

AMENDED PERMIT

APPROVING MINE PLAN AND RECLAMATION PROGRAM

Permit: **Q-9-041**

Mine No: 1640182

Issued to: **BC Hydro and Power Authority
1055 Dunsmuir Street
Vancouver, British Columbia
V7X 1V5**

for work located at:


West Pine Quarry

as described in Notice of Work application **1640182-201601**

The approval for Notice of Work 1640182-201601 is valid beginning **December 15, 2016 and ending prior to December 31, 2022.**

Issued July 24, 2015.

Amended December 15, 2016.



Victor Koyanagi, P.Ge.
Inspector of Mines

PREAMBLE

A Notice of Work application (1640182-201601) dated June 22, 2016 (application), was submitted to the Chief Inspector of Mines (Chief Inspector) July 6, 2016 in accordance with Part 10.1.2 of the Health, Safety and Reclamation Code for Mines in British Columbia (Code).

The following series of reports were also filed with the Chief Inspector and form part of the application:

- a) Site C Clean Energy Project Main Civil Works Detailed Operations Plan – West Pine Quarry, prepared by Peace River Hydro Partners dated March 16, 2016
- b) Site C Clean Energy Project Main Civil Works: West Pine Quarry EPP Addendum, Solid Phase and Water Quality Monitoring Plan dated November 24, 2016, prepared by Peace River Hydro Partners.
- c) Site C Clean Energy Project Main Civil Works: West Pine Quarry Environmental Protection Plan prepared by Peace River Hydro Partners dated September 29, 2016.
- d) Site C Clean Energy Project: Definition Design, West Pine Quarry Geochemical Characterization Status at the End of 2014 dated November 2014 prepared by Klohn Crippen Berger Ltd. and SNC-Lavalin Inc.
- e) Site C Clean Energy Project: Implementation Design Geochemical Characterization Status at the End of 2014, dated March 2015 prepared by Klohn Crippen Berger Ltd. and SNC-Lavalin Inc.
- f) Site C Clean Energy Project: Construction Environmental Management Plan Revision 2 dated February 4, 2016 prepared by BC Hydro.
- g) Site C Clean Energy Project - Implementation Design – 2014 Site Investigation, Ref. No. BKS-03-106, February 2015.
- h) Site C Clean Energy Project - West Pine Quarry Development Plan, Ref. No. BKS-03-056, December 2012.

The Application was referred to other agencies on July 12, 2016 in accordance with Part 10.3.1 of the Code.

CONDITIONS

The Mine Plan and Reclamation Program as submitted in the Application is hereby approved, subject to compliance with the following conditions:

A. General

1. Compliance with *Mines Act* and Code

All work shall be conducted in compliance with all sections and parts of the *Mines Act* and the Health, Safety and Reclamation Code for Mines in B.C. (Code), and the owner, agent or manager (Permittee) shall obey all orders issued by the Chief Inspector or his delegate.

2. Departure from Approval

The Permittee shall notify the Regional Inspector of Mines in writing of any intention to depart from the approved application and this *Mines Act* permit (Q-9-041) to any substantial degree, and shall not proceed to implement the proposed changes without the written authorization of the regional Inspector of Mines.

3. Permit

This Permit is not transferable or assignable.

B. Health and Safety

1. Emergency Response Plans (ERP)

(a) The ERP shall be kept up to date and be made available at the mine site at all times. The ERP shall reference relevant policies and establish proactive procedures to provide direction for management, mine site employees and contractors.

(b) The Permittee shall ensure that mine site employees and contractors are knowledgeable and accountable for fulfilling the actions of the ERP.

2. Explosive Management Plan

The Permittee shall develop and submit an Explosive Management Plan to the Health and Safety Inspector for review and approval prior to any blasting activity.

3. Dangerous Occurrences

The manager shall ensure compliance with section 1.7.1 of the Code and report dangerous occurrences to the Regional Health and Safety Inspector of Mines whenever necessary.

C. Mine Plan

1. Quarry Pit Walls

(a) Design

- (i) The quarry pit wall design is approved subject to an annual review by a qualified Professional Engineer with experience in the design of pit slopes.
- (ii) Further investigation, including geotechnical logging, rock strength testing and structural/hydrogeological modeling shall be undertaken during excavation to provide information for final wall design.

(b) Construction

- (i) The minimum final width of pit slope catchment berms shall be 8 m as required by the Health, Safety and Reclamation Code for Mines in BC.
- (ii) Surface drainage is to be diverted away from the pit slopes in accordance with good engineering practice.
- (iii) If persistent seepage is encountered in the exposed pit walls, a hydrogeological study shall be performed in accordance with the recommendations of the geotechnical design engineer. If required by the hydrogeological study, suitable mitigation measures shall be employed to reduce groundwater pressures in the pit walls.

(c) Operation

- (i) Controlled blasting methods (e.g. trim and buffer, pre/post shear) shall be implemented to minimize damage to the crest and bench face of all final walls and on any interim walls that will be in place for a period exceeding 12 months. Controlled blasting may be omitted where a qualified professional engineer assesses conditions and states in writing that worker safety will not be adversely endangered by the proposed excavation.
- (ii) Final pit walls shall be carefully scaled during pit development to limit the potential for rock fall.
- (iii) If access cannot be gained to clean a catchment berm and a danger exists to any person working below, a safe work procedure shall be developed and implemented before work proceeds.

(d) Monitoring

- (i) Regular geological mapping, geotechnical mapping and evaluation of pit wall performance shall be undertaken.
- (ii) A visual inspection and monitoring program shall be established to detect early evidence of any potentially dangerous pit wall instability.

(iii) Periodic surveys shall be conducted to ensure that the pit walls are developed in accordance with the mine plan.

(e) Reporting

(i) Annual inspections of pit slopes are to be undertaken by a qualified professional geotechnical engineer. Observations made during the inspection, and the results of pit slope performance monitoring shall be summarized in an annual report and submitted to the Chief Inspector by March 31 of the year following the inspection. Recommendations relating to health & safety or geotechnical stability are to be followed unless a suitable alternative course of action is approved in writing by the professional undertaking the review, or by a third party Professional Engineer.

(ii) A report shall be submitted to the Chief Inspector in the event of a single bench failure resulting in a dangerous occurrence (as defined by the Health, Safety and Reclamation Code) and in the event of a multi-bench failure regardless of consequence.

2. Surplus Materials Stockpile

(a) Design

(i) The design of the Surplus Materials Stockpile (SMS) to the elevation of 790m is approved subject to an annual review by a qualified Professional Engineer.

(ii) Factors of safety for the SMS slopes shall satisfy design criteria from the Interim Guidelines of the BC Mine Waste Rock Pile Research Committee.

(b) Construction

(i) In accordance with the design engineer's recommendation, overburden shall be removed from the SMS footprint and the stockpile shall be founded on bedrock.

(ii) Final foundation footprints shall be inspected and approved by a qualified professional geotechnical engineer prior to Surplus Material placement.

(iii) In accordance with the design engineer's recommendations, the SMS shall be constructed in a bottom-up manner using a nominal lift thickness of 15 metres.

(c) Operation and Monitoring

(i) A SMS monitoring plan shall be established to detect early evidence of any potentially dangerous slope instability during operation. The monitoring plan shall include the instrument type, spacing, monitoring frequency, and appropriate initial threshold and response criteria for any required instrumentation. The plan shall be updated as needed to reflect the status of SMS development. SMS monitoring and management shall

be conducted in accordance with the recommendations of a qualified professional engineer and good engineering practice. The plan shall be maintained on site and shall be provided to any Mines Inspector upon request.

- (ii) Entry into the potential run-out zone of the stockpile, whether of short or extended duration, shall comply with Section 6.10.1(7) of the Health, Safety and Reclamation Code for Mines in BC.

(d) Reporting

While active, the stockpile shall be included in the annual review of high risk spoils, which shall be conducted by a qualified professional geotechnical engineer.

3. Topsoil and Overburden Stockpile (TOS)

(a) Design and Construction

- (i) Soil stockpiles shall be constructed in accordance with the recommendations of a qualified professional geotechnical engineer.
- (ii) Factors of safety for the TOS slopes shall satisfy design criteria from the Interim Guidelines of the BC Mine Waste Rock Pile Research Committee.
- (iii) Soil stockpiles shall be constructed with side slopes of 2H:1V or less as required to maintain stability and minimize erosion.

(b) Monitoring

Regular visual inspection of the soil stockpile crests and slopes shall be undertaken to ensure stability and erosion control are maintained.

4. Sediment Ponds

(a) Design

Sediment ponds or other water management facilities defined as “dams” under the CDA Dam Safety Guidelines shall be designed in accordance with those guidelines. This shall include, but not be limited to, the determination of the consequence classification, inflow design flood, earthquake design ground motion, and required factors of safety. Detailed designs for these facilities shall be prepared by a qualified professional engineer and submitted to the chief inspector for approval at least 30 days prior to the commencement of construction. Provided that adequate sediment and erosion control measures are in place, clearing, grubbing, stripping, and foundation preparation may proceed upon receipt of this permit amendment.

(b) Construction

- (i) Sediment ponds and water management facilities shall be constructed under the supervision of the design engineer and are to include

sufficient field reviews to allow the designer to confirm that each facility was built in general conformance with the design.

- (ii) The Permittee shall ensure that any weathered bedrock or loose soil, and any organic soil or debris is removed from the footprint of the embankments. Suitability of the prepared foundation shall be confirmed by a qualified professional geotechnical engineer.

(c) Operation

A minimum freeboard of 0.5 m above the Inflow Design Flood level shall be maintained.

(d) Monitoring

- (i) A water level gauge or other suitable pond level monitoring system shall be installed to monitor water level and freeboard.
- (ii) Instrumentation shall be installed and monitored in accordance with the recommendations of the design engineer.
- (iii) Inspection and instrumentation records shall be maintained on site.

(e) Reporting

- (i) Embankments for sediment ponds and water management facilities shall be included in the annual safety inspection of all dams on the mine site. The annual inspection shall be completed by a qualified professional engineer and a copy of the inspection report shall be submitted to the chief inspector by March 31 of the year following the inspection. Any recommendations relating to health & safety or geotechnical stability shall be followed unless a suitable alternative course of action is approved in writing by the professional undertaking the review, or by a third party professional engineer. The consequence classification for each facility shall be reviewed and confirmed during each annual inspection.
- (ii) As-built drawings and construction details for each facility shall be included in an as-built report and submitted to the Chief Inspector prior to operation of the facility. The as-built report is to include a QA/QC summary and sample data.
- (ii) Any sediment pond or water management facility that satisfies the Code definition of a “major dam” or “major impoundment” shall have an up to date OMS Manual. The OMS Manual for these facilities shall be submitted to the chief inspector prior to commissioning of these facilities, and shall include inspection schedules, monitoring procedures, and response trigger levels for any installed instrumentation.
- (iii) Any sediment pond or water management facility that is defined as a major impoundment under the Code, and has a consequence

classification of “High” or greater, shall have an Emergency Preparedness and Response Plan. The plan shall incorporate the results of a dam break and inundation study, and shall be submitted to the chief inspector for approval prior to operation of the facility.

(iv) Dam Safety Reviews shall be conducted in accordance with the timelines provided in the CDA Dam Safety Guidelines.

(f) Closure

Any sediment pond or water management facility that is no longer required to meet water quality objectives shall be decommissioned following closure. Decommissioning of these facilities is to be conducted in accordance with the recommendations of a qualified professional engineer.

5. Mine Roads

(a) Design

All mine roads shall be designed and constructed according to current engineering standards and in accordance with the Health, Safety and Reclamation Code for Mines in BC.

(b) Construction

(i) All organic material is to be stripped from the footprint of fill slopes. The footprint of fill slopes greater than five metres in height are to be inspected by a qualified geotechnical engineer prior to fill placement.

(ii) All cut and fill slopes greater than five metres in height are to be inspected by the design engineer for conformance with design.

(c) Maintenance

The rock fall potential from cut slopes shall be assessed annually and scaling shall be conducted as required to safeguard road users.

D. Protection of Land and Watercourses

1. Metal Leaching and Acid Rock Drainage (ML/ARD)

(a) All mining activities on the mine site shall adhere to the terms and conditions listed in the Metal Leaching and Acid Rock Drainage Guidelines for Mines in British Columbia where applicable.

(b) All materials with the potential to generate ML/ARD shall be placed in a manner that minimizes the production and release of metals and contaminants to levels that assure protection of environmental quality.

(c) Only materials classified as not potentially acid generating (NP/AP < 2) shall be used for road and site construction and repairs.

- (d) The Permittee shall submit an updated West Pine Quarry Environmental Protection Plan to the Regional Mines Inspector within 30 days of permit issuance.
- (e) Concurrent with excavation, the Permittee shall implement a monitoring program to confirm the geochemical characteristics of excavated materials produced and mine surfaces exposed, to determine the potential for ML/ARD and the need for mitigation measures to ensure protection of environmental quality.
- (f) To characterize excavated materials, geochemical sampling shall be of a minimum frequency of one sample every 7,500 tonnes. Analyses shall include ABA (paste pH, fizz rating, total sulphur, acid soluble sulphate sulphur, total carbon, total inorganic carbon and neutralization potential) and total elemental composition (including major and trace elements) after a strong acid digestion.
- (g) All plans for the prediction, and if necessary, the prevention, mitigation and management of metal leaching and acid rock drainage shall be prepared in accordance with the Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.
- (h) A report, authored by a qualified professional, summarizing the results of the operational monitoring shall be submitted annually. The report shall include a description of the geology encountered, interpretation of all ML/ARD, and an account of any mitigation strategies undertaken during the program and an assessment of whether additional mitigation is required.

2. Water Management

- (a) The Permittee shall, when required to do so by other agencies, obtain permits and licenses for water diversion and discharge.
- (b) In the event that seepage and other drainages that may arise from the mine or plant site results in an exceedance of the applicable provincial water quality standards in the receiving environment, the Permittee shall collect and treat, or otherwise mitigate drainage for as long as is necessary.
- (c) The Permittee shall conduct routine site inspections during quarry development to evaluate the need for water management infrastructure (i.e. localized collection ditches and sumps, and sediment ponds).
- (d) If water management structures are deemed necessary based on permit condition D.2.(c), the Permittee shall develop and implement a Water Management Plan to minimize the release of total suspended solids and contaminant loadings from the quarry pit and stockpile areas.

3. Surface Water and Ground Water Quality Monitoring

- (a) The Permittee shall monitor and track changes to surface water quality from the mine site. The program shall be capable of providing early warning about an increase in contaminant loading.

- (b) Water quality samples from the Pine River, immediately downstream of the quarry, shall be collected prior to any excavation. Analytical parameters shall include pH, conductivity, total suspended solids, turbidity, alkalinity/acidity, sulphate, and total and dissolved major cations and trace elements. Detection limits shall be sufficient to compare to provincial water quality guidelines.
 - (c) Water quality samples from Pine River shall be collected and analyzed during spring freshet and fall low-flow conditions downstream from any surface runoff from the site. Analytical parameters shall include pH, conductivity, total suspended solids, turbidity, alkalinity/acidity, sulphate, and total and dissolved major cations and trace elements. Detection limits shall be sufficient to compare to provincial water quality guidelines.
 - (d) Monitoring results of water quality and water quantity, including interpretation of the results, shall be kept up to date in a dedicated database available for review by an inspector and reported in the Annual Reclamation Report.
4. Sediment and Erosion Control
- (a) Sediment control and water management structures shall be constructed and be operational prior to any disturbance.
 - (b) The Permittee shall initiate progressive reclamation where possible to minimize erosion around the mine area.
5. Soil Salvage and Storage
- (a) The Permittee shall salvage and stockpile topsoil for use in reclamation.
 - (b) Stockpiles shall be clearly marked to ensure that they are protected; the locations, origins and quantities of material shall be documented and reported in the Annual Reclamation Report.
 - (c) Stockpiled topsoil and organic materials shall be protected via appropriate practices including re-vegetating using a certified weed-free seed mix to reduce erosion during the storage period. Seed mixes shall be “Common #1” grade as per the Canada Seed Regulation or better, and species selection shall occur with a preference for native, geographically appropriate, and non-persistent agronomic species.
 - (d) Stockpiled soil suitable for use in reclamation that is recoverable shall not be used as fill.
6. Vegetation Management
- (a) The Permittee shall limit disturbance to vegetation to those areas approved in the permit application.
 - (b) The Permittee shall manage and control weeds that establish on the site and shall take reasonable efforts to ensure that weeds do not move from the site to

adjacent areas. The control of weeds shall consider using non-toxic means for weed control when possible.

7. Wildlife Protection

- (a) Pursuant to Part 1.6.9 of the Code, the Mine Manager shall incorporate into the mine safety program a no hunting and no shooting policy for the permitted mine site.
- (b) The Permittee shall develop and implement a practical system for monitoring ungulates on the mine site. Monitoring reports shall be comprehensive and complete and made available to an inspector on the mine site upon request.

8. Riparian Areas

- (a) All reasonable efforts shall be made to avoid negative impacts to riparian areas.
- (b) Equipment operating near water courses shall be free of external grease, oil or fluid leaks and an emergency spill response kit shall be kept on-site.
- (c) In-stream work is not authorized under this permit.

E. Reclamation and Closure Program

1. Reclamation Security

Reclamation liability shall remain the responsibility of the BC Ministry of Transportation and Infrastructure during and after life of mine.

2. Annual Reclamation Report

By March 31st of each year, an Annual Reclamation Report shall be submitted in a form containing the information required by the Chief Inspector. The Annual Reclamation Report shall document the current status of the mine plan, reclamation obligations, outstanding liability and associated costs to complete the reclamation and closure activities in accordance with the approved Reclamation Plan, and all monitoring including water quality, and relevant and material ongoing maintenance activities.

3. Land Use

The land surface shall be progressively reclaimed with a view generally to re-establishing pre-mining capability and productivity conditions to the following end land use objective: **wildlife**.

4. Re-vegetation

The Permittee shall ensure disturbed areas on the mine site are re-vegetated progressively where appropriate to control weeds, erosion and sediment using appropriate/native plant species including culturally important native species.

5. Growth Medium

All severely compacted areas shall be deeply ripped prior to placement of growth media and/or vegetation.

6. Temporary Shutdown

- (a) If the mine ceases operation, the Permittee shall,
 - (i) continue to carry out the conditions of the permit, and
 - (ii) carry out a program of site monitoring and maintenance.
- (b) If the mine ceases operation for a period longer than one year, the Permittee shall apply for an amendment setting out a revised program for approval by the Chief Inspector.

F. Other Conditions

1. Use of Excavated Materials

The owner agent or operator (permittee) shall not allow materials excavated from the mine site to be removed or utilized by anyone other than BC Hydro and Power Authority or BC Ministry of Transportation and Infrastructure.

2. Access Control

The Manager shall ensure, pursuant to section 1.3 of the Health, Safety and Reclamation Code for Mines in British Columbia, other than an inspector, only persons authorized by the manager shall enter or be permitted to enter the mine site. This shall be accomplished through the use of locked gates or other suitable means. Notice to this effect shall be posted at all road entrances to the mine. A current copy of any gate key will be *provided to the Regional Inspector of Mines*.

3. Dust Control

Dust management and monitoring will take into account at minimum the following:

- a) All dust on the mine site shall be suitably controlled at the source. Dust shall not be allowed to negatively impact the highway or rail infrastructure.
- b) All roads on the mine site shall be appropriately constructed and top-dressed such that dust is controlled.
- c) A sprinkler system, water truck, or other appropriate means shall be utilized to ensure dust control on the mine site.
- d) The Permittee shall ensure all vehicles exiting the mine site are adequately washed to minimize the potential spread of dust and weeds.

4. Authorizations from Other Agencies

The Permittee is responsible for obtaining all permits and authorizations as required from other government agencies and complying with terms and conditions as set out by those agencies. This includes Maintenance of Environmental Assessment Certificate # E14-02 in good standing

5. Fuels and Lubricants

Fuels and Lubricants, if stored on the mine site, shall conform to the requirements of the *Field Guide to Fuel Handling, Transportation, and Storage*.

The Permittee shall develop and implement a hydrocarbon management plan that deals with fueling, operational servicing, spill prevention, emergency response, spill contingency, and clean-up for fuels and lubricants stored on the mine site in accordance with the *Field Guide to Fuel Handling, Transportation, and Storage*. This plan shall be kept on site and made available to the Regional Inspector upon request. The Manager shall ensure all workers on the site are aware of and understand this plan.