

# Appendix A

## Smoke Management Plan

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*Site C Clean Energy Project*

*Revision 5: September 14, 2021*

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## Revision History

Version	Date	Comments
Rev 2	March 2018	<ul style="list-style-type: none"> <li>• Table detailing revision history to align with requirements in the CEMP S. 2.4.</li> <li>• Rationale for edits to align with requirements in the CEMP S. 2.4.</li> <li>• Add references to relevant legislation, as footnotes.</li> <li>• Reformat and change order of content. Section changes are noted in revision history table.</li> <li>• Replace 'Primary' and 'Secondary Smoke Sensitivity Zones' with 'Category A' and 'Category B Areas', respectively, to align plan with wording and definitions used in currently enacted legislation.</li> <li>• Reduce scope of document; remove vegetation clearing activities, which are guided by the Vegetation Clearing and Debris Management Plan (VCDMP). Remove references to VCDMP and all vegetation clearing activities which are guided by the VCDMP.</li> <li>• Move content in Appendices to body of document.</li> <li>• Add definitions for BCWS, CEMP, EIS, MFLNRORD (update to reflect current Ministry name), and VI. Delete definitions for acronyms VCDMP, PM 2.5, PSSZ, SSSZ and reformatting and alphabetization (Abbreviations and Acronyms).</li> <li>• Clarify regulatory framework applicable to burning activities. Remove guidance provided by OBSCR policy intentions. Addition of Wildfire Act and Wildfire Regulation and Site-C conditions (Federal Decision Statement and Schedule B - Table of Conditions). Add potential for 'substitute requirements' if new legislation is enacted during the project (S. 2.1 / S. 2.1.1, 2.1.2, 2.2)</li> <li>• Separate regulatory framework from plan scope to simplify plan organization (S. 2.0 / S. 2.0, 3.0)</li> <li>• Remove vegetation clearing activities from plan scope (S. 2.2 / S. 3.0).</li> <li>• Remove Vegetation Activities by Project Area; activities guided by VCDMP (S.3.0 / N/A).</li> <li>• Clarify and distinguish in the plan those components that are: required by legislation or are required as BMPs to meet open burning / smoke condition objectives. Rename section to better reflect the contents. Removed reference to VCDMP and references to potential, future regulations. Changes align plan to currently enacted legislation, remove irrelevant references, clarify regulatory requirements, and provide contractors and monitors operational best practices to meet or exceed smoke management objectives (S. 4.0 / S 4.0).</li> <li>• Clarification of annual burn program planning requirements. Content split into subsections. Addition of prioritization of areas under good venting conditions (S. 4.2 / S. 5.1.1, 5.1.2).</li> <li>• Change 'to be determined' to 'may be determined' to more accurately reflect the ground truthing activities and communications which have occurred since Ver. 1 (S. 4.3 / S. 5.1.3).</li> <li>• Add 'schools in session, identified sensitive receptors, and continuing health care centres' as land use requiring minimum 1,000 m setback. Add list of identified sensitive receptors. Changes are to remain consistent with the categories outlined in currently enacted legislation (OBSCR), Appendix B of the CEMP, Appendix L of the EIS, and Condition 57. Add allowance for application to relax minimum</li> </ul>

Version	Date	Comments
		<p>setbacks to allow alignment with currently enacted legislation (OBSCR) (S. 4.4 / S.4.4).</p> <ul style="list-style-type: none"> <li>• Smoke release periods re-defined to match definitions in currently enacted legislation (OBSCR) (S. 5.0 / S.4.5).</li> <li>• Addition of annual allowable burning periods and smoke free periods to the burn criteria for Category A Areas to align plan to currently enacted legislation (OBSCR) (S. 5.0 / S. 4.5).</li> <li>• Reformat and move daily ignition period (S. 5.0 / S. 5.4.1).</li> <li>• Remove redundant definition daily ignition period (S. 5.2 / N/A).</li> <li>• Add methods to amend daily burn plan, in the case of changed venting conditions: allow use of forced air mechanism or extinguishing burning (S. 6.1 / S. 5.3.2).</li> <li>• Add provincial ambient air quality objectives. Update BCH-installed particulate monitoring station (number and locations) (S. 6.2 / 6.2).</li> <li>• Delete Post Season Custom Venting Forecast Analysis to align with currently enacted legislation (OBSCR) (S. 6.3 / N/A).</li> <li>• Clarify methods, responsibility, and requirement of obtaining BRN for Category 2 and 3 burns to align with currently enacted legislation (Wildfire Regulation) and with requirements in the CEMP S. 2.4. (S. 7.1, Appendix A / S. 4.6).</li> <li>• Clarify roles and responsibilities regarding notification including: stakeholders based on geographic location, timing of notification(s), notification responsibility, and required documentation (S. 7.2, Appendix D / S. 7.0, 7.1).</li> <li>• Clarify tracking responsibility, add tracking requirements and amend submission timing and format. Required tracking: daily burn logs, documentation of compliance with smoke release period, nest/ den survey results, setback relaxation approvals, and debris reduction monitoring. Add example entry of burn tracking form (S. 7.3, Appendix C / S. 6.1.1).</li> <li>• Delete annual burn reporting to align with currently enacted legislation (S. 7.4 / N/A).</li> <li>• Update revision information (QP and date) (S. 8.0 / S. 8.0).</li> <li>• Update works consulted (S. 9.0 / S. 9.0).</li> <li>• Expand and clarify piling requirements (locations prohibited, definitions, fuel break) (Appendix A / S. 5.2.1).</li> <li>• Identify contractor responsibility for burn plan. Provide direction for burning in the event that ventilation forecast is not representative of local conditions. Provide additional considerations prior to practical applications for venting forecasts (forecaster confidence, prioritization of areas, wind direction, location of values potentially impacted) (Appendix A / S. 5.3.1, 5.3.2).</li> <li>• Add pre-burn considerations, requirement and example template of pre-burn checklist (Appendix A / S. 5.4).</li> <li>• Reduce allowable surface area of debris emitting smoke at the end of the smoke release period from 10% to 5% for Category B areas to align with currently enacted legislation (OBSCR) (Appendix A / S. 6.0).</li> <li>• Expand upon connection between venting forecasts, ventilation index, ventilation category, mixing height and wind speed (Appendix B, S. 5.1 / S. 4.5.1).</li> <li>• Replace Table 6 notification list with detailed contact list, by geographic area</li> </ul>

Version	Date	Comments
		<p>(Appendix D / S. 7.3).</p> <ul style="list-style-type: none"> <li>• Add objectives for SMP to align with requirements in the CEMP S. 2.4 (N/A / S. 1.1).</li> <li>• Define 'Category Areas' and addition of Category Area mapping to align with requirements in the CEMP S. 2.4. (N/A / S. 4.1)</li> <li>• Add prohibited materials, acceptable timing of burning, and specific conditions which limit burning to align plan to currently enacted legislation (OBSCR) (N/A / 4.2, 4.3).</li> <li>• Add definition of Category pile sizes and conditions to align plan to currently enacted legislation (Wildfire Regulation) (N/A / S. 4.2).</li> <li>• Define sources of venting forecasts; identify acceptable use of sources (N/A / S. 4.5.1.1).</li> <li>• Recognize smoke free periods and allowable annual smoke release periods as legislated requirements to align with currently enacted legislation (OBSCR) (N/A / S. 4.5.3, 4.5.4).</li> <li>• Add 'stop-burn' conditions to align with currently enacted legislation (OBSCR) (N/A / S. 4.5.5).</li> <li>• Recognize risk of hold-over fires, add conditions for burning outside of normal burning windows (N/A / S. 5.1, 6.0).</li> <li>• Add local validation of venting forecast through use of test piles (N/A / 5.3.2).</li> <li>• Clarify training requirements, contractor responsibility regarding training, competence, and record-keeping to align with requirements in the CEMP S. 2.4 (N/A / 5.3.4).</li> <li>• Add Environmental Considerations section to require den and active nest surveys prior to ignition (N/A, 5.3.5).</li> <li>• Add acceptable methods to monitor and measure smoke release period to ensure compliance with currently enacted legislation; require contractor to develop measurable reporting and documentation of smoke release period compliance. Add infrared scheduling information (N/A / S. 6.1).</li> <li>• Define and identify wildfire reporting requirements to align with currently enacted legislation (Wildfire Act and Wildfire Regulation) (N/A / S. 7.2).</li> </ul> <p>These revisions are not material within the meaning of Section 2.6 because:</p> <ul style="list-style-type: none"> <li>• The revisions will not result in a reduction of any monitoring or reporting requirements;</li> <li>• The revisions will not result in the deletion or reduction of an environmental specification;</li> <li>• The revisions will not otherwise make an adverse effect more likely, nor become more adverse and be significant.</li> </ul>
Rev 3	Nov. 2019	<ul style="list-style-type: none"> <li>• The entire document was reviewed and updated to reflect regulatory changes, specifically the September 2019 Open Burning Smoke Control Regulation. Edits and updates include changes in: practices to ensure compliance with new or amended regulatory requirements; technical definitions and how new definitions apply to practices or regulatory interpretations, and terminology (minor changes to wording generally not impacting practices). Updates to Rev 3 include updating all citations to the current Open Burning Smoke Control Regulation (from BC Reg.</li> </ul>



Version	Date	Comments
		<p>145/93 to BC Reg. 405/19).</p> <ul style="list-style-type: none"> <li>• Add Glossary to define words and phrases from the relevant legislation, as well as to define words and phrases recurring throughout the document.</li> <li>• Update to the footnote legal citation style.</li> <li>• Update S. 2.1.1 to describe newly enacted OBSCR.</li> <li>• Update S. 3.0 to clarify scope of the document.</li> <li>• Update S. 4.0 to reflect OBSCR (terminology) and to reflect the changes in section headings of the updated SMP (to ensure consistency throughout document).</li> <li>• Update S. 4.1 to introduce smoke sensitivity zones which replace category areas. Delete maps outlining outdated category areas. Provide direction to provincial mapping for smoke sensitivity zone identification.</li> <li>• Move definitions in S. 4.2 to glossary. Update criteria and definition of allowable and prohibited material to be burned (origin of material, banned materials, requirement to minimize material for open burning) as per new OBSCR.</li> <li>• Update S. 4.3 to introduce 'burn criteria' as required elements for burning, as per new OBSCR. Clarify and outline situations which supersede burn criteria and under which burning may not occur, as per OBSCR.</li> <li>• Update S. 4.4 with regulation setbacks and option to burn with modified setbacks, as per OBSCR. Change terminology (continuing care to community care) to remain consistent with legislation.</li> <li>• Update S. 4.5 to reflect OBSCR: 'ignition criteria' is changed to 'burn criteria', addition of burn divisions potentially applicable to the Project.</li> <li>• S. 4.5.1 defines specific burn criteria for burn division 1: by smoke sensitivity zone and modified setbacks.</li> <li>• S. 4.5.2 defines burn criteria for burn division 5: burning using air curtain incinerators.</li> <li>• S. 4.5.3 relates venting forecasts to burn criteria and relevant tables.</li> <li>• S. 4.5.3.1 removes option to test burn as acceptable venting forecast. Removes reference to 'parcel' as the main unit for determining compliance with OBSCR. Update ventilation forecasting website. Align terminology 'custom ventilation forecaster' with OBSCR.</li> <li>• S. 4.5.4 align burn period, burn duration, and burn 'end' definitions with OBSCR. Identify pile as the unit for regulatory compliance (burn criteria, smoke sensitivity zone, burn duration are all measured by pile).</li> <li>• S. 4.5.4 allows option to move vegetative debris from the point of origin to provide some operational flexibility.</li> <li>• Update 4.5.5 with wording consistent with OBSCR.</li> <li>• Add S. 4.7 to outline new reporting requirements, as per OBSCR.</li> <li>• S. 5.0 clarify that best management practices also include regulatory requirements.</li> <li>• S. 5.1.1 add 'burn criteria' to encompass all the criteria required for ignition under OBSCR.</li> <li>• S. 5.1.2 replace 'category areas' with 'smoke sensitivity zones'. Add requirement to minimize soil content mixed in with vegetative debris. Add seasoning requirements based upon smoke sensitivity zone. Clarify that minimum setbacks differ for open</li> </ul>

Version	Date	Comments
		<p>burning piles versus use of an air curtain incinerator. All changes were made to comply with OBSCR.</p> <ul style="list-style-type: none"> <li>• S. 5.1.2 include option for BCH to authorize hand-piling (as per CEMP) in RRZs, if necessary due to topographic limitations; change is to offer flexibility for piling in highly constrained areas.</li> <li>• S. 5.3.1 replace 'category areas' with 'smoke sensitivity zones'.</li> <li>• S. 5.3.2 remove reference to test burn as an approved method for obtaining venting forecast.</li> <li>• S. 5.3.2.1 replace 'category areas' with 'smoke sensitivity zones'. Remove option to apply to the MOE for a longer smoke release period; this is no longer an allowable practice under OBSCR.</li> <li>• S. 5.3.5 allows for use of drones during den surveys. Allowance for QEP to provide environmental rationale, when deemed appropriate by the QEP, in place of completing another den survey after the duration of validity has expired.</li> <li>• S. 5.4 add specific reference to aerial ignition and requirement of an ignition plan.</li> <li>• S. 5.4.1 remove bulleted examples of safety, regulatory and operational variables for the pre-burn checklist to reduce redundancy from other sections. Clarify requirement to comply with <i>Wildfire Act</i> and Regulation as part of pre-burn checklist.</li> <li>• S. 5.4.1, Table 7 (pre-burn checklist) update to reflect regulatory changes and terminology. Wording clarification for pile locations specific to RRZs.</li> <li>• S. 5.4.2 include requirement for, and minimum components of, an ignition plan.</li> <li>• S. 5.4.3, Table 8 update to comply with OBSCR (daily ignition period by smoke sensitivity zone).</li> <li>• S. 5.4.4 require aerial ignitions to comply with specific helicopter company safe work procedures and best practices.</li> <li>• S. 6.1 update monitoring requirements to comply with OBSCR definitions of 'end' in terms of open burning. Include acceptable actions in the event that piles do not achieve desired levels of debris consumption or comply with burn 'end' requirements, as per OBSCR. Add allowance to use thermal scans for hazard abatement monitoring.</li> <li>• S. 6.2 summarize / clarify list of records created during proper implementation of the smoke management plan. Include requirement for ignition plan.</li> <li>• S. 6.2.1 updates to burn tracking procedure. Updates to data collection requirements and update Table 9 (burn tracking form) to comply and be consistent with OBSCR. Add Table 10 as an example system to document compliance with OBSCR, in terms of burn period and smoke release monitoring.</li> <li>• S. 6.2.2, S. 6.2.2.1 and S. 6.2.2.2 clarify record-keeping responsibility and expected frequency of record submission to BCH.</li> <li>• S. 7.0 clarify that 'reporting' is in reference to the reporting of a wildfire or escaped open burn.</li> <li>• S. 7.3 update key contacts.</li> <li>• S. 8.0 update with current and applicable OBSCR.</li> <li>• S. 9.0 update works consulted.</li> </ul>

Version	Date	Comments
Rev 4	Sept. 2020	<ul style="list-style-type: none"> <li>The entire document was reviewed for potential amendments required due to regulatory changes, specifically the Wildfire Regulation, BC Reg 38/2005, amended June 26, 2020 by B.C. Reg. 157/2020. No edits or updates were required as a result of this review.</li> <li>MOE changed from Ministry of Environment to Ministry of Environment and Climate Change</li> <li>Earle Plain title and contact details updated</li> </ul>
Rev 5	Sept 14, 2021	<ul style="list-style-type: none"> <li>Updated Table 3 to amend the 'period for igniting piles of unlit vegetative debris' and 'period for adding unlit vegetative material to ignited piles' within the MSSZ to be consistent with Open Burning Smoke Control Regulation (B.C. Reg 152/2019).</li> <li>Updated Table 12, key contacts for notification, specifically contacts for the following: Ministry of Environment and Climate Change Strategy, RCMP Hudson Hope Detachment, RCMP Fort St John Detachment, City of Fort St John, Fort St John Fire Department, District of Taylor and Fire Department, District of Hudson's Hope, Hudson's Hope Fire Department, Chetwynd Fire Department, BC Wildfire Service, Northern Health, BC Hydro Public Relations and Communications.</li> </ul>

## Abbreviations and Acronyms

BCWS.....	British Columbia Wildfire Service
BMP .....	Best Management Practices
BRN.....	Burn Registration Number
CEMP .....	Construction Environmental Management Plan
CVF.....	Custom Venting Forecast
EAC.....	Environmental Assessment Certificate
EAO.....	BC Environmental Assessment Office
EIS.....	Environmental Impact Statement
HSSZ.....	High Smoke Sensitivity Zone
LSSZ .....	Low Smoke Sensitivity Zone
MFLNRORD....	Ministry of Forests, Lands, and Natural Resource Operations and Rural Development

MOE .....Ministry of Environment and Climate Change

MSSZ .....Medium Smoke Sensitivity Zone

OBSCR .....Open Burning Smoke Control Regulation

SMP .....Smoke Management Plan

VI .....Venting Index / Ventilation Index

## Glossary<sup>1</sup>

**Burnt surface area:** the area that is underneath or surrounding the remains of a fire and covered by charred or smoldering vegetative debris.

**Category 2 open fire<sup>2</sup>:** an open fire, other than a campfire, that:

- (a) burns material in one pile not exceeding 2 m in height and 3 m in width,
- (b) burns material concurrently in 2 piles each not exceeding 2 m in height and 3 m in width, or
- (c) burns stubble or grass over an area that does not exceed 0.2 ha.

**Category 3 open fire<sup>3</sup>:** an open fire that burns:

- (a) material concurrently in 3 or more piles each not exceeding 2 m in height and 3 m in width,
- (b) material in one or more piles each exceeding 2 m in height or 3 m in width,
- (c) one or more windrows, or
- (d) stubble or grass over an area exceeding 0.2 ha.

**Community Care Facility<sup>4</sup>:** premises or part of a premises (a) in which a person provides care to 3 or more persons who are not related by blood or marriage to the person and includes any other premises or part of a premises that, in the opinion of the medical health officer, is used in conjunction with the community care facility for the purpose of providing care, or (b) designated by the Lieutenant Governor in Council to be a community care facility.

**Custom ventilation forecast:** a forecast of the atmosphere’s ability in a geographic area to disperse smoke and which is (a) obtained from a custom ventilation forecaster, and (b) submitted by email to the ministry, using the email address made known by the ministry for the purposes of receiving custom ventilation forecasts, before starting open burning.<sup>5</sup>

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<sup>1</sup> Unless otherwise noted, all definitions in the glossary are from BC Reg 405/19 Part 1 – Definitions.

<sup>2</sup> BC Reg 38/2005, s. 1(1)

<sup>3</sup> BC Reg 38/2005, s. 1(1)

<sup>4</sup> *Community Care and Assisted Living Act* S.B.C. 2002, c. 75, parts 1 and 3 and BC Reg 405/19, Part 1.

<sup>5</sup> BC Reg 405/19, s. 16

**Custom ventilation forecaster:** a person who (a) is a meteorologist employed by Environment Canada and classified as a Meteorologist 3 or above, (b) is a Weather Forecaster, a Fire Weather Forecaster, an Air Quality Meteorologist or an Air Quality Science Specialist employed by or under contract with the government, or (c) has similar knowledge and experience as described in paragraph (a) or (b) and is approved in writing by a director to conduct custom ventilation forecasts for the purposes of this regulation.

**Dry basis moisture content:** with respect to a given amount of vegetative debris, means the weight of moisture contained in the vegetative debris divided by the weight of the vegetative debris if the vegetative debris was dry, with both weights measured in the same weight units, multiplied by 100 and expressed as a percentage.

**End** (with regards to open burning): (a) if the open burning is being done using an air curtain incinerator, the point in time when the fire in the air curtain incinerator is emitting smoke from no more than 10% of the base of the air curtain incinerator, and (b) respecting all other open burning, the point in time when each pile of vegetative debris has ceased flaming and is emitting smoke from no more than 10% of its burnt surface area;

**Fire suppression system<sup>6</sup>:** a system for suppressing fire by delivering: (a) water, (b) a suppressant, (c) a surfactant, or (d) any combination of the substances (a) to (c) and may include a water delivery system.

**High smoke sensitivity zone:** (a) land in the province that is outlined and shaded in pink and labelled 'High Smoke Sensitivity Zone' in the legend, on a map listed in Schedule 3 except all areas of that land that are designated under section 7 as being a medium smoke sensitivity zone or a low smoke sensitivity zone, and;  
(b) all areas of land that are designated under section 7 as being a high smoke sensitivity zone".

**Low smoke sensitivity zone:** land in the province that is not a high smoke sensitivity zone or a medium smoke sensitivity zone.

**Medium smoke sensitivity zone:** (a) land in the province that is outlined and shaded in yellow, and labelled "Medium Smoke Sensitivity Zone" in the legend, on a map listed in Schedule 3 except all areas of that land that are designated under section 7 as being a high smoke sensitivity zone or low smoke sensitivity zone, and  
(b) all areas of land that are designated under section 7 as being a medium smoke sensitivity zone".

**Opacity<sup>7</sup>:** the degree to which smoke obscures the view of an object in the background, expressed numerically from 0% (transparent) to 100% (opaque).<sup>8</sup>

**Seasonal residence<sup>9</sup>:** a fixed residence that, while not being occupied on a full-time basis, is occupied on a regular basis. A regular basis does not imply a scheduled occupancy but implies use of six weeks per year or more. The residence must not be mobile and should have some sort of foundation or features of permanence (e.g., electrical power, domestic water supply,

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<sup>6</sup> BC Reg 38/2005, s. 1(1)

<sup>7</sup> BC Reg 405/19, s. 28(1)

<sup>8</sup> As determined in accordance with the United States Code of Federal Regulations, Title 40, Part 60, Chapter 1, Appendix A-4, Method 9, as amended from time to time.

<sup>9</sup> Alberta Energy Regulator 2007

septic system) associated with it. Summer cottages or mobile homes are examples of seasonally occupied dwellings, while a holiday trailer simply pulled onto a site is not.

**Seasoned vegetative debris:** vegetative debris that (a) has been dried to the extent that the dry basis moisture content is 30% or less, (b) has been put in piles for a period of at least 4 months, or (c) has originated from standing dead timber.

**Water delivery system**<sup>10</sup>: a system that can (a) deliver a sufficient volume of water to effectively fight a fire of a reasonably foreseeable size, taking all factors into consideration, including the conditions of the area where the water delivery system may need to be used, and (b) deliver water to any place at the site of an industrial activity, on the burn area or the high risk activity, or reasonably adjacent to the burn area or the site of a high risk activity.

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<sup>10</sup> BC Reg 38/2005, s. 1(1).

## 1.0 Introduction

As part of the planning associated with the Site C Clean Energy Project (the Project), and the environmental assessment process, a Smoke Management Plan (SMP) was developed and submitted with the Environmental Impact Statement (EIS) (BC Hydro 2013) and currently exists as Appendix A of the Construction Environmental Management Plan (CEMP).<sup>11</sup> The SMP describes how project-related burning will be conducted compliant with the most current British Columbia Ministry of Environment Open Burning Smoke Control Regulation (OBSCR) and other relevant regulatory requirements, outlines best management practices to reduce smoke emissions and mitigate air quality impacts from burning, and remains in accordance with the Site C Clean Energy Project Construction Environmental Management Plan (CEMP), section 5.1 Air Quality Management, which states:

- Manage smoke from the burning of clearing debris in accordance with the Smoke Management Plan (Appendix A).

### 1.1 Objectives

The objectives of the SMP are as follows:

- Outline regulatory requirements of open burning activities;
- Detail Best Management Practices to avoid, mitigate, or minimize the emissions of smoke and particulates from open burning; and,
- Ensure consistency and compliance with all relevant provincial and federal conditions mandated as part of the environmental assessment process.

## 2.0 Regulatory Context

### 2.1 Provincial Legislation

#### 2.1.1 *Environmental Management Act* and Open Burning Smoke Control Regulation

Under the authority of the Environmental Management Act 12, the BC Ministry of Environment (MOE) has the mandate to regulate smoke emissions from open burning activities through the application of the Open Burning Smoke Control Regulation 13 (OBSCR). The OBSCR is divided into the Part 1 – Interpretation and Application, Part 2 – General Requirements for Open Burning, Part 3 – Specific Requirements for Open Burning, Part 4 – Substituted Requirements, Part 5 – Air Protection Measures, and Part 6 - Miscellaneous. The Open Burning Smoke Control Regulation 405/19 is under effect as of September 15, 2019 and has replaced the repealed Open Burning Smoke Control Regulation 145/93. Revision 3 (November 2019) of the SMP is to reflect the regulatory changes reflected in the recently enacted OBSCR. This plan may need to be reviewed and updated to reflect any future changes in legislation.

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<sup>11</sup> B.C. Hydro. 2016. Construction Environmental Management Plan, Site C Clean Energy Project Revision 4.

<sup>12</sup> *Environmental Management Act* S.B.C. 2003, c. 53

<sup>13</sup> BC Reg 405/19

### 2.1.2 *Wildfire Act and Wildfire Regulation*

The *Wildfire Act*<sup>14</sup> and *Wildfire Regulation*<sup>15</sup> define the legal responsibilities and obligations regarding fire use, wildfire prevention, wildfire control, and rehabilitation. These pieces of legislation are the responsibility of the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (MFLNRORD) and, more specifically, the BC Wildfire Service (BCWS). The *Wildfire Regulation* lays out the responsibilities of a person or entity igniting a fire including, but not limited to: ensuring no fire escapes, providing sufficient fire suppression systems and personnel, and defining fire control requirements in the case of an escape. Additionally, it is the *Wildfire Regulation* which requires notification to the MFLNRORD (Burn Registration Number), depending on the category of burn defined by the size and number of piles ignited<sup>16</sup>, as well as the information required to receive the registration number<sup>17</sup>. Although the *Wildfire Regulation* does not address smoke control or air quality, it is directly relevant to open burning.

## 2.2 Site-C – Specific Conditions

### 2.2.1 Federal Decision Statement

The Federal Decision Statement, issued November 25, 2014, by the Minister of Environment Canada and under Section 54 of the *Canadian Environmental Assessment Act, 2012 (CEAA)*, establishes conditions with which BC Hydro must comply. Relevant to the Smoke Management Plan is Section 12 – Health of Aboriginal Peoples – Air Quality. Specifically, Section 12 requires measures to avoid or minimize exceedances of federal and provincial air quality objectives and to minimize or manage the potential effects of smoke.

### 2.2.2 Environmental Assessment Certificate Schedule B – Table of Conditions

The Environmental Assessment Certificate was issued with 77 Conditions under which the project may proceed. The following conditions are directly applicable to the SMP:

- Condition 57, which outlines provincial conditions regarding ambient air quality, specifically the requirements regarding an Air Quality Management Plan and a Smoke Management Plan. This condition mandates that project-related smoke is controlled by following the OBSCR. Additionally, the plan is to include measures to manage emissions and procedures to provide MOE with: 1) data collected during monitoring; and, 2) the SMP and any amendments for review.
- Condition 70, which stipulates that Project effects through construction and operations must be managed by implementing measures detailed in mitigation and monitoring plans, such as this SMP and the Contractor's Environmental Protection Plan.

## 3.0 Scope

The smoke management plan outlines the practices for burning clean woody / vegetative debris (open burning) to manage the effects of smoke emissions from burning, to reduce the risk of an

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<sup>14</sup> *Wildfire Act* S.B.C. 2004, c. 31

<sup>15</sup> BC Reg 38/2005

<sup>16</sup> BC Reg 38/2005, s. 22 (1) (c)

<sup>17</sup> BC Reg 38/2005, s. 24 (1)



escape, and to meet all regulatory requirements relevant to open burning. The scope of the smoke management plan is limited to open burning practices implemented as part of the Site C Clean Energy Project.

## 4.0 General Requirements

All burning activities will be compliant with, or exceed the requirements of, the BC OBSCR<sup>18</sup>. The following measures have been developed in accordance with these existing regulations and other relevant regulatory requirements:

1. general requirements;
2. identification of smoke sensitivity zone(s);
3. material to be burned;
4. timing of burning;
5. minimum set-back distances;
6. ignition criteria and burn duration;
7. burn registration; and,
8. Records and reporting.

Best Management Practices (BMPs) are intended to provide operational direction to, as much as practicable, promote fast and efficient burns which minimize the amount of smoke generated and confine smoke emissions as much as possible to periods with favourable venting thereby minimizing potential impacts of smoke from burning activities, and minimize the chance of fire escape. BMPs are outlined in Sections 5.0, 6.0, and 7.0 include direction in the following areas:

1. seasonal burn planning;
2. debris pile construction and seasoning;
3. pre-burn protocols;
4. light-up procedures;
5. monitoring and tracking; and,
6. Notification and wildfire reporting.

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<sup>18</sup> BC Reg. 405/19

## 4.1 Identify Sensitivity Zones

The OBSCR and allowable burning practices are based upon three spatial Categories: high, medium and low smoke sensitivity zones. The zones are based upon distance from populations: the 'high' zone is immediately surrounding communities, while the 'low' zone is farthest from population centers.

To identify the relevant sensitivity zone, use the provincial interactive mapping application found here:

<https://governmentofbc.maps.arcgis.com/apps/webappviewer/index.html?id=6d288bc667b24528a5c1e3b4c0373d07>.

The smoke sensitivity zone and relevant operational requirements (burn criteria) for open burning is designated per pile and by pile location.<sup>19</sup>

In addition to the aforementioned regulated spatial zones, through ground-truthing exercises with Aboriginal groups, or during the notification period, locations of high Aboriginal use may be identified, and shall be treated as high smoke sensitivity zones during planned burning activities (i.e. utilize burn criteria for high smoke sensitivity zones).

## 4.2 Material to be Burned

This smoke management plan applies solely to open burning of vegetative (clean woody) waste that meets Category 2 and Category 3 pile sizes and has been piled within a 5 km radius of where the vegetative debris originated.<sup>20</sup>

In areas where operations vary between the two Category of burns (Category 2 and Category 3), differences will be noted, else, practices and operations will be the same.

Prior to open burning, BCH and the contractor must ensure that every reasonable alternative for reducing, reusing, or recycling the vegetative debris has been used in order to minimize the amount of debris burned.<sup>21</sup> Vegetative debris usage is detailed in the Vegetation Clearing and Debris Management Plan.

Open burning that does not meet the definition provided above is outside the scope of this SMP and may require additional permits from the MOE.

Regulations prohibit the burning of the following material in any quantity: animal carcasses; asphalt or asphalt products; batteries; biomedical waste; carpets; construction waste other than lumber that has not been treated with wood preservatives or other chemicals and is not coated with paint, varnish, oil or other finishing material; demolition waste; electrical wire; fibreglass and other fibre-reinforced polymers; fuel and lubricant containers; furniture and appliances; hazardous waste; manure; paint and varnish; plastics; polystyrene foam; railway ties; rubber; tar paper; tires; treated or painted wood products; and used oil.<sup>22</sup>

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<sup>19</sup> Personal communication (email), October 10, 2019 from [OBSCR@gov.bc.ca](mailto:OBSCR@gov.bc.ca).

<sup>20</sup> BC Reg. 405/19, s. 9

<sup>21</sup> BC Reg. 405/19, s. 10

<sup>22</sup> BC Reg. 405/19, s. 12 and BC Reg. 320/2004, schedule 1, s. 2

### 4.3 Timing of Burning

Open burning may occur when in accordance with all burn criteria, including acceptable venting. See Section 4.3 for burn criteria and Section 4.5.3 for details on acceptable venting forecasts.

Prior to ignition, it must be confirmed that there are no other burning restrictions in place. This includes burning restrictions from relevant local government<sup>23</sup>, the MOE<sup>24</sup>, and MFLNRORD (bcwildfire.ca), all of which supersede venting indices or venting forecasts, including custom venting forecasts (CVF).<sup>25</sup> The OBSCR grants the MOE the authority to prohibit burning in an area during periods of poor air quality, when it is likely that air particulate matter will reach unacceptable levels within 24 hours<sup>26</sup>, or when pollution is occurring or likely to occur from open burning.<sup>27</sup> In these circumstances, the MOE may require fires extinguished, prohibit additional debris added to the fire, or prohibit ignition.

Burning may not be initiated if the local air flow or atmospheric mixing is likely to cause smoke to have a negative impact on a nearby population or workcamp or create a navigational hazard at nearby airports or on nearby highways by significantly reducing visibility.<sup>28</sup> Both of these conditions override the existence of an acceptable venting forecast and/ or compliance with all other burn criteria.

### 4.4 Setback Distances

The minimum fire setback distances that will be maintained for burning operations carried out under the Site C SMP are described in Table 1.

Areas may be identified during ground-truthing exercises with Aboriginal groups, or through the notification process, that meet the definition of “seasonal residence”. Identified seasonal residences will have appropriate fire setback distances applied (Table 1).

**Table 1. Setback Distances**

Category	Setback Distance (m) <sup>29</sup>	Modified Setback Distance (m) <sup>30</sup>
Neighbouring buildings: residences (including seasonal residences in use), businesses	500	100
Nearest property line of: hospitals, schools, community care facilities, and identified sensitive receptors <sup>31</sup>	1,000	500

<sup>23</sup> BC Reg. 405/19, s. 6(a)

<sup>24</sup> BC Reg. 405/19, s. 30(1)(a)(b)

<sup>25</sup> BC Reg. 38/2005, s. 22(1)(a)

<sup>26</sup> Specifically, when the amount of particulate matter in the air in an area has reached, or will reach within 24 hours, a level that is likely to result in the air quality not meeting the ambient air quality objectives set out in Schedule 2 of OBSCR.

<sup>27</sup> BC Reg. 405/19, s. 30(1)(a)(b)

<sup>28</sup> BC Reg. 405/19, s. 14(a)(b)

<sup>29</sup> BC Reg. 405/19, s. 13(1) and the Site C Clean Energy Project Construction Environmental Management Plan Appendix B - Air Quality Monitoring Program

<sup>30</sup> BC Reg. 405/19, s. 13(2)

<sup>31</sup> Identified sensitive receptors as outlined in the CEMP Appendix B – Air Quality Monitoring Program.

Modified setback distances are allowed under OBSCR, when open burning complies with specific burning conditions. The burn criteria for modified setbacks is detailed in Table 4 of Section 4.5.1. Open burning utilizing air curtain incinerators have unique setbacks to pile burning; setbacks for air curtain incinerators are found in Table 5 of Section 4.5.2.

Sensitive receptors for the area have been identified in Environmental Impact Statement (EIS) Volume 2 Appendix L. Those sensitive receptors which require a minimum setback of 1,000 m are enumerated in Table 2. Regardless of sensitive receptors listed in Table 2, any and all hospitals, community care facilities, or schools require setbacks based on relevant burn criteria, as outlined in Table 1, Table 4, or Table 5.<sup>32</sup>

**Table 2. Sensitive Receptors Requiring a Setback Equivalent to Hospitals, Schools, and Community Care Facilities, as Identified in Appendix B Air Quality Monitoring Program of the Construction Environmental Management Plan (CEMP).**

Schools	Health Care Facilities	Senior Care Facilities	Childcare Facilities
Aboriginal Education Center	Fort St. John Health Unit	Heritage Manor III	Chunky Monkey Daycare
Alwin Holland	Fort St. John Hospital	Peace Lutheran Apt. #1	Oscare Daycare/Oscare Tots
Baldonnel Elementary	Fort St. John Medical Clinic	Peace Lutheran Apt. #2	The Zoo Daycare
Bert Ambrose Elementary	Fort St. John Pharmacy and Wellness Centre	The Sunset Home	Little Kritters Daycare
Bert Bowes Middle School	The Taylor Medical Clinic	North Peace Care Centre	ABC & 123 Family Daycare
Board Office	ABC Medical Clinic	Abbeyfield Houses of Fort St. John	Baby Bear Daycare
Charlie Lake Elementary School	North Peace Medical Clinic	New Senior Housing	Rascals
Christian Life School		Peace Villa	Building Blocks Daycare
CM Finch Elementary			Kidz Club
Dr. Kearney Middle School			Northern Lights College Daycare
Duncan Cran Elementary			Little Bear Family Daycare

<sup>32</sup> BC Reg. 405/19, s. 13 (1) and (2)

Schools	Health Care Facilities	Senior Care Facilities	Childcare Facilities
École Central Elementary			Little Peanuts Family Daycare
Facilities and Transportation			Little Pigs Family Daycare
Key Learning Centre			Nanny Norma's Daycare
North Peace Secondary			Pitter Patter Day Care
Energetic Learning Campus			Puddle Jumpers
Northern BC Distance Education			Seeds to Sow
Open Learning			The Playground Family Daycare
Robert Ogilvie Elementary			The Wiggles and Giggles Daycare
Student Support Services			TJ's Playhouse
Taylor Elementary			Tot's and Tikes Family Daycare
Technology Services			The Stepping Stones Centre
Upper Half way Elementary			Aboriginal Head Start
Wonowon Elementary			Child Development Centre
			Keeginaw Pre-School
			Totem Pre-School
			Rise and Shine Clubhouse
			Barney and Friends Family Daycare
			Hudson's Hope Playschool

Best Management Practices shall be employed so that smoke does not negatively impact a nearby population centre or workcamp or pose a hazard at airports or on provincial highways by significantly reducing visibility.<sup>33</sup>

## 4.5 Burn Criteria

Four components combine to define the timing of debris pile ignition and the burn duration (length of allowable burning), specifically, open burning division, smoke sensitivity zone, venting forecasts, and setbacks.

There are five acceptable divisions within OBSCR under which open burning can occur, two of which are likely to be employed under the Project:

1. Division 1 – High, Medium and Low Smoke Sensitivity Zones.
2. Division 5 - Air Curtain Incinerators.

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<sup>33</sup> BC Reg. 405/19, s. 15 (a) and (b)

#### 4.5.1 Division 1 – Open Burning by High, Medium, and Low Smoke Sensitivity Zones

Table 3 outlines the specific burn criteria for burning in high, medium and low sensitivity zones.

**Table 3. Burn Criteria for Open Burning Completed Under Division 1 by High, Medium, and Low Smoke Sensitivity Zones<sup>34</sup>.**

	<b>Division 1 – Open Burning by Smoke Sensitivity Zone</b>				
<b>Sensitivity Zone</b>	<b>High (HSSZ)</b>	<b>Medium (MSSZ)</b>		<b>Low (LSSZ)</b>	
<b>Setback Distances (m)<sup>35</sup></b>	Residences and Businesses: 500 Schools, hospitals, and community care facilities: 1000				
<b>Burn Duration</b>	< 2 days	< 1 day	< 4 days	< 1 day	< 6 days
<b>Venting Indices Required</b>	Good (Day Open Burning Starts), Fair or better (Second day of burning)	Good	Good (Day Open Burning Starts), Fair or better (Second day of burning)	Good	Good or Fair (Day Open Burning Starts) and Good or Fair (for the Second Day of Open Burning)
<b>Ignition Time</b>	Not earlier than 1 hour after sunrise				During the burning period
<b>Period for Igniting Piles of Unlit Vegetative Debris</b>	Between 1 hour after sunrise and 4 hours before sunset on the day that open burning starts	During the burning period	Between 1 hour after sunrise and 2 hours before sunset on the day that open burning starts	During the burning period	During the burning period
<b>Period for Adding Unlit Vegetative Material to Ignited Piles</b>	Between 1 hour after sunrise and 4 hours before sunset on the day that open burning starts	During the burning period	Between 1 hour after sunrise and 2 hours before sunset on the day that open burning starts and on the second day of open burning	During the burning period	During the burning period
<b>Burning Ends<sup>36</sup></b>	4 pm on the second day of open burning	4 pm or two hours before sunset, whichever is later, on the same day open burning starts	4 pm on the fourth day of open burning	4 pm or two hours before sunset, whichever is later, on the same day open burning starts	4 pm on the sixth day of open burning

<sup>34</sup> BC Reg. 405/19, ss. 19 - 22

<sup>35</sup> BC Reg. 405/19, s. 13(2). Open burning is allowed within modified setbacks, as per Section 13 (2), OBSCR 405/19. Additional burn criteria apply and are outlined in Table 4.

<sup>36</sup> "end", with regards to when open burning ends, as defined in BC Reg. 405/19 Part 1 and in the glossary.

	<b>Division 1 – Open Burning by Smoke Sensitivity Zone</b>			
<b>Sensitivity Zone</b>	<b>High (HSSZ)</b>	<b>Medium (MSSZ)</b>		<b>Low (LSSZ)</b>
<b>Seasoning<sup>37</sup> Requirements</b>	Vegetative debris must be seasoned	The amount of seasoned vegetative debris must be maximized	Vegetative debris must be seasoned	The amount of seasoned vegetative debris must be maximized
<b>Ventilation Forecast Requirements</b>	Ventilation forecast for the area must be obtained on the day, but before burning starts			
<b>CVF Requirements</b>	CVF for the area must be obtained on the day before or on the day, but before burning starts			

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<sup>37</sup> As defined in BC Reg. 405/19 Part 1 and in the glossary.



Despite the setbacks detailed in Table 3, when completing open burning as per Division 1, open burning may be carried out within modified setbacks, if the additional burn criteria conditions laid out in Table 4 are met with respect to the open burning.

**Table 4. Burn Criteria for Open Burning in Modified Setbacks.<sup>38</sup>**

	<b>Modified Setbacks (Division 1 – Open Burning by Smoke Sensitivity Zone)</b>
<b>Setback Distances (m)</b>	Residences and Businesses: 100 Schools, hospitals, and community care facilities: 500
<b>Piling</b>	Vegetative debris must be piled before it is open burned
<b>Pile Dimensions</b>	Largest horizontal dimension is not greater than twice the height (e.g. for a pile 4 m tall, horizontal dimension must be ≤ 8 m).
<b>Reporting</b>	Written record of the dates the vegetative debris was piled is available to an officer upon request.
<b>Pile Composition</b>	No stumps; largest part of each separate portion of the vegetative debris has a diameter < 50 cm; vegetative debris is seasoned vegetative debris
<b>Notification</b> (not later than 24 hours in advance of starting open burning)	All reasonable efforts are made to give notification of open burning to: occupants of residences, businesses, schools, hospitals and community care facilities within 500 m. Notification to the persons who manage the school, hospital or community care facility.
<b>Ventilation Forecasts</b>	Good
<b>Ignition Time</b>	Not earlier than 1 hour after sunrise
<b>Burning Ends</b>	4 pm or two hours before sunset, whichever is later, on the same day open burning starts
<b>Other Ventilation Requirements</b>	<ul style="list-style-type: none"> <li>• Ventilation forecast for the area must be obtained on the day, but before burning starts, or</li> <li>• CVFs for the area must be obtained on the day before or the day of burning, but before burning starts.</li> </ul>

#### 4.5.2 Division 5 – Open Burning Using Air Curtain Incinerators

Open burning using air curtain incinerators is exempted from setbacks, as outlined in Section 4.4 and Table 1, as well as piling and seasoning requirements. Setbacks specific to the use of air curtain incinerators are dependent upon meeting open burning criteria and are outlined in Table 5.

<sup>38</sup> BC Reg 405/19, s. 13(2)

**Table 5. Burn Criteria for Open Burning Under Division 5, Using Air Curtain Incinerators.<sup>39</sup>**

	Distance of open burning from values (m)	Distance of open burning from values (m)
Neighbouring buildings residences (including seasonal residences in use), and businesses	100 - 1000	1000+
Nearest property line of hospitals, schools, community care facilities, and identified sensitive receptors.	500 – 2000	2000+
Opacity <sup>40</sup> requirements	Does not exceed 40% during the 30-minute period following the start of open burning and does not exceed 15% for more than 5 consecutive minutes during any other 30-minute period during open burning	
Vegetative debris stacking	Vegetative debris is not stacked above the air outlet of the air curtain incinerators.	
Operational continuity	Air curtain blowers operate continuously until the incinerators cease combustion of the vegetative debris or until all the vegetative debris has been reduced to ash	
Ignition Time	Not earlier than 1 hour after sunrise	N/A
Timing of addition of vegetative debris	From one hour after sunrise to sunset	N/A
Ventilation forecast	Fair or better for the day open burning is carried on; a Poor forecast for the day requires that no more vegetative debris is ignited	N/A

### 4.5.3 Venting Forecasts

Venting forecasts are issued every morning for the current and next day. The forecasts include the ventilation (or venting) index (VI), wind speed, and mixing height to help guide burning operations. Forecast venting conditions for the day of the burn and the following day, if applicable, must meet the minimum venting requirements laid out within the OBSCR and in the relevant burn criteria table (Table 3, Table 4, Table 5).

BC Air Quality defines VI as; “a numerical value related to the potential of the atmosphere to disperse airborne pollutants, such as smoke from a prescribed fire. It is based on both the current wind speed in the mixed layer and the mixing height. The mixed layer is the surface layer of air that is turbulent and well mixed. The mixing height is the thickness of this mixed layer.” Greater wind speeds and thicker mixing heights will result in higher venting indices. It should be noted; however, when wind speeds are too high, ground level mixing may be reduced.

A VI of 0 means that there is no ability for the atmosphere to disperse smoke, whereas a VI of 100 means excellent smoke dispersion; the persistence of smoke from open burning is tied

<sup>39</sup> BC Reg 405/19, s. 28

<sup>40</sup> As defined under BC Reg 405/19, s. 28(1) and the glossary.

directly to atmospheric venting conditions. The numerical values are categorized into three ranges: poor, fair, and good (Table 6). Category boundaries may differ in some jurisdictions; the ventilation forecast provides both the numerical value, as well as the ventilation category. Regulatory requirements outline minimum requirements for ventilation category.

**Table 6. Venting Indices**

Venting Index Numerical Rating	Ventilation Category
0-33	Poor
34-54	Fair
55-100	Good

#### 4.5.3.1 Venting Forecast Sources

There are three acceptable sources for daily venting forecasts: custom venting forecasts (CVFs), Environment Canada regional forecasts, and qualified independent forecasters (details for each source are found in the following subsections). The source of daily forecasts for burning under this SMP will be CVFs, with few exceptions as noted below.

Custom ventilation forecasts must be obtained by a custom ventilation forecaster, as per OBSCR.<sup>41</sup>

There may be times when a CVF for the burn area is not available. In the circumstance that CVFs are unavailable, contractors shall utilize the Environment Canada ventilation forecasts. Contractors must record the daily forecast and source, as well as results of test burn, if applicable. More information on recording and reporting is found in Section 5.

In summary, the source for daily ventilation forecast shall be used in the following order:

1. CVF subscription service, then
2. Environment Canada regional forecast.

It is not allowable to select the forecast that is the most favourable for operations or that best suits burning objectives.

A retained, independent, MOE-approved forecaster would replace the CVF subscription service for ventilation forecasts listed above.

#### Custom Venting Forecasts

To encourage the best dissipation of smoke, burning under this smoke management plan will use custom venting forecasts prepared by a custom ventilation forecaster. Custom venting forecasts are tied more closely to specific geographic locations than Environment Canada forecasts which are prepared for a larger regional area. For this reason, custom venting forecasts are generally thought to be a more accurate choice than Environment Canada venting indices, which often can result in a forecast which is either too strict or too lenient for those locations which are not well-represented by the average area or region for which the forecast was prepared.

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<sup>41</sup> BC Reg 405/19, s. 16

The provincial fire centre weather forecasters are approved by the MOE and shall be retained by the contractor through subscriptions for service to provide custom venting forecasts. Custom forecasting subscriptions are generally available for the fall burning season. To set up subscription and receive MOE-approved CVFs, the contractor shall contact the regional MOE contact (see section 7.3 Key Contacts).

The contractor shall provide the following information to the forecaster, where burning is anticipated: Burn Registration Number, location, latitude /longitude, elevation / elevation range, and approximate number of piles.<sup>42</sup>

### **Environment Canada Forecasts**

The Environment Canada daily venting indices for the Fort St John Zone can be found at: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/ventilation-index> or by phoning 1-888-281-2992 (See Section 7.3).

### **Independent Qualified Forecasts**

BC Hydro may hire an independent, qualified forecaster to provide custom venting forecasts. It is required that all independent forecasters meet the OBSCR definition of custom ventilation forecaster and are approved by the MOE Director in advance of any burning activity which depends upon their forecasts.<sup>43</sup> The first step in forecaster approval is contacting the regional MOE contact (See Section 7.3).

If either BCH or a contractor retains an independent forecaster, the forecasts will take the place of the CVF subscription service. Documentation of MOE approval must be recorded and kept on file.

#### **4.5.4 Burn Duration / Burning Period**

The burning period is the time between ignition and burn end, as outlined in the applicable burn criteria. Burn 'end' for pile burning means the point in time when each pile of vegetative debris has ceased flaming and is emitting smoke from no more than 10% of its burnt surface area.<sup>44</sup>

Smoke release monitoring is the monitoring of burning activities in accordance with burn duration commitments, based upon smoke sensitivity area, setback, and Division under which open burning is occurring. Burn duration commitments are detailed in Table 3, Table 4, and Table 5. Smoke release monitoring and tracking is detailed in Section 6.1.

Burn duration is measured per pile.<sup>45</sup> Each pile that is ignited must individually adhere to burn duration / burn period.

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<sup>42</sup> A general rule of thumb which may be helpful for estimating number of piles is:  $(NAR * 2 = \# \text{ of piles})$ , where NAR = Net Area to be Reforested (ha) = Area Harvested / Cleared.

<sup>43</sup> BC Reg 405/19, Part 1 and pers. comm. Gail Roth, Ministry of Environment, August 3, 2017.

<sup>44</sup> BC Reg 405/19, Part 1

<sup>45</sup> Personal communication (email), October 10, 2019 from [OBSCR@gov.bc.ca](mailto:OBSCR@gov.bc.ca).

The regulation allows for vegetative debris to be open burned up to 5 km from the point of origin. In the case that longer burning period or more flexibility on venting conditions, vegetative debris originating within the HSSZ may be moved to the MSSZ, within 5 km, for open burning.

#### 4.5.5 Change in Burning Conditions

Should weather conditions change such that local airflow or atmospheric mixing is causing or likely to cause make smoke dispersion inadequate, specifically to negatively impact a nearby population or work camp or to be a navigational hazard at an airport or on highways by significantly reducing visibility, debris may not be added to an open burn until conditions improve and is no longer causing to have effects described as above.<sup>46</sup>

## 4.6 Burn Registration

### 4.6.1 Category 3 Piles

Prior to the initiation of any Category 3 burns, the contractor shall obtain a Burn Registration Number (BRN).<sup>47</sup> BRNs are obtained through the BC Wildfire Service at **1.888.797.1717**. BRNs are valid for one parcel and for a two-week period after which time they may be re-issued through the same process. A separate BRN is required for each parcel on which open burning is planned. The following information is required in order to receive a BRN: contact information for person initiating burn (contractor information), parcel description / coordinates of open burning (center point of area for parcels with multiple piles), the number of piles to be burned under the BRN, type of material to be burned, and any other information relating to the proposed open fire that the official or the person answering the telephone number requires.<sup>48</sup>

The following is required for compliance with the BRN<sup>49</sup>: check venting indices (CVFs) prior to ignition; comply with OBSCR, local bylaws, local and provincial fire bans, the *Wildfire Act* and Wildfire Regulations. Following this SMP will ensure compliance with the BRN.

BRNs must be recorded and kept on site during burning activities. Details regarding required contractor recording and reporting are found in Section 6.2.

### 4.6.2 Category 2 Piles

Category 2 burns do not require a BRN. When completing Category 2 burns, the contractor shall record size (height and width), number of piles burning concurrently (two or fewer), and number of piles burned through the day. Piling and burning may be done concurrently, under the condition that pile number or size do not exceed maximums allowed for Category 2. Details regarding required contractor recording and reporting are found in Section 6.2.

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<sup>46</sup> BC Reg 405/19, s. 15

<sup>47</sup> BC Reg. 38/2005, s. 22(1)

<sup>48</sup> BC Reg. 38/2005, s. 24(1)

<sup>49</sup> Pers. comm. Operator at BCWS BRN phone number.

Category 2 burns as part of industrial operations must adhere to all OBSCR regulations, and therefore contractors must: check venting indices (CVFs) prior to ignition; comply with OBSCR, local bylaws, local and provincial fire bans, the *Wildfire Act* and Wildfire Regulations.

## 4.7 Records and Reporting

OBSCR requires all Category 3 and open burning with use of an air curtain incinerator record and maintain specific information, with respect to open burning.<sup>50</sup> The documentation must be kept on site and available for the duration of the open burning, retained for a period of one year from the start of burning, and submitted to the MOE upon request. Details on required information to achieve regulatory compliance are found in section 6.2.

## 5.0 Smoke Reduction – Best Management Practices

Best Management Practices (BMPs) provide guidance to debris management contractors and BCH monitors for opening burn activities and smoke management to help achieve smoke management objectives and compliance with regulatory requirements. The OBSCR requires all reasonable efforts are taken to minimize the amount of smoke emitted when open burning.<sup>51</sup> The strategies and techniques within the BMPs of this section shall ensure that this requirement is met. Specific regulatory requirements outlined in the OBSCR will be identified within the BMPs, where appearing.

### 5.1 Seasonal Burn Planning

#### 5.1.1 Burn Season

Typically, the late summer / early fall offers better burning conditions in terms of fire weather indices and longer daily average of appropriate venting (i.e. longer days). Additionally, this window provides the best window to avoid “holdover” fires; fires that do not extinguish during the winter months can retain the potential to ignite dead grass and forest fuels in the early spring fire season (usually April and May). Fires in late summer and fall have the most time to extinguish on their own in the winter months. Fire hazard abatement monitoring is detailed in Section 6.1.

Burning outside the usual burning season (as noted above) is acceptable, given that the regulatory requirements as set out in this SMP are followed, regardless of seasonal timing (*i.e.* open burning is compliant with all applicable burn criteria, such as venting indices are checked and favourable, there are no provincial or local fire prohibitions, BRN is received, if applicable, and burns comply with all provincial legislation and regulations (OBSCR, *Wildfire Act* and Wildfire Regulation).

#### 5.1.2 Burning Prioritization

Any burning within high smoke sensitivity zones should be prioritized to take advantage of the best venting conditions and longer daytime hours to allow for optimum conditions in those areas closest to populations.

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<sup>50</sup> BC Reg 405/19, s. 31.

<sup>51</sup> BC Reg. 405/19, s. 11

### 5.1.3 Sensitive Time Periods

Seasonal scheduling of burning activities will consider regionally important time periods, for example periods with high recreational activity or periods with known Aboriginal use based on the results of ground-truthing exercises. During, and two days prior to, sensitive time periods, no debris piles will be ignited.

Based on regional recreation activity, the following periods have been identified as sensitive:

- long weekends in May, July, August and September
- Aboriginal use periods – may be determined based on ground-truthing exercises and through the First Nations notification process. Burning practices may require modification based upon responses received from notification. For details regarding burning notification, see Section 7.1.

## 5.2 Debris Pile Construction and Seasoning

Proper pile construction techniques will aid in the achievement of a high intensity burn that is capable of consuming itself in the shortest time possible and achieve easy and safe ignition.

### 5.2.1 Pile Size, Shape and Components

Pile construction shall consider the following:

1. Piles should be roughly conical (haystack or bell-shaped) with a width to height ratio of roughly 2:1. In all cases, piles must be stable.<sup>52</sup>
2. Large piles typically burn hotter and cleaner than smaller piles. Efforts should be made to make fewer, larger piles, while considering crew safety and meeting the smoke release period criteria. Ideally, pile height of 4 m, or higher, is recommended.
  - a. Category 2 burns are a maximum size of 3 m in width and 2 m in height (maximum of two piles burning concurrently per parcel).
3. Coniferous slash often burns better than deciduous (aspen/cottonwood) slash. Efforts should be made to mix fuel types, where practicable.
4. To ensure the continuity of the burn, piles should contain a mixture of debris sizes (mixture of fines with larger diameter material) with as few voids as possible.<sup>53</sup>
5. To achieve efficient ignition, place smaller diameter fuels at the base to create an ignition zone, ideally 2 m thick.

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<sup>52</sup> To help achieve compliance with BC Reg. 405/19, s. 11(b)

<sup>53</sup> To help achieve compliance with BC Reg. 405/19, s. 11(b)

- a. For Category 2 piles, create a good mixture of small and large diameter fuels throughout the pile. Due to reduced size, a 2 m ignition zone is neither ideal, nor feasible.
6. Minimize soil content that may be mixed in with vegetative debris; break root wads up to remove any soils/rocks prior to piling and place pieces higher on the pile.<sup>54</sup>
  7. Within the high sensitivity smoke zone, all vegetative debris burned (piles) must be seasoned, such that the pile is 30% or less moisture content, originates from dead standing timber, or has been piled for a minimum of 4 months<sup>55</sup>. Pile covering is an option to keep fuel moisture content low; remove covering prior to burning.
  8. Within the medium sensitivity smoke zone, within each pile maximize the amount of vegetative debris which is seasoned vegetative debris; piles should be seasoned until they can easily combust. Ideally seasoned piles would be 30% or less moisture content or piled for at least 4 months.<sup>56</sup> Pile covering is an option to keep fuel moisture content low; remove covering prior to burning.
  9. Establish a fuel break around each pile.<sup>57</sup> Determining necessary fuel break width and type should consider, but not be limited to, the following variables: pile size, proximity to adjacent fuels, type of fuels burning and adjacent, fire weather, slope, and aspect. Fuel breaks are defined as: 1) a barrier or a change in fuel type or condition, or 2) a strip of land that has been modified or cleared.<sup>58</sup>
    - a. Examples of potentially acceptable fuel breaks, depending on the variables list above, may include: frozen soils to a depth of one foot, snowpack on frozen soil, or removal of all combustible material / biomass to mineral soil to a width determined to be sufficient for conditions.
  10. Maintain fuel breaks while the fire is burning and there is a risk of the fire escape.<sup>59</sup>

Additional considerations:

11. Do not construct piles in low, water-receiving sites. Low water-receiving sites are defined as any location where the water table is at the soil surface such that fuels are not be able to season or would not be able to achieve ideal fuel moisture content for burning. Areas to avoid may include swales, wetlands, low-lying flood plains, or areas of seepage. This is to ensure that fuels achieve the desired fuel moisture content and therefore burn hotter and with less smoke emission. Piles should be built in locations which are dry (water table not at the surface) for more than 4 consecutive months from spring to winter, not including moisture received during

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<sup>54</sup> BC Reg. 405/19, s. 11(a)

<sup>55</sup> BC Reg. 405/19, s. 19(a)

<sup>56</sup> BC Reg. 405/191, s. 1(c)

<sup>57</sup> BC Reg. 38/2005, s. 22 (1)

<sup>58</sup> BC Reg. 38/2005, s. 1 (1)

<sup>59</sup> BC Reg. 38/2005, s. 22 (1) (f)



precipitation events, and which are not likely to have the water table at the surface during the desired burning window.<sup>60</sup>

12. Do not construct piles within riparian reserve zones (RRZ)<sup>61</sup>, unless directed by BCH due to operational or topographic limitations. Any machine work will be conducted in accordance with CEMP Section 4.5 (15 m machine-free riparian buffer from the Ordinary High Water Mark).
13. Do not construct piles within the minimum setbacks outlined in Table 1, unless open burning using an air curtain incinerator.
  - a. Setbacks for air curtain incinerators can be found in Table 5
14. Do not pile where burning will negatively impact (scorch) the timber edge or retained trees. Larger, machine-built piles will require larger setbacks, whereas smaller, hand-built piles can be closer.
15. Avoid introducing soils and other non-combustibles into the pile.<sup>62</sup>

## 5.3 Pre-Burn Protocols

### 5.3.1 Collate Burn Plan Information

Prior to the burning season, contractors shall collate information related to the smoke sensitivity zone and the approximate number and location (coordinates) of the piles slated for burning. This information is required in obtaining Burn Registration Numbers (BRNs) (see Section 4.6). This information must be available for BCH upon request.

### 5.3.2 Venting Forecasts

Confirm source of venting forecast: custom venting forecast, whether through a subscription service provided by a MOE pre-approved forecaster or by retaining a qualified independent forecaster, or regional forecasts from Environment Canada. See Section 4.5.2 for details regarding venting forecast sources and acceptable utilization.

#### 5.3.2.1 Limitations of Venting Index and Forecasts

Strict adherence to the venting indices (the computed value or category) may conflict with the practical objective of minimizing potential impacts of smoke. There are limitations to the venting index calculations, which shall be considered by the contractor prior to ignition. For example, wind direction and proximity to potential values impacted are not incorporated into the venting index. There may be additional impacts from changing weather, such as changing wind patterns

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<sup>60</sup> To help achieve compliance with BC Reg. 405/19, s. 11(c)

<sup>61</sup> BC Reg 41/2016, s. 1 (1)

<sup>62</sup> To help achieve compliance with BC Reg. 405/19, s. 11(a)

and rain/snow events that may result in undesirable burning conditions or evening and overnight venting conditions. It is important to consider wind direction and mixing heights.

### **Practical Application**

The following adaptations shall be considered by the contractor prior to ignition, as appropriate:

- If wind direction is not favourable and smoke is likely to impact populations, highways, or airports, burn instead in locations where wind direction works in favour of burn and smoke travel.
- Consider moving to remote piles when forecaster confidence in continued good venting is low.
- Consider prioritizing any high smoke sensitivity area burns when forecaster confidence in continued good venting is high.
- Lower mixing heights will not have the capacity for large volumes of smoke, suggesting that the ignition of a large number of piles should be avoided. Ignite fewer piles in these situations to reduce overall volume of smoke emitted.

Despite acceptable venting forecast (e.g. good and fair) advancing weather conditions can result in a rapid decline in venting leading to unacceptable levels of smoke.

### **Venting Forecast Validation**

Venting forecast validation can be completed through ignition and monitoring of a test pile. After test pile ignition, monitor the performance of the burn for 15-30 minutes relative to:

- Fire intensity.
- Smoke release (direction, dispersion, quantity and relation to important infrastructure such as highways, airports, sensitive receptors, and population centres).
- Potential for escape to adjacent piles or slash.

With confirmation that the test pile is burning as planned, continue with the daily burn plan and monitor pile burning performance throughout the day. Where significant reductions in burn performance are noted, burning shall be halted or the burn plan revised to increase burn performance to an acceptable level. Documentation of venting forecast validation, results, and pile performance monitoring are the responsibility of the contractor. See Section 6.2 for details.

### **During Burning**

If, during burning, it is determined that smoke dispersion is not ideal, potential adjustments to daily burn plans could include one, or more, of the following strategies:

1. Ceasing to add new debris to the pile earlier in the day or imposing earlier end time for ignition period to allow for more daytime burning.
2. Using accelerants to promote more rapid pile ignition.
3. Using forced air mechanisms to encourage hotter fires and more complete combustion.

4. Re-piling slash to improve pile construction.
5. Extinguishing burn pile.

### 5.3.3 Communication with Forecasters

The contractors shall communicate with the custom venting forecasters regarding burn registration information. To maximize the effectiveness of the custom venting forecast, work with the forecaster in identifying any additional information that may be required to ensure the most accurate forecasts possible. This information may include specific pile elevation and timing related to the issuance of forecasts. Forecast limitations should be discussed with the forecaster and documented in the daily burn log, as applicable.

### 5.3.4 Training

Desired open burning outcomes are much more likely to be achieved if burning crews have the appropriate level of experience and training. All supervisors, ground crews, and machine operators shall be appropriately trained in regulatory requirements, BMPs, safe work protocols, and Standard Operating Procedures and must be competent in operational fire and fire suppression activities. Contractors must retain records of training and certification on site and provide to BCH upon request. The following is a non-exhaustive list of areas of competency.

- Wildfire Regulation requirements;
- OBSCR requirements;
- Site C Smoke Management Plan –smoke management strategies and BMPs;
- burning criteria;
- burn pile construction;
- burn pile ignition;
- firefighting;
- wildfire reporting;
- fuel handling, storage and spill reporting; and,
- emergency response procedures (ERPs).

### 5.3.5 Environmental Considerations

The Contractor's Qualified Environmental Professional (QEP) shall survey each burn pile prior to light-up to confirm they are not actively being used as an animal den. QEPs may consider the use of drones for den surveys. Den surveys shall have validity duration of 7 days, so if a pile is not lit within this validity period the QEP must complete another den survey prior to light-up or provide environmental rationale in weekly environmental monitoring reports justifying the duration that the burn pile can be considered clear of animal dens. During the bird nesting window (see the CEMP), and when Contractors intend to burn piles, the QEP shall also survey each pile to confirm it is absent of active bird nesting activity. These bird nest surveys shall have validity duration of 3 days, so if a pile is not lit within this time period the QEP must complete another nest survey prior to light-up. The results of these den and nest surveys (as appropriate) shall be available on-site at all times during burn activities and included in weekly reporting (see Section 6.2). Any pile containing an active den or nest must be clearly marked in the field and mapped and this must be communicated to crews in a documented tailboard so they can easily identify it and not light it.

## 5.4 Light-Up Procedures

Pile ignition may occur by ground crews or by aerial ignition (helicopters). It is critical to ensure that all the logistics relative to the burning plan have been addressed prior to ignition. In order to ensure this, a pre-burn checklist (go no-go safety checklist) and an ignition plan must be completed.

### 5.4.1 Pre-burn Checklist

The pre-burn checklist should include all critical safety, regulatory, and operational variables. It is the responsibility of the contractor to ensure that pre-burn checklists include smoke management variables, as well as ensure compliance with other directly relevant legislation, such as the *Wildfire Act* and Wildfire Regulation. A pre-burn checklist must be completed each day one or more debris piles are ignited and separate checklists must be generated for each area covered by a venting forecast and for burning in separate smoke sensitivity zones (e.g., separate pre-burn checklists are required for burns in a custom venting forecast area that spans two or more smoke sensitivity zones). In the event that one or more boxes on the pre-burn checklist are unable to be 'ticked', ignition must not occur.

Table 7 provides an example pre-burn checklist for operators.<sup>63</sup>

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<sup>63</sup> Pre-burn checklist adapted from a variety of sources, including: BCTS Strait of Georgia Open Burning Checklist and BCWS Burn Plan Template.

**Table 7. Example Open Burning Pre-Burn Checklist for Category 2 and Category 3 Fires. The Pre-Burn Checklist may be Modified or Adapted to Better Suit Aerial Ignitions.**

Parcel Description:		Project Geographic Location:	
Latitude (UTM):		Longitude (UTM):	
Category Area:		Burn Category:	
Completed by: _____		Date: _____	
Company Name: _____			
Contact Phone Number(s) _____ (cell / office / other _____) _____ (cell / office / other _____)			
MFLNRORD Burn Registration Number (required for Category 3 burns): _____ N/A Call 1-888-797-1717			
<b>ALL forest fires must be reported immediately to:          1-800-663-5555, or *5555, or to a regional manager, district manager, designated forest official, or peace officer.          The BCH contact must also be notified as soon as possible.</b>			
<b>This checklist is intended for informational purposes only. It is not legal advice. Regulatory obligations are found in the <i>Wildfire Act</i> and Regulation and the <i>Environmental Management Act</i> and Open Burning Smoke Control Regulation.</b>			
Definitions from Wildfire Regulation (2005) Section 1			
Category 2 Open Fire: "...open fire that (a) burns material in one pile not exceeding 2 m in height and 3 m in width, (b) burns material concurrently in 2 piles each not exceeding 2 m in height and 3 m in width, or (c) burns stubble or grass over an area that does not exceed 0.2 ha." (See Wildfire Regulation, S. 21)." Category 3 Open Fire: "...open fire that burns (a) material concurrently in 3 or more piles each not exceeding 2 m height and 3 m in width, (b) material in one or more piles each exceeding 2 m in height or 3 m in width, (c) one or more windrows, or (d) stubble or grass over an area exceeding 0.2 ha." (See Wildfire Regulation, S. 22)." 			
<b>'NO' = NO IGNITION</b>			
Element	Yes / No / N/A	Comments	
<b>PLANNING</b>			
Has smoke sensitivity zone been determined? Is it understood how the smoke sensitivity zone impacts operational activities (burn criteria)?			
Are the piles sufficiently seasoned, according to the smoke sensitivity zone? <ul style="list-style-type: none"> <li>• HSSZ – piles were constructed 4 months ago or more, debris originates from dead standing timber, or are ≤30% moisture content.</li> </ul>			
Has piling been completed according to the SMP such that burning can be completed safely and effectively (including surrounded by a fuel break) and such that the pile can be consumed and burning end within the applicable burn duration? If no, re-pile or allow to season.			
Are pile locations >500 m from any inhabited residences or business and >1,000 m from schools in session, hospitals, continuing care facilities, and identified sensitive receptors (unless burning under the burn criteria conditions stipulated for modified setbacks)?			
Are pile locations outside riparian reserve zones?			
Are piles located according to BMPs: 1) outside of low-lying and water receiving areas; 2) sufficient distance from standing timber to avoid scorching; 3) sufficient distance from surrounding bush to avoid scorching?			
Is a site map available for workers on-site, as well as for arriving responders in the event of an escape? Maps should identify water sources, access/egress, potential helicopter landings, etc.			
A Qualified Environmental Professional has surveyed the piles and confirmed they are free of active animal dens and active migratory bird nests.			
Are ERPs completed and on-site?			
Are there any applicable burning bans or restrictions? Check with BCWS and record fire danger rating.			

Is there a means to report a wildfire on site? (cellular, satellite phone, or radio contact)		
Does the venting index/venting forecast meet OBSCR (day of burn and following day)? Record rating.		
Are there any Air Quality Burning Bans? Check with MOE. Document communications.		
Burn Registration Number received (Category 3 only)?		
Legal obligations under the <i>Wildfire Act</i> and Wildfire Regulation reviewed and understood?		
Legal obligations under the Environmental Management Act and Open Burning Smoke Control Regulation reviewed and understood?		
BCH SMP reviewed and understood?		
Do the piles include only clean, woody waste / debris?		
Have all notifications been completed and recorded in the notification log?		
Have you checked with the local Fire Department and Municipality for local Bylaws that pertain to open fires and permits which may be required?		
Has the crew briefing been completed?		
<b>WEATHER</b>		
Have you checked current and forecasted wind conditions? Are the current and forecasted winds acceptable for burning? If the wind is strong enough to carry sparks to other combustible material, do not burn.		
Check the detailed weather information, including Fire Danger Class, Temperature, Relative Humidity, Precipitation and Wind Speed for work site.		
Ensure that a system is in place for site crew and supervisor to keep notified of current and expected weather forecasts. (Keep records)		
Have site conditions that could lead to potentially dangerous fire behavior or increase probability of spot potential or escape, including slope, aspect, topography, fuels, access and egress, been fully considered?		
Have you checked wind direction and confirmed that wind direction is favourable (will not negatively impact nearby populations and will not pose a hazard at airports or provincial highways by significantly reducing visibility)?		
Was a test pile lit and results recorded?		
<b>SAFETY / SUPPRESSION CAPABILITIES</b>		
Is crew competent and trained to complete operational fire and fire suppression activities? Keep training logs and certifications on file.		
Has all staff on-site been trained on a suppression/response plan in the event of an escape?		
Has a communication plan been established for reporting escaped fire or other emergency situations?		
Are available resources known, able to be contacted, and aware of their responsibility to respond if contacted for containment of potential escapes? And does the list of resources meet the requirements of Wildfire Regulation based on Category of fire?		
Have sources of water for fire suppression been identified. If none available, develop a contingency plan.		
Ensure key contact information for reporting emergencies is included in the ERP.		
Is adequate suppression equipment available at the burn area of a type and capacity adequate for fire control if a fire escapes?		
Are adequate personnel on site to ensure that the fire does not exceed the capacity of the persons, firefighting tools and heavy equipment on site for timely action to prevent fire from escaping?		
Is there a patrol on site equipped with at least one firefighting hand tool and who will immediately carry out fire control, if practicable, and who has the means to report the fire and is aware of this responsibility?		
Crew members have adequate PPE and fire suppression tools in good working order.		

### 5.4.2 Ignition Plan

A daily ignition plan shall be developed and provided to BCH prior to each day’s ignition activities. It shall include, but not be limited to, personnel; ignition method, tactics, and procedures; ignition location (e.g. GPS points of piles to be ignited or extents of ignition); and flight plan.

### 5.4.3 Daily Ignition Period

The daily ignition period is the recommended time of pile ignition and has been designed to coincide with the time of day where venting conditions are typically best and to ensure that there is sufficient time remaining after ignition for the burn to consume most of the pile (Table 8). Following daily ignition periods will increase the potential for burns to occur during the time of day when venting is most favourable and minimize the release of overnight smoke when venting is generally less favourable.

**Table 8. Recommended Daily Ignition Period**

Smoke Sensitivity Zone	Venting Forecast (Day of Ignition)	Venting Forecast (Day After Ignition)	Daily Ignition Period
High	Good	Fair or Better	1-hr after sunrise to 4-hr before sunset <sup>64</sup>
Medium	Good	Fair or Better	1-hr after sunrise to 2-hr before sunset <sup>65</sup>
Low	Fair or Better	Fair or Better	1-hr after sunrise to 2-hr before sunset

### 5.4.4 Pile Ignition

Pile ignition shall conform to the following:

1. Ignition should occur on the upwind side of the pile.
2. Ignition should be low on the pile.
3. To support rapid ignition, select a portion of the pile with the most ideal mixture of piece size and distribution (i.e. choose a portion of the pile that most accurately represents the characteristics of the piles, as described in Section 5.2.1).
4. When fine fuels are damp / green or when slash pile lacks the appropriate distribution of piece sizes, consider using propane torches or fuel gel and forced air mechanisms to encourage a better and hotter ignition. Alternately ignition can wait until fuel moisture conditions are such that an efficient ignition and burn can be achieved.
5. When aerial ignition is used, all ignitions shall follow the safe work procedures and best practices of the helicopter company and the situational awareness and judgment of the pilot.

<sup>64</sup> BC Reg 405/19, s. 20 (d)

<sup>65</sup> BC Reg 405/19, s. 21 (c)

## 6.0 Monitoring and Tracking

### 6.1 Monitoring

Monitoring of pile burning will be undertaken at three levels; smoke release, debris reduction and hazard abatement.

#### 1. *Smoke Release*

After the allowable burning period ends, piles will be inspected for compliance with the burn duration. If, at the end of allowable burn duration, the pile is found to be emitting smoke from more than 10% of its burnt surface area<sup>66</sup> (or with the use of an air curtain incinerator, the burn is emitting smoke from more than 10% of the base of the air curtain incinerator), then the pile will be extinguished (debris broken up to achieve burn end).

In the event that debris reduction objectives have not been met at the end of the burn duration, available options include and may implemented, at the discretion of BCH:

- extinguish the pile and consider all operations for the pile to be complete;
- re-pile to facilitate cleaner burning and reignite under a new burning period with acceptable venting and according to the relevant burn criteria; or,
- buck any long pieces to a length <4 m.

New piles will be considered a new burning period and must comply with this SMP and regulatory requirements as a new burn.<sup>67</sup>

Under all scenarios, BC Hydro and the contractor shall review the contributing factors to a burn which exceeds the burn period and shall make appropriate compensatory changes to subsequent burn plans.

It is the contractors' responsibility to ensure compliance with burn periods. The contractor shall document compliance and submit documentation to BCH weekly with the burn tracking requirements (see 6.2.1 for details).

#### 2. *Debris Reduction*

Debris reduction shall be assessed to ensure that the appropriate reduction in debris mass has been achieved. If it is deemed that the level of debris reduction is not acceptable, BCH may determine that the pile shall be: 1) extinguished, re-piled and ignited again; 2) bucked into lengths shorter than 4 m; or, 3) left as-is.

#### 3. *Hazard Abatement*

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<sup>66</sup> As defined in BC Reg 405/19, s. Part 1 and the glossary.

<sup>67</sup> Personal communications: Earle Plain Air Quality Meteorologist email October 29, 2019.



For the purposes of hazard abatement, piles will be monitored to ensure that the piles are completely extinguished. Category 3 fires must be extinguished by the date specified by the official or person who issued the BRN.<sup>68</sup> Contractors must be able to display that each individual pile is out. This can be achieved by cold trailing by hand or assurance by a thermal scan.

Depending on seasonal timing of burns, there may be potential for holdover fires to pop up in the spring. Pile monitoring in spring shall be completed by the contractor to ensure holdover fires do not cause unintended ignitions or burns. This risk is highest in spring after snowmelt and prior to green-up.<sup>69</sup> Infrared scanning shall be completed immediately after the site is snow-free and prior to hazard build up. Site conditions shall be monitored to determine appropriate timing for infrared scanning, rather than relying solely on calendar timing to schedule scans.<sup>70</sup>

## 6.2 Tracking

Tracking, or documentation, is required to demonstrate diligence to the process, to demonstrate compliance with legislation and commitments, and to help track efficacy and improve performance. Tracking documents produced through activities related to this SMP include, but are not limited to:

- Burn tracking form;
- Pre-burn checklist;
- Ignition plan;
- Burn period / smoke release form;
- Den and bird nesting surveys; and,
- Associated photo-documentation of the above.

### 6.2.1 Burn Tracking

Burn tracking begins prior to ignition and continues through to the time it is confirmed that the fire is extinguished. Burn tracking provides valuable data for continual improvement, helps to achieve compliance with regulations and BMPs, and tracks productivity. It is the contractor's responsibility to:

1. Ensure a pre-burn checklist and ignition plan is completed prior to ignition and provided to BCH upon request (Sections 5.4.1 and 5.4.2, Table 7).
  - a. Note any diversions from ignition plan.
2. Record GPS coordinates of ignited piles, date of piling, and allowable burning duration.
  - a. Pre-ignition, georeferenced photos of piles is recommended (or alternative documentation system of an equivalent and measurable monitoring system developed by the contractor and approved by BCH).

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<sup>68</sup> BC Reg. 38/2005, s. 22 (2) (b)

<sup>69</sup> Personal communication, Doug Smith, BCWS, Prince George Fire Centre.

<sup>70</sup> Personal communication, Cliff Laursen, BCWS, Prince George Fire Centre.

3. Complete and submit the Burn Tracking Form daily (Table 9). The form provides details on the progress of the burn plan, documents compliance, and provides information related to burning criteria.
4. Document any changes to ongoing burn plans; note if or how the changes are a direct result from monitoring feedback (Table 9).
5. Complete the burn period / smoke monitoring tracking form (or alternative equivalent documentation system developed by the contractor).
  - a. Record ocular observations and photos related to achievement of burn period per pile.
6. Complete and retain results of den and active-bird nesting surveys (Section 5.3.5).

The daily burn tracking form, burn period / smoke release monitoring documentation, photo-documentation and den and bird nesting surveys shall be submitted weekly to the BCH representative / project supervisor. All other documentation shall be available to BCH upon request.

**Table 9. Burn Tracking Form, including an example entry. Ignitions on different parcels, different geographic location or Smoke Sensitivity Zone, or difference in Burn Category (Category 2 / Category 3) would necessitate additional entries or additional forms. An asterisk (\*) indicates reporting requirements from the OBSCR.<sup>71</sup>**

BRN Information			Location			Custom Venting Forecast			Other Information												
*Date / Ignition Period	*Number of Piles	Piles Ignited	Pile Remaining	*Burn Reference #	Parcel Description (Legal, PID, or description)	Latitude	Longitude	Elevation	Smoke Sensitivity Zone	Burn period end	*Venting Source Used	*Venting @ 4 pm Day 1 (VI/ VI Category)	*Venting @ 4 pm Day 2(VI/ VI Category)	Wind speed and direction (Current / Forecasted)	Closest value and direction from burn site	Pile size (height and width)- Category 2 Only	Test Burn (Y/N and results)	Fuel Break (type, width, maintenance)	Change in conditions / update (Time/ Comment)	Change in conditions / update (Time/ Comment)	Additional comments
11/15/19, 10:30am – 11:30am	95	94	1	123456	REM SEC 3 TP 86 R 24212W6M	56. 14 54.36	121.12 58.82	700 m	Medium	11/18/2019, 4:00 pm	CVF	65 (good)	52 (fair)	17 kph, NE / 6kph, N	Fort St John - NE	N/A – Category 3 burn	Y – 9:30am ignition, venting moderate, wind blowing away from town. Clear skies.	6" snow on frozen soils, expanded 2' during burn, watched and no fire spread	11:30 am checked conditions, venting slightly improving, no reduction of visibility.	2:00 pm change in wind speed and direction. Gusting to 35 km, S wind. Burn halted.	Photo documented test burn venting, afternoon venting, and pre-burn piles.

<sup>71</sup> 31(1) Open Burning Smoke Control 405/19

**Table 10. An example of an acceptable burn period/ smoke release monitoring form.**

General information			Smoke release / burn duration monitoring						Debris reduction			Other			
Date / Time of Day	Burn Reference #	Parcel Description (Legal, PID, or description)	Latitude	Longitude	Smoke Sensitivity Zone	Allowable Burn Duration	Pile Ignition Date / Time	Burn period end	% of burnt surface area emitting smoke	Action taken	Follow-up recommended	Pile size (m) (unconsumed vegetative debris remaining)	Piece size (note number and size of pieces >4 m in length)	Follow-up recommended	Additional comments
11/15/19, 3:45 pm	123456	REM SEC 3 TP 86 R 24212W6M	56. 14 54.36	121.12 58.82	Medium	<4 days	11/15/17, 10:30am	11/18/2019, 4:00 pm	~5%	None required; smoke release in compliance with burn end (<10%)	Cold trail or thermal scan to ensure pile is extinguished (spring 2020)	2 m x 3 m x 1 m	1 piece >4 m	None recommended; one piece > 4m will remain due to pile location and limited accessibility	Georeferenced photographs taken; smoke release is visible.

### 6.2.2 Record Keeping and Submission

It is the responsibility of the contractor to complete, retain, and submit all records created as a result of open burning and implementation of the SMP.

#### 6.2.2.1 Weekly Submission

The following forms (or contractor-developed equivalent) and associated photo documentation shall be submitted weekly by the contractor to the appropriate BCH representative. Records will be saved as pdf files and uploaded to SharePoint.

- Burn tracking form;
- Burn period / smoke release form;
- Den and bird nesting surveys.

#### 6.2.2.2 Upon Request

The following records must be retained and submitted to BCH or MOE upon request.

- Pre-burn checklist;
- Ignition plan.

Daily burn tracking forms must be retained for a period of one year beginning on the start date of open burning and be submitted to an MOE officer upon request.<sup>72</sup>

## 6.3 Air Quality Monitoring, Advisories and Burn Bans

The BC Ministry of Environment operates an air quality monitoring station at the North Peace Cultural Centre in Fort St. John. Fine particulates will be monitored at 3 locations (85<sup>th</sup> Avenue Industrial Lands, Old Fort, and the Site C worker accommodation complex) and monitoring will be completed according to Appendix B - Air Quality Monitoring Program of the CEMP.

The Ministry of Environment (MOE) may issue air quality advisories or burn bans should particulate matter concentrations approach or exceed provincial objectives<sup>73</sup>. The current provincial 24-hour ambient air quality objectives are as follows:

- Particulate matter <2.5 microns (PM<sub>2.5</sub>): 25 µg/m<sup>3</sup>
- Particulate matter <10 microns (PM<sub>10</sub>): 50 µg/m<sup>3</sup>

If an advisory and/or burn ban is issued, burn operators are required to adhere to the terms of the advisory and/or burn ban.<sup>74</sup>

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<sup>72</sup> BC Reg 405/19, s. 31(2)(b)(c)

<sup>73</sup> BC Reg 405/19, s. Schedule 2

<sup>74</sup> BC Reg 405/19, s. 30(1)(2)(3)

## 7.0 Notification and Wildfire Reporting

### 7.1 Notification

Notifications to key stakeholders will take a multi-layered approach. The contractor shall notify BCH of existence of acceptable burning conditions and intention to ignite up to 24 hours in advance of ignition and not later than 8:00 AM on the day prior to ignition.

#### 7.1.1 Public

Intentions to burn will be included in a biweekly construction bulletin issued by BC Hydro. Additionally, the Contractor will issue notices to groups identified in Tables 9 and 10, preferably within 24 hours of a day with acceptable burn conditions and no later than 8:00 AM on the day a burn might or will occur. Contractors will use messaging approved by BC Hydro for this communication and will cc BC Hydro on all e-mail notifications. Property owners and First Nations will be contacted by BC Hydro.

#### 7.1.2 First Nations

Indigenous groups are to be notified a minimum 30 days' prior to the commencement of burning activities in a given location. This is in order to maintain a consistent standard and to align the notification process with requirements from other permits and licenses issued for the Site C project under the *Wildlife Act* and the *Land Act*. As outlined in the aforementioned permits and licenses, notification is to occur: prior to initiation of an activity; within 30 days of completion of the activity; and, upon significant change to a construction activity. Therefore, the notification process applies to all open burning activities, as outlined in this smoke management plan. Indigenous groups will be notified by BCH Indigenous Affairs Department.

#### 7.1.3 Other Stakeholders

All other stakeholders shall be notified by the contractor. Notification shall occur prior to 8:00 AM on the day of burn. Contractors must keep notification logs to document and track: day and time of notification, method of notification (email, phone, text, or a combination), results of notification (voicemail, read receipt, summary of conversation, etc.). Notification logs must be submitted by the contractor to BCH weekly.

**Table 11. Geographical Units and Key Stakeholders for Notification. Contacts for key stakeholders are found in Section 7.3.**

Stakeholders	Site C Reservoir			Transmission Line		Quarry Sites	
	Dam Site to Cache Creek	Cache Creek to Half-way River	Halfway River to Hudson's Hope	Site C Dam to Jackfish Road	Jackfish Road to Peace Canyon Dam	West Pine	Portage Mountain
RCMP	x	x	x	x	x		x
City of Fort St John	x			x			

Stakeholders	Site C Reservoir			Transmission Line		Quarry Sites	
	Dam Site to Cache Creek	Cache Creek to Half-way River	Halfway River to Hudson's Hope	Site C Dam to Jackfish Road	Jackfish Road to Peace Canyon Dam	West Pine	Portage Mountain
Fort St John Fire Department	x			x			
Charlie Lake Volunteer Fire Department	x						
Peace River Regional District	x	x	x	x	x		x
District of Taylor and Taylor Fire Department	x	x	x	x	x		
District of Hudson's Hope		x	x		x		x
Hudson's Hope Fire and Rescue Service		x	x		x		x
Chetwynd Fire Department					x	x	
District of Chetwynd					x	x	
BC Wildfire Service	x	x	x	x	x	x	x
Northern Health	x	x	x	x	x		x
MFLRNORD	x	x	x	x	x		x
Property owners	x	x	x	x	x	x	x

## 7.2 Wildfire Reporting

In accordance with the *Wildfire Act*, all wildfires shall be reported to 1.800.663.5555 or \*5555 from a cellular phone.<sup>75</sup> There must be means on site to report a wildfire (cellular phone, satellite phone, or radio to someone with means to report).<sup>76</sup>

## 7.3 Key Contacts

**Table 12. Key contacts for notification, party responsible for notification, and primary method of notification.<sup>77</sup>**

Agency	Contact	Responsible for Notification	Primary Method for Notification
Ministry of Environment – Regional Contact	Earle Plain Head, Air Quality Section Monitoring, Assessment, and Stewardship Environmental Protection Ministry of Environment and Climate Change Strategy Office: 250-739-8253 Fax: 250-751-3103 <a href="mailto:Earle.Plain@gov.bc.ca">Earle.Plain@gov.bc.ca</a> 2080-A Labieux Road Nanaimo, BC V9T 6J9  Gail Roth Air Quality Meteorologist, Air Quality Section (Assessments) Monitoring, Assessment & Stewardship Ministry of Environment and Climate Change Strategy Office: 250-645-9358 Fax: 250-565-6629 <a href="mailto:Gail.Roth@gov.bc.ca">Gail.Roth@gov.bc.ca</a> Suite 325, 1011 4th Avenue, Prince George, BC V2L 3H9	Contractor	Email
Environment Canada Daily Ventilation Forecasts	<a href="https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/ventilation-index">https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/ventilation-index</a>	N/A	N/A
RCMP Hudson Hope Detachment	Cpl. Rob Gardner email: robert.gardner@rcmp-grc.gc.ca  Linda Cantlon Linda.cantlon@rcmp-grc.gc.ca	Contractor	Email

<sup>75</sup> 2 *Wildfire Act* S.B.C. 2004, c. 31

<sup>76</sup> 6(4) *Wildfire Regulation*, 38/2005

<sup>77</sup> Contacts are likely to change over the duration of the project. It is recommended to confirm and update, as necessary, prior to each burning season.



Agency	Contact	Responsible for Notification	Primary Method for Notification
RCMP Fort St John Detachment	S/Sgt. Scott Watson Email: <a href="mailto:Scott.Watson@rcmp-grc.gc.ca">Scott.Watson@rcmp-grc.gc.ca</a>	Contractor	Email
City of Fort St John	Milo MacDonald, Chief Administrative Officer <a href="mailto:mmacdonald@fortstjohn.ca">mmacdonald@fortstjohn.ca</a> 250-787-8160	Contractor	Email
Fort St John Fire Department	Darrel Blades, Fire Chief <a href="mailto:d blades@fortstjohn.ca">dblades@fortstjohn.ca</a> 250-785-4333	Contractor	Email
Peace River Regional District	<a href="mailto:prrd.dc@prrd.bc.ca">prrd.dc@prrd.bc.ca</a> 250-784-3200	Contractor	Email
District of Taylor and Taylor Fire Department	Steve Byford, LAFC, CD, Fire Chief <a href="mailto:Sbyford@districtoftaylor.com">Sbyford@districtoftaylor.com</a> <a href="tel:250-789-3392">250-789-3392</a>  Kevin Holder, Deputy Fire Chief <a href="mailto:ecalla@districtoftaylor.com">ecalla@districtoftaylor.com</a>	Contractor	Email
District of Hudson's Hope	Mokles Rahman, Chief Administrative Officer <a href="mailto:cao@hudsonshope.ca">cao@hudsonshope.ca</a> 250-783-9901	Contractor	Email
Hudson's Hope Fire and Rescue Service	Brad Milton, Fire Chief <a href="mailto:brad@hudsonshope.ca">brad@hudsonshope.ca</a> 250-783-0542	Contractor	Email
Charlie Lake Volunteer Fire Department	Edward Albury, Fire Chief <a href="mailto:Edward.albury@prrd.bc.ca">Edward.albury@prrd.bc.ca</a> 250-785-1424	Contractor	Email
Chetwynd Fire Department <sup>78</sup>	Dan Golob <a href="mailto:dgolob@gochetwynd.com">dgolob@gochetwynd.com</a> 250-788-2424	Contractor	Email
District of Chetwynd	Carol Newsom, Chief Administrative Officer <a href="mailto:CNewsom@gochetwynd.com">CNewsom@gochetwynd.com</a> 250-401-4104	Contractor	Email
BC Wildfire Service, Prince George Fire Centre	Doug Smith, Senior Wildfire Officer – Prevention <a href="mailto:Doug.j.smith@gov.bc.ca">Doug.j.smith@gov.bc.ca</a> 778-693-2879  James Bergen, Fire Protection Officer <a href="mailto:james.bergen@gov.bc.ca">james.bergen@gov.bc.ca</a> 778-576-8898 250-785-6349	Contractor	Email
Northern Health	<a href="mailto:Resource.development@northernhealth.ca">Resource.development@northernhealth.ca</a> 250-263-6000  Seyoum Gebeyehu Environmental Health Officer, Health Protection and Disease Prevention <a href="mailto:Seyoum.gebeyehu@northernhealth.ca">Seyoum.gebeyehu@northernhealth.ca</a>	Contractor	Email

<sup>78</sup> The Chetwynd Fire Department does not provide firefighting or rescue services for the West Pine quarry area. Highway rescue only is available.

Agency	Contact	Responsible for Notification	Primary Method for Notification
	Ali Moore Team Lead, Health Protection and Disease Prevention <a href="mailto:Ali.moore@northernhealth.ca">Ali.moore@northernhealth.ca</a>		
MFLRNORD	Ken Dobb – Project Manager <a href="mailto:Ken.dobb@gov.bc.ca">Ken.dobb@gov.bc.ca</a> 250-795-4169	Contractor	Email
Property Owners	James Thomas, BC Hydro Senior Manager, Properties: <a href="mailto:James.Thomas@BCHydro.com">James.Thomas@BCHydro.com</a> 604-695-5288  Thomas Brent: <a href="mailto:Thomas.brent@bchydro.com">Thomas.brent@bchydro.com</a>  Steven Burke: <a href="mailto:Steven.Burke@bchydro.com">Steven.Burke@bchydro.com</a>  Will Mbaho, Communications Advisor: <a href="mailto:will.mbaho@bchydro.com">will.mbaho@bchydro.com</a> 604-699-7281  Jimmy Yip: <a href="mailto:jimmy.yip@bchydro.com">jimmy.yip@bchydro.com</a>	BCH Public Relations Department	Bi-weekly Construction Report
First Nations		BCH Indigenous Affairs Department	TBD by BCH Indigenous Affairs Department

## 8.0 Qualified Professionals

This plan was revised in accordance with the BC Open Burning Smoke Control Regulation 405/19, enacted September 15, 2019, Waste Discharge Regulation, *Wildfire Act*, and Wildfire Regulation by the following qualified professional:

Tove Pashkowski      Registered Professional Forester

This plan was originally prepared (June 2015) in accordance with the BC Open Burning Smoke Control Regulation (BC MOE 2012) and proposed updates to the regulation (BC MOE 2010), by the following qualified professionals:

William Golding      Registered Professional Forester, Silvicon Services Inc.

Paul Veltmeyer      Registered Professional Forester, BC Hydro.

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