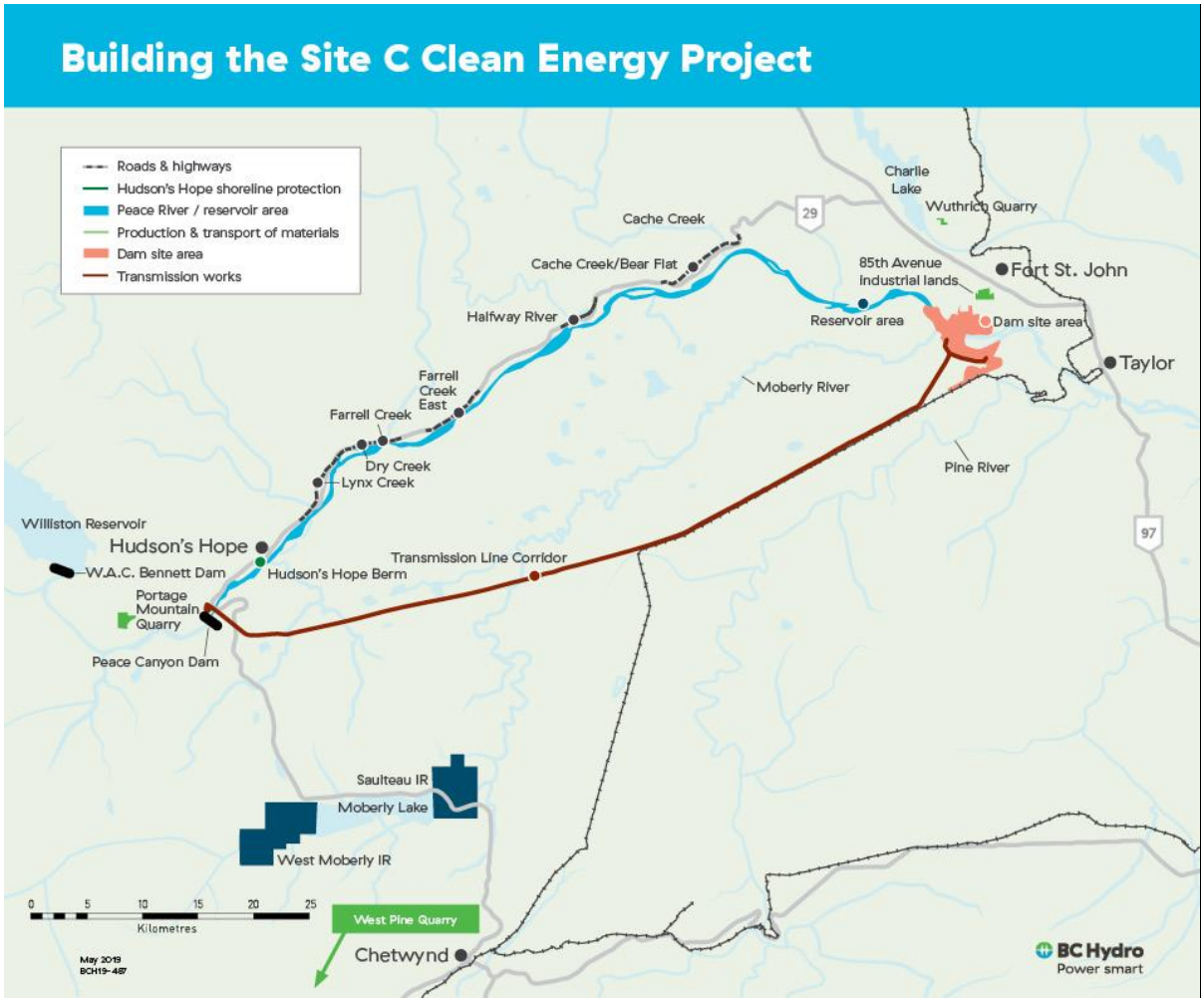
- Site preparation, including onsite access roads;
- Clearing of the left and right banks at the dam site and clearing of the lower reservoir area;
- Construction of the worker accommodation lodge and Peace River construction bridge;
- Powerhouse excavation, and the placement of 650,000 cubic metres of roller-compacted concrete in the powerhouse buttress;
- Spillways excavation, and the placement of 600,000 cubic metres of roller-compacted concrete in the spillways buttress;
- Construction of dam site access public roads;
- Construction of the Site C viewpoint;
- Construction of 50 affordable housing units in Fort St. John;
- Fish habitat enhancements downstream of the dam site;
- Excavation of the diversion tunnel inlet (upstream) and outlet (downstream) portals, allowing for the commencement of diversion tunnel excavations;
- Excavation of the right bank drainage tunnel, which will be used to monitor and drain the water from within the foundation under the powerhouse, spillways and dam buttresses and will eventually be connected to services within the powerhouse;
- Completion of two river diversion tunnels, which are used to reroute a short section of the Peace River to allow for the construction of the main earthfill dam;

- Completion of the upstream and downstream cofferdams;
- Construction and commissioning of the temporary fish passage facility;
- Diversion of the Peace River around the Site C construction site;
- Completion of the Peace Canyon 500 kV gas-insulated switchgear expansion to enable connection of Site C to the BC Hydro electrical system;
- Completion of the Site C substation and the first of two new 500 kV transmission lines that connect Site C to the Peace Canyon generating station;
- Completion of the finishing concrete work inside the 454-metre-long left bank drainage tunnel;
- Earthfill dam excavation, and the placement of 450,000 cubic metres of roller-compacted concrete in the dam and core buttress, marking the completion of the Project's overall roller-compacted concrete placement program. In total, nearly 1.7 million cubic metres of roller-compacted concrete was placed since 2017;
- Completion of the steel super-structure for the powerhouse;
- Completion of the second of two new 500 kV transmission lines that connect Site C to the Peace Canyon generating station;
- Completion of the bridges at Dry Creek, Lynx Creek, Farrell Creek, Halfway River, and Cache Creek as part of the Highway 29 realignment;
- Completion of the shoreline protection berm at Hudson's Hope;
- Completion of the Maurice Creek spawning shoals;
- Completion of the headworks gantry crane;
- Completion of concrete work for the intakes;

- Completion of the 96 steel piles in the spillway and downstream of the powerhouse, as part of the right bank foundation enhancements;
- Completion of the concrete pile caps in the powerhouse tailrace excavation;
- Completion of the Highway 29 realignment;
- Decommissioning of the old sections of Highway 29 that were realigned;
- Completion of the earthfill dam to the elevation required to enable reservoir filling; and
- Completion of the tunnel conversion process, which involved installing four large rings inside one of the two tunnels that are currently diverting the Peace River around the dam site, to restrict the flow of water through the tunnel.

Figure B-1 shows the location of the key Site C components that are being constructed.

Figure B-1 Site C Project Components



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Appendix C

Safety

Safety Incidents

The following safety incidents occurred from July 1 to September 30, 2023:

Serious Safety Incidents (includes near misses, minor injury with potential of a serious injury, and serious injuries)

1. A worker adjusted a scaffold's mesh, leading to a piece of plywood falling 60-feet and striking another worker below, resulting in a shoulder soft tissue injury.
2. A three-foot-long scaffolding tube fell 20-feet from the overhead crane catwalk to the main floor, landing next to a worker. There were no injuries.
3. While moving panels, telehandler operator made contact with overhead communications lines. Load was in close proximity to overhead powerlines.
4. While cutting some rebar, worker lost their footing and their hand made contact with the bandsaw blade. This resulted in a three-inch-long cut, requiring surgery.
5. While performing a crane lift in Area A, a load of unit 3 top covers fell out of the slings and landed on the outrigger of the boom truck. No workers were in the immediate area, no injuries occurred.
6. Workers were lowering a skip from the main floor to the unwatering gallery. When the skip was passing through the opening on the turbine pit floor, it began to spin and contacted a piece of the wood railing around the opening, causing a four-foot piece to break off and fall to the unwatering gallery floor. No workers were injured.
7. During shoring dismantling in the transition block, an unsecured 2x4 plank fell 20-feet, striking another worker below and causing a minor shoulder injury.
8. While repositioning the aerial work platform to the landing pad, a portion of the plywood at the pad's centre broke, causing the aerial work platform to tilt. A worker, positioned between the handrail and the aerial work platform, attempted

to push it to prevent further leaning, but it caused their arm to become trapped between the aerial work platform and the handrail. Fortunately, a bin prevented the aerial work platform from falling further.

9. While filling a water truck at the boat ramp, the truck rolled backwards and struck a worker who was in the water, testing the truck's hose, resulting in moderate abrasions.

10. During panel stripping operations in the approach channel, a mobile crane was used to extract the panels once they were ready. One worker anchored their fall protection onto the panel while positioned on top of a 25-foot wall. When the panel unexpectedly broke free, the worker fell between the panel and wall but their fall protection prevented their fall after a three-foot drop. No workers were injured.

11. A welder slipped and dislodged the screw dog while exiting the flexible coupling area, causing it to fall down 25-feet and contact another worker's respiratory mask, resulting in a minor injury to their neck.

12. While a worker was adjusting the gate guides, a single two-meter scaffold decking rolled out from under their feet. The worker was tied off and able to support their weight on the ledgers and guides, safely returning to the scaffold working deck. The decking piece fell to the ground, about 60-feet away from the side brackets. There was no control zone in place on the ground below.

13. While the worker was positioned next to the drill rig, their leg was caught between the jaws and safety switch device when the breakout table unexpectedly moved. The worker experienced a strain to their knee.

14. When a worker was using a prybar to extract a pin from a wheel loader, they accidentally struck their eyelid resulting in a laceration that required stitches.

15. During the removal of a piece of lath, the lath slipped and fell from a height of 53-feet to the draft tube level, near three workers working with a different contractor.

16. During the relocation of a sand blasting (abrasive) hose, it snagged on scaffolding, briefly activating and contacting a worker's leg with blast media. The worker went to the hospital to remove embedded grit from his leg.
17. Workers were tasked with switching the 600V, 450A temporary power panel on unit 2. They shut off power from the unit 2 and unit 3 sub-panel before locking out the meter disconnect. When done, a worker turned on the disconnect, and there was a loud thud and sparks. The wrong disconnect was activated.
18. Work was being performed inside the lower-level outlet maintenance gate shafts which are considered confined spaces; however, proper confined space procedures were not in place.

All Injury Incidents

There were also 25 injury incidents that occurred during this reporting period including one lost time injury and 24 medical attention injuries.

Lost Time Injuries:

1. A worker was drilling overhead in an awkward position, and they suffered a hernia and lower back pain.

Medical Attention Requiring Treatment Injuries:

2. A worker fractured their hand while using a hammer.
3. While welding water stops at the approach channel, a worker bending to cut a piece of wood, inadvertently stood up and contacted the corner of a super stud, resulting in a lumbar traverse process fracture.
4. A worker walking on the rebar mat lost their footing, resulting in a fracture on the top of their foot.
5. A worker was cutting tie wire that secured a screed rail on the weir pour, and when they cut the last tie, the rail unexpectedly sprung up and struck the worker in the mouth, resulting in chipped front teeth.

6. While descending from a platform, a worker contacted the sharp edge of a cut-off bolt, resulting to a laceration on their forearm that required stitches.

7. While positioning pads under the crane's outrigger for setup, the crane operator tore their bicep which required a minor surgery.

8. A worker slipped and fell on the scaffolding deck, and while attempting to break the fall, they accidently caught their finger on the scaffolding, resulting in a laceration that required stitches.

9. A worker was in the process of installing wedge segments for the unit 1 flexible coupling seal fitting, when a segment shifted, fell and contacted the worker’s hard hat. Worker experienced a back strain that required a medical prescription for the pain relief.

10. A worker was using a utility knife to cut a piece of foam when their hand slipped, resulting in a laceration to their outer leg that required stitches.

11. A worker was using a utility knife to cut Styrofoam when the blade contacted their hand, resulting in a laceration that required stitches.

12. A worker was using a winch to secure mobile equipment when the handle on the winch inadvertently contacted the worker, resulting in a laceration to their ear that required stitches.

13. A worker was using a hydro vac hose, with a coil rod attached as a handle, to clean under a rebar cage. The hose became stuck due to the debris suction. When the worker tried to release it, the coil rod handle struck their face resulting in a nasal fracture.

14. While cutting some rebar, worker lost their footing and their hand made contact with the bandsaw blade. This resulted in a three-inch-long cut, requiring surgery to their hand.

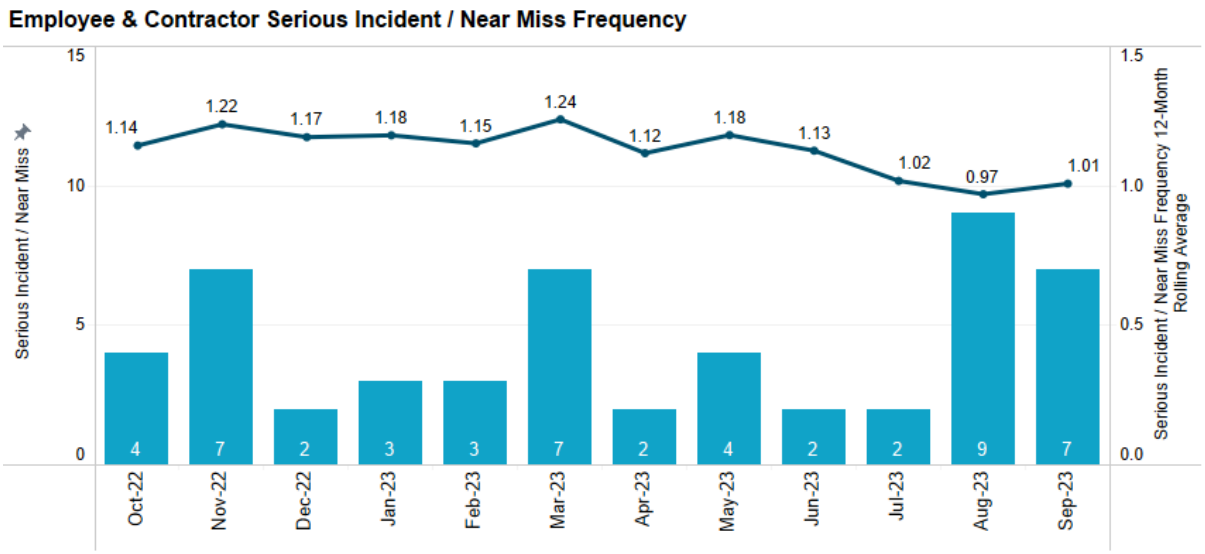
15. While using a drill press, the drill bit caught the worker's glove, resulting in a laceration to their finger that required stitches.

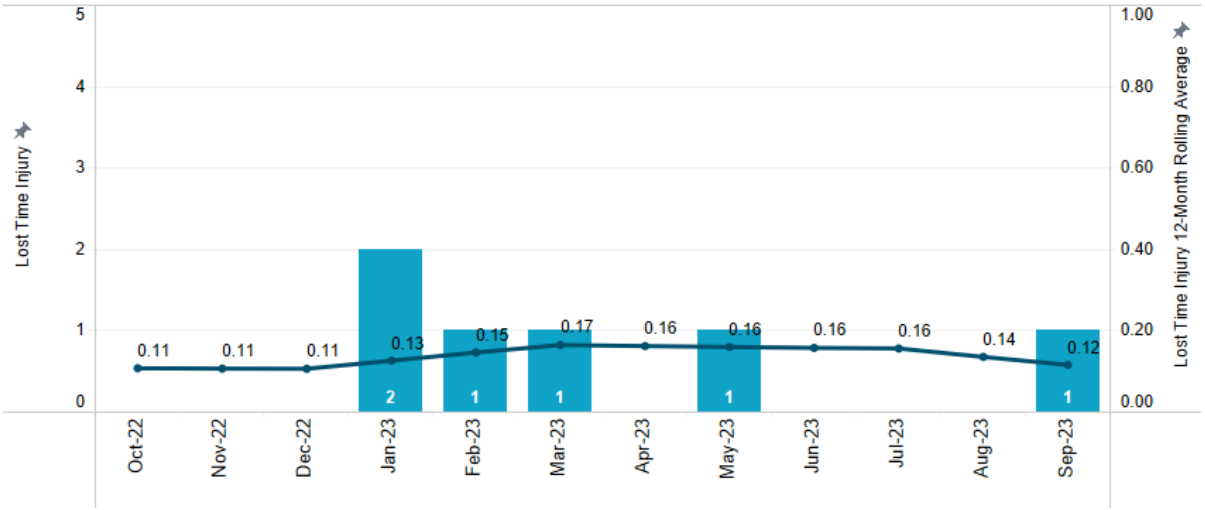
16. Two workers were removing 14-foot push-pull bracing, and one worker set their end down, transferring the weight to the second worker's side. This forced the second worker's hand into a pinch point between the bracing and the concrete floor and fractured their finger.
17. A worker slipped on wet bedrock, resulting in a dislocated shoulder.
18. A worker sustained a finger injury in the worker accommodation that required a medical prescription.
19. While cutting PVC with a hook knife, the worker accidentally cut their arm, resulting in a laceration that required stitches.
20. While handling a crane outrigger pad weighing approximately 90 pounds, the top pad inadvertently fell on the worker's hand, resulting in a laceration to their finger that required stitches.
21. A worker accidentally hit their mouth with a hammer, resulting in one loose tooth and three chipped teeth.
22. When a worker was using a prybar to extract a pin from a wheel loader, they accidentally struck their eyelid resulting in a laceration that required stitches.
23. A worker was separating the vacuum hose when the coupler on the hose accidentally struck their face, resulting in a laceration that required stitches.
24. A worker was stripping panels when debris from the deck above fell into their eye, resulting in a piece of rust becoming embedded, requiring medical attention.
25. While passing some scaffold tubes, a worker’s hand became caught and pinched between another scaffold tube, resulting in a laceration to their hand that required stitches.

Safety Performance Frequency Metrics

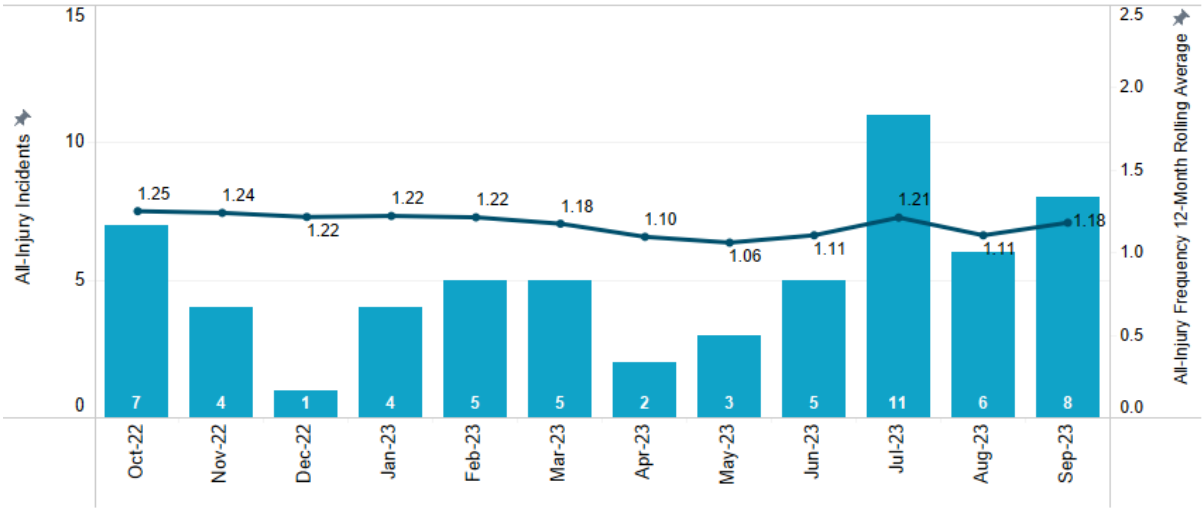
The following graphs provide information on employee and contractor serious incidents/near miss frequency, lost time injury frequency and all-injury frequency from August 2022 to September 2023.

Figure C-1 Employee and Contractor Serious Incident/Near Miss Frequency, Lost Time Injury Frequency and All-injury Frequency





Employee & Contractor All-Injury Frequency



Regulatory Inspections and Orders

Table C-1 lists the safety regulatory inspections and orders received from WorkSafeBC and the Ministry of Energy, Mines and Low Carbon Innovation from July 1 to September 30, 2023.

Table C-1 Safety Regulatory Inspections and Orders

#	Date of Inspections	Regulatory Agency	PPM Subproject	Inspection Report Number Title	Inspection Report Type	Inspection Report Status	Number of Orders Issued	Subject of Order	Regulation Order / Reference
1	July 4, 2023	WorkSafeBC	GSS	202317876054A	Incident Investigation - injury of a worker	Closed	0		Reference(s): WCA69(1); WCA71(2)(c); WCA72(2)(b); OHS4.39(1); OHS8.23(1)
2	July 5, 2023	WorkSafeBC	All	202318192036A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OSH3.19(1), OSH3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g),
3	July 5, 2023	WorkSafeBC	Balance of Plant	202318192038A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g)
4	July 5, 2023	WorkSafeBC	Worker Accomodation	202318192035A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1) WCA72(2), WCA75(3)(g)
5	July 6, 2023	WorkSafeBC	GSS	202317876053A	Incident Investigation - injury of a worker	Closed	0		References(s): WCA69(1)(b), WCA72(2)(b)
6	July 6, 2023	WorkSafeBC	GSS	202318192037A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g)
7	July 6, 2023	WorkSafeBC	Main Civil Works	202318192034A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g)
8	July 6, 2023	WorkSafeBC	Main Civil Works	202318192041A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g)
9	July 6, 2023	WorkSafeBC	Turbine Generator	202318192040A	First Aid Request	Closed	0		OHS3.16(1)(a), OHS3.17(1)(d), OHS3.19(1), OHS3.19(4), OHS3.21(4), WCA69(1)(b), WCA72(1), WCA72(2), WCA75(3)(g)
10	August 3, 2023	WorkSafeBC	GSS	202317876060A	Incident Investigation - injury of a worker	Closed	4	Regular inspections Wet floors Waste material Grounding portable equipment	Order(s): OHS3.5, OHS4.40, OHS4.41, OHS19.14(3) Reference(s): WCA69(1), WCA71(2)(c), WCA72(2)(b), OHS3.7, OHS4.39(1), OHS19.15(1), OHS19.15(2)
11	August 26, 2023	WorkSafeBC	Infrastructure	202317876068A	Incident Investigation - injury of a worker; Order to stop use unsafe equipment	Closed	2	Equipment safety Stop use order	Order(s): OHS4.3(1)(a), WCA89(1) Reference(s): WCA89(4), WCA88(1), WCA88(2), OHS3.7
12	September 6, 2023	Ministry of Energy, Mines and Low Carbon Innovation	Infrastructure	213536	General site inspection	Closed	2	General mine rules Workplace Conditions	Order 213536-S1-O1, Order 213536-S1-O2, Advisory 213536-S2-A1

Total **8**

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Appendix D

Workforce Overview

Table D-1 Current Site C Jobs Snapshot (July 2023 to September 2023)[29]

	Number of B.C. Workers and Total Workers	Construction and Non-Construction Contractors[30] (Including Some Subcontractors). Excludes Work Performed Outside of B.C. (e.g., Manufacturing)	Engineers and Project Team[31]	Total
July 2023	B.C. Workers	3,038	803	3,841
	Total Workers	5,109	877	5,986
August 2023	B.C. Workers	2,904	787	3,691
	Total Workers	4,949	859	5,808
September 2023	B.C. Workers	2,685	790	3,475
	Total Workers	4,584	858	5,442

Data is subject to change based on revisions received from the contractors.

Employment numbers are provided by Site C contractors and are subject to revision. Data not received by the Project deadline may not be included.

BC Hydro has contracted companies for major contracts, such as main civil works, who have substantial global expertise. During the month of September 2023, there were no workers in specialized positions working for a Site C construction or non-construction contractor, who were subject to the Labour Market Impact Assessment process under the Federal Temporary Foreign Worker Program. Additionally, there were 49 management and professionals working for Site C construction and non-construction contractors through the Federal International Mobility Program.

29 Employment numbers are direct only and do not capture indirect or induced employment.

30 Construction and non-construction contractors total workforce employment numbers include work performed on the Site C dam site, transmission corridor, reservoir clearing areas, public roadwork, worker accommodation and services.

31 Engineers and Project team are comprised of both onsite and offsite workers. The Project team includes BC Hydro construction management and other offsite personnel. An estimate is provided where possible if primary residence is not given.

Table D-2 Site C Apprentices Snapshot (July 2023 to September 2023)

Month	Number of Apprentices
July 2023	331
August 2023	375
September 2023	310

Data is subject to change based on revisions received from the contractors.

Table D-3 Current Site C Job Classification Groupings

Biologists and Laboratory	Carpenters	Inspectors	Construction managers/ supervisors	Crane Operators	Electricians	Engineers
Foresters	Health Care Workers	Heavy Equipment Operators	Housing Staff	Heating, Ventilation, and Air Conditioning	Kitchen Staff	Labourers
Mechanics	Millwrights	Office Staff	Pipefitters	Plumbers	Sheet Metal Workers	Truck Drivers
Underground Mining	Welders	Surveyors	Security Guards	Boilermakers	Cement Masons	Crane Operators
Ironworkers						

Data is subject to change based on revisions received from the contractors.

Table D-4 Indigenous Inclusion Snapshot (July to September 2023)

Month	Number of Indigenous Workers
July 2023	530
August 2023	519
September 2023	472

Data is subject to change based on revisions received from the contractors.

The information shown has been provided by BC Hydro's onsite[32] construction and non-construction contractors and their subcontractors that have a contractual requirement to report on Indigenous inclusion in their workforce.

[32] Onsite includes work performed on the Site C dam site, transmission corridor, reservoir clearing areas, public roadwork, worker accommodation and services.

Employees voluntarily self-declare their Indigenous status to their employer and there may be Indigenous employees that have chosen not to do so; therefore, the number of Indigenous employees may be higher than shown in Table D-4.

As with any construction project, the number of workers, and the proportion from any location will vary month-to-month and reflects the seasonal nature of construction work. The number of workers will also vary as a contract's scope of work is completed by the contractor.

Women

In September 2023, there were 536 women working for Site C construction and non-construction contractors. The number of women was provided by on-site construction and non-construction contractors and engineers that have a contractual requirement to report on the number of women in their workforce.

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Site C Clean Energy Project

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Appendix E

Technical Advisory Board Report

Site C Clean Energy Project

Technical Advisory Board Meeting No. 26

Report

(August 21 to 23, 2023)

August 2023

Table of Contents

List of Attachments

1. Introduction

The 26th meeting of the Site C Technical Advisory Board (TAB) was convened via MS Teams video calls August 21 to 23, 2023. The meeting was preceded by a site visit, which was conducted on August 16-18, 2023. The primary objectives were to assess the progress and performance of the works, including construction performance of the Right Bank Foundation Enhancements (RBFE) and the earthfill dam. Attention was also given to further planning toward reservoir filling and operations. These technical discussions and updates focused primarily on the Main Civil Works (MCW). Also, some aspects associated with the Generating Station and Spillways (GSS) and Balance of Plant (BoP) packages were discussed.

1.1 Meeting Organization

Since the last meeting, Meeting No. 25 in March-April 2022, the TAB has convened for a number of technical updates via MS Teams, which are recorded in the following documents:

- Notes from technical updates for the periods of June 9, July 6, August 3, October 3, November 1 and December 14, 2022, and January 31, February 28, March 28, May 2, June 6 and July 20, 2023. These notes are filed on the TAB Sharepoint site (TAB Sharepoint Site) and are also available on request.
- The agendas and list of attendees for each of these technical updates are included in Attachment A.

The agenda for this meeting and the list of attendees are included as Attachment B.

A debriefing is scheduled to be conducted with members of the Project Team and Executives of BC Hydro (BCH), the Project Assurance Board and the Independent Engineers on August 25, 2023. This report will be submitted to BC Hydro on August 24, 2023, and subsequently transmitted to the Project Assurance Board.

The TAB wishes to acknowledge the excellent overviews and presentations that it received. It recognizes the substantial effort that goes into the preparation for the TAB meeting and the technical update conference calls. It appreciates the frank and informative discussions that take place during the meetings.

2. Overview of TAB involvement in design and construction of Site C

BCH has retained a TAB on almost all of its major hydroelectric projects for many years. The main purpose of a TAB is to provide independent, non-binding advice to senior management on technical matters associated with the design, construction and operation

of the facility with special emphasis on safety during the construction and subsequent operational life of the facility. Davidson (2019)[1] states the TAB purpose and provides a list of the key questions that it asks as follows:

- "The most important contribution they can make to a design is to bring their experience and expertise to constructively challenge the project team to meet the 3 Rs of resilience, robustness and reliability. Typical Board questions include:
    - Is there sufficient data to support design and construction?
    - Is the proposed design justifiable based on the available site investigation information?
    - Does the design provide multiple lines of defense against potential failure modes?
    - Can these defensive design features be counted on when they are needed the most?
    - Can the dam sustain extreme events without catastrophic loss?
    - Are the risks tolerable compared to other projects?
    - Who owns the risks and are they being held accountable?
    - Is the project team on the right path to success?"

Although primarily focussed on mining dams, McKenna (2022)[2] provides a comprehensive guidance on the best practice for the organization and operation of TABs.

The current TAB was formed in December 2016 when Dr. Peter Mason joined. The other members of the current TAB had participated in prior TABs, some for a number of years. During the pandemic, it was not possible for the TAB to convene as a group and to undertake site visits. This limitation was overcome by well prepared monthly conference calls, incorporating comprehensive progress reports. A record of TAB activities since its 25th meeting is available in Attachment C.

The current main technical focus, including preparation for reservoir filling is discussed in Section 4, Technical Commentary, presented below.

[1] Davidson, R., 2019. The role of a review board in creating resilient design NZCOLD ANCOLD Resilient Dams and levees for Resilient Communities, Oct. 9-12, Auckland.
[2] McKenna, G., 2022. Building and Operating a successful geotechnical review board. Proceedings Canadian Dam Association, Annual Conference.

3. Project Update

Construction of the project started in the summer of 2015 with the preliminary works (site clearing, access roads, construction bridge, worker accommodation, construction power and other construction facilities).

The MCW construction, which includes the construction of the cofferdams, earthfill dam, the diversion works, the approach channel, the RCC buttress and excavation work, started in the summer of 2016.

Large excavations were completed on the left bank from 2015 to 2018 to remove over-steepened glacial lake deposits and ancient slides of glacial deposits and bedrock colluvium. Several of these ancient slides reactivated during construction causing delay and required redesign of the excavation slope to accommodate large haul roads within the permanent slope.

The excavation of the twin diversion tunnels started in summer 2018 along with completion of the roller compacted concrete (RCC) buttress.

The GSS Contractor started concrete placements in summer 2018 for the powerhouse and start of the construction of the draft tube and powerhouse structure, and by the summer of 2020, the powerhouse concrete foundation and steel superstructure were erected beginning with the service bay. The completion of the spillway buttress in 2019 was followed by the start of construction of the spillway headworks. River diversion through the tunnels was achieved in fall 2020. In 2021, the dam and core buttress was completed along with preparation and grouting of the earthfill dam foundation, with the exception of the left bank abutment foundation preparation and grouting. The earthfill dam, which had been the critical path of the project showed substantial progress in 2022 and was materially complete by August 2023.

Foundation enhancements, which were added during construction on the right bank, included piles in the spillway basin and also downstream of the powerhouse. These enhancements were underway by early 2021 and are now completed in both structures.

The excavation for the approach channel, which provides flows to the power intake and spillway, was completed in phases. The design of the lining of the approach channel was substantially modified during construction to increases redundancy and resilience. The enhanced liner started construction in spring 2022 and is scheduled to be completed in fall 2023.

Construction of gates in the power intakes and within the spillway began in 2022 and is continuing. In June 2023, diversion tunnel 2 was dewatered and conversion initiated, which is a required step in the design for reservoir filling. The conversion of diversion tunnel 2 is estimated to be complete by mid-September. All other major civil and

mechanical works are scheduled for completion in fall 2023, which is planned to be shortly followed by reservoir filling.

Substantial construction of the mechanical and electrical equipment associated with the generating station, including turbine generator and related equipment, has been underway for several years. These works are not the focus of the TAB but are understood to be scheduled for completion to enable power generation in early 2024 should reservoir filling be achieved.

Figure 3.1 – Site Overview (Summer 2023)

4. Technical Commentary

4.1 Status of Water Retaining Structures

4.1.1 Dam

With a height of more than 70 m above foundation and a fill volume of 15 million cubic metres, the Site C dam classifies as a major structure of its kind. Initial studies had selected an earthfill dam, using locally available material – fluvial gravel for the shells and till for the core. Till is known to need special precautions in the design as well as scrupulous quality assurance during construction.

When rising energy demand prompted re-activation of the Site C Project, a study of alternatives confirmed the selection of the earthfill dam but also identified the need for

massive concrete buttresses to support the spillway and the powerhouse, and to serve as an abutment for the embankment on the right flank. These elements were intended to provide a more reliable foundation because of the complex conditions in the right abutment due to effects of residual stresses in the sensitive foundation, where minor deformations might further reduce the low shear strength on bedding planes.

BCH's Engineering Design Team carefully analyzed this novel concept but agreed with the TAB that remaining geotechnical and geohydraulic uncertainties required the "observational method" to verify the efficiency of the measures or to show the need for amendments. Eventually, when bedding planes responded at deeper levels than anticipated, a shear key downstream of the core near the right abutment was constructed to limit deformations that could affect the powerhouse. Instrumentation specifically dedicated to this shear key has demonstrated its fully satisfactory efficiency.

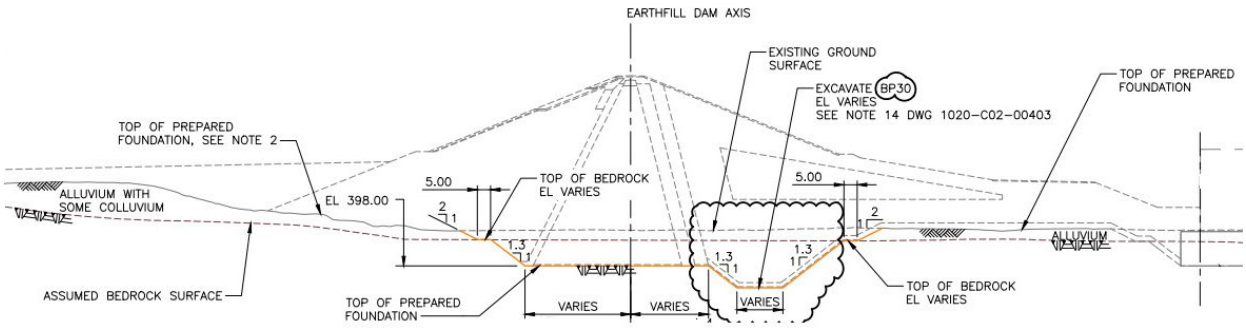

Figure 4.1: Section with shear key taken to Bedding Plane 30

Particular attention was applied to the preparation of the core foundation of the earthfill dam, considering mainly two aspects:

1. The presence of shear zones, which constitute mechanical weakness, offer seepage paths and allow migration of fines.

2. The degrading of the shale, which might produce a fissured, permeable and mechanically weak horizon.

Addressing the first item, a strong team was assigned to the task of surveying and recording the geological features exposed by the excavation. The geological logs in general terms confirmed the presence of shears earlier identified by the subsurface explorations but revealed many important details, which the limitations of core drilling had not indicated.

The findings of the geological logging of the core foundation justified the decision to grout the foundation. This treatment comprised up to three deep, central lines, a grid of

consolidation holes, staggered in depth plus specific treatment concentrating on the shear zones.

Figure 4.2 - Foundation Cleaning and Prescriptions (7 January 2020)

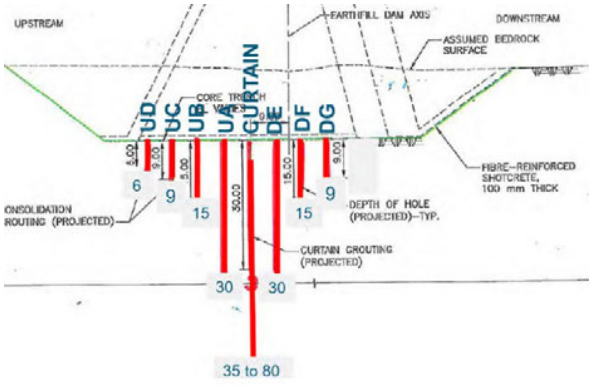

Figure 4.3 - Sample section of the configuration of the grout curtain

Although, as originally anticipated, the rock in general did not accept much grout, local takes reaching to more than 500 kg/m of cement clearly established the need for and the success of this work.

Much care has been applied to preparation of the foundation of the core on the rock. Shear zones received dental concrete, slush grouting was carried out, and degraded rock was removed shortly before starting fill placement.

As additional defence against under seepage, till blankets have been locally placed on the foundation adjacent to the core.

Particular attention was given to the quality control and quality assurance of the fill by the Contractor's program. Satisfactory compliance with the specified grain size distribution and compaction of the different zones of the embankment has been obtained. Independent quality assurance testing was also conducted by BCH's designers and confirmed these results.

Figure 4.4 - Fill Zones

With the established quality of the fill, the stability of the embankment will essentially depend on the performance of the foundation. In consideration of this situation, the instrumentation installed extends well into the foundation.

Within the fills and foundation of the dam, a series of instruments are installed to monitor movements and water pressures, as well as temperature sensors for flows which are all key considerations related to the safety of the structure. Both water pressure responses and deformations as monitored are less than anticipated, which supports the assessment of their safety and readiness for operations. These conclusions are further supported by Performance-Based Design which creates a numerical model of past performance and

can forecast future behaviour based on this calibration. This strengthens the conclusion of the TAB that the embankment dam is “Fit for Service” as intended.

4.1.2 Concrete Structures

The first two construction seasons entailed excavation of soil and rock to expose the foundation conditions along both right and left banks. With the foundations exposed the construction of the concrete structures began on the buttress structures. Thus far, more than 2.5 million cubic metres of concrete has been produced and placed to form the structures at the site, comprising about 1.7 million cubic metres of roller compacted concrete (RCC) and more than 800,000 cubic metres of cast in place concrete (CIPC). The MCW Contractor produced and placed the RCC and the GSS Contractor produced and placed the CIPC. All the aggregates for all the concrete were mined from the local borrow areas and processed for concrete production. Each respective Contractor was responsible for developing their own aggregates and concrete production and placements to meet the specification quality and control.

The RCC was specified and used where mass concrete placements were necessary, as in the large buttresses and larger spillway walls, which necessitated large volumes of concrete and high rates of placements. The early years of RCC placement were challenging with respect to maintaining the rates of placement and schedules. However, by the third season of RCC, the means and methods of placement and rates of placement had greatly improved.

The RCC mix was studied and designed to utilize one standard mix to be workable and placed at high rates. The quality control had many “touchpoints” along its delivery route, from the continuous concrete mix – plant to the truck haul units, to delivery on the buttresses, and spreading of RCC to proper lift thickness, proper surface moisture and compaction and density testing. All of these truck-hauled deliveries were routed along predetermined haul roads and timed to facilitate an efficient rate of placement along the buttress structures.

The CIPC is a normally vibrated concrete and was specified for all other structural concrete. The GSS Contractor was responsible for most of the CIPC that was produced and placed. Temperature control was necessary for all concrete placements, since much of the CIPC was placed in the cold season of the year. The quality control was also more difficult since there were often several CIPC placements being placed at one time. While it was challenging, quality control was never compromised.

The CIPC was produced and placed in variable quantities with each placement being detailed for a specific function within the structural purpose. For instance, in the month of June 2023, there were 81 individual placements completed and 12,555 cubic metres of structural CIPC placed. Each placement form had its unique quality and inspection

required and was satisfied before the placement is released. If any deficiency is noted, it must be corrected and satisfied prior to release and placement.

Upon completion of the concrete structure, whether RCC or CIPC, any deficiencies are rectified or accepted. Placement records must be complete and certified and signed off as to the validity and completeness of the work in accordance with the detailed engineering drawings and "Fit for Service" of the structure. The Engineering Design Team is issuing these certifications as the work is completed.

4.1.2.1 Non-Conforming Concrete

On December 14, 2022, the second of three concrete placements was made as part of the Unit 4 turbine spiral case embedment. Seven day concrete cylinders (samples) were tested and indicated non-conforming concrete during a limited period of the placement. In early January 2023, once BC Hydro and the GSS Contractor personnel had returned to the site from the winter shut down, areas of loose and soft concrete were observed on the top surface of the concrete, indicating that there was nonconforming concrete in the placement. Further dismantling of the formwork around the placement confirmed that there was nonconforming concrete throughout the placement. A review of the concrete batch tickets and compressive test results from the placement was performed, and it was concluded that during the batching process, a delivery of fly ash was erroneously unloaded into the batch plant cement silo, resulting in approximately 100 cubic metres of concrete with low cement content being produced and placed into the 1,500 cubic metre placement. Engineering and procedural controls were immediately implemented at the batch plant to prevent a recurrence of this issue, and Non-Conformity Report 1482 was raised by the Contractor, to document the root cause and corrective actions.

With close supervision from BCH, the Contractor undertook an extensive mapping and coring program. Core results showed that there was non-conforming concrete at varying depths throughout the west end of the placement, the northeast end, in between the spiral casing and the turbine pit liner, and underneath the servomotor pockets. Over the course of six months, the Contractor accessed the non-conforming concrete from the top of the placement and through cut-outs in the servomotor pockets and turbine pit steel liner with the intention of removal of all the non-conforming concrete. Using jackhammers and hydro demolition, the non-conforming concrete was accessed and removed. Where rebar was cut to access the concrete, replacement bars were either spliced (where splice length was available) or coupled using barlock couplers. Throughout the rectification of this non-conformity, the spiral case internal embedment pressure was maintained to ensure that the design gap between the spiral case and adjacent concrete was not compromised. Once BCH was satisfied that all the non-conforming concrete had been removed and the rebar and spiral case surfaces cleaned, the Contractor was authorized to replace the concrete (June 2023).

Figure 4.5 – Unit 04 – Non-conforming Concrete

4.1.3 Approach Channel

The layout of the Site C Project locates the generating and spillway facilities on a RCC buttress located on the right (south) valley wall immediately downstream of the embankment dam. Therefore, it is necessary to impound the reservoir against these structures. This is achieved by constructing an approach channel to fulfill this function. The stability of the valley wall supporting the generating and spillway facilities is sensitive to the development of seepage (piezometric) pressures in the rock. Therefore, it is necessary to minimize any inflow into the rock and maximize the drainage of any seepage that does enter it. As a result, the approach channel and its supporting rock foundation must be made as impervious as practical. Any seepage that does enter this mass is captured by drains reporting to the right bank drainage tunnel, see Section 5.1 below. The approach channel is made impervious at the surface by constructing an impervious liner system and at depth by installing a grout curtain around its periphery.

The sequence of surface construction involves: i) surface excavation, ii) geological mapping, iii) foundation preparation, iv) placing fill as prescribed, v) placing the complex geosynthetic and geocomposite clay liners, and vi) adding erosion protection as required.

Progress has been generally according to plan with completion forecast at the end of September, in time for reservoir filling.

Figure 4.6 presents two recent photos of the approach channel, one to the west and one to the north.

Figure 4.6 - Photos of the approach channel (west view is the photo on the left and north view is the photo on the right)

The geological mapping has been comprehensive. Occasional local grouting of shear zones in the rock was regarded as prudent. The updated model of the rock was generally consistent with design considerations. The complex liner system has been constructed with comprehensive quality control programs. The periphery grout curtain has been completed with only modest grout takes.

Impounding the reservoir will modify the seepage regime in the right valley wall adjacent to the approach channel. The shales comprising the bedrock display characteristics of creep and possibly swelling over geological time. These processes may change the hydraulic conductivity of the strata below and adjacent to the approach channel which could augment uncertainty associated with the adequacy of the designed drainage system. This uncertainty is managed by careful monitoring and the establishment of contingency plans. The management of this uncertainty has been strengthened by the development of a numerical model, calibrated to observed conditions that integrates all relevant observations and, by incremental updating, can forecast seepage patterns to identify in advance whether the trends are of concern and whether actions, such as installing additional drainage, are warranted. This seepage model is expected to operate over the life of the dam and will ultimately be managed by the Dam Safety Team.

4.1.4 Right Bank Foundation Enhancements (RBFE)

As a result of small movements having been identified on bedding shears below the depth of the shear key at the base of the RCC buttress, it was decided to install piles to minimize the potential for future movements. At the time of the last TAB Report No. 25, 48 steel piles filled with concrete had been installed which completed the program for the spillway. For completion of the RBFE, it remained that for the powerhouse an additional 48 piles would be drilled from the top of the rock and subsequently a concrete pile cap would be cast connecting the piles to the powerhouse. This required excavation to a working bench for the enhancements to be executed.

Figure 4.7 illustrates the work required at this time while Figure 4.8 is the setting in the field at the end of June 2022. Figure 4.9 illustrates the advance of the work prior to winter shutdown. The tight workspace and careful sequencing are noteworthy. An overview of the works in February 2023 is shown in Figure 4.10 that illustrates progress under winter conditions.

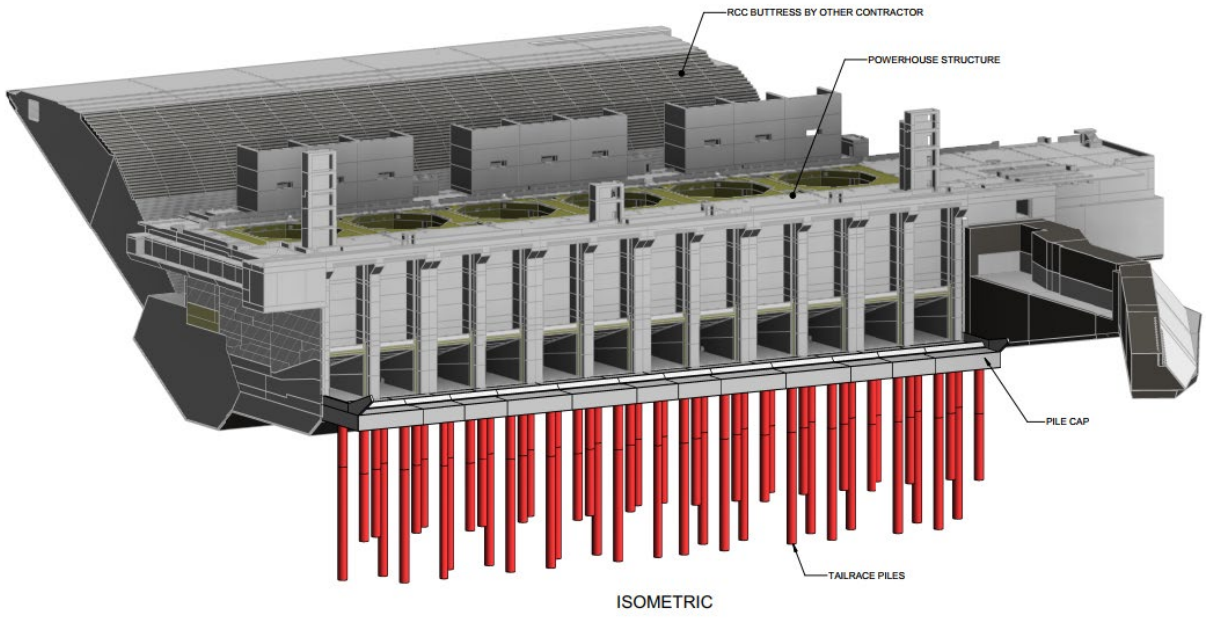

Figure 4.7 - RBFE Sequence of Events

Figure 4.8 - Piles Installation Process, June 2022

Figure 4.9 - RBFE Tailrace Overview, October 2022

Figure 4.10 - RBFE Tailrace Overview, February 2023

The RBFE piling works are complete. The construction satisfied all of the quality control measures and the success of this installation under difficult construction conditions is noteworthy.

4.2 Status of hydraulic works required for Reservoir Filling

4.2.1 Concept for Reservoir Filling

The plan for filling the reservoir, that is impounding it for the first time, will be discussed in more detail in Section 4.3. However, a brief introduction will be given here to explain the need for certain structures and other works to be complete before initial impounding commences. Other requirements may need to be in place at further stages during the impoundment process such as riprap in the upper regions of the approach channel.

The project is envisioning a fall 2023 filling. If achieved, this milestone will limit the exposure to an extended diversion. The exposure of an extended diversion involves additional reliance on the diversion works for potentially a further year and an additional flood season. The diversion works have limited capacity compared to the spillway and are designed to be temporary structures with limited redundance and resilience. In addition, with tunnel conversion nearly complete, an extended diversion would also involve the undesirable prolonged use of the converted diversion tunnel 2 (DT2) and operation of diversion tunnel 1 (DT1) at high water levels during potential floods. These risks are evaluated and accepted during the construction phase of the project but should

be minimized as completion approaches. Dam safety is paramount in any of these considerations.

Currently the river is being diverted through DT1 while large circular steel orifices are being installed in DT2. When the works in DT2 are completed, it will be re-opened, and flows will resume through both tunnels. Thereafter, progressive inflow controls from upstream together with the timed closure of DT1 (at approximately El. 425 m) will be used to raise the reservoir to El. 440 m. Flows will begin to enter the approach channel when the reservoir reaches approximately El. 438 m. Thereafter, considerable outflow capability will be provided by the low level outlets and the second diversion tunnel (DT2) can be closed.

The TAB notes that the precise timing of these events may be influenced by certain non-technical considerations associated with the timing of the inundation, water releases from upstream and requirements for downstream flows. Initiation of reservoir filling requires the permanent works to be either complete or in a suitable state that they can be reliably completed later. At no stage in the process should dam safety be compromised and the TAB is aware that BCH is fully committed to that intention.

In this context it should be noted that the timing and requirements for first reservoir filling are not the same as those that need to be in place for first power generation. For example, reservoir filling may be desirable to suit perceived environmental constraints some months before the power generation units are available. The main power station requirement for initial reservoir impoundment will simply be that the station is secure against inundation from upstream and from downstream at the time when reservoir filling commences.

The subsections below explore the current status of the structures at Site C in relation to the above considerations and requirements.

4.2.2 Diversion Tunnels

The upstream approach to the diversion tunnels is being locally monitored by sonar arrangements to ensure that future gate operations will not be compromised by submerged debris. At the outlet stilling basin, upper erosion is being maintained by additions of riprap as necessary, but the works are otherwise behaving acceptably and as anticipated by dedicated hydraulic model tests, including those effects from the current asymmetrical discharges from DT1.

During the site visit, the length of DT2 was walked and the walls found to be in remarkably good condition especially given that the tunnel has sustained prolonged and continuous discharge for some years. Some invert erosion and degradation has occurred over a width of approximately 3 metres; however, it is a more of a surface roughening than anything significant.

Figure 4.11 – Diversion Tunnel Orifice

All four steel orifices have now been assembled in position and three have been concreted. Work on concreting the last orifice was in preparation during the site visit and it was possible to inspect the concrete anchorages through an access and inspection hole. The installation of the orifices has been done to a very efficient and good standard.

The primary design of the steel orifices was to provide a high strength welded connection to embedded steel plates and anchorages within the concrete. In addition, it had also been expected to achieve a high friction, roughened concrete surface between the existing tunnel lining concrete and the concrete within the steel orifices. However, concerns over silica dust production should artificial roughening have taken place within the confined space of the tunnel interior, resulted in additional mechanical shear anchors being adopted instead. The TAB had expressed an earlier concern over the capacity of the shear connection between the orifices and the tunnel lining given the high hydrodynamic loadings to which the orifices will be subjected at their maximum design capacity and under an upstream reservoir elevation of El. 440 m. This resulted in additional redundancy being provided at the shear connection. This will have been reduced somewhat by the current smooth concrete-to-concrete connection but then enhanced by the additional mechanical shear connections provided to compensate. The matter was discussed with the BCH designer on site and the TAB are satisfied that the issue was well understood and has been controlled by the measures taken.

4.2.3 Spillway and Stilling Basin

As noted in Section 4.1.1, once the reservoir reaches El. 440 m, flow control can pass to the low level outlets and further recent discussions have concerned the completion status of these works prior to their operation. The gates are operated by upper servomotors and travel down via side guides prior to their eventual location in fully constructed gate guidance slots at low level. While these lower built-in gate slots are required for initial operation, investigation is underway to defer installation of the intermediate upper guidance rails in some low level outlet bays. The addition of upper intermediate guidance rails at a later stage is not unique and in fact happens every time a dam is raised in conjunction with existing low level gated works. Nevertheless, it does represent a potential risk. An initial assessment of potential risks and mitigations was carried out by the BCH Engineering Design Team. This indicated that the proposal should be acceptable but recommended that, "*A full constructability review should be completed, with input from the contractor (AFDE), to verify that future installation is feasible and confirm associated risk and mitigations*". The TAB understands this review has been initiated and is continuing. The TAB supports that deferral of these guides be considered as one of the measures that contribute to avoiding extended diversion.

The fact that gate operations during this period will be made by temporary local arrangements is also not seen as an issue by the TAB but rather normal during the pre-commissioning and commissioning stages of a project and when final operational arrangements are being completed.

Other directly related works to be completed in this area prior to start of reservoir impoundment include a number of stilling basin apron slabs together with their anchoring arrangements, and two sections of end sill. The completion of the apron slabs and their anchorages is particularly important to ensure security against uplift from an external raised tailwater elevation. Also, in this general area, the auxiliary spillway chute is only partially constructed at present. Discussions with staff on the site indicate that all these works should be completed by early October. The certification of the completion of the work by the Engineering Design Team is addressed by project plans before impounding and the TAB will be informed if any material future variances in the design are required.

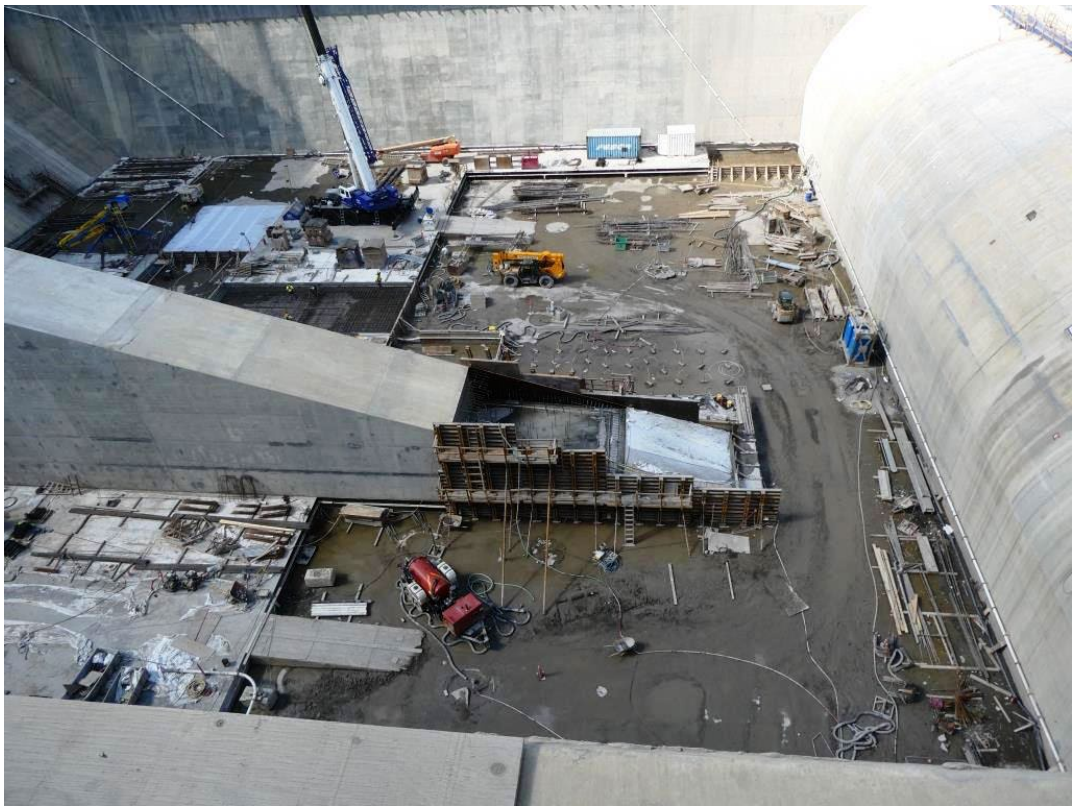

Figure 4.12 – Spillway Apron

4.2.4 Other Structures and Other Aspects

Some aspects of the concrete structures are discussed in Section 4.1, nevertheless this section will summarize other outstanding works to be completed prior to the start of reservoir impounding and/or prior to reservoir El. 440 m being reached.

The status and completion complexity of the approach channel is discussed in Section 4.1. Aspects discussed here will relate just to the associated structures. They include the Carpi membrane to be applied to the upstream face of the roller compacted concrete (RCC) approach channel sidewall and the specific Carpi upstream seals to be applied at the vertical joints in the structures. Both aspects had just started at the time of the site visit.

Work was continuing at the power intakes on completing the built-in parts for the trash racks. The trash rack elements are stacked in the laying out yard ready to be placed. Before impounding can commence all openings will need to be sealed by upstream gates and it is understood that these will be available and in place when required.

A single gantry crane is operational to service the upstream gates on both the spillway and power intakes. The remaining transition section of crest deck was placed during the

site visit, and this will facilitate gantry access to all points on the crest for both the intake and spillway works. An access approach road is also now available and facilitates similar access for mobile cranes to the crest if needed to supplement the main gantry.

Immediately downstream of the power station, sections of concrete slabbing remain to be completed for the tailrace outfall channel. Associated areas of riprap protection also need to be placed prior to the eventual removal of the downstream cofferdam and the inundation of both the tailrace and the spillway stilling basin. Clearly the draft tube gates for the power station will need to be in place before this happens and it is understood that this should not prove to be a constraint.

Temporary pumping arrangements for the power station are also currently being arranged in readiness for tailrace inundation and prior to the permanent pumps being commissioned. It is understood that the temporary arrangements including backup power and temporary backup pumps will all be managed by dedicated subcontractors.

Figure 4.13 – Intakes and RCC Tailrace Wall

4.2.5 Achieved Construction Quality on the Structures

During the site visit, all aspects of the structures were visited to the extent possible. The impression gained was that the structural concrete has generally been placed and finished to a high standard. Two minor exceptions were some air pocket holes on parts of the upper central stilling basin weir and some minor defects at the base of the low level outlet chutes as they join the downstream deflector. The latter is an area of high velocity

flow and defects here should be made good to the required F4 shutter finish. However, these areas will be accessible in the long term for inspection and maintenance. The defects in upper parts of the central weir are largely cosmetic. Nevertheless, as the area will not later be easily accessible, the TAB recommends that efforts be made to make them good to the extent reasonably possible.

Several of the gate guide arrangements were also inspected in some detail. The works are being overseen by the gate manufacturer ATB Riva but based on a standard BCH design concept with which BCH have had good corporate success. Again, the TAB considers that a good quality product is being achieved and that where adjustments and amendments have been required, these have also been done to a good standard.

Figure 4.14 – Achieved Construction Quality on the Structures

4.3 Reservoir Filling

4.3.1 Reservoir Filling Plan

The plan for filling the reservoir, that is impounding it for the first time, has been introduced in subsection 4.2.1. Here it is discussed in more detail. Visually the intended sequence is best explained by reference to BCH Figure 4.15.

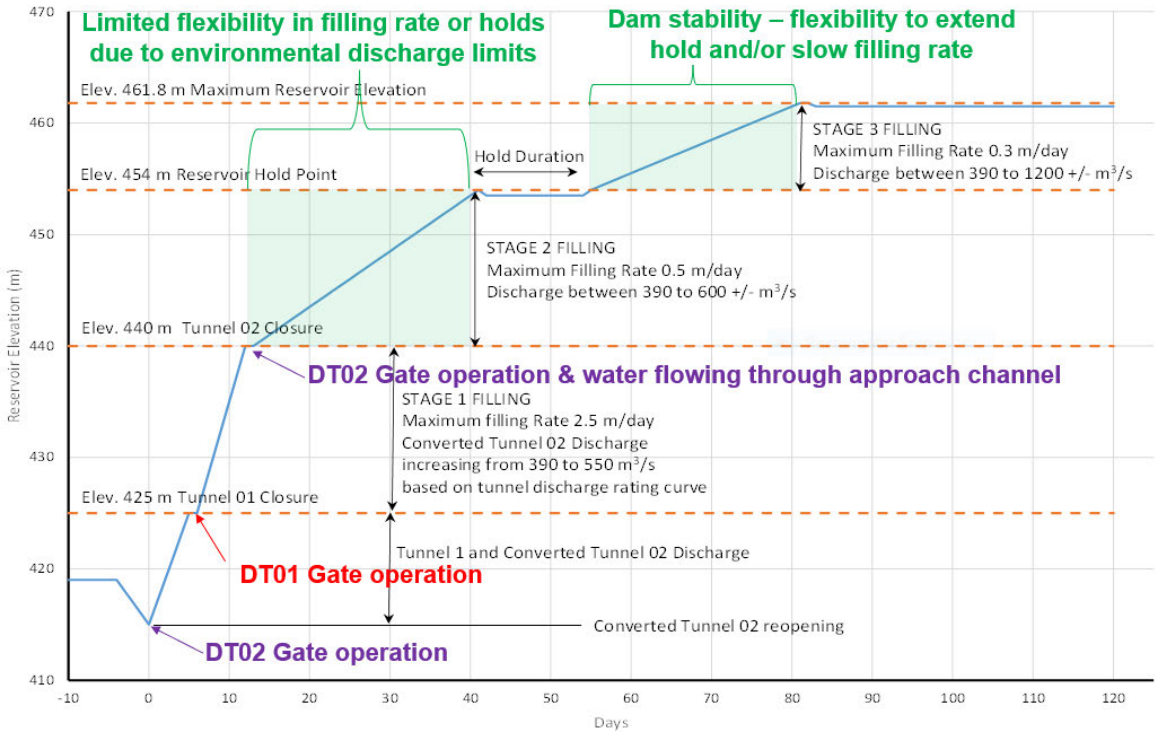

Figure 4.15 – Intended Reservoir Filling Sequence

The river is currently being diverted through Diversion Tunnel No. 1 (DT1) while large circular steel orifices are being installed in Diversion Tunnel No. 2 (DT2). When the works in DT2 are completed, it will be re-opened, and flows will resume through both tunnels. The rate of subsequent reservoir rise will be dependent on releases from upstream plants and on natural inflows but is targeted at 2.5 m/day. When the reservoir reaches El. 425 m, DT1 will be permanently closed, and the gate operating system removed. Flows will continue though just the converted DT2 and again with a targeted reservoir rise rate of 2.5 m/day, depending on inflows. During this time excess energy in the flow will be dissipated by the orifices embedded in DT2.

When the reservoir reaches approximately El. 438 m, flows will start to enter the approach channel and hence reach the low level outlets. At approximately El. 440 m, DT2 will be closed with flow control diverting to the low level outlets. It is the intent to continue reservoir rise using both inflow control from upstream plants and also the considerable discharge capacity of the low level outlets. Note that once the hydraulic cylinders from the DT1 and DT2 gates are removed it will not be possible to re-open either DT1 or DT2 as the hydraulic cylinders need to be cut to remove the cylinders.

During all these stages, monitoring of the works will be taking place and, especially as reservoir elevations rise above El. 425 m and approach El. 440 m. This should include

monitoring the turbidity and debris and the general appearance of flows exiting the converted DT2.

Reservoir rises above El. 440 m are planned at a reduced average rate of 0.5 m/day. In practice they could be varied around that figure to suit circumstances. Another hold point, this time prolonged, will occur when the reservoir reaches El. 454 m. This is also the elevation at which turbine operation and testing can proceed. Note that at elevations above approximately El. 449 m, it will be possible to begin discharge via the main spillway crests, further enhancing total potential outflow capacity and the ability to control reservoir levels.

There will be no urgency to raise reservoir levels above El. 454 m and in practice a slower rise rate of 0.3 m/day is envisaged, up to the maximum normal reservoir level of El. 461.80 m. During this time, both low level outlet gates and main radial spillway gates will be available to discharge inflows together, at some point, with contributions from the turbines. During all stages it may also be possible to restrict inflows by judicial use of releases from Williston Reservoir upstream, although this may be somewhat constrained by power generation requirements.

Factors to be considered related to the timing of filling are discussed above (Section 4.2.1). Filling Site C in the fall is optimal with respect to flood control. However, unusual power generation requirements at upstream plants need to be considered. The TAB understands that BCH has evaluated and continues to evaluate contingency plans for such events.

Also as noted earlier the timing and requirements for first reservoir filling are not the same as those which need to be in place for first power generation. For example, reservoir filling may be desirable to suit perceived environmental constraints some months before the power generation units are available. The main power station requirement for initial reservoir impoundment will simply be that the station is secure against inundation from upstream and from downstream at the time when reservoir filling commences.

4.3.2 Surveillance Plans for Dam Site

The Project team has put together a comprehensive surveillance response plan to be implemented during reservoir filling and thereafter. It is integrated within the OMS manual that covers diversion, tunnel conversion, reservoir filling and operation. This critical document will be reviewed and revisited as required.

The current filling plan has been discussed above. Roles and responsibilities for Project personnel have been outlined and detailed tasks have been developed. Abundant instrumentation is in place to validate that the dam and related facilities are behaving as intended. Alert levels for all instruments are being established based on the considered normal operating range of an instrument. This pays attention to its historical range, the

design assumptions for the facility and any performance modelling of anticipated responses.

The instrumentation response to date has been well-managed and continues to receive detailed attention and review by Project staff. In general, all observations to date are well below design performance limits, as would be expected prior to reservoir filling. During filling, priority consideration will be given to monitoring deformations and seepage at various locations. Response plans have been developed to guide the appropriate actions in the event abnormal conditions appear to have been identified. In addition, comprehensive integrated instrumentation reviews will be conducted on a weekly basis. At the proposed hold point at El. 454 m, a performance assessment will be completed by the Engineering Design Team before proceeding with filling. Specific numerical models for stability, deformations and groundwater response are available to help with the interpretation of the observed performance as conditions change. The variety of responses to the behaviour, which range from “condition as planned” to “stop reservoir filling” have been identified.

Separate monitoring processes with respect to flow into the right bank drainage tunnel and the RCC drainage gallery have been developed.

The TAB is content with the surveillance plans as currently formulated. It recommends that in addition to Project staff controlling the filling plan as proposed, representatives from BCH Dam Safety also be invited to participate to facilitate the ultimate transfer of responsibilities as Site C enters its operational phase.

The reliability of the design of the Site C structures is enhanced by its adoption of Performance-Based Design (PBD) in addition to more traditional standards-based design criteria. PBD is made practical by utilizing the availability of performance-based numerical modeling tools to forecast behaviour in a timely manner and adjusts forecasts in an equally timely manner to confirm, or not, that the facilities are behaving as intended. PBD is being utilized at Site C in two ways: 1) to predict deformations of the structures and compare the predictions with observations, and 2) to predict the development of seepage pressures in the structures and below the approach channel which can also be compared with observations. The execution of the computer modelling in support of PBD is conducted by specialists supporting the Engineering Design Team. The TAB understands from the Engineering Design Team that the availability of this support has been confirmed during the period of reservoir filling.

The TAB further recommends that the Engineering Design Team forecast the observable performance with impounding to the hold point at El. 454 m. This should include deformations, piezometers, and seepage discharges. It should be based on the computational models informed by site experience. Future departures from forecast values to establish levels requiring heightened attention should also be established.

4.3.3 Surveillance Plans for Reservoir Slopes

The early project studies had addressed the hazards potentially associated with mass movements along the reservoir shores, primarily related with unconsolidated sediments above the shale bedrock. In 1973, a voluminous flow slide at Attachie evidenced the potential hazards implied by this geological situation. In the following studies, four sites were found to deserve particular attention (Moberly, Tea Creek, Cache, Attachie) and the evaluation of field surveys, complemented by subsurface exploration, arrived at the conclusion that an observational approach would be appropriate for risk management.

Studies were completed in the late 70s, early 80s and early 90s and when project studies resumed by 2010, the TAB listed the main hazards to be attended as:

- Bank erosion
- Changes in groundwater regime
- Slope failure along the reservoir and their direct impact
- Generation of impulse waves and their impact along the shores and at the dam
- Formation of landslide dams with consequential hazards
- Reservoir sedimentation, generation of floating debris
- Public concerns

and recommended a comprehensive update of the shoreline study, taking advantage of new technologies for survey and monitoring. This task has been accomplished using remote sensing by ground based, aircraft and satellite technology for morphological evaluation and for movement detection to establish an inventory of reservoir slope hazards, which identified 17 sites of main interest. The study advanced with subsurface explorations, providing the basis for developing geotechnical and hydrogeological models of potential mass movements. On the basis of these models, the run-out as well as possible impulse waves have been simulated. In this way, the impact lines along the reservoir shores could be traced accordingly and the areas directly and indirectly at risk were identified.

Measures protecting the shoreline have meanwhile been implemented in the upstream reach of the reservoir (near Hudson’s Hope) and the highway on the north bank has been shifted to a higher elevation. The sites of noteworthy hazards have been instrumented for observational risk management. To allow data evaluation in nearly real time, in-place inclinometers, shape accel arrays (chains of inclination sensors) and vibrating wire

piezometers have been installed and connected to Automatic Data Acquisition System stations.

Schedules for inspections and data collection have been made, alert levels and corresponding course of action are defined. The instrumentation and methodology are best practice, offering appropriate risk management during reservoir inundation.

A well-conceived precautionary approach to manage this risk has been elaborated. The TAB is pleased to see that a quantitative risk analysis has been developed for potential closure of the highway and the one permanent residence that is at risk. The TAB accepts the methodology that has been adopted and has the view that BCH has been sufficiently informed about their exposure.

5. Additional Commentary

5.1 Right Bank Drainage Tunnel (RBDT)

The continued operation of the RBDT is an essential requirement over the life of the Project and hence access to monitor and repair the tunnel is a key design element. The tunnel serves to monitor and collect drainage from the right bank which is an integral part of its design. Once flow is collected in the tunnel at a sump, it is discharged by pumping, which controls the outflow capacity.

Following completion of the tunnel some extensometers installed in the roof of the tunnel indicated small movements that could be diagnostic of creep in the rock. These movements have now terminated. However, extensive cracking developed in the shotcrete around the tunnel, and this has received considerable attention by the Project design team supported by additional experts. The general conclusion is that the RBDT is stable and that the cracking is associated with shrinkage.

The RBDT intersects a drainage adit, RBDTA, which creates a larger excavation at the intersection. The design team propose some extra vertical support at this location and the TAB agrees.

There is extensive instrumentation to monitor movements affecting the RBDT. It is the view of the design team that no additional stabilization is needed at this time. If problems develop in the future, they will be local with sufficient advance warning to undertake stabilization measures to ensure continued safe access to the RBDT. The project team has implemented various measures to increase resilience prior to reservoir filling and is investigating further measures that may be implemented in the future. The potential additional measures may be implemented after reservoir filling, prior to project completion to reduce maintenance requirements and extend operating life. The TAB concurs with this approach.

5.2 Review of Powerhouse Components

5.2.1 Penstock Flexible Joints

Large, 10.20 m diameter steel penstocks transmit water from the power intakes to the powerhouse turbines. The intake structures may be subject to deflection due to foundation movement and also hydraulic loading. The penstocks will be subject to thermal movements due to temperature change. So that neither of these effects transmit undue load onto the power station, the penstocks incorporate flexible joints able to accommodate movement. This is a standard arrangement at such works. Each penstock has one flexible joint on the sloping section downstream of the intake and a second flexible joint sited further downstream on the horizontal length of penstock as it enters the power station and connects to the turbine spiral case.

The upper flexible joints are the responsibility of the GSS Contractor and the lower flexible couplings are the responsibility of the turbine/generator Contractor Voith and in both locations based on a design supplied by Fematics in 2019. Concern over the robustness and adequacy of the arrangements led to modifications by LAR/Chesterton in 2022 for the upper coupling. Continued concern led BCH to explore a parallel and more robust arrangement with ATB Riva, a company already working at Site C on the gates. ATB Riva have had recent experience of designing and installing similar sized couplings elsewhere. The TAB was kept abreast of the concerns and possible schedule implications throughout this process.

Internal pressure testing on the first coupling installed on a sloping section of penstock revealed problems with sealing and produced excessive leakage. This was largely due to problems achieving the necessary circularity of matching penstocks and coupling components at the coupling location. Various options were considered to improve the situation, but the TAB concurred with the eventual BCH decision that, on the sloping sections of penstocks, it would be more appropriate to install and commence operations with a reliable and already proven design. As a result, the ATB Riva based design has been adopted for these locations. They are currently under manufacture in Quebec and will be assembled and installed on site following full trial pre-assembly in the factory. They will be incorporated onto short, thickened lengths of penstock and these will be welded into position on the existing penstocks. This process should guarantee their effectiveness.

It should be added that throughout this process extensive finite element modelling was undertaken to ascertain the likely long-term deflections and cyclic movements at the upper and lower flexible joints. Assessments were also made of the likely loads transmitted onto the power station were the lower flexible joints to be eliminated. Means of locally enhancing penstock flexibility were also explored with the TAB being kept fully abreast of developments. However, transmitting load onto the power station from penstock movements was not envisaged in the original design basis for the stations and,

given Voith's confidence that they could achieve success with their original arrangement at the lower location, it was decided to proceed there as originally planned.

More control is possible at the lower horizontal couplings and various modifications have been trialled to improve reliability. Initial testing has now guided Voith and BCH towards a solution where one half of the joint is made fully flexible while the other half is welded in position. At the time of writing, the TAB is satisfied that a workable solution has now been demonstrated for these locations and which can be employed on all other penstocks.

As noted elsewhere, while the flexible joints do need to be operating satisfactorily for power production and machine commissioning, the couplings and units do not need to be operational or even watered-up for reservoir impounding to proceed. These issues do not affect dam safety.

Figure 5.1 – Penstock Flexible Joints

5.3 Tracking Log

The TAB has been informed that the Tracking Log related to past TAB recommendations has been updated and maintained to date. It is the TAB's view that it can be closed.

6. Future Meetings

The TAB recommends that the next TAB meeting be virtual and the date to be determined. In addition, TAB update teleconferences will convene as follows: September 26 and November 1, 2023. Other conference calls will be scheduled as required.

Respectfully submitted,

Dr. Norbert R. Morgenstern

Dr. Wynfrith Riemer

Mr. Joseph L. Ehasz, P.E.

Dr. Peter J. Mason

Attachment A – Technical Update Conference Calls Agendas and List of Attendees

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
June 09, 2022

Location: Conference Call and Screenshare

AGENDA

1. Project Update [redacted]
2. Approach Channel
   a) Construction Update [redacted]
   b) Geology Update [redacted]
   c) Liner Systems Trial [redacted]
   d) Centre Berm Region 1 Update [redacted]
3. Earthfill Dam
   a) Fill placement and QC Update [redacted]
   b) 3D Deformation Modelling – Performance Base Design [redacted]
4. Right Bank Foundation
   a) Hydrogeological Model Update [redacted]
   b) Instrumentation Update [redacted]
5. Powerhouse Tailrace – Pile Cap Excavation Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
July 6, 2022

Location: Conference Call and Screenshare

AGENDA

1. Project and Construction Updates [redacted]
2. Upcoming TAB topics
3. Discussion

List of Attendees

TAB:	Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason
PAB Advisors:	[redacted]
Other:	[redacted]
Engineering:	[redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
August 3, 2022

Location: Conference Call and Screenshare

AGENDA

1. Project Update [redacted]
2. Approach Channel
   a) Construction Update [redacted]
   b) Geology Update [redacted]
3. Earthfill Dam
   a) Fill placement and QC Update [redacted]
4. Powerhouse Tailrace
   a) Construction Update [redacted]
   b) Erosion Protection [redacted]
5. Right Bank Drainage Tunnel
   a) Review of Instrumentation, Drainage and Observations [redacted]
   b) Path Forward in Preparation for Reservoir Filling [redacted]
6. Right Bank Foundation
   a) Hydrogeological Model Update [redacted]

List of Attendees

TAB:	Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason
PAB Advisors:	[redacted]
Other:	[redacted]
Engineering:	[redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference/Video Call
Oct 3, 2022

Location: Conference Call and Screenshare

AGENDA

Start at 8am PDT. Meeting will open at 745am PDT to test systems

1. Project Update [redacted]
2. Flexible Coupling Update [redacted]
3. Approach Channel Update
   a) Construction Update [redacted]
   b) Geology Update [redacted]
4. Earthfill Dam Update
   a) Fill placement and QC Update [redacted]
5. Update on Right Bank Drainage Tunnel [redacted]
6. Right Bank Foundation Modelling
   a) Hydrogeological Model Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
November 1, 2022

Location: Conference Call and Screenshare

AGENDA

1. Project Update [redacted]
2. Penstock Coupling Update [redacted]
3. Approach Channel
   a) Geology Update [redacted]
   b) Construction Update [redacted]
   c) Grouting Update [redacted]
4. Earthfill Dam
   a) Fill placement and QC Update [redacted]
5. Instrumentation Update
   a) Earthfill Dam [redacted]
   b) Right Bank Foundation [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer

PAB Advisor: [redacted]

E&Y: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
December 14, 2022

Location: Conference Call and Screenshare

AGENDA

8am to noon (PST)
Teams meeting will open at 745am to test system

1. Project Update [redacted]
2. Penstock Coupling Update [redacted]
3. RCC Buttress Investigation Program and Results [redacted]
4. Right Bank Instrumentation Update [redacted]
5. Right Bank Hydrogeological Model - Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason
PAB Advisors: [redacted]
Other: [redacted]
Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
January 31, 2023

Location: Conference Call and Screenshare

AGENDA

January 31, 2023

1. Project Update [redacted]
2. GSS and Gates [redacted]
   a) GSS overview [redacted]
   b) Hydro mechanical overiver [redacted]
   c) Flexible coupling status (upper and lower) [redacted]
   d) Unit 4 concrete [redacted]
3. Construction Update
   a) Approach Channel and Tailrace [redacted]
   b) Geology update [redacted]
   c) Approach Channel Grouting Update [redacted]
4. Right Bank Hydrogeological Model - Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
Feb 28, 2023

Location: Conference Call and Screenshare

AGENDA

1. Project Update [redacted]
2. Filing plans [redacted]
   - Operations, Maintenance and Surveillance Manual
   - Interim Dam Safety Risk Management Plan
   - Surveillance Response Plan to El. 454m
3. GSS
   a) Flexible coupling status (upper and lower) [redacted]
   b) Unit 4 concrete [redacted]
4. Construction Update
   a) Approach Channel and Tailrace [redacted]
5. Right Bank Hydrogeological Model - Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
March 28, 2023

Location: Conference Call and Screenshare

AGENDA

8:00 am to noon (PST)
Teams meeting will open at 7:45am to test system

1. Project Update [redacted]
2. Penstock Coupling Update [redacted]
3. Update on Approach Channel and Tailrace [redacted]
4. Grouting and Geology Update [redacted]
5. Right Bank Hydrogeological Model - Update [redacted]

List of Attendees

TAB:	Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason
PAB Advisors:	[redacted]
Other:	[redacted]
Engineering:	[redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
May 2, 2023

Location: Conference Call and Screenshare

AGENDA

8:00 am to noon (PST)
Teams meeting will open at 7:45am to test system

1. Project Update [redacted]
2. Penstock Coupling Update [redacted]
3. Hydromechanical update [redacted]
4. Unit 4 concrete remediation update [redacted]
5. Update on Approach Channel and Tailrace [redacted]
6. Grouting and Geology Update [redacted]
7. Right Bank Drainage Tunnel Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
June 6, 2023

Location: Teams Meeting Screenshare

AGENDA

8:00 am to noon (PST)
Teams meeting will open at 7:45am to test system

1. Project Update [redacted]
2. Penstock Coupling Update [redacted]
3. Hydromechanical update [redacted]
4. Unit 4 concrete remediation update [redacted]
5. Update on Approach Channel and Tailrace [redacted]
6. Earthfill Dam Update [redacted]
7. Geology and Grouting Update [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason
PAB Advisors: [redacted]
Other:
Engineering: [redacted]

BC Hydro
Power smart

Site C Clean Energy Project
Technical Advisory Board
Conference Call
July 20, 2023

Location: Teams Meeting Screenshare

AGENDA
8:00 am to noon (PST)

Teams meeting will open at 7:45am to test system

July 20, 2023

1. Project Update [redacted]
2. Tunnel Conversion Update [redacted]
3. Reservoir Filling Surveillance Plans [redacted]
4. Penstock Coupling Update and HME [redacted]
5. Unit 4 concrete remediation update [redacted]
6. Update on Approach Channel and Tailrace [redacted]
7. Geology Update [redacted]
8. Earthfill Dam Update [redacted]
9. Reservoir Slopes [redacted]

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

PAB Advisors: [redacted]

Other: [redacted]

Engineering: [redacted]

BC Hydro
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Site C Clean Energy Project
Technical Advisory Board
Site Visit
August 16-18, 2023

Location: Project Site

TAB Site Visit Schedule

Date	Time	Itinerary	Attendees
August 16	830am to 10am	Currently open time	Norbert Morgenstern, [redacted]
	10:00am to 11:00am	Travel to Dam Site (Left Bank Office) and clear Security	Drivers to site: [redacted]: Wynfirth Reimer, Nordie Morgenstern, [redacted] [redacted]: [redacted], Peter Mason, [redacted] others/Spare
	11:00 to 11:30am	Left Bank Office Safety and tour kickoff Collect safety gear	Drivers – same as above
	12:00 to 12:45pm	Left Bank Bench Dam Overview and Lunch	Drivers – same as above
	1:00 to 2:30pm	Approach Channel and jet grouting	Drivers – same as above
	3:00 to 5:00pm	Tailrace and Right Bank Drainage Tunnel	[redacted] - coordinate Note: side by side transport for up to 3 – rest walking in/out
	5:00 to 5:30pm	Travel to Pomeroy Hotel and Conference Centre	Drivers – same as above
	6:00 to 8:00pm	Pomeroy: Dinner and discussion/presentation in board room next to restaurant	Wynfrith Reimer, Nordie Morgenstern, Peter Mason, [redacted]
August 17	8am to 9am	Discussion on Reservoir Shorelines in Pomeroy Hotel next to restaurant	Nordie Morgenstern, Wynfrith Reimer, [redacted]
August 17 – Group 1	10am to 5pm	Reservoir Shorelines Tour (Helicopter and Vehicle)	[redacted] Wynfrith Riemer Driver – [redacted] Wynfrith Reimer returns to Pomeroy hotel

BC Hydro
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Site C Clean Energy Project
Technical Advisory Board
Site Visit
August 16-18, 2023

Location: Project Site

Date	Time	Itinerary	Attendees
August 17 – Group 2	8 to 9am	Training for diversion tunnel conversion	[redacted], Peter Mason, [redacted]
	9am to 10am	Tour diversion tunnel 2	John France, Peter Mason, [redacted]
	11am to 1 pm	Spillway stilling basin and chute (including lunch)	Peter Mason, [redacted]
	1:00pm to 3:00pm	Spillway and intake gates, headworks, cranes	[redacted]
-	3 to 3:30pm	Travel to airport	[redacted]
August 18th	10am to 2:30pm	Powerhouse, power intakes	Peter Mason, [redacted]
	3:00 to 3:30pm	Travel to airport	Peter Mason, [redacted]

Attachment B – Meeting Agenda and List of Attendees

BC Hydro
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Site C Clean Energy Project
Technical Advisory Board
Meeting No. 26
August 21-23, 2023

Location: Teams Meeting Screenshare

AGENDA

August 21, 2023, 8:00am to Noon
Discussions and Report Preparation

August 22, 2023, 8:00am to 10:00am
Discussions with the Engineering Design Team (8:00 to 8:45am)
Report Preparation

August 23, 2023, 8:00am to 10:00am
Discussions and Report Preparation

List of Attendees

TAB: Norbert Morgenstern, Joe Ehasz, Wynfrith Riemer, Peter Mason

Engineering: [redacted]

Attachment C - List of TAB Conference Calls, May 3, 2022 to date

List of TAB Conference Calls, May 3, 2022 to date

Conference Call	May 3, 2022
Conference Call	June 9, 2022
Conference Call	July 6, 2022
Conference Call	August 3, 2022
Conference Call	October 3, 2022
Conference Call	November 1, 2022
Conference Call	December 14, 2022
Conference Call	January 31, 2023
Conference Call	February 28, 2023
Conference Call	March 28, 2023
Conference Call	May 2, 2023
Conference Call	June 6, 2023
Conference Call	July 20, 2023
Site Visit	August 16-18, 2023
Meeting #26	August 21-23, 2023

BC Hydro
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Site C Clean Energy Project

Quarterly Progress Report No. 31

Appendix F

Summary of Individual Contracts Exceeding $10 Million)

PUBLIC

CONFIDENTIAL ATTACHMENT

BC Hydro
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Site C Clean Energy Project

Quarterly Progress Report No. 31

Appendix G

Project Progression

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Site C Clean Energy Project

Quarterly Progress Report No. 31

Appendix H

Detailed Project Expenditure

PUBLIC

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