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July 11, 2019

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

Dear Mr. Wruck:

**RE: British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Site C Clean Energy Project
PUBLIC Quarterly Progress Report No. 15 – January to March 2019 (Report)**

BC Hydro writes to provide its public Report.

Commercially sensitive and contractor-specific information has been redacted.

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

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

Yours sincerely,



Fred James
Chief Regulatory Officer

st/ma

Enclosure (1)

Site C Clean Energy Project

Quarterly Progress Report No. 15

F2019 Fourth Quarter

January 2019 to March 2019

PUBLIC

Table of Contents

1	Project Status – January to March 2019	1
1.1	Overview and General Project Status	1
1.2	Major Accomplishments, Work Completed, Key Decisions and Key Issues.....	6
1.2.1	Construction.....	6
1.2.2	Engineering	16
1.2.3	Quality Management.....	18
1.3	Safety and Security	21
1.4	First Nations Consultation	26
1.5	Litigation.....	27
1.6	Permits and Government Agency Approvals	28
1.6.1	Background	28
1.6.2	Federal Authorizations.....	29
1.6.3	Provincial Permits	30
1.6.4	Environmental Assessment Certificate	31
1.6.5	Permitting Improvement.....	32
1.7	Environment.....	33
1.7.1	Mitigation, Monitoring and Management Plans	33
1.7.2	Environmental Compliance Inspections and Enforcement.....	34
1.7.3	Heritage	36
1.7.4	Agricultural Mitigation and Compensation Plan Framework	36
1.8	Labour, Employment and Training Initiatives and Building Capacity Initiatives.....	37
1.8.1	Labour	37
1.8.2	Employment.....	38
1.8.3	Training and Capacity Building Initiatives	39
1.9	Community Engagement and Communication	41
1.9.1	Local Government Liaison	41
1.9.2	Business Liaison and Outreach	42
1.9.3	Housing Plan and Housing Monitoring and Follow-Up Program.....	44
1.9.4	Labour and Training Plan	44
1.9.5	Human Health.....	45
1.9.6	Property Acquisitions	45
1.10	Key Procurement and Contract Developments	46

1.10.1	Key Procurement.....	46
1.10.2	List of Major Contracts Awarded (Excess of \$50 million).....	47
1.10.3	Large Contracts to Date (Excess of \$10 million).....	48
1.10.4	Contract Management.....	48
1.11	Plans During Next Six Months.....	49
1.12	Impacts on Other BC Hydro Operations.....	50
1.13	Site Photographs.....	50
2	Project Schedule.....	50
2.1	Project In-Service Dates.....	50
2.2	Project Governance, Costs and Financing, and Risk.....	51
2.2.1	Project Governance.....	51
2.2.2	Project Budget Summary.....	51
2.3	Project Expenditure Summary.....	52
2.4	Internal Project Financing versus External Borrowings to Date.....	52
2.5	Material Project Risks.....	53

List of Figures

Figure 1	Site C Project Components.....	2
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List of Tables

Table 1	Project Status Dashboard.....	4
Table 2	Quality Management Non-Conformity Report Metrics Reporting Period – January 2019 to March 2019.....	19
Table 3	Summary of Site C Safety and Regulatory Metrics.....	23
Table 4	Litigation Status Summary.....	28
Table 5	Warning Letters and Orders.....	34
Table 6	Site C Jobs Snapshot Reporting Period – January 2019 to March 2019.....	38
Table 7	Public Enquiries Breakdown.....	43
Table 8	Major Project Contracts and Delivery Models.....	46
Table 9	Major Project Construction Contracts Awarded.....	47
Table 10	Key Milestones for Activities Planned during the Next Six Months (April 2019 to September 2019).....	49
Table 11	In-Service Dates.....	50
Table 12	Project Budget.....	51

Table 13	Total Project Expenditures Budget Compared to Forecast and Life to Date – Budget Compared to Actual Expenditures to March 31, 2019 (\$ million nominal)	52
Table 14	Actual Fiscal 2019 Project Expenditures Compared to 2018/19 to 2020/21 Service Plan (\$ million Nominal).....	52
Table 15	Material Project Risks.....	53

Appendices

Appendix A	Site Photographs
Appendix B	Safety and Security
Appendix C	Summary of Individual Contracts Exceeding \$10 Million PUBLIC
Appendix D	Project Progression PUBLIC
Appendix E	Detailed Project Expenditure PUBLIC
Appendix F	Workforce Overview
Appendix G	Site C Construction Schedule

1 **Project Status – January to March 2019**

2 This Quarterly Progress Report No. 15 (**Report No. 15**) provides information
3 concerning the Site C Clean Energy Project (**Project**) covering the period from
4 January 1, 2019 to March 31, 2019.

5 **1.1 Overview and General Project Status**

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

- 8 • Site preparation, including on-site access roads;
- 9 • Clearing of the left and right banks at the dam site and clearing of the lower
10 reservoir area is substantially complete;
- 11 • Left bank cofferdams;
- 12 • Construction of the worker accommodation lodge and Peace River construction
13 bridge;
- 14 • Powerhouse excavation, and placement of 414,000 cubic metres (m³) of
15 roller-compacted concrete in the powerhouse buttress;
- 16 • Construction of dam site access public road;
- 17 • Construction of the Site C viewpoint;
- 18 • Excavation of the diversion tunnel inlet (upstream) and outlet (downstream)
19 portals, allowing for the commencement of diversion tunnel excavations; and
- 20 • Excavation of the right bank drainage tunnel, which will be used to monitor and
21 drain the remaining excavations for the spillway and dam buttresses and will
22 eventually be connected to services within the powerhouse.

1 **Figure 1 Site C Project Components**



2 Significant Project updates that occurred between January 1, 2019 and
3 March 31, 2019, include:

- 4 • At the end of January 2019, backfilling of Adit 4 was completed. This is one of
5 four tunnels and chambers located around the dam site that were excavated in
6 the late 1970s and early 1980s during preliminary studies for the Project (a fifth
7 adit was excavated in 2012). For more information, refer to section [1.2.1.1](#);
- 8 • The right bank drainage tunnel was completed in February 2019. Refer to
9 section [1.2.1.1](#) for more information;

-
- 1 • In February 2019, the first of more than 400 transmission towers was raised.
2 These towers will support the two new 500 kV transmission lines leading from
3 the Site C substation to Peace Canyon generating station. For more
4 information, refer to section [1.2.1.5](#);
- 5 • The generating station and spillways contractor opened their penstock
6 fabrication facility in Fort St. John in February 2019. The penstock steel is
7 transported from Quebec by rail, and then welded into 11-metre-wide cylinders
8 before being shipped to site by truck;
- 9 • The Site C heritage plan entered its tenth year in February 2019. The heritage
10 resources management plan describes how the Project plans to mitigate
11 adverse effects on heritage resources. Site C's heritage studies have
12 unearthed hundreds of thousands of artifacts. The archaeological artifacts will
13 be stored at the Fort St. John North Peace Museum. Refer to section [1.7.3](#) for
14 further information on the heritage resources management plan;
- 15 • In March 2019, care of water became a challenge earlier than anticipated.
16 Unseasonably warm temperatures in mid-March 2019 had Site Crews
17 managing water flows that are usually seen in April 2019. For further
18 information, refer to section [1.7.1](#):
- 19 ○ The L3/L4 stilling basin and Garbage Creek diversion were able to pass the
20 flows without any major issues; and
- 21 ○ Smaller erosion and sediment control features were assessed and updated
22 on a daily basis to minimize sediment contributions to local waterways, also
23 keeping within environmental permit requirements;
- 24 • In March 2019, anchors for intake operating gates and intake maintenance
25 gates were delivered;
- 26 • In March 2019, pre-production stator bars for the generators were shipped from
27 the contractor's São Paulo facility to BC Hydro's subsidiary, Powertech Labs,

- 1 for type testing to confirm the design will meet contract requirements. For
2 further information, refer to section [1.2.1.4](#);
- 3 • In March 2019, nearly \$30,000 was donated to support three Peace Region
4 non-profit groups through the Site C project’s Generate Opportunities (GO)
5 Fund. As of March 2019, \$316,489 had been distributed to 34 projects;
 - 6 • The March 2019 employment statistics showed there were 3,674 people
7 working on the Project (79 per cent of those from British Columbia). For more
8 information, refer to section [1.8.2](#); and
 - 9 • As of March 31, 2019, two equipment supply contracts were awarded. These
10 contracts are for the supply of the generator terminal equipment and the
11 protection and control panels. In total, ten equipment supply contracts will be
12 awarded for the Project. Refer to section [1.2.1.3](#) for further information.

13 These, and other, project updates are detailed in this report. [Table 1](#) provides a
14 dashboard based on the Project’s status as of March 31, 2019.

Table 1 Project Status Dashboard

● On Target ● Moderate Issues ● At Risk

Status as of:		March 2019
Overall Project Health	●	Overall project health remains amber. Main civil works is on track to meet river diversion in September 2020 and the dam in-service milestone for 2024. The Site C substation and Peace Canyon switchyard expansion are progressing on schedule. The transmission line contract is behind the baseline schedule; however the in-service date for the two 500 kilovolt transmission lines is still expected to be met as the delays can be mitigated.
Scope	●	Scope changes have been minimal and the changes are expected to be managed within contingency.
Schedule	●	The Project continues to be on track for river diversion (September 2020) and for the overall in-service date of 2024.
Cost	●	The Project is currently forecast to be completed under the project budget of \$10.7 billion, which includes drawing on the Treasury Board Reserve. This forecast is based on BC Hydro’s standard project delivery methodology which uses a P50 confidence level as the basis for preparing a forecast. The project budget was approved by the board of directors in February 2018. Cost pressures continue to be identified, assessed, and monitored.

Status as of:		March 2019
Regulatory, Permits and Tenures	●	Permits are on track and are meeting schedule requirements. To date, the Project has obtained 70 per cent of its major required authorizations and the remaining authorizations are anticipated to be received as required to meet the overall project schedule needs. Environmental Assessment Certificate Amendment approvals are progressing, with all requested amendments approved to date.
Environment	●	BC Hydro and contractors continue to take action to address environmental incidents related to the care of water event that occurred in September 2018. In the month of September 2018, approximately 55 mm of rain fell causing the release of approximately four million litres of low pH storm water into the Peace River. The Water Comptroller issued an Order to Remedy requiring the submission of an independent review of the care of water system. BC Hydro and our contractors have subsequently increased the system capacity along with other actions to reduce the potential of future similar events. Environment Canada initiated an investigation on October 10, 2018 and the investigation is ongoing. All other environmental aspects are trending positively.
Procurement	●	The proponents that have been selected to participate in the request for proposals for the balance of plant contract were approved by the Board in November 2018.
Indigenous Relations	●	Six of 10 agreements are fully executed and in implementation. Confidential discussions are underway with the provincial government, BC Hydro, West Moberly First Nations and Prophet River First Nation to seek alternatives to litigation related to the Site C Project.
Litigation	●	The treaty infringement claims filed by West Moberly First Nations and Prophet River First Nation in January 2018 remains active. The trial of these claims is expected to occur sometime between 2022 and 2024. In February 2019, the Government of B.C., BC Hydro, West Moberly First Nations and Prophet River First Nation agreed to enter into confidential discussions to seek alternatives to litigation related to Site C. The parties will continue trial preparations as these discussions proceed.
Safety	●	Site C remains a complex, multi-work front, multi-employer project with significant safety hazards both on-site and off-site. BC Hydro continues to have strong safety and regulatory performance. In February 2019, there was an incident involving a worker who received an electrical shock from a roadheader. WorkSafeBC attended the site to investigate the roadheader incident and tunneling activities were suspended for 12 days while WorkSafeBC and the main civil works contractor completed their investigations. As of March 31, 2019, the safety risks associated with the roadheader event had been addressed.
Stakeholder Engagement	●	BC Hydro continues to work with the communities, regional district and stakeholder groups on the implementation of various community agreements.
Quality	●	Overall, quality is tracking well. BC Hydro continues to work with each contractor to identify and resolve non-conformities and quality issues as they arise. BC Hydro is in the process of implementing the recommendations from the Project quality assessment performed in the previous reporting period.

1 **1.2 Major Accomplishments, Work Completed, Key Decisions and**
2 **Key Issues**

3 **1.2.1 Construction**

4 Refer to [Appendix F](#) for the high level construction schedule.

5 **1.2.1.1 Main Civil Works**

6 The scope of the main civil works contract includes the construction of the following
7 major components:

- 8 • Diversion works, including two 10.8 metre diameter, concrete-lined tunnels.
9 Tunnel No. 1 is 700 metres in length and tunnel No. 2 is 790 metres in length;
- 10 • Excavation and bank stabilization (approximately 26 million cubic metres of
11 overburden and rock excavation);
- 12 • Relocation of surplus excavated material (including management of
13 discharges);
- 14 • Dams and cofferdams (including a zoned earth embankment 1,050 metres long
15 and 60 metres above the present riverbed and stage 1 and 2 cofferdams);
- 16 • Roller-compacted concrete (including a buttress approximately 800 metres long
17 made up of two million cubic metres of concrete);
- 18 • Haul roads; and
- 19 • Inlet and outlet portals.

20 Construction progress at Site Currently is split between work on the left bank and
21 right bank. Main civil works is on track to meet river diversion in September 2020
22 and the dam in-service milestone for 2024.

1 **Left Bank**

2 Work activities on the left bank are to stabilize the slope with a mass excavation,
3 stabilize the diversion inlet and outlet portals and excavate a set of diversion tunnels
4 in preparation for river diversion and construction of the earthfill dam.

5 The activities currently underway or completed during this reporting period include:

- 6 • At the end of January 2019, backfilling of Adit 4 was completed. This is one of
7 four tunnels and chambers located around the dam site that were excavated in
8 the late 1970s and early 1980s during preliminary studies for the Project (a fifth
9 adit was excavated in 2012):
 - 10 ○ Adit 4 was of particular importance due to its proximity to the diversion
11 tunnels, the size of the test chamber excavation, and because the earthfill
12 dam and associated drainage and grouting works are also in close
13 proximity; and
 - 14 ○ The purpose of the adits was to learn more about the rock and gain a better
15 understanding of the geotechnical conditions present on-site and methods
16 for tunneling;
- 17 • Work on the diversion tunneling has continued since August 2018. The
18 contractor has experienced challenges with the excavation from the outlet
19 portal, putting the tunnel excavation behind plan. The issues include:
20 WorkSafeBC permitting delay, a safety incident on a roadheader, resourcing
21 challenges, and lower productivity due to encountered rock conditions.
22 BC Hydro continues to work with the contractor to plan the work and mitigate
23 schedule risks. The remaining excavation has been re-sequenced to mitigate
24 the impact of the delay on meeting a key construction diversion milestone on
25 March 1, 2020;
- 26 • Tunneling from the diversion tunnel inlet portal is in transition and preparations
27 are underway to start the lining and inlet structure construction. The inlet and

1 outlet structures are forecast to be completed by the end of 2019 in support of
2 gate installation and dry testing by March 2020;

- 3 • Preparation on the left bank dam core excavation has started but is tracking
4 behind schedule. BC Hydro is working with the contractor to identify options to
5 improve the 2019 excavation schedule to support till placements in 2019; and
- 6 • The till conveyor system construction is underway with clearing completed and
7 ground preparations for the foundation underway. The till conveyor will begin
8 moving dam core material from the 85th Avenue Industrial Lands to the dam site
9 in summer 2019.

10 ***Right Bank***

11 The right bank scope of work includes the excavation of the powerhouse, spillways
12 and dam, and placing roller-compacted concrete for the foundations to support the
13 powerhouse, dam and spillway structures. The current completed activities on the
14 right bank include:

- 15 • Excavation of the right bank drainage tunnel to allow for spillway and dam
16 abutment excavation was completed in February 2019;
- 17 • The last blast to complete the second phase of the spillway buttress slope
18 excavation was completed in April 2019 and roller-compacted concrete
19 placements started in May 2019. The plan for 2019 is to place over
20 600,000 cubic metres of roller-compacted concrete, which will be the largest
21 roller-compacted concrete season of the project;
- 22 • With the completion of the spillway excavation, the right bank dam core trench
23 and dam buttress excavation will commence in May 2019; and
- 24 • Approximately 25 per cent of the aggregates required for 2019 have been
25 stockpiled. In spring 2019, the remaining aggregates started to be crushed and
26 cleaned. Aggregate production for 2019 started in March 2019 with new silica

1 management equipment, and production is expected to ramp up to full
2 production by May 2019.

3 ***In-River Work***

4 When the river is diverted in 2020, upstream and downstream cofferdams will be in
5 place in the Peace River to provide safe access for the main dam construction. The
6 current in-river work includes dredging in support of the stage 1 cofferdams.

7 ***Earthfill Dam***

8 Work on the earthfill dam commenced in October 2018 and initial material
9 placements for the earthfill dam will continue through 2019. Foundation preparation
10 is about to commence with core trench excavation and grout curtain trials both
11 expected to start in summer 2019.

12 **1.2.1.2 *Generating Station and Spillways***

13 The generating station and spillways scope of work includes the construction of the
14 following major components:

- 15 • Generating station and spillways civil work includes:
 - 16 ○ Concrete, steel, installing cranes, and installing gates for the powerhouse;
 - 17 ○ Concrete, penstocks, and installing gates for the inlet headworks; and
 - 18 ○ Concrete and installing gates for the spillways;
- 19 • Cranes which includes the supply and commissioning of the powerhouse
20 cranes, tailrace gantry crane, and headworks gantry crane; and
- 21 • Hydromechanical equipment, including the supply of all gates.

22 ***Generating Station and Spillways Civil Work***

23 As of the end of the reporting period, the generating station and spillways contractor
24 had placed a cumulative total of 27,300 cubic metres of concrete compared to a plan

1 of 31,000 cubic metres. The contractor is approximately three weeks behind plan
2 due to the work slowing during the cold winter months, but has a credible plan to
3 recover the schedule before summer 2019.

4 Currently, concrete placements are being performed for Units 1, 2, 3, and 5; and the
5 main service bay.

6 As of March 31, 2019, the contractor had:

- 7 • Mobilized crews to start the intake headworks starting in April 2019;
- 8 • Mobilized the steel building crew to build the powerhouse superstructure
9 starting in April 2019; and
- 10 • Substantially completed the main service bay concrete (approximately two
11 months ahead of schedule).

12 ***Cranes***

13 As of March 31, 2019, the powerhouse bridge cranes were 90 per cent complete.

14 These will be shipped to site in June 2019. Design work continues for the headwork
15 gantry crane.

16 ***Hydromechanical Equipment***

17 During the reporting period, the hydromechanical contractor delivered the anchors
18 for the intake operating gates and the intake maintenance gates. Design of the
19 actual gates continues.

20 **1.2.1.3 *Balance of Plant***

21 The formal procurement process for the generating station and spillways balance of
22 plant contract was launched in June 2018. The request for proposals for the balance
23 of plant contract was issued on April 30, 2019. As of March 31, 2019, two equipment
24 supply contracts were awarded and eight equipment supply contracts were either in
25 evaluation or negotiations stages.

1 **1.2.1.4 Turbines and Generators**

2 The scope of the work includes the complete design, supply, installation, testing and
3 commissioning of six turbines, generators, governors and exciters. All progress for
4 design, procurement and manufacturing for the turbines and generators is on
5 schedule.

6 The contractor continues the assembly and welding of embedded turbine
7 components in its temporary manufacturing facility on the right bank at site. The
8 contractor's São Paulo factory will supply the majority of the turbine generator
9 components, and has produced all cast steel parts for three of the six turbines. Initial
10 meetings for the various other turbine and generator components in the São Paulo
11 factory have been held concurrently with visits to most of the contractor's
12 subcontractors in the São Paulo area. Based on the powerhouse construction
13 schedule, the contractor will commence turbine installation in the powerhouse by
14 July 2020. Current areas of focus include ensuring quality of the manufactured
15 components and that contract specifications and schedule are met.

16 Pre-production stator bars for the generators were shipped in March 2019 from the
17 contractor's São Paulo facility to BC Hydro's subsidiary, Powertech Labs, for type
18 testing to confirm the design will meet contract requirements.

19 **1.2.1.5 Transmission and Substation**

20 The transmission sub-project will connect the Site C Project to the BC Hydro
21 transmission system. The scope of work includes the following major components:

- 22 • A new 500 kV Site C substation;
- 23 • Two 75 kilometre long, 500 kV transmission lines from the Site C substation to
24 the Peace Canyon generating station;
- 25 • Three one kilometre long, 500 kV transmission lines from the Site C generating
26 Station to the Site C substation; and

-
- 1 • Expansion of the existing Peace Canyon 500 kV gas-insulated switchgear to
2 incorporate the two new 500 kV transmission line terminals.

3 ***Transmission***

4 Vegetation clearing on the transmission line right-of-way resumed, and trees and
5 vegetation felling was substantially completed in March 2019. Clearing of waste
6 wood and merchantable timber will be completed in the summer of 2019.

7 The installation of transmission towers on foundations started in February 2019 and
8 51 towers were erected (compared to a plan of 120 towers) prior to work pausing in
9 March 2019 due to road access restrictions during the spring break up period.

10 Despite being behind schedule, the transmission line contractor has a plan to get
11 back on track. This includes restarting foundation installation on the eastern half of
12 the transmission line in the late spring and continuing to assemble and install
13 transmission towers.

14 ***Substation***

15 Substation construction continued from January to March 2019, including the
16 installation of protection and control equipment in the control building, the installation
17 of 500 kV equipment, steel supports for conductors in the 500 kV switchyard, and
18 the completion of the shunt reactor oil-containment system. Substation construction
19 continues to be on schedule.

20 ***Peace Canyon Gas-Insulated Switchgear Expansion***

21 The gas-insulated switchgear design-build contractor mobilized their electrical
22 contractor to site in January 2019, and began the installation of protection and
23 control equipment in the control room, the installation of protection and control
24 cabling and the installation of grounding conductors in the outdoor switchyard.

25 The gas-insulated switchgear equipment was delivered to Peace Canyon in
26 March 2019. The outage at Peace Canyon started on April 23, 2019 and is expected

1 to end in July 2019. The Peace Canyon gas-insulated switchgear expansion is
2 expected to be placed into service in July 2019.

3 **1.2.1.6 Highway 29**

4 The creation of the Site C reservoir requires realignment of segments of
5 Highway 29, totalling approximately 30 kilometres. The scope of the highway
6 realignment also entails relocation of existing 25 kV distribution lines along the
7 existing highway and the slope protection berm at District of Hudson's Hope to
8 protect against bank erosion due to reservoir wind, waves and water table rise. In
9 order for the highway to remain accessible once the reservoir is created and the
10 dam is operating, the permanent realignment is planned to be completed by
11 spring 2023.

12 The Highway 29 realignment is divided into four main areas:

- 13 • Cache Creek (East and West);
- 14 • Halfway River;
- 15 • Western segments (Farrell Creek East, Farrell Creek, Dry Creek, Lynx Creek,
16 Lynx Creek East); and
- 17 • Other areas (Portage Mountain Quarry and Hudson's Hope shoreline
18 protection).

19 **Cache Creek**

20 **Cache Creek East**

21 The design for the revised realignment option continues to progress and is expected
22 to be completed in late 2019. The property acquisition process will continue for
23 Cache Creek East. A request to amend the Project's Environmental Assessment
24 Certificate to reflect the revised realignment will be submitted to the Environmental
25 Assessment Office in May 2019.

1 ***Cache Creek West***

2 The procurement for services related to the four kilometres of the highway
3 realignment at Cache Creek West started in summer 2018. A contract was issued
4 for a partial scope of work in October 2018. The construction activities for this partial
5 scope of work started in early October 2018 and most of the work was completed by
6 December 2018 with the exception of some drainage work which will be completed
7 in spring 2019. The invitation to quote for the remaining scope for Cache Creek
8 West was issued in December 2018. The contract negotiations were carried out and
9 completed in March 2019 and a contract is planned to be awarded by May 2019.
10 The planned construction start date is June 2019.

11 ***Halfway River***

12 The majority of geotechnical investigations were completed for Halfway River
13 segment of Highway 29 during the summer of 2018. The detailed design for this
14 segment of the highway started in winter 2018 and 50 per cent of the detailed design
15 milestone was completed in March 2019. The detailed design is progressing and
16 planned to be completed by July 2019.

17 The clearing and grubbing work started in early February 2019 and was completed
18 by March 2019. The remaining pre-construction work including the removal of
19 archeological site materials is scheduled to start by June 2019.

20 An amendment to the Project's Environmental Assessment Certificate was issued on
21 October 26, 2018 to reflect a revised design of the Halfway River bridge. More
22 details can be found in section [1.6.4](#).

23 ***Western Segments***

24 The majority of the geotechnical investigations were completed for the western
25 segments of Highway 29 during the summer of 2018. Some additional geotechnical
26 investigations will take place in spring 2019 to investigate additional borrow sources.

1 Functional design work for Farrell Creek, Dry Creek, Lynx Creek and Lynx Creek
2 East has commenced and is planned to be completed in spring 2019.

3 The design team also completed an assessment of short-term shoreline erosion and
4 stability for Farrell Creek East in February 2019 to support the functional design. The
5 property acquisition process will continue for the western segments.

6 ***Other areas***

7 As part of the development of the Portage Mountain Quarry, BC Hydro completed
8 trial blasts in late summer 2018 to assess the production yields and quality of rock.
9 The preliminary assessments of yield production and rock quality, durability and
10 geochemical testing were completed during fall 2018. The final report was received
11 in January 2019. Some aspects of the mine development plan and design were
12 revised in winter 2019 to address safety concerns with the haul road.

13 This quarry is being developed to supply rip rap materials for sections of Highway 29
14 realignment and to construct the shoreline protection berm for the District of
15 Hudson's Hope.

16 The Hudson's Hope Shoreline Protection Value Engineering Study was completed in
17 March 2019. Detailed design is expected to be complete in fall 2019.

18 ***1.2.1.7 Reservoir Clearing***

19 The reservoir clearing scope of work is divided into three main areas:

- 20 • Lower reservoir;
- 21 • Moberly River drainage, eastern reservoir, Cache Creek drainage; and
- 22 • Middle reservoir, Halfway River drainage and western reservoir.

23 Clearing in the Moberly River drainage, eastern reservoir and middle reservoir is
24 required to support diversion in fall 2020. All other clearing is scheduled for
25 completion by spring 2023 (prior to reservoir inundation).

1 ***Lower Reservoir***

2 Clearing activities in the lower reservoir are complete.

3 ***Moberly River Drainage, Eastern Reservoir and Cache Creek Drainage***

4 Clearing occurred in the Moberly River drainage, eastern reservoir and Cache Creek
5 area over the 2018/2019 winter. All clearing was completed in these areas except for
6 some floodplain debris removal and some trees on steep slopes in the Moberly River
7 drainage and north bank of the eastern reservoir, respectively. Some trees for
8 wildlife buffers were also left behind in these areas. Wood waste remains in each of
9 the three areas.

10 The uncleared portions of the Moberly River drainage and north bank of the eastern
11 reservoir will be cleared in summer 2019. Wood waste removal will occur in
12 fall 2019.

13 Clearing of the south bank portion of the eastern reservoir was rescheduled for the
14 2019/2020 clearing season and procurement activities will begin in May 2019.

15 ***Middle Reservoir, Halfway River Drainage and Western Reservoir***

16 Designs for the middle reservoir, Halfway River drainage and western reservoir are
17 underway. Access and clearing for the middle reservoir is scheduled to start in
18 fall 2019 and is anticipated to progress westward in future clearing seasons.

19 Clearing between Cache Creek and Halfway River is also required to support
20 diversion.

21 **1.2.2 Engineering**

22 The Engineering team provides technical support across the Site C project, with
23 substantial focus this reporting period on the achievement of the Project and
24 contractors' schedule for both the main civil works contract and the generating
25 station and spillways civil works contract.

1 ***Main Civil Works***

2 For the main civil works contract, the main focus areas for the engineering team
3 during the reporting period were the advancement of the river diversion schedule
4 and completion of engineering designs and proposed contractors' changes for the
5 left bank excavation permanent drainage, spillway buttress roller-compacted
6 concrete slope protection and concrete outline drawings, and the diversion inlet
7 structure construction joints. Engineering also provides ongoing support to
8 construction through constructability, schedule and engineering reviews for the
9 sequencing and scheduling of the spillway buttress excavation and roller-compacted
10 concrete placement for handover to the generating station and spillways civil works
11 contractor.

12 ***Large Cranes, Hydromechanical, Turbines and Generators***

13 Engineering support to construction and vendor integration has been ongoing
14 throughout the reporting period for the large cranes, hydromechanical equipment
15 and turbines contracts.

16 The hydromechanical equipment specifications and the gantry crane design basis
17 memorandum have advanced.

18 ***Generating Station and Spillways, Balance of Plant and Equipment Supply***

19 Several batches of construction drawings for the generating station and spillways
20 civil works contract were completed through the reporting period, in support of, and
21 in accordance with, the revised contractors schedule for the release of remaining
22 construction drawings.

23 The implementation design for the balance of plant and equipment supply packages
24 for the generating station and spillways has been advancing including specifications
25 and REVIT modelling work. Technical evaluation was completed for the large valve
26 equipment supply request for proposals, while submission reviews and analysis

1 were completed for the 500 kV motor operated disconnect switches and compressed
2 air receiver equipment supply request for proposals.

3 Design continued to advance on the protection and control systems and is on
4 schedule.

5 ***Transmission and Substation***

6 Design continues to advance on the protection and control systems and is on
7 schedule. Implementation design for the 500 kV transmission lines and the right
8 bank substation was completed, while the Peace Canyon gas-insulated switchgear
9 design is nearing completion with protection and controls details remaining.

10 ***Highway 29***

11 Advancement of the implementation design for Highway 29 and associated bridge
12 structures continues in accordance with the Project schedule requirements, with the
13 alternate route designs progressing in consultation with stakeholders. Also,
14 geotechnical investigations were undertaken to confirm design assumptions, ground
15 risk or sources for construction materials.

16 ***Technical Advisory Board***

17 A conference call was held with the Technical Advisory Board on January 16, 2019
18 and the Technical Advisory Board was provided with a project update while also
19 considering technical aspects of the main civil works and the generating station and
20 spillways contracts.

21 The next Technical Advisory Board meeting is scheduled to be held from May 28 to
22 May 29, 2019 in Fort St. John and Vancouver.

23 **1.2.3 Quality Management**

24 The Project has a quality management plan that outlines activities to ensure
25 materials, equipment and the constructed works meet contract quality requirements.

1 The plan identifies resources and procedures necessary for achieving the quality
 2 objectives, roles and responsibilities, resource planning and establishment of a
 3 quality management program.

4 Implementation and monitoring of quality control and quality assurance plans are
 5 requirements for all contractors. The Project tracks and manages quality
 6 non-conformities, which is an occurrence that does not conform to the quality
 7 requirements of the contract. [Table 2](#) identifies quality management non-conformity
 8 instances during the reporting period

9 **Table 2 Quality Management Non-Conformity**
 10 **Report Metrics Reporting Period –**
 11 **January 2019 to March 2019**

Contract	Reported January 1, 2019 to March 31, 2019	Closed January 1, 2019 to March 31, 2019	Reported to Date	Closed to Date	Open as of March 31, 2019
Main Civil Works	54	44	1,124	1,088	36
Turbines and Generators	7	2	36	22	14
Generating Station and Spillways Civil Works	32	15	96	58	38
Large Cranes	1	3	10	9	1
Hydromechanical Equipment	0	0	0	0	0
Transmission	1	0	63	57	6

12 The quality performance of the main civil works contractor was good for the reporting
 13 period. BC Hydro and the contractor continue to meet on a weekly basis to discuss
 14 and resolve quality issues, and quality steering committee meetings continue to be
 15 held monthly to discuss broader topics related to the contractor's quality
 16 performance. The main civil works contractor has recently achieved its staffing
 17 targets for quality control personnel at the site in order to support the multiple work
 18 fronts in the 2019 construction season. Offsite manufacturing of the diversion gates
 19 and embedded parts continues to proceed without any major quality issues.

1 The quality performance of the turbines and generators contractor was good for the
2 reporting period. BC Hydro and the contractor continue to meet on a weekly basis to
3 discuss and resolve quality issues. BC Hydro continues to have a local surveillance
4 inspector employed full time at the contractor's São Paulo manufacturing facility, and
5 is in the process of assessing whether or not additional resources are required as
6 the manufacturing activities increase.

7 The quality performance of the generating station and spillways civil works
8 contractor was generally good for the reporting period. While several
9 non-conformities were raised related to curing and thermal control of concrete,
10 BC Hydro and the contractor collaborated to identify and implement improvements in
11 the specifications and work methods to prevent future reoccurrence. None of these
12 non-conformities is expected to impact the Project schedule or the performance of
13 the structures. Offsite manufacturing of penstocks and trashracks continues to
14 proceed without any major quality issues.

15 The quality performance of the transmission contractors was good for the quarter
16 ending March 31, 2019. BC Hydro continues to perform quality surveillance audits of
17 the transmission contractors to verify that their quality management systems are
18 being adhered to.

19 BC Hydro continues to implement the recommendations from the quality
20 assessment report issued in December 2018. Updates to the Project quality plan
21 and the quality sections of the resident engineering plan are underway and are
22 expected to be completed by June 2019.

23 BC Hydro has retained the services of a civil works quality management specialist to
24 support the site team with quality audits of the main civil works and generating
25 station and spillways civil works contractors. These audits are scheduled to
26 commence in the second quarter of 2019.

1.3 Safety and Security

Safety continues to be the top priority on the Site C Project.

There was an increase in the number of electrical incidents that occurred during the reporting period. Incidents include: workers unintentionally cutting into low voltage electrical cables and a high voltage incident involving one of the roadheaders in the diversion tunnel. WorkSafeBC attended the site to investigate the roadheader incident and tunneling activities were suspended for 12 days in February 2019 while WorkSafeBC and the main civil works contractor completed their investigations.

As a result of these incidents, BC Hydro brought in two BC Hydro Safety Advocates to conduct a high level review of Site C's temporary construction power infrastructure. The focus of the review was on the installation of the distribution panels, Site Cabling, and 25 kV poles and wiring in the areas they reviewed.

Subsequently, a number of recommendations were made and are being considered including electrical awareness training for non-electrical trades' workers. In addition, BC Hydro requested that the main civil works contractor undertake a review of their equipment management practices and procedures.

A number of initiatives were undertaken in this reporting period to promote a strong safety culture including reinforcement of BC Hydro's Life Saving Rules, the Site C Absolutes and the BC Hydro Safety Stop Program.

Life Saving Rules

BC Hydro Life Saving Rules banners were designed and provided to our prime contractors to install in their respective work areas as a reminder to people working in those areas to work safely.

Site C Absolutes

The Site C labour, security, and communications team updated the Site C Absolutes to increase awareness and reinforce the prohibition of cannabis and cannabis

1 products on-site. The updated Site C Absolutes notification was sent to all Site C
2 contractors, which included signage and frequently asked questions documents.
3 These documents made it clear that recreational cannabis and cannabis products
4 would remain prohibited on the Site C Project, including inside vehicles in parking
5 lots or in passing a security gate, in any camp facility, and in work areas both on and
6 off the dam site.

7 BC Hydro Safety Stop Program

8 The BC Hydro Safety Stop program was rolled out to employees and contractors
9 working on the Site C Project. The program provides workers with common
10 language to immediately stop a work activity because of a safety issue, rule
11 violation, or need for clarification on safety-related issues. The Safety Stop program
12 is not a new concept; it is a tool used to support our courage to intervene safety
13 practice and stop a potentially unsafe situation.

1 Summary of Safety and Regulatory Performance Metrics
 2 [Table 3](#) below summarizes the Site C safety and regulatory metrics in a tabular
 3 format. This table reflects current safety and regulatory performance metrics used
 4 for Site C, including leading indicators to ensure ongoing focus on the key priorities.
 5 More details can be found following the table.

6 **Table 3 Summary of Site C Safety and Regulatory**
 7 **Metrics**

	Reported January 1, 2019 to March 31, 2019 ¹	Reported Since Inception (July 27, 2015 to March 31, 2019) ¹
Fatality ²	0	0
Permanently Disabling Injury ³	0	1 ⁴
Serious Incidents ⁵	4	36
Lost Time Injuries ⁶	1	20
All-Injury Incidents ⁷ (Lost Time Injuries ⁶ and Medical Attention requiring Treatment ⁸)	5	82
Regulatory Inspections	15	84
Regulatory Orders	31	152

1 Numbers are subject to change due to timing of when data is retrieved and when injury is categorized.
 2 Excludes health events unrelated to work standards.
 3 A permanently disabling injury is one in which someone suffers a probable permanent disability.
 4 In June 2018, an injured worker received a permanent partial disability award from WorkSafeBC due to a lost time injury incident in August 2017. The worker was attempting to unload a light plant (tower) from a flatbed truck. The worker stepped on the light plant (tower) outrigger to gain enough height to reach the lifting attachment when the worker lost balance and fell approximately 7.5 feet to the ground. 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.
 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 is a count of all work-related fatalities, lost time injuries and medical attention requiring treatment.
 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.

1 Safety Performance Metrics

2 For the overall project during the reporting period, Site C (including all contractors)
3 experienced four serious incidents, and five all injury incidents that include one lost
4 time injury and four medical attention requiring treatment. There were no public
5 incidents during this quarter.

6 Serious Incidents in the reporting period:

- 7 1. A worker who did not isolate the energy to the 600 v cable prior to start of work;
- 8 2. A high voltage electric shock to a worker involving one of the roadheaders in the
9 diversion tunnel;
- 10 3. A worker was removing a tarp in the ice with a jackhammer when it contacted a
11 600 v electrical cable; and
- 12 4. Cable yard log striking a worker.

13 There have been 36 serious incidents to date which include 26 near misses and 10
14 incidents.

15 All Injury Incidents in the reporting period:

- 16 • Lost time injury:
 - 17 1. A section of a conveyor dropped on a worker's foot resulting in a fractured
18 foot.
- 19 • Medical attention requiring treatment:
 - 20 1. A worker bumped their forearm against a stay-form resulting in a
21 4" x 1" laceration;
 - 22 2. A hand faller was struck by wood debris in the left eye while cutting;
 - 23 3. A pry bar slipped and made contact with the right side of the worker's
24 head, just below the workers hard hat resulting in a small laceration; and

1 complied with. The Ministry of Energy, Mines and Petroleum Resources did not
2 conduct any regulatory inspections over the same time period.

3 WorkSafeBC's primary focus was on the roadheader incident in the diversion tunnel.
4 Other areas of interest were general Site Conditions, roles and responsibilities of an
5 employer, tower and mobile cranes in the right bank cofferdam area, ventilation
6 systems in main civil works maintenance shop, tunneling and excavation in the left
7 bank, and contractor safety orientation and training programs.

8 Of the 15 regulatory inspections that occurred during this reporting period, four
9 resulted in no orders or a 'clean sheet'. In March 2019, the rolling 12-month 'clean
10 sheet' result was 30 per cent. The per cent of 'clean sheets' is a metric that
11 measures regulatory safety compliance. There is an additional metric, 'average
12 number of orders per regulatory inspection', which helps correct for the higher
13 volume of regulatory inspections expected at a large construction project like Site C.
14 The average number of orders per regulatory inspection has dropped over the last
15 three years, from 2.5 in fiscal 2017 to 1.7 in fiscal 2019.

16 Refer to [Appendix B, Table B-1](#) for the details of the safety regulatory inspections
17 and orders that occurred during the reporting period.

18 **1.4 First Nations Consultation**

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

25 Accommodation offers were originally extended to ten First Nations communities.
26 Six agreements have been fully executed and are in various stages of

1 implementation. The provincial government, BC Hydro, West Moberly First Nations
2 and Prophet River First Nation have agreed to enter into confidential discussions to
3 seek alternatives to litigation related to the Site C Project to date, Impact Benefits
4 Agreements with Doig River First Nation, Halfway River First Nation, Sauteau First
5 Nation and McLeod Lake Indian Band, and a Project Agreement with Dene Tha'
6 First Nation have been publicly announced.

7 **1.5 Litigation**

8 A number of legal challenges of the Project have been filed by First Nations and
9 other interests. In all cases where the courts have issued rulings, the legal
10 challenges have been dismissed.

11 The treaty infringement claims filed by West Moberly First Nations and Prophet River
12 First Nation in January 2018 remain active. West Moberly First Nations had
13 concurrently filed an injunction application in January 2018 to stop construction of
14 the Project, but the injunction was denied by the court. The trial of the treaty
15 infringement claims is expected to occur sometime between 2022 and 2024.

16 In February 2019, the Province of British Columbia, BC Hydro, West Moberly First
17 Nations and Prophet River First Nation agreed to enter into confidential discussions
18 to seek alternatives to litigation related to Site C. The parties will continue trial
19 preparations as these discussions proceed.

20 The details of all open proceedings as of March 31, 2019 are summarized in [Table 4](#)
21 below.

1 **Table 4 Litigation Status Summary**

Description	Date
B.C. Supreme Court: Treaty Infringement Claims	
West Moberly First Nations Prophet River First Nation	Claims filed January 15, 2018
West Moberly First Nations	Injunction application filed Hearing date Injunction denied January 31, 2018 July 23 to August 3, 2018 and September 4 to 7, 2018 October 24, 2018 No appeal filed
B.C. Supreme Court Civil Claims	
Building Trades v. BC Hydro	Civil claim filed Response to claim filed March 2, 2015 April 10, 2015
Aggregate Mining Process LLC and Reynolds Shipping LLC	Civil claim filed Response to claim filed November 16, 2018 December 6, 2018
Office of the Information and Privacy Commissioner (OIPC)	
Applicant requested review of Freedom of Information response	Request for review filed OIPC Order issued Application for judicial review of Order filed August 17, 2017 December 11, 2018 January 18, 2019

2 **1.6 Permits and Government Agency Approvals**

3 **1.6.1 Background**

4 Before the Site C Project could start construction, an extensive environmental
 5 assessment process was undertaken that resulted in the issuance of the Provincial
 6 Environmental Assessment Certificate and the Federal Decision Statement in
 7 support of the Project. In addition, the Project is required to apply for multiple
 8 provincial permits, water licences, leaves to commence construction and federal
 9 authorizations. Timing of the application for these permits and authorizations is
 10 staged and aligned with the construction schedule, availability of detailed design
 11 information, and by project component. Permitting approaches and requirements are
 12 also determined through regular meetings with regulatory agencies, and are subject
 13 to change throughout the Project. As at March 31, 2019, BC Hydro estimates that

1 approximately 426 permits will be required throughout the life of the Project. Of
2 these permits, 297 have been received and are actively being managed.

3 Multiple conditions are attached to each permit or authorization, which cover
4 subjects such as air quality, water quality, fish and aquatics, wildlife, heritage, health
5 and safety, construction environmental management and First Nations consultation.
6 Each of the conditions must be implemented, audited and tracked to prove
7 compliance or identify issues for follow-up with corrective actions. BC Hydro has
8 developed a comprehensive Construction Environmental Management Plan which
9 outlines how we will comply with the Project Environmental Assessment Certificate,
10 Federal Decision Statement, and provincial and federal permits and authorizations.
11 As of March 31, 2019, all required conditions and submissions have been met in
12 accordance with the schedule and requirements of the conditions.

13 **1.6.2 Federal Authorizations**

14 Federal authorizations are required under the *Fisheries Act* (Fisheries and Oceans
15 Canada) and the *Navigation Protection Act* (Transport Canada). All major federal
16 authorizations for construction and operation of the Site C dam and reservoir were
17 received in July 2016. At this time, no further *Fisheries Act* authorizations are
18 anticipated. Additional *Navigation Protection Act* approvals for discrete works in the
19 reservoir (e.g., shoreline works, debris booms and Highway 29 bridges) are
20 anticipated to be issued at the regional level. As of March 31, 2019, 43 federal
21 approvals have been received and are actively being managed. One approval is
22 pending, and 17 future approvals are planned.

23 On May 4, 2018, BC Hydro submitted an application to amend the *Navigation*
24 *Protection Act* approval for the main civil works due to changes to the design of the
25 spillway, as approved in Environmental Assessment Certificate amendment No. 1,
26 dated June 22, 2018. The amended *Navigation Protection Act* approval was issued

1 on February 27, 2019. The amended approval updates requirements for audible
2 warnings for flow release changes from the generating station and spillways.

3 **1.6.3 Provincial Permits**

4 Site C requires provincial permits primarily under the *Land Act*, *Water Sustainability*
5 *Act*, *Forest Act*, *Wildlife Act*, *Heritage Conservation Act*, and *Mines Act*. These
6 permits include investigative permits, licences to occupy land, water licence
7 approvals, leaves to commence construction and leaves to construct, and licences
8 to cut vegetation, among others. Permit applications are sequenced with the overall
9 schedule of the Project to ensure the most current and factual information is
10 included in the submissions.

11 Approximately 365 provincial permits and approvals will be required throughout the
12 life of the Project. As of March 31, 2019, 254 permits have been obtained and are
13 actively being managed. These have included permits for the dam site area (site
14 preparation and clearing, as well as preliminary works for the main civil works and
15 generating station and spillways, such as construction of cofferdams, excavation and
16 construction of roller-compacted concrete buttress), worker accommodation (land
17 tenure and water withdrawal), Highway 29 geotechnical investigations, transmission
18 line clearing and construction of access roads, and lower/eastern reservoir and
19 Moberly River clearing. Future provincial permits are planned for the construction of
20 the Highway 29 realignment, Hudson's Hope Berm, and middle and western
21 reservoir clearing and filling. All future permits are anticipated to be issued in
22 accordance with the Project construction schedule.

23 The majority of the provincial permits are administered by the Ministry of Forests,
24 Lands, Natural Resource Operations and Rural Development and the Ministry of
25 Energy, Mines and Petroleum Resources. In addition, BC Hydro has developed a
26 coordinated First Nations consultation process with the Ministry of Forest, Lands,
27 Natural Resource Operations and Rural Development to assist with the government

1 permit workload. This coordinated consultation process was implemented in
2 January 2018.

3 **1.6.4 Environmental Assessment Certificate**

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

8 To date, the Environmental Assessment Office has issued four amendments to the
9 Project's Environmental Assessment Certificate. These are:

- 10 • Amendment No. 1 – Changes to Environmental Assessment Certificate
11 Schedule A project description regarding design changes to the generating
12 station and spillway (issued June 22, 2018);
- 13 • Amendment No. 2 – Changes to Environmental Assessment Certificate
14 Schedule A project description regarding design changes to the Halfway River
15 Bridge within the Halfway River Highway 29 realignment (issued
16 October 26, 2018);
- 17 • Amendment No. 3 – Changes to Environmental Assessment Certificate
18 Schedule A project description regarding the use of West Pine Quarry, in
19 addition to the already approved Portage Mountain Quarry, as a source of
20 quarry and excavated material for the construction of the Highway 29
21 realignment, Hudson's Hope shoreline protection, and areas along the reservoir
22 requiring protection during reservoir filling (issued November 14, 2018); and
- 23 • Amendment #4 – Changes to Environmental Assessment Certificate
24 Schedule B Conditions No. 4 and No. 13 to permit the selective use of
25 mechanical clearing in riparian zones during reservoir clearing when it is unsafe
26 to undertake manual clearing (issued February 12, 2019).

1 All amendments and amendment requests are posted on the Environmental
2 Assessment Office website at
3 <https://projects.eao.gov.bc.ca/p/site-c-clean-energy/docs>.

4 As with any large construction project, refinements to the design are expected.
5 There are no material impacts to the cost of the Project as a result of the proposed
6 amendment requests.

7 **1.6.5 Permitting Improvement**

8 In order to efficiently and effectively manage the large volume of permits required for
9 the Project, BC Hydro continues to engage with regulators, First Nations
10 communities and contractors to share information, seek feedback, and identify
11 process improvements. Process improvements implemented include the following:

- 12 • BC Hydro continues to facilitate meetings with the Ministry of Forests, Lands,
13 Natural Resource Operations and Rural Development, the Comptroller of Water
14 Rights, the Department of Fisheries and Oceans and contractors to ensure
15 permit applications are coordinated, timely and sufficient;
- 16 • Regular permitting forums are being held with Indigenous groups to share
17 information on upcoming permit applications and to seek feedback before
18 applications are submitted to regulators;
- 19 • BC Hydro has implemented a coordinated Indigenous groups consultation
20 process with the Ministry of Forest, Lands, Natural Resource Operations and
21 Rural Development to assist with the government permit workload; and
- 22 • On February 14, 2019, permitting forum #11 was held which covered
23 10 permits and authorizations for the middle and western reservoir clearing.

1.7 Environment

1.7.1 Mitigation, Monitoring and Management Plans

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

Focus remains on minimizing sediment and erosion across the dam site, care of water, hydrocarbon management, invasive weed control and finding a solution to the pH and metal limits required by the Water Comptroller as the background conditions throughout the site make compliance challenging.

On the left bank, construction of the sediment control features located at L3 (the main channel through the dam site) is substantially complete and they effectively conveyed water from the spring freshet. Additionally, large portions of the left bank have been revegetated and are less susceptible to erosion as a result. Care of water systems are being implemented within the till conveyor area and include directional ditching, sediment control devices and ponds.

On the right bank, the impacts of exposed, naturally occurring potentially acid generating rock is being managed with the installation of a temporary care of water system. An on-site mobile water treatment plant was added to the system in July 2018 to augment the collections and retention system by treating water for high metal content and low pH prior to discharge into the Peace River. The system is comprised of ditches, pumps, holding ponds, sediment ponds and the treatment plant, as well as other treatment options. During the reporting period, additional holding capacity was added to the system at the water treatment pond, collection ditches and in other locations on the right bank.

As of March 31, 2019, all required submissions have been made in accordance with the schedule and requirements of the conditions.

1 Also during this reporting period, 12 annual reports were submitted to regulators in
 2 accordance with the conditions.

3 **1.7.2 Environmental Compliance Inspections and Enforcement**

4 During the reporting period, the Site C Project was inspected by provincial regulators
 5 from the B.C. Environmental Assessment Office who performed more than 48 hours
 6 of inspections. The results of these inspections are listed below in [Table 5](#).

7 **Table 5 Warning Letters and Orders**

Agency	Number of Warning Letters	Number of Orders
Water Comptroller’s Office	0	1 <i>(from September 2018)</i>
Environmental Assessment Office	0	0
Ministry of Forests, Lands, Natural Resource Operations and Rural Development	0	0
Ministry of Energy, Mines and Petroleum Resources	0	0
Canadian Environmental Assessment Agency	0	0
Department of Fisheries and Oceans Canada	0	0
Transport Canada	0	0
Environment Canada	0	0

8 Compliance officers from the B.C. Environmental Assessment Office, the Water
 9 Comptroller and the Department of Fisheries and Oceans performed on-site
 10 inspections during the reporting period. During the inspections, environmental
 11 compliance was focused on the following areas:

- 12 • Completing the channelization works at the areas of the dam site referred to as
 13 L3 and Garbage Creek. The stilling basin in the upper portion of L3 was
 14 damaged due to high flows during the 2018 freshet. This stilling basin was
 15 decommissioned and the area cleared of debris. Repairs of the L3 upper stilling

1 basin and channel have been underway through the fall and winter of 2018 and
2 were substantially completed in March 2019; and

- 3 • Improving the care of water systems on the right bank. BC Hydro increased the
4 holding capacity and effectiveness of these care of water systems by removing
5 much of the weathered acidic rock, completing clean water bypass ditches,
6 increasing treatment pond holding capacity and increasing the overall water
7 holding capacity.

8 BC Hydro has performed almost 8,300 inspections over the reporting period with a
9 compliant or partial compliant result of 97 per cent across all contractors and works
10 areas.

11 During the year, the independent environmental monitor continued weekly
12 inspections with a focus on hydrocarbon management, waste disposal, erosion and
13 sediment control, dust management and wildlife management. Overall, the weekly
14 inspections indicated general environmental compliance.

15 Site C staff met bi-weekly with provincial regulators to ensure ongoing focus and
16 attention to the areas of most importance and concern for the regulators and to
17 proactively address any environmental or regulatory issues that may arise.

18 As the volume of construction activities increase in the various work areas other than
19 the dam site, some issues are beginning to arise related to the interaction of project
20 activities with stakeholders, such as smoke, noise, traffic and dust management.
21 Issues are addressed on a case-by-case basis in accordance with the environmental
22 plans.

23 Additionally, Site C engaged both an Independent Environmental Monitor and an
24 Independent Engineer that report directly to provincial regulators. The Independent
25 Environmental Monitor provides weekly reports that have demonstrated substantial
26 compliance across the Project while continuing to identify areas of focus for

1 sediment and erosion control, water management and spill prevention. The
2 Independent Engineer worked directly with site staff to proactively identify design
3 issues that may impact the environment and develop mitigation plans to avoid or
4 minimize impacts.

5 **1.7.3 Heritage**

6 In accordance with a number of Environmental Assessment Certificate and Federal
7 Decision Statement conditions, the Site C Heritage Resources Management Plan
8 addresses the measures that will be used to mitigate the adverse effects of the
9 Project on heritage resources.

10 As most heritage studies only take place in snow-free conditions, no significant
11 fieldwork occurred from January 2019 to March 2019. In this period the heritage
12 team and consultants focused on finalizing and submitting the 2018 annual permit
13 reports to the BC Archaeology Branch and First Nations communities (reporting on
14 the 2018 field season) in accordance with *Heritage Conservation Act* permit terms
15 and conditions. Additionally, one palaeontological Annual Report was submitted to
16 the B.C. Archaeology Branch and the B.C. Heritage Branch. One heritage chance
17 find was reported in this period, and one *Heritage Conservation Act* permit
18 amendment was received.

19 Heritage reviews of contract documents, contractor environmental plans and
20 construction readiness plans were performed to ensure compliance.

21 Additionally during this period, a procurement process for heritage services was
22 posted to BC Bid, and the contracts subsequently awarded.

23 **1.7.4 Agricultural Mitigation and Compensation Plan Framework**

24 As part of the Site C Agricultural Mitigation and Compensation Plan, BC Hydro has
25 established a \$20 million BC Hydro Peace Agricultural Compensation Fund to
26 support agricultural production and related economic activity in the Peace Region.

1 The fund is governed by a regional decision-making board made up of
2 representatives from five regional agricultural organizations, the Peace River
3 Regional District, three agricultural producer members-at-large and one Peace River
4 Valley agricultural producer. Northern Development Initiative Trust was selected as
5 the fund administrator in a public request for proposals process with a contract
6 concluded on August 8, 2018. BC Hydro approved the financial management plan
7 for the \$20 million fund, which was developed by Northern Development Initiative
8 Trust and the fund board. Subsequently, BC Hydro transferred \$20 million to
9 Northern Development Initiative Trust in December 2018. The board and Northern
10 Development Initiative Trust will meet in spring 2019 to review the initial investment
11 returns and define timing and programs for the first agricultural grant intake.

12 **1.8 Labour, Employment and Training Initiatives and Building** 13 **Capacity Initiatives**

14 **1.8.1 Labour**

15 To date, unions that have participated in the construction of Site C include:
16 Construction Maintenance and Allied Workers (**CMAW**), the Christian Labour
17 Association of Canada (**CLAC**) Local 68, Canada West Construction Union (**CWU**)
18 Pile Drivers 2402, the Construction and Specialized workers Union (**CSWU**)
19 Local 1611, the International Union of Operating Engineers (**IUOE**) Local 115, and
20 the Ironworkers Local 97, the International Brotherhood of Electrical Workers
21 (**IBEW**), MoveUP and the Teamsters Local 213.

22 In addition, 10 unions affiliated with the BC Building Trades will be working on the
23 installation of the turbines and generators. Since September 2017, the International
24 Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers
25 (**Boilermakers Union**) members have been working on this contract.

1 The generating station and spillways contractor has signed a labour agreement for
2 the generating station and spillways civil works with the IUOE Local 115, the CSWU
3 Local 1611 and CMAW.

4 Further, the substation contractor has negotiated labour agreements with the IBEW
5 for the electrical work on the Site C substation, and their civil subcontractor has been
6 certified to the CMAW. The transmission contractor is performing transmission line
7 work on the Project and is signatory to a labour agreement with the IBEW.

8 **1.8.2 Employment**

9 Contractors submit monthly workforce data electronically to BC Hydro. [Table 6](#)
10 presents the monthly number of construction contractors, non-construction
11 contractors, engineers, and project team workers for this period. As with any
12 construction project, the number of workers – and the proportion from any particular
13 location – will vary month-to-month and also reflects the seasonal nature of
14 construction work.

15 **Table 6 Site C Jobs Snapshot Reporting Period –**
16 **January 2019 to March 2019**

Month	Number of B.C. primary residents ⁹	Number of total workers ¹⁰
January 2019	2,479	3,186
February 2019	2,760	3,494
March 2019	2,894	3,674

17 In March 2019, 79 per cent of the workforce was made up of residents of British
18 Columbia, while 26 per cent of the workforce lived in the Peace River Regional

⁹ Employment numbers provided by Site C contractors and consultants are subject to revision. Data not received by the Project's deadlines may not be included in the above numbers. Employment numbers are direct only and do not capture indirect or induced employment.

¹⁰ Total workers include:

- Construction and non-construction contractors performing work on Site C dam site, transmission corridor, reservoir clearing area, public roadwork, worker accommodation and services;
- Engineers and project team that is comprised of both on-site and off-site workers; and
- The project team, which includes, BC Hydro construction management and other offsite Site C project staff. An estimate is provided where possible if primary residence is not given.

1 District. The on Site Contractor workforce number also includes 13 per cent women
2 and 118 workers who are working for various contractors as apprentice carpenters,
3 welders, electricians, millwrights, ironworkers, mechanics, boilermakers and heavy
4 equipment operators.

5 **1.8.3 Training and Capacity Building Initiatives**

6 In September 2017, the Contractors Labour Committee agreed to establish an
7 Indigenous labour subcommittee. The purpose of the subcommittee is to support
8 Indigenous training, labour and employment on Site C through communication,
9 consultation, coordination and cooperation among contractors on the Project.

10 All major Site C construction contractors currently attend this meeting. The
11 committee meets quarterly, or on an as-needed basis.

12 The committee has developed a number of initiatives, such as:

- 13 • Established a protocol for distribution of Indigenous candidate resumes;
- 14 • Developed and implemented the Indigenous Employment and Information Day;
- 15 • Participated in the development of the BC Hydro and Northern Lights College
16 pre-carpentry skills pilot program on the Site C Project;
- 17 • Reviewed and assisted contractors in contract reporting requirements;
- 18 • Discussed communication of site-wide policies;
- 19 • Shared regional cultural events with project contractors;
- 20 • Shared BC Hydro's Indigenous Employment and Business Development
21 employment and training initiatives;
- 22 • Reviewed contractors' best practices;
- 23 • Shared success stories to assist in generating opportunities; and

-
- 1 • Reviewed project status and upcoming labour requirements for contractors and
2 how to meet labour demands.

3 BC Hydro has included apprentice targets in the generating station and spillways
4 civil works contract, the transmission lines and the substation contracts, and the
5 Highway 29 work to be procured by BC Hydro.

6 As of March 2019, the generating station and spillways contractor employed about
7 180 journeyperson carpenters on the generating station and spillways civil works
8 contract and 40 apprentices. This amounts to 18 per cent of all these workers being
9 apprentices. Further, 10 per cent of the carpentry workforce from the generating
10 station and spillways contractor self-identifies as Indigenous. Of the self-identified
11 Indigenous carpenters, nearly 40 per cent are apprentices.

12 In August 2013, Northern Lights College Foundation started distributing the
13 BC Hydro Trades and Skilled Training Bursary Awards. As of March 31, 2019, a total
14 of 249 students had received bursaries, including 108 Indigenous students who have
15 benefitted from the bursary in programs such as electrical, welding, millwright,
16 cooking, social work, and many others. The bursary ended in October 2018, with
17 remaining amounts still available. However, BC Hydro has worked with the Northern
18 Lights College Foundation to extend the bursary for an additional year, and reserve
19 the remaining bursary amounts for trades programs directly needed for project work.

20 BC Hydro continues to work with local employment agencies to ensure that as job
21 opportunities become available, they are posted on the WorkBC website as well as
22 on the Fort St. John Employment Connections website. In March 2019, Site C
23 contractors reported 794 workers on-site from the Peace River Regional District.
24 This is a total of 26 per cent of the construction and non-construction contractors'
25 workforce.

26 Site C contractors have noted that certain trades will be in high demand over the
27 next two to three years during peak project construction periods. As such, major

1 contractors on-site are exploring opportunities for apprentice and other training on-
2 site. Currently, BC Hydro worked with Northern Lights College and Site C
3 contractors to develop the BC Hydro and Northern Lights College pre-carpentry
4 skills pilot program on the site. This program was successfully delivered in
5 April 2019.

6 The intent of this program is to provide an overview of the skills required for the
7 carpentry trade (essential skills training), general employment knowledge
8 (employment readiness), overview of job requirements for carpenters, knowledge of
9 B.C.'s apprenticeship system, and Site C Project-specific knowledge.

10 This is a 14-day program designed for local new workers or workers new to the trade
11 with preference given to local Indigenous candidates. The course was partly run at
12 the worker accommodation camp and the 14 days was intended to reflect a typical
13 Site C schedule.

14 The main civil works contractor has reported apprentices in the heavy equipment
15 operator and labourer trades through a new training program in partnership with
16 CLAC and the Industry Training Authority.

17 In January 2019, BC Hydro helped facilitate the third Site C Project Indigenous
18 Employment and Training Information Session in Fort St. John. The purpose of this
19 meeting was to assist in building relationships between employment and training
20 professionals from the Indigenous communities and key Site C contractors.

21 **1.9 Community Engagement and Communication**

22 **1.9.1 Local Government Liaison**

23 There are a number of Environmental Assessment Certificate conditions that are
24 relevant to local communities in the vicinity of the Project. BC Hydro is implementing
25 some of these conditions through community agreements offered to five local
26 governments. Through these discussions BC Hydro has, in some instances, agreed

1 to additional measures to address concerns about local community impacts from
2 construction and operation of the Project.

3 BC Hydro has concluded four community agreements with respect to the Project,
4 with the District of Taylor (2013), the District of Chetwynd (2013), the City of
5 Fort St. John (2016) and the District of Hudson's Hope (2017). BC Hydro and the
6 City of Fort St. John established a Community Agreement Monitoring Committee to
7 jointly oversee implementation of the community agreement. BC Hydro continues to
8 work cooperatively with the City of Fort St. John, District of Hudson's Hope,
9 District of Taylor and the District of Chetwynd to ensure implementation of their
10 respective agreements.

11 During this reporting period, the Regional Community Liaison Committee, which is
12 comprised of local elected officials and local First Nations communities, met once
13 (March 13, 2019). Eight local governments and four local First Nations communities
14 (McLeod Lake, Doig River, Saulteau and Blueberry River) as well as the two MLAs
15 for Peace River North and Peace River South, are invited to participate as
16 committee members. Representatives from the Project's major contractors have also
17 attended the meetings as invited guests.

18 **1.9.2 Business Liaison and Outreach**

19 BC Hydro continued to implement its business construction liaison and outreach by
20 attending local chamber of commerce meetings in Fort St. John and Chetwynd.
21 During this reporting period, the project team sent three notifications to the Site C
22 business directory.

23 **1.9.2.1 Community Relations and Construction Communications**

24 BC Hydro continued to implement its construction communications program
25 throughout the reporting period. The program includes updating and maintaining the
26 project website (www.sitecproject.com) with current information, photos and videos

1 of construction activities, and providing information to local and regional
 2 stakeholders as required.

3 **Construction Bulletins**

4 Bi-weekly construction bulletins were issued throughout this reporting period. These
 5 bulletins are posted on the project website and sent by email to the web-subscriber
 6 list.

7 **Public Enquiries**

8 In total, BC Hydro received 577 public enquiries between January 1 and
 9 March 31, 2019, compared to 475 in the previous quarter. The majority of these
 10 enquiries continued to be about business and job opportunities, with limited
 11 construction impact concerns from local residents. [Table 7](#) shows the breakdown of
 12 some of the most common enquiry types.

13 In total, BC Hydro has received more than 9,500 enquiries since August 2015.

14 **Table 7 Public Enquiries Breakdown**

Enquiry Type ¹¹	January 2019	February 2019	March 2019
Job Opportunities	128	110	164
Business Opportunities	41	30	19
General Information	12	10	7
Construction Impacts ¹²	5	5	7
Other ¹³	14	13	12
Total	200	168	209

15 **1.9.2.2 Communications Activities**

16 Based on a search using the media database Infomart, there were 124 stories
 17 referencing the Site C Project in B.C. news media between January 1, 2019 and
 18 March 31, 2019, compared to 157 media stories in the previous quarter.

¹¹ This table is a sample of enquiry types and does not include all enquiry types received.
¹² The nature of the construction impact inquiries is primarily air quality, noise and traffic conditions.
¹³ “Other” accounts for enquiries related to a variety of other topics, such as recreation access near construction sites, property owner correspondence, or requests for site tours.

1 **1.9.3 Housing Plan and Housing Monitoring and Follow-Up Program**

2 BC Hydro and BC Housing signed a contribution agreement on July 19, 2016 related
3 to the development, construction and operation of a building in Fort St. John
4 comprised of 50 residential rental units. This agreement is the outcome of detailed
5 discussions between the two partners to find the most appropriate approach to
6 meeting the Project's environmental assessment conditions and the housing terms
7 of the Community Measures Agreement with the City of Fort St. John. The
8 agreement structured the financial contribution from BC Hydro to enable viable
9 financial operation of the affordable housing units in the near-term and viable
10 financial operation of all 50 units of affordable housing in the longer term.

11 The housing project construction has been completed by Western Canadian
12 Properties Group with landscaping and other finishing works underway. Occupancy
13 is expected in summer 2019. BC Hydro continues to work with BC Housing to
14 determine the availability of suites for BC Hydro staff during the remainder of the
15 Project. Any suites not utilized by BC Hydro are available to BC Housing to offer for
16 public rental.

17 **1.9.4 Labour and Training Plan**

18 In accordance with an Environmental Assessment Certificate condition, a Labour
19 and Training Plan was developed and submitted to the Environmental Assessment
20 Office on June 5, 2015. This plan, as well as Environmental Assessment Certificate
21 Condition 45, includes reporting requirements to support educational institutions in
22 planning their training programs to support potential workers in obtaining project jobs
23 in the future. This report was issued to the appropriate training institutions in the
24 northeast region of B.C. in July 2016, July 2017 and July 2018. The next report will
25 be issued in July 2019.

1 1.9.5 Human Health

2 1.9.5.1 Health Care Services Plan and Emergency Service Plan

3 The Project health clinic is contracted by BC Hydro with Halfway River International
4 SOS Medical Ltd., a partnership between Halfway River First Nation and
5 International SOS. The clinic continues to operate in its permanent location within
6 the Two Rivers Lodge, and based on camp occupancy was staffed 24/7 during this
7 period with a nurse practitioner and advanced care paramedics. BC Hydro and the
8 clinic operator continue to liaise with the local health care community.

9 The clinic provides workers with access to primary and preventative health care and
10 work related injury evaluation and treatment services and is currently open seven
11 days a week, 24 hours a day. Since opening the health clinic, there have been a
12 total of 9,161 patient interactions. During the reporting period, there were 936 patient
13 interactions, of which 211 were occupational and 725 non-occupational. Several
14 preventive health themes were promoted to workers including: extreme cold
15 weather, sexually transmitted infections, and back pain.

16 1.9.6 Property Acquisitions

17 During this quarter, BC Hydro commenced negotiations with property owners to
18 access their lands in order to conduct the 2019 field season, which is required to
19 inform design and mitigation options for the various components of the Site C
20 Project.

21 BC Hydro continued to review property acquisition drawings and continued the
22 property acquisition process for the re-alignment of three highway projects (Cache
23 Creek East, Farrell Creek and Lynx Creek West) and the Hudson's Hope shoreline
24 protection project.

25 In the next quarter, BC Hydro will commence the property acquisition process for the
26 re-alignment of two additional highway projects (Farrell Creek East and Lynx Creek
27 East).

1 **1.10 Key Procurement and Contract Developments**

2 **1.10.1 Key Procurement**

3 The Project procurement approach was approved by the board of directors in
 4 June 2012 for the construction of the Project. The procurement approach defined the
 5 scope of the major contracts and their delivery models, as summarized in [Table 8](#)
 6 below.

7 **Table 8 Major Project Contracts and Delivery**
 8 **Models**

Component	Contract	Procurement Model	Anticipated Timing
Worker Accommodation	Worker accommodation and site services contract	Design-Build-Finance-Operate-Maintain	Completed
Earthworks	Site preparation contracts	Predominantly Design-Bid-Build	Completed
	Main Civil Works contract	Design-Bid-Build	Completed
Reservoir/ Transmission Clearing	Multiple reservoir clearing contracts to be awarded over seven to eight years	Design-Bid-Build	Five contracts completed (transmission line, lower and eastern reservoirs)
Generating Station and Spillways	Turbines and Generators contract	Design-Build	Completed
	Generating Station and Spillways Civil Works contract	Design-Bid-Build	Completed
	Hydromechanical Equipment contract	Supply Contract	Completed
	Balance of Plant Equipment Supply	Supply Contracts	Two contracts completed (generator terminal equipment and protection and control panels), eight more contracts to be awarded in fiscal 2020
	Balance of Plant Contract)	Design-Build/ Design-Bid-Build	Shortlisted respondents signed participation agreements on December 19, 2018

Component	Contract	Procurement Model	Anticipated Timing
Electrical and Transmission Infrastructure	Transmission Lines Construction contract	Design-Bid-Build	Completed
	Site C substation contract	Design-Bid-Build	Completed
	Peace Canyon Substation upgrade contract	Design-Build	Completed
Highway 29 Realignment	Design-Bid-Build in coordination with B.C. Ministry of Transportation and Infrastructure with anticipated contracts being awarded from 2018 to 2022		

1 **1.10.2 List of Major Contracts Awarded (Excess of \$50 million)**

2 Since inception of the Project, seven major construction contracts (i.e., greater than
 3 \$50 million in value) have been awarded: worker accommodation, north bank site
 4 preparation, main civil works, turbines and generators, generating station and
 5 spillways civil works, transmission line construction and hydromechanical
 6 equipment. The contracts were procured through a public competitive process and
 7 awarded based on a rigorous evaluation process within the budget established for
 8 each contract. A list of construction contracts in excess of \$50 million awarded to
 9 March 31, 2019 is shown in [Table 9](#) below.

10 **Table 9 Major Project Construction Contracts**
 11 **Awarded**

Work Package	Contract Value ¹⁴ (\$ million)	Current Status
Site Preparation: North Bank	60	Contract executed July 2015
Worker Accommodation	473	Contract executed September 2015
Main Civil Works	2,113	Contract executed December 2015
Turbines and Generators	464	Contract executed March 2016
Generating Station and Spillways Civil Works	1,619	Contract executed March 2018
Hydromechanical Equipment	69	Contract executed April 2018
Transmission Line Construction	114	Contract executed May 2018

¹⁴ Contract value reflects the current value including executed change orders to the end of the reporting period.

1.10.3 Large Contracts to Date (Excess of \$10 million)

BC Hydro has provided a table in [Appendix C](#) which shows the breakdown to date of the contracts awarded in excess of \$10 million and cumulative variances.

1.10.4 Contract Management

1.10.4.1 *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 \$366 million to reflect approved changes to date. The changes are managed within project contingency.

1.10.4.2 *Contingency and Project Reserve Draws*

As a result of the change in timing for river diversion and other factors including an increase in direct and indirect costs, BC Hydro revised the project budget to \$10.7 billion, which was approved by the provincial Treasury Board in January 2018 and the BC Hydro board of directors in February 2018. This revised budget includes contingency of \$858.1 million and reserve subject to the control of Treasury Board of \$708 million.

The project has a risk management plan that establishes the risk management framework for the project and describes specific processes, procedures, organization, tools and systems that guide and support effective risk management. Utilizing this plan, risks are identified, assessed and managed. The output of the risk management process is documented in the risk register. The risk register is utilized as an input into project forecasts and analysis conducted to inform contingency requirements.

Refer to [Appendix E](#) for more detailed information regarding contingency and project reserve draws.

1 **1.11 Plans During Next Six Months**

2 [Table 10](#) below presents the key milestones for activities planned during the next
3 six months.

4 **Table 10 Key Milestones for Activities Planned**
5 **during the Next Six Months (April 2019 to**
6 **September 2019)**

Milestone	Performance Measurement Baseline	Plan Date (Control Date ¹⁵)	Forecast ¹⁶	Variance
Generating Station and Spillways				
Primary anchor for intake operating gates and intake maintenance gates provided	March 2019	March 2019	March 2019	Complete
Work area W2 (intakes) access provided to the contractor	May 2019	May 2019	May 2019	Complete
Main service bay concrete complete	May 2019	May 2019	March 2019	Complete
Main service bay ready for powerhouse bridge cranes assembly and erection	July 2019	July 2019	July 2019	On track
Highways				
Halfway River grading, paving and bridge contract award complete	July 2019	September 2019	September 2019	On track
Main Civil Works				
Outlet portal stabilization ready for tunnelling	April 2019	April 2019	January 2019	Complete
Right bank drainage tunnel excavation, support and drainage complete	August 2018 ¹⁷	September 2019	February 2019	Complete
Turbines and Generators				
Stator bars pre-production test at Powertech	June 2019	June 2019	June 2019	On track
Unit 1 draft tube supply complete	August 2019	August 2019	August 2019	On track
Transmission				
PCN GIS Outage	March 2019	April 2019	April 2019	Complete

¹⁵ Control date reflects plan, adjusted for approved changes to milestone dates.

¹⁶ As of March 31, 2019.

¹⁷ The Performance Measurement Baseline date for this key milestone was incorrectly noted as being August 2019 in the Annual Report No 3 (combined with the Quarterly Progress Report No. 14) instead of August 2018 which is the original Performance Measurement Baseline date for this key milestone.

1 **1.12 Impacts on Other BC Hydro Operations**

2 In the reporting period, GM Shrum and Peace Canyon dams were operated as
3 expected during this phase of the Site C construction, with no material impacts on
4 generation or water management relative to plan. BC Hydro continues to plan the
5 operation of Williston Reservoir to reduce the risks to the Project during the Site C
6 river diversion.

7 **1.13 Site Photographs**

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

9 **2 Project Schedule**

10 **2.1 Project In-Service Dates**

11 As filed with the British Columbia Utilities Commission Inquiry respecting Site C on
12 October 4, 2017, BC Hydro identified that the river diversion milestone will move
13 from 2019 to 2020. This did not impact the overall in-service dates, as shown in
14 [Table 11](#) below.

15 **Table 11 In-Service Dates**

Description	Final Investment Decision In-Service	Status
5L5 500 kV Transmission Line	October 2020	On Track
Site C substation	November 2020	On Track
5L6 500 kV transmission line	July 2023	On Track
Unit 1 (first power)	December 2023	On Track
Unit 2	February 2024	On Track
Unit 3	May 2024	On Track
Unit 4	July 2024	On Track
Unit 5	September 2024	On Track
Unit 6	November 2024	On Track

2.2 Project Governance, Costs and Financing, and Risk

2.2.1 Project Governance

In December 2017, the Provincial Government announced their approval to continue with construction of the Site C project. The approval to proceed included increased external and internal oversight of project performance. Measures to improve project governance implemented this quarter include:

- EY Canada continued to provide independent oversight for the Project including budget oversight, schedule evaluation and risk assessment analysis; and
- EY Canada attended a site visit in February 2019 with a member of the Project Advisory Board and a member of the Technical Advisory Board.

2.2.2 Project Budget Summary

As a result of the change in timing for river diversion and other factors including an increase in direct and indirect costs, BC Hydro presented a revised cost estimate of \$10.7 billion to the board of directors in December 2017.

[Table 12](#) below presents the overall project budget, based on the project budget approved in February 2018, represented in nominal dollars.

Table 12 Project Budget

Description	(Nominal \$ million)
Dam, Power Facilities, and Associated Structures	4,548
Offsite Works, Management and Services	1,845
Total Direct Construction Cost	6,393
Indirect Costs	1,456
Total Construction and Development Cost	7,849
Contingency	858
Interest During Construction	1,285
Project Budget, before Treasury Board Reserve	9,992
Treasury Board Reserve	708
Total Project Budget	10,700

2.3 Project Expenditure Summary

[Table 13](#) provides a summary of the budget for the total Project, the current forecast total Project cost and the variance between the two. It also presents the cumulative updated budget amount planned to March 31, 2019 compared to the cumulative actual costs incurred to March 31, 2019 and the variance between the two.

Table 13 Total Project Expenditures Budget Compared to Forecast and Life to Date – Budget Compared to Actual Expenditures to March 31, 2019 (\$ million nominal)

Description	Total Project			Life to Date, to March 31, 2019		
	Budget	Forecast	Variance	Budget	Actual Expenditures	Variance
Project	9,992	9,992	0	3,398	3,491	(93)
Treasury Board Reserve	708	708	0	0	0	0
Total Project	10,700	10,700	0	3,398	3,491	(93)

[Table 14](#) below provides a summary of the 2018/19 to 2020/21 Service Plan Project expenditures for Fiscal 2019, the actual Project expenditures for Fiscal 2019 and the related variance.

Table 14 Actual Fiscal 2019 Project Expenditures Compared to 2018/19 to 2020/21 Service Plan (\$ million Nominal)

Description	2018/19 to 2020/21 Service Plan Fiscal 2019	Actual Expenditures Fiscal 2019	Variance
Project	917	1,136	(219)
Treasury Board Reserve	-	-	-
Total Project	917	1,136	(219)

Details of the variances between actual and plan are in [Appendix E](#).

2.4 Internal Project Financing versus External Borrowings to Date

To date, all project funding has been from internal borrowings and there has been no Site C Project-specific debt issued. As part of BC Hydro's debt management

1 strategy, BC Hydro’s exposure to variable debt is managed within a board-approved
 2 range of 5 per cent to 25 per cent and a target of 15 per cent. In addition, from
 3 fiscal 2017 to March 31, 2019, BC Hydro has hedged \$10.0 billion of its future
 4 forecast long-term debt issuances through the use of derivative contracts to lock in
 5 interest rates. As at March 31, 2019, \$6 billion of hedges remain outstanding to
 6 hedge future debt issuances, hedging 75 per cent of BC Hydro’s forecast total
 7 borrowing requirements out to and including fiscal 2025.

8 **2.5 Material Project Risks**

9 Material project risks are identified through a project risk profile assessment, which
 10 is prepared on an ongoing basis. As the Project progresses through implementation
 11 phase, the material project risks will evolve to reflect the current risks facing the
 12 Project. The list of material project risks does not include risks that are subject to
 13 confidentiality obligations or solicitor client privilege, or that disclose commercially
 14 sensitive information relating to matters that are currently outstanding, including
 15 procurements and negotiations that are in progress at the time of this report, the
 16 disclosure of which would be harmful to BC Hydro’s commercial interests.

17 Refer to [Table 15](#) below for a list of the material project risks.

18 **Table 15 Material Project Risks**

Risk Description	Impact and Response Plan Summary
Risk of river diversion system delay if contractor productivity does not meet plan and/or differing geotechnical conditions	<p>Impact: Diversion delay could cause the schedule to slip by a year and increase costs.</p> <p>Response: BC Hydro closely monitors the development of design and construction plans, and labour and equipment productivity for critical construction activities (tunnel excavation/linings, inlet/outlet portals, and gates and cofferdam); provision of additional incentives through settlement agreement with contractor.</p>
Risk that BC Hydro's borrowing costs for project are higher than budgeted	<p>Impact: Rising interest rates increase the Project's interest costs above the amount budgeted.</p> <p>Response: BC Hydro has hedged interest rates on approximately 75 per cent of future debt placements through fiscal 2025, to reduce the potential impact of rising interest rates.</p>

Risk Description	Impact and Response Plan Summary
Risk of contractor labour rate increases in excess of budgeted amount	<p>Impact: BC Hydro has included provisions in major contracts that allow for labour escalation to a prescribed amount, as well as a cost/savings sharing formula based on general industry rates above or below the prescribed amount. Increased pressure on the labour market would likely drive labour wage rates higher, potentially resulting in general industry increases beyond the prescribed amounts.</p> <p>Response: BC Hydro has defined contract labour escalation formulas in all major contracts.</p>
Risk of a safety incident resulting in fatality or disabling injury	<p>Impact: Serious worker injury or fatality; project delays and associated costs.</p> <p>Response: Continue with BC Hydro and contractor safety steering committee to address shared safety issues and opportunities; BC Hydro and contractor implement safety cultural leadership training; increase BC Hydro executive involvement and engagement with site safety leadership; regularly holding on-site safety conferences; contractor to bring in senior safety manager to prepare safety improvement plan for BC Hydro review; continue to include safety in on-boarding BC Hydro and contractor orientations; and relentlessly promote a strong safety culture.</p>
For work fronts other than the left bank diversion tunnels: risk of differing geotechnical conditions	<p>Impact: Potential schedule delay and increased cost.</p> <p>Response: Completed detailed geotechnical investigations prior to construction; close monitoring and quick intervention to manage construction risk if geotechnical issues arise.</p>
Risk that Highway 29 costs exceed the established budget	<p>Impact: Overall cost increase.</p> <p>Response: Conduct value engineering during design phase to find cost savings and/or reduce cost increases; ensure BC Hydro or independent review of the budget, execution strategy, constructability; schedule review during contract negotiation for direct award contracts; utilize the Ministry of Transportation and Infrastructure public tender process to obtain competitive prices and verification of unit rates for negotiating future direct award contracts.</p>
Risk that spillway costs increase materially due to design changes	<p>Impact: Increased quantities result in higher construction costs.</p> <p>Response: Issue revised drawings to the contractor. Meet with the contractor to plan work so that construction cost increases are minimized.</p>
Risk that Indigenous groups do not support the Project	<p>Impact: Indigenous groups file legal challenges (e.g. injunction applications) or engage in protest actions that could delay or stop the project work and/or increase costs.</p> <p>Response: Project team to continue to engage and consult with First Nations and ensure commitments to First Nations are met or exceeded, fully support the development of legal response documents; follow court order requirements, if applicable; continue to negotiate Impact Benefit Agreements.</p>

Risk Description	Impact and Response Plan Summary
Risk of insufficient on-site aggregate supply to meet demand	<p>Impact: Decreased productivity, schedule delays and increased cost for main civil works concrete production (roller-compacted concrete, cast-in-place concrete/conventional vibrated concrete and shotcrete), dam (general fill, filter materials, drain material, and riprap), and highways.</p> <p>Response: Increase aggregate stockpiles; work with contractors to minimize waste and maximize aggregate production; release BC Hydro on-Site Contingency aggregate excavations sites; procure off-site and haul in additional aggregate.</p>
Risk that reservoir clearing costs are higher than budget	<p>Impact: Overall costs increase.</p> <p>Response: Review scope, modify approach, negotiate pricing, provide sufficient time to negotiate, work with Indigenous Relations on procurements; develop alternative procurement options if planned procurement not feasible.</p>
Risk that productivity for roller-compacted concrete is lower than planned	<p>Impact: Project schedule not achieved; potential interface issues may arise with other contractors.</p> <p>Response: Detailed planning completed in advance of start of work. Physical progress is captured and reported on a weekly basis for key work fronts. Key interface milestones are monitored and discussed on a regular basis. Meetings are held with the contractor on a regular basis.</p>
Risk that Highway 29 is not completed on time for inundation	<p>Impact: Highway construction not completed on schedule, impacting inundation schedule; increased costs.</p> <p>Response: Increase design resources in peak periods; utilize schedule float; proactively respond to geotechnical issues; proponents to secure steel supply contracts during bid; use Ministry of Transportation and Infrastructure specifications; support First Nations contractors to work with qualified builders.</p>
Risk that the Project cannot attract and retain sufficient skilled workers	<p>Impact: Contractors may not be able to adequately source, supply, attract, and retain sufficient project labour 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.</p> <p>Response: Contractors provide labour sourcing and supply plans, provide advance notice of foreign workers, and participate in local job fairs. BC Hydro will encourage and facilitate capacity-building initiatives, monitor employee turnover rates and labour conditions on other projects.</p>

Site C Clean Energy Project

Quarterly Progress Report No. 15

Appendix A

Site Photographs

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Figure A-1 A welder works on part of the spiral case in the on-site turbines and generators manufacturing facility (January 2019)



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Figure A-2 Hoarding and heating protects concrete from the cold as it is placed at the generating station's double chamber walls (January 2019)



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Figure A-3 General view of concrete placement at the main service bay (January 2019)



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Figure A-4 Inspector reviewing and certifying that scaffolding is safe and complies with regulations. All parts of the Project are regularly monitored by environmental and safety inspectors (January 2019)



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Figure A-5 On-Site Concrete batch plant is used to mix concrete for the generating station and spillways (February 2019)



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Figure A-6 Excavation continues on the foundation for the three concrete spillways on the south bank (February 2019)



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Figure A-7 A view of the unit #3 draft tube formwork (February 2019)



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Figure A-8 As of March 31, 2019, 51 towers had been raised along the 75-kilometre-long transmission line corridor. In total, 405 towers will hold up two new 500 kV transmission lines, which will connect Site C power to the rest of BC Hydro's grid (February 2019)



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Figure A-9

Work is underway on the 5-kilometre-long electric conveyor system that will move excavated till material from the 85th Avenue Industrial Lands to the dam site for construction of the Site C dam. Piles have concrete caps with bolt settings onto which the conveyor structure is bolted (March 2019)



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Figure A-10 Looking east over the spillway buttress excavation. Once excavation is complete, construction of the spillways buttress will commence. Site C will have two mechanical spillways and one auxiliary spillway, which will allow water to pass safely in the unlikely event of power loss (March 2019)



Site C Clean Energy Project

Quarterly Progress Report No. 15

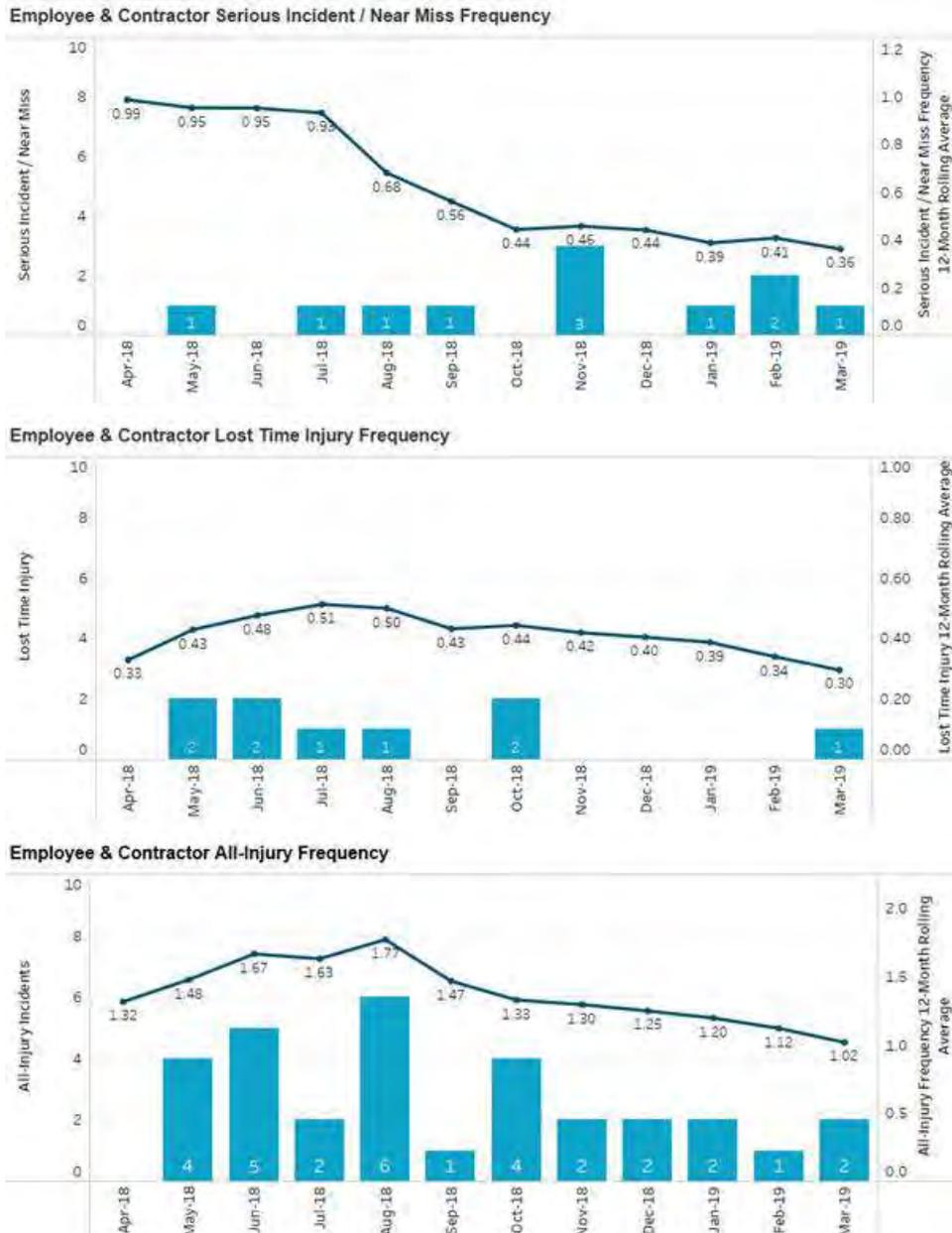
Appendix B

Safety and Security

1 [Figure B-1](#) below provides information on Employee and Contractor Serious
2 Incidents / Near Miss Frequency, Lost Time Injury Frequency and All Injury
3 Frequency from April 1, 2018 to March 31, 2019.

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Figure B-1 Employee and Contractor Serious Incidents/Near Miss Frequency, Lost Time Injury Frequency and All Injury Frequency



- 1 [Table B-1](#) lists the safety regulatory inspections and orders received from
- 2 January 2019 through March 2019.

3 **Table B-1 Safety regulatory inspections and orders**

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
Inspection #1: WorkSafeBC conducted an inspection in the contractor's maintenance shop. The compliance date is February 15, 2019.			
Low	Safety Documentation	Order #1: Brake cleaner is used in the maintenance shop and being applied using a spray bottle. The contractor failed to ensure that the container has a workplace label applied to it.	January 4, 2019
Low	Safety Documentation	Order #2: The contractor acquired brake cleaner for use, handling or storage at a workplace and provided the inspector a safety data sheet for brake cleaner. The contractor failed to ensure that all the safety data sheets are available for acquired products used in the workplace.	
Low	Safety Documentation	Order #3: The contractor failed to ensure that a hazardous product is not used, stored or handled in a workplace unless all the applicable workplace hazardous materials information system requirements concerning labels, product identifiers, safety data sheets and worker education and training are complied with.	
Low	Safety Documentation	Order #4: The contractor failed to ensure effective local exhaust ventilation is used at any fixed work station to minimize worker exposure to harmful air contaminants produced by welding, burning or soldering.	
Low	Safety Documentation	Order #5: The contractor failed to ensure the inspection and maintenance of the weld fume extraction system (smoke eater) is being carried out in accordance with the manufacturer's instructions and standards. The contractor was conducting pre-use checks but could not provide any information or proof that other regular maintenance had been conducted.	
Low	Safety Documentation	Order #6: The contractor failed to ensure the health and safety of all workers present at the workplace.	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
Inspection #2: WorkSafeBC conducted a site inspection in the inlet portals of the diversion tunnels. The compliance date is March 16, 2019.			
Low	Safety Documentation	Order #1: The contractor failed to ensure that an effective tag-in method of accounting for all workers entering and leaving the underground working is established and maintained.	January 17, 2019
<p>Inspection #3: WorkSafeBC inspection was conducted on the outlet diversion tunnel portal area. There are several workers working on the slope above the portal and other workers installing the infrastructure on the surface that is required to support the underground.</p> <p>Above portal entrance: At the time of the inspection there were rock climbers working on the slopes above the portal area installing mats. As part of the safe work process, a control zone was set up below the area to prevent workers from entering into the hazard area.</p> <p>Acceptance: The inspection was also conducted to gather information for the prevention practices and quality group of WorkSafeBC that are working on AR201800122 (the acceptance for the heating equipment and ventilation for the diversion tunnel (outlet portal).</p>			
		No Orders	January 17, 2019
<p>Inspection #4: WorkSafeBC conducted an inspection on the right bank drainage tunnel. At the time of the inspection the underground crew were installing rock bolts.</p> <p>Topics of discussion with the contractor included but were not limited to the following:</p> <p>Dust collection – the contractor must ensure that the mechanical ventilation system is operated in accordance with good engineering practice, maintained in good working order as per the manufacturer and capable of supplying sufficient fresh air to the underground working.</p> <p>Ground failure - On December 10, 2018 an electrician noticed that a portion of the east wall, in the gallery to the cofferdam had failed. The electrician notified supervision immediately. The accumulation of water behind the shotcrete may have been one of the contributing factors into the failure of the wall. When the engineer of record and the contractor create safe work procedures and ground support details they must ensure that suitable systems are installed to remove the water to prevent an incident like this from happening again. All remedial engineering documentation and a safe work procedure must be submitted to WorkSafeBC engineering for review, prior to re-entering the drainage gallery and initiating remedial work.</p>			
		No Orders	January 18, 2019
Inspection #5: WorkSafeBC conducted an inspection on aerial work platform. The inspection area is at the new warehouse building that is under construction. The compliance date is January 24, 2019.			
Low	Safety Documentation	Order #1: The contractor failed to ensure suitable ladders, work platforms or scaffolding are provided for roofing activities requiring position at elevations above a grade. In addition, the contractor to provide supporting documentation from the manufacturer for the utilization of the aerial work platform equipment for access on location.	January 21, 2019

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
<p>Inspection #6: WorkSafeBC conducted an inspection on aerial work platforms. The inspection area is at the new warehouse building that is under construction. The sub-contractor is to provide the exterior wall and roof panel installation services at the warehouse project. At the time of the inspection the contractor was installing 3 part sheet metal clad and insulating roof material on the northern roof elevation above the main entrance of the warehouse. The compliance date is January 31, 2019.</p>			
Low	Safety Documentation	<p>Order #1: The contractor failed to ensure each elevating work platform (aerial work platform) in use at a workplace, the equipment manufacturer's operation manual, including specific instructions for enter and exit at elevations, to be available at the workplace.</p>	January 21, 2019
Low	Safety Documentation	<p>Order #2: The contractor failed to ensure each elevating work platform in use at a workplace, the equipment manufacturer's operation manual, including specific instructions for enter and exit at elevations, to be available at the workplace.</p>	
Low	Safety Documentation	<p>Order #3: The contractor failed to ensure the s-fork hoisting hook attachments installed on the forks of the all-terrain fork lift to be installed on the equipment as specified by the equipment manufacturer or certified by a professional engineer for use on the equipment.</p>	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
Inspection #7: WorkSafeBC conducted site inspection as a result of an incident that involved a high risk of serious injury to a worker on the roadheader equipment #084 in the left bank diversion tunnel #2 – inlet. This inspection report contains a stop use order. The compliance date is March 1, 2019.			
High	General Conditions	Order #1: Cable ties were installed on the electrical cabinet door safety interlock switches, rendering them ineffective on the roadheader equipment #084. The contractor must not intentionally remove, impair, or render ineffective any safeguard provided for the protection of workers, except as permitted by the Occupational Health and Safety Regulation.	February 17, 2019
High	Stop Use Order	Order #2: WorkSafeBC has reasonable grounds to believe that a thing that is being used or that may be used by a worker in this workplace is either not in safe operating conditions, or does not comply with this Part or the regulations. Pursuant to Section 190(1) of the Workers Compensation Act, the main civil works contractor is ordered to immediately stop use of the roadheader equipment #084.	
Low	Rights and Responsibilities	Order #3: The employer is directed to perform a special inspection of the roadheader equipment #084 involved in the electrical incident on February 17, 2019. A malfunction occurred when a worker was in the process of resetting the equipment's main circuit breaker and a 1000-volt electrical discharge occurred, the employer is directed to conduct an inspection prior to use.	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
<p>Inspection #8: WorkSafeBC conducted site inspection as a result of an incident that involved a high risk of serious injury to a worker on the roadheader equipment #025 in the left bank diversion tunnel #1 – inlet. This inspection report contains a stop use order. The compliance date is March 1, 2019.</p>			
High	General Conditions	<p>Order #1: The roadheader equipment #025 equipment's electrical cabinet door safety interlock switches had been rendered ineffective by use of electrical tape. The contractor must not intentionally remove, impair, or render ineffective any safeguard provided for the protection of workers, except as permitted by the Occupational Health and Safety Regulation.</p>	February 17, 2019
High	Stop Use Order	<p>Order #2: WorkSafeBC has reasonable grounds to believe that a thing that is being used or that may be used by a worker in this workplace is either not in safe operating condition, or does not comply with this part of the regulations. Pursuant to Section 190(1) of the Workers Compensation Act, the main civil works contractor is ordered to immediately stop use of the roadheader equipment #025.</p>	
Low	General Conditions	<p>Order #3: Prior to the operation of the roadheader equipment #025, the contractor is responsible to ensure the safeguards are in place and functioning.</p>	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
Inspection #9: WorkSafeBC conducted site inspection as a result of an incident that involved a high risk of serious injury to a worker on the roadheader equipment #026 in the left bank diversion tunnel #2 – outlet. This inspection report contains a stop use order. The compliance date is March 1, 2019.			
High	General Conditions	Order #1: Cable ties were used on the electrical cabinet door safety interlock switches, rendering them ineffective on the roadheader equipment #026. The contractor must not intentionally remove, impair, or render ineffective any safeguard provided for the protection of workers, except as permitted by the Occupational Health and Safety Regulation.	February 17, 2019
High	Stop Use Order	Order #2: WorkSafeBC has reasonable grounds to believe that a thing that is being used or that may be used by a worker in this workplace is either not in safe operating condition, or does not comply with this Part of the regulations. Pursuant to Section 190(1) of the Workers Compensation Act, the main civil works contractor is ordered to immediately stop use of the roadheader equipment #026.	
Low	General Conditions	Order #3: Prior to the operation of the roadheader equipment #026, the contractor is responsible to ensure the safeguards are in place and functioning.	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
Inspection #10: WorkSafeBC conducted site inspection as a result of an incident that involved a high risk of serious injury to a worker on the roadheader equipment #023 in the left bank diversion tunnel #1 – outlet. This inspection report contains a stop use order. The compliance date is March 1, 2019.			
High	General Conditions	Order #1: Cable ties were used on the electrical cabinet door safety interlock switches, rendering them ineffective on the roadheader equipment #023. The contractor must not intentionally remove, impair, or render ineffective any safeguard provided for the protection of workers, except as permitted by the Occupational Health and Safety Regulation.	February 17, 2019
High	Stop Use Order	Order #2: WorkSafeBC has reasonable grounds to believe that a thing that is being used or that may be used by a worker in this workplace is either not in safe operating condition, or does not comply with this Part of the regulations. Pursuant to Section 190(1) of the Workers Compensation Act, the main civil works contractor is ordered to immediately stop use of the roadheader equipment #023.	
Low	General Conditions	Order #3: Prior to the operation of the roadheader equipment #023, the contractor is responsible to ensure the safeguards are in place and functioning.	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
<p>Inspection #11: WorkSafeBC conducted site inspection as a result of an incident that involved a high risk of serious injury to a worker on the roadheader equipment #084 in the left bank diversion tunnel #2 – inlet. The incident occurred during the start-up phase for the underground roadheader equipment. The main circuit breaker had been accessed through the equipment's high voltage electrical cabinet, in order to perform a complete reset of the equipment and computer system. A worker received an electrical shock from this 1000-volt energy release.</p> <p>An observation of the roadheader equipment on location revealed that main electrical cabinet exterior door handles were not functioning as per the manufacturer; this had been clearly labeled on the electrical cabinet door via felt marker. Upon further inspection of the equipment, it was noted that electrical cabinet door safety interlock switches to de-energize the cabinet had been rendered ineffective by way of cable ties. Further observation and review of the main circuit breaker switch box revealed two missing isolation covers that were not installed to protect the worker from inadvertent contact to the energized parts.</p>			
High	Rights and Responsibilities	Order #1: The contractor failed to ensure the missing breaker extension in the roadheader electrical cabinet must be remedied without delay.	February 17, 2019
Low	Rights and Responsibilities	Order #2: The contractor must investigate after receiving the report of unsafe condition and ensure that any necessary corrective action is taken without delay.	
Low	General Conditions	Order #3: The contractor failed to ensure that each tool, machine and piece of equipment in the workplace is capable of safely performing the functions for which it is used and is selected, used and operated in accordance with the manufacturer's instructions, if available.	
Low	Mobile Equipment	Order #4: The manufacturer developed a contractor specific training program for the use of the roadheader equipment on location, but the contractor failed to ensure the injured worker took part in this instructional training.	
High	De-Energization and Lockout	Order #5: The contractor failed to ensure the energy is isolated and effectively controlled the unexpected release of electrical energy that could cause an injury.	
Low	General Duties of Employers	Order #6: The contractor failed to provide adequate information, instruction, training and supervision at the workplace to ensure the workers can work without undue risk.	

Risk Level	Theme	Inspection reports and orders received	Date of Inspection
<p>Inspection #12: WorkSafeBC conducted a site inspection on the tower crane erection and use in L2 powerhouse area. The compliance date is March 4, 2019.</p>			
Low	Safety Documentation	<p>Order #1: The contractor failed to have a nameplate or other permanent marking for the hook lifting devices that displays the manufacture's name and address, serial number, weight of the device, if more than 45kg and working load limit.</p>	February 20, 2019
<p>Inspection #13: WorkSafeBC conducted the site inspection on the concrete pump and concrete placing boom. The contractor has three concrete pumps trucks and four concrete placing booms that either have been or will be erected / operating on the Site C Clean Energy Project.</p> <p>The contractor is the subcontractor of the generating station and spillways prime contractor to place concrete on the generation station, powerhouse and spillway projects.</p> <p>WorkSafeBC reviewed and discussed the content of a Concrete Pump Inspection Checklist that included the following:</p> <ul style="list-style-type: none"> • Qualification of the supervisor • Qualification of the operator • Evaluation of the set-up location • Periodic (annual) inspection requirements as per CSA Z151-09 • Frequent (monthly) inspection requirements as per CSA Z151-09 • Daily pre use inspection by the operator documented • Short rigging outriggers as per the manufacturers instruction • Outrigger cribbing under all float pads as per the manufacturers instruction • Guarding installed at the hopper supply elbow • Controls and emergency stops functioning correctly. 			
		No orders	February 21, 2019
<p>Inspection #14: WorkSafeBC conducted an inspection on the procedures for checking well-being of a worker which includes following:</p> <ol style="list-style-type: none"> 1. Working alone policy 2. Time intervals / emergency rescue 3. Recording results 			
		No orders	March 11, 2019
<p>Inspection #15: WorkSafeBC conducted an inspection at 240 Road till conveyor road crossing site. The compliance date is March 25, 2019.</p>			
Low	Traffic Control	<p>Order #1: The contractor failed to ensure that effective traffic control is provided and used whenever traffic could be hazardous to a worker.</p>	March 25, 2019

Site C Clean Energy Project

Quarterly Progress Report No. 15

Appendix C

**Summary of Individual Contracts Exceeding
\$10 Million**

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Appendix D

Project Progression

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Appendix E

Detailed Project Expenditure

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Appendix F

Workforce Overview

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**Table F-1 Current Site C Jobs Snapshot
 (January 2019 to March 2019)¹⁸**

	Number of BC workers and total workers	Construction and non-construction contractors¹⁹ (including some subcontractors). Excludes work performed outside of B.C. (e.g., manufacturing)	Engineers and project team²⁰	Total
January 2019	BC Workers	1,927	552	2,479
	Total Workers	2,579	607	3,186
February 2109	BC Workers	2,185	575	2,760
	Total Workers	2,855	639	3,494
March 2019	BC Workers	2,293	601	2,894
	Total Workers	3,020	654	3,674

3 Employment numbers provided by Site C contractors are subject to revision. Data
 4 not received by project deadline may not be included in the above numbers.

5 BC Hydro has contracted companies for major contracts, such as main civil works,
 6 who have substantial global expertise. During the month of March 2019 there were
 7 ten workers in a specialized position working for Site C construction and
 8 non-construction contractors, which were subject to the Labour Market Impact
 9 Assessment process under the Federal Temporary Foreign Worker Program.
 10 Additionally, there were 50 management and professionals working for Site C
 11 construction and non-construction contractors through the Federal International
 12 Mobility Program.

¹⁸ Employment numbers are direct only and do not capture indirect or induced employment.
¹⁹ Construction and non-construction contractors includes work performed on Site C dam site, transmission corridor, reservoir clearing area, public roadwork, worker accommodation and services.
²⁰ Engineers and project team are comprised of both on-site and off -site workers. The project team includes BC Hydro construction management and other offsite Site C project staff. An estimate is provided where possible if primary residence is not given.

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**Table F-2 Preliminary Site C Apprentices Snapshot
 (January 2019 to March 2019)**

Month	Number of Apprentices
January 2019	102
February 2019	93
March 2019	118

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

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**Table F-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						

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**Table F-4 Indigenous Inclusion Snapshot
 (January 2019 to March 2019)**

Month	Number of Indigenous Workers
January 2019	293
February 2019	313
March 2019	333

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

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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 the table.

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

5 ***Women***

6 In March 2019, there were 400 women working for Site C construction and
7 non-construction contractors. The number of women was provided by
8 on-Site Construction and non-construction contractors and engineers that have a
9 contractual requirement to report on the number of women in their workforce.

Site C Clean Energy Project

Quarterly Progress Report No. 15

Appendix G

Site C Construction Schedule

Site C Construction Schedule

October 2018
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Construction Activity	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Dam Site Area											
Clearing: dam site											
Access roads at the dam site											
Worker accommodation											
Peace River construction bridge											
Excavation and material relocation											
Cofferdams and diversion tunnels											
Earthfill dam											
Roller-compacted-concrete buttress											
Generating station and spillways											
Turbines and generators											
Substation											
Powerhouse transmission lines											
Viewpoint construction/landscaping											
Demobilization and site reclamation											
Roads and Highways*											
Public road improvements											
240 Road											
269 Road											
271 Road											
Old Fort Road											
Highway 29 realignment											
Castle Creek West											
Cache Creek/Bear Flat											
Haltway River											
Dry Creek											
Farnell Creek											
Farnell Creek East											
Lynx Creek											
Peace River / Reservoir Area*											
Clearing: Lower reservoir and Moberly Drainage											
Clearing: Eastern reservoir											
Clearing: Middle reservoir											
Clearing: Western reservoir											
River diversion											
Reservoir filling and operations											
Transmission Works*											
Transmission line clearing											
Transmission line construction											
Extension of Peace Canyon switchyard											
Hudson's Hope Shoreline Protection											
Hudson's Hope Berm*											
DA Thomas Road upgrades											
Production & Transport of Materials											
85th Avenue Industrial Lands											
Portage Mountain Quarry											
West Pine Quarry											
Wutrich Quarry											

The construction schedule is indicative only and subject to change. The purpose of the schedule is to illustrate the general sequence of construction activities, but the dates are subject to change.
*Transmission works are preparation or road disposal.