PORT of vancouver | Vancouver Fraser Port Authority

Project and Environmental Review Guidelines

Environmental air assessment

Environmental programs, Vancouver Fraser Port Authority

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1. Introduction

These guidelines are intended to assist applicants in preparing an assessment of potential environmental impacts from air emissions, resulting from the proposed operations, which could affect air quality and contribute to climate change. Air emissions resulting from construction, demolition or non-routine maintenance activities are addressed through the Construction Environmental Management Plan (CEMP) guidelines and/or through permit conditions.

An environmental air assessment may need to be provided as a supporting technical study for PER categories C and D. Section 4 Applicability should be reviewed and can assist in determining how these guidelines may apply and the general scope of the assessment.

2. Overview

This document provides guidance to applicants and their consultants who are proposing works and activities (referred to herein as “projects”) on Vancouver Fraser Port Authority-managed lands and waters (“port lands and waters”). These guidelines support the Vancouver Fraser Port Authority’s Project and Environmental Review (PER) process and should be used by both applicants and qualified environmental professionals retained to assist with technical aspects of an environmental air assessment. These guidelines also support air assessments as may be required to support the port authority’s air action programs or other initiatives. It outlines the typical objectives of an environmental air assessment and describes the processes that are generally followed. The intention is to assure that, where projects are found to warrant an environmental air assessment, the assessment is carried out in a consistent manner and to an appropriate level of care and attention.

The environmental air assessment technical study should be submitted as a written document, following the general outline presented in this document and as part of a project permit application. As these guidelines are broad in nature, applicants may be required to meet with the port authority to confirm the scope of the assessment during the PER preliminary review phase prior to submitting an application. Where a proponent plans to amend or seek an Air Quality Management Permit from Metro Vancouver (GVRD), the port authority may request the attendance of Metro Vancouver, where appropriate, to facilitate coordination. The objective of the preliminary air assessment meeting is improve coordination and clarity on the air assessment process, timelines and general approach.

Note: This document provides guidance only and is not intended to address all aspects of an environmental air assessment. The Vancouver Fraser Port Authority at its sole discretion and through the PER process will determine actual requirements and the adequacy of an environmental air assessment.

3. Principles and objectives

The Vancouver Fraser Port Authority is committed to reducing air emissions associated with port activities, including fugitives (such as dust and volatile organic compounds (VOCs)), and greenhouse gases (GHG), in order to protect air quality and the health of port users and local communities, and to minimize contributions to climate change. The port authority’s objectives as related to air emissions are as follows:

- Reduction of Criteria Air Contaminants (CAC), e.g., equipment turnover and upgrades
- Reduction in the severity and number of air emission discharge incidents, e.g., fugitive dust episodes
- Reduction of all air emissions (CAC and GHG) through improvements in operational efficiency, use of alternative technologies, fuel switching, and electrification
- Demonstration of continuous improvement in air emission management[1]

An environmental air assessment is a key component in determining if a project and related activities will result in significant adverse environmental impacts and mitigation measures that may be required. The determination of a

1 Continuous improvement is an important objective for the Vancouver Fraser Port Authority and should be addressed both during the design stage (this assessment) and through an operational Air Emissions Management Plan (AEMP) which is tied to permit conditions or lease terms.

significant impact to air quality[2] is based on the incremental change as a result of a project and/or related operational activities. In order to assess the potential for a project to impact the environment, a comparison must be made between the current condition (baseline case) and a predicted future condition (post project cases), as detailed in section 5 Environmental air assessment guidelines.

3.1. Levels of assessment

For projects that require an air assessment, two levels are defined with increased detail and effort. The use of two assessment levels allows an appropriate degree of care and attention to be applied in relation to the scope of the project regarding the assessment of impacts to air quality.

Level 1 **Emission estimation** – a bottom-up approach for estimating emissions based on activities associated with a project and is **required for all assessments**. A Level 1 assessment requires a quantification[3] of total emissions and qualification[4] of emission variability (seasonal, daily, hourly) to provide an indication of degree and/or potential that a discharge to the air could affect air quality.

Level 2 **Atmospheric dispersion modelling** – provides greater detail on potential impacts to air quality and builds upon the emission estimates in Level 1, accounting for meteorological conditions, source variations, terrain, and the influence of physical structures. Dispersion modelling would apply only to sources within the facility, terminal or leased property boundary.

A determination of a Level 2 assessment requirement for the environmental air assessment will be made during the PER preliminary review phase and details discussed during the preliminary air assessment meeting.

Note: PER Categories are specifically applied to projects that are below the *Impact Assessment Act* "designated project" threshold, and therefore photochemical modelling or other advanced techniques as part of the assessment are not applicable to this guide.

3.2. Assessment framework

In order to assess the degree or potential to which a project may impact the environment, a comparison of current conditions (baseline case) is made to a predicted future condition (post project cases). The assessment relies primarily on an overall emission level comparison, thus it is important to detail the connection between activity and emissions to the air. A clear connection should be made between the activities, such as commodity throughput, hours of operation, vessel calls, rail and truck gate counts, fleet changes, and how they might influence air emission characterization. Figure 1 summarizes the general steps required for a Level 1 assessment. See section 4 Applicability for details on when a Level 2 assessment may apply.

The following are key components and requirements in the Level 1 assessment framework as presented in Figure 1.

Geographic scope Captures the facility, terminal or leased property of the proposed project and the related supply chain activity that support the operations of the facility (e.g., marine, truck, and rail). Supply chain activities are considered in an effort to identify mitigating measures that can be applied within the facility boundary, or proposed operations occurring with the port authority's jurisdiction. See section 5.3.1 Geographic boundaries for additional details.

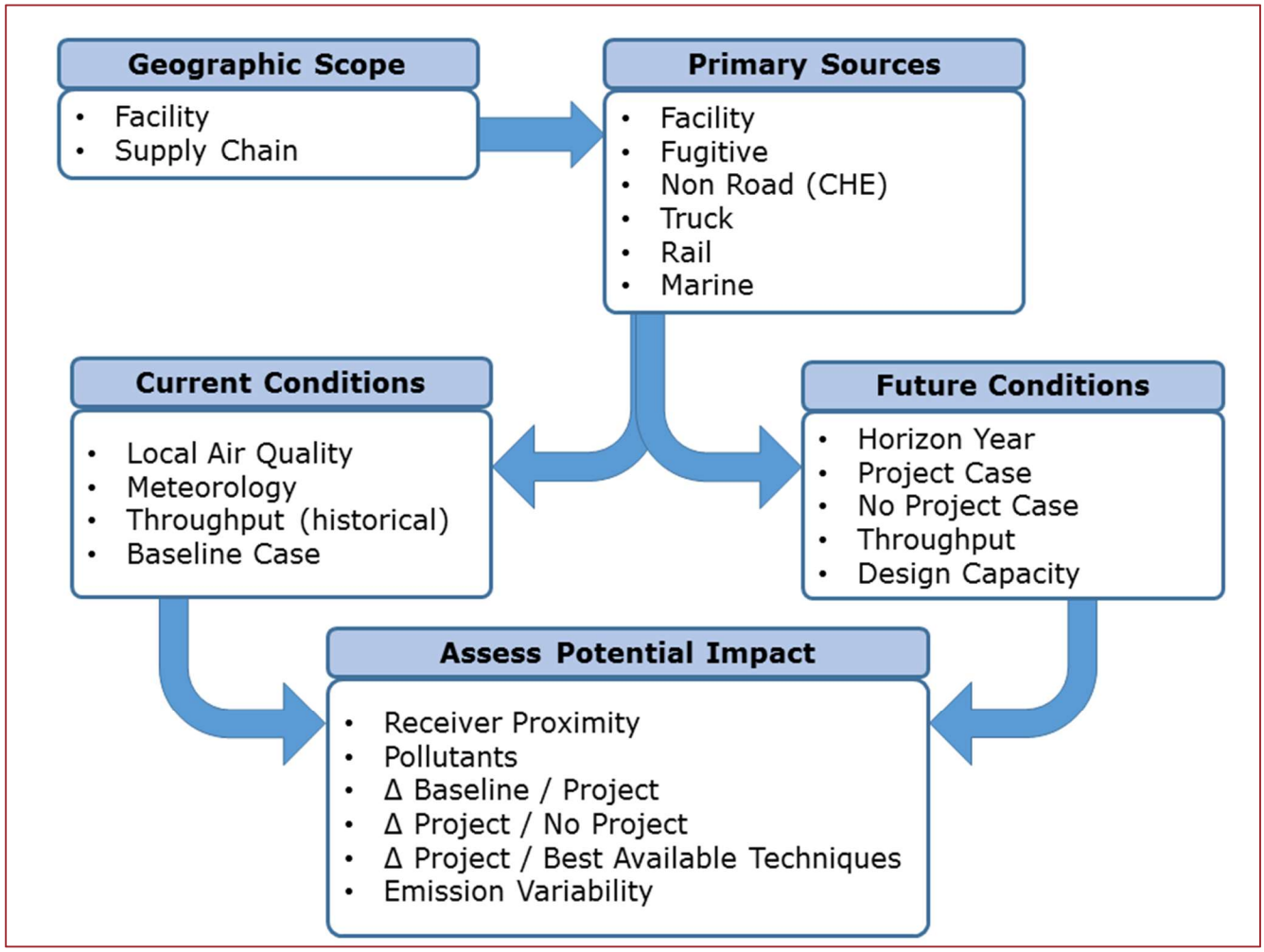
2 Air quality in this context is the metric that we can use to quantify the environmental state of the air around us, is something that we can physically measure and track over time, can inform health authorities, and support local, regional, and national air shed planning.

3 Quantify: to calculate, express, or measure a determinate or estimated value.

4 Qualify: to characterize, make more specific, or limit in meaning or applicability.

Primary sources	Within the defined geographic scope, define the primary sources of emissions to the air and associated operating modes for both the current and future conditions. Primary sources could include emissions from the facility, cargo handling equipment, trucks, rail, marine, vessels, and other sources.
Current condition	Qualify the current air quality environment and quantify the activity levels within the geographic scope and by primary sources in order to establish a baseline emissions case.
Future condition	Quantify future activity levels within the geographic scope and by primary sources in order to establish future emissions (project case), taking into consideration a business as usual scenario (no project case), a best available techniques scenario (BAT case), and qualify design capacity constraints.
Assess impact	Quantify the change in emissions between the baseline to project case, between the project to no project case, and the project to best available techniques case. For a Level 1 assessment; qualify the potential for impacts based on receiver proximity, pollutant make up, and emission estimate variability. For a Level 2 assessment; quantify the potential impacts through dispersion modelling of the facility, terminal or leased property.

Figure 1: Assessment framework – Level 1



Legend: CHE – Cargo Handling Equipment
Δ - Delta, incremental change

4. Applicability

These guidelines cover the assessment of potential impacts from **operational** air emissions. Air emissions resulting from **construction, demolition or non-routine maintenance** activities are addressed through the Construction Environmental Management Plan (CEMP) guidelines and/or through permit conditions.

4.1. Assessment considerations

The following considerations inform the determination of whether an air assessment is required as part of the Project and Environmental Review. In general this is reflected in the PER Categories (A through D) in which C and D category reviews may require an air assessment. The Vancouver Fraser Port Authority will determine when an environmental air assessment is required during the PER preliminary review phase and provide guidance on the how the assessment should be undertaken.

- Will the project involve non-static processes or activities such as the operation of heavy mobile equipment or machinery, or the movement and/or processing of goods or raw materials?
- Will the project involve mechanical processing equipment (commodity handling, conveyors, crushers, etc.)?

- Will equipment and/or processes be located/conducted in open air environments (i.e., not within an enclosed structure)?
- Will the combined power of equipment (excluding electrical and marine) be greater than 2000kW?
- Will the project involve an expansion of the hours/days of operation?
- Will the project result in an increased throughput capacity?
- Will the project generate significant volumes of road and/or rail traffic?
- Will the project change the type or frequency of marine traffic?
- Are there any sensitive receivers within 200 m (community proximity)?
- Is there a potential for dust issues?
- Is there a potential for odour issues?

4.2. Scope of assessment

A Level 1 assessment emission estimate is required for all air assessments submitted as part of a project permit application. During the preliminary air assessment meeting, the requirements will be discussed and an air assessment checklist will subsequently be issued by the port authority. A Level 2 dispersion modelling assessment may be required in consideration of the following:

- Current condition (baseline case) air quality is marginal
- Any one pollutant (not GHG) increases significantly
- New pollutant introduced (new project, change in commodity, etc.)
- Residence or sensitive habitat in close proximity
- Emissions show considerable variability and high peak rates

A determination of a Level 2 assessment requirement for the environmental air assessment will be made during the PER preliminary air assessment meeting. If a Level 2 assessment is required, the dispersion modelling plan must be reviewed with the port authority prior to conducting the analysis.

5. Environmental air assessment guidelines

These guidelines focus on defining the scope of the assessment and a reporting framework in order to assist applicants and qualified environmental professionals to fulfill port authority requirements. The emission estimation methods are discussed at a high level and general guidance is provided but it is the responsibility of the qualified environmental professional who is an air quality practitioner to ensure that methods are correctly applied and that assumptions are clearly stated and referenced.

The air assessment reports submitted to the Vancouver Fraser Port Authority must generally follow the example table of contents provided in Appendix I –Table of contents for an air assessment report.

5.1. Current condition

The current condition establishes the baseline case for emissions and provides additional context of historical activities and the general state of air quality.

5.1.1. Air quality determination

A discussion of local air quality should be provided. The intent is to establish and qualify if the current air quality is good, marginal, or poor. Metro Vancouver and the Province of British Columbia manage an air monitoring network that can be referenced as appropriate along with any other relevant and applicable information and data.

5.1.2. Meteorological influences

A discussion of local meteorological conditions should be provided to establish how the emissions from a site may generally be influenced.

5.1.3. Historical throughput

A discussion should be provided that qualifies the chosen baseline throughput in relation to historical activities. At least five years of historical information, if applicable, should be summarized and provided as part of the assessment report.

5.1.4. Baseline case

Provide details on the representative baseline year throughput and activity levels for the facility boundary and the supply chain boundary. Please note that this component focuses on the activities that are a primary input into the baseline emissions estimate calculations.

5.2. Future condition

The future condition establishes emissions (project case), taking into consideration a business as usual scenario (no project case), a best available techniques scenario (BAT case), and design capacity constraints.

5.2.1. Future condition timeframe (horizon year)

A future horizon year should be chosen that reflects the facility after the project has been completed and activities are at anticipated levels. Air emission estimation methods for some sources can be strongly influenced by the calendar year due to regulations and equipment turn over.

5.2.2. Project and no project case

The assessment of potential impacts is based on changes to emissions from a baseline case to a future condition project case. In order to determine the amount of emissions that would change directly as a result of the project, a “no project” case (business as usual) provides an indication of changes external to the project.

For example, in the marine sector, the International Maritime Organization (IMO) developed regulations on fuel sulphur that came into effect in 2015 that drastically reduce emissions of sulphur oxides (SO_X) and particulate matter (PM). Any projects that use a baseline prior to 2015 and a future case post 2015 would show dramatic changes for SO_X and PM independent of the project under review. A no project case highlights the external changes that occur as a course of business and which are relevant to the assessment.

5.2.3. Best available techniques case

Two key objectives as outlined in section 3 are for a reduction in emissions and a demonstration of continuous improvement. In order to evaluate the potential for improved performance a discussion should be provided as part of the assessment on how the proposed project and site operations compare to best available techniques (BAT)[5]. The comparison between the proposed project and BAT should demonstrate if, and to what degree, an improvement could be achieved.

5.2.3.1. Best Available Technology Not Entailing Excessive Cost (BATNEEC)

Technology is a subset of best available techniques and a qualitative scan and evaluation of technologies should be conducted to compare Best Available Technology Not Entailing Excessive Cost (BATNEEC) to the technology proposed for the project. The evaluation should consider; suitability, applicability, environmental performance, cost, and other relevant criteria.

Specific instructions may be provided during the PER preliminary review phase for technologies which may need to be included or considered in the assessment.

5 “Best available techniques” means the most effective and advanced stage in the development of activities and their methods of operation, which is practical and suitable for preventing or reducing emissions and the impact on the environment as a whole.

5.2.3.2. Best available procedures

For emission sources that are impacted by operational procedures, a qualitative evaluation should be conducted for opportunities to improve performance through standard operating procedures.

5.2.4. Expected throughput and design capacity

Provide details on the throughput and activity levels for the facility boundary and the supply chain boundary. Please note that this component focuses on the activities that are a primary input into the future emissions estimate calculations.

A discussion should be provided that qualifies the chosen throughput capacities in relation to the design capacity of the facility. It is important to identify where the constraints occur. For example, if the facility is constrained by rail capacity in the main line network, improvements in rail could impact the total future throughput and emissions independent of the any changes at the facility.

5.3. Emission and source identification

The relevant sources of emissions contained within the geographic scope of the project require identification and characterization.

5.3.1. Geographic boundaries

The geographic boundaries define the area of primary emission sources and should be included in the assessment and separated into sources contained within the facility boundary and the supply chain boundary.

5.3.1.1. Facility boundary

The facility boundary generally will coincide with the leased area and operations under direct control of the applicant. Activities directly adjacent to the leased area that support operations, for example, rail yards, truck staging and marine vessel berthing, should be included in the facility boundary.

5.3.1.2. Supply chain boundary

The supply chain typically includes activities from marine, rail, and trucking. The supply chain boundary is project-specific, dependent on the transportation mode and project location within the port authority's jurisdiction, and will be determined in consultation with port authority staff during the preliminary air assessment meeting. Supply chain activities are considered in the assessment in order to identify any air emissions impacts and corresponding mitigating measures that could be implemented in the activities taking place within the port authority's jurisdiction.

5.3.2. Primary sources

Table 1 provides examples of emission sources and corresponding aspects that should be considered when defining the activities for the current and future conditions. Examples and details provided in Table 1 are not comprehensive and professional judgement and experience must be exercised and applied as appropriate.

Table 1: Example source characterization

Primary source	Detail	Mode	Metric	Fuel	Combustion type
Marine	Ocean going vessels	• Berth • Anchor • Maneuvering • Transit	• Time of operation • Fuel consumption rates	• HFO • MDO • MGO	• 2 stroke (ME) • 4 stroke (ME, AE) • Boilers • Turbines
	Harbour craft (tugs)	• Duty cycle aggregation		• Diesel	
Rail	Switch locomotive		• Time of operation	• Diesel	
	Main line locomotive				

Primary source	Detail	Mode	Metric	Fuel	Combustion type
	Facility locomotive	• Duty cycle aggregation	• Time of operation • Annual fuel consumption		• 2 stroke compression • 4 stroke compression
On road	Heavy trucks Light duty Misc.	• Drive cycle aggregation	• Time of operation • Annual fuel consumption	• Diesel • Gasoline • Propane • Nat gas	• 4 stroke spark • 4 stroke compression
Non road	Cranes Loaders Cargo Handling Equipment (CHE) Misc. (sweeper)	• Duty cycle aggregation	• Time of operation • Fuel consumption rates	• Diesel • Gasoline • Propane • Nat gas	• 2 stroke spark • 4 stroke spark • 4 stroke compression
Stationary	Stack Process	• Facility specific	• Time of operation	• Any	• Any
Fugitive	Dust Vapours	• Handling • Storage • Processing	• Facility specific	• n/a	• n/a
Legend:	HFO, MDO, MGO = heavy fuel oil (aka. residual oil), marine diesel oil and marine gas oil ME, AE = main engine (also known as propulsion engine) and auxiliary engine				
Note: Examples and details provided in this table are not comprehensive and professional judgement and experience must be exercised and applied as appropriate.					

5.3.3. Pollutants of concern

The air assessment should take into account CACs in Canada, air toxics, black carbon and GHG (CO_2, N_2O, CH_4, SF_6, PFCs and HFCs) as appropriate. It is anticipated that some of these may be scoped out of the assessment if deemed insignificant or of limited value. The pollutants to be included in the assessment and the justification for exclusion should be clearly stated. In terms of pollutants within air assessments associated with the Port, some relevant issues should be noted:

- Diesel Particulate Matter: An accounting of PM emissions by fuel type is necessary due to the fact that diesel particulate matter (DPM) emissions have been associated with additional human health impacts. A large percentage of equipment within the port is powered by diesel fuel and it is a reasonable simplification to attribute all the PM to diesel sources.
- Fugitive Dust: Fugitive dust should be reported as Total Particulate Matter (TPM), PM_{10}, and $PM_{2.5}$
- Sulphur Oxides: Approximately 97% of total primary SO_X emissions occur as sulphur dioxide (SO_2). Given the inherent uncertainty of estimation methods, SO_X and SO_2 emission estimates may be considered equivalent.
- Nitrogen Oxides: The majority of port related emission sources release Nitrogen Oxide (NO_X) compounds that convert to Nitrogen Dioxide (NO_2) depending on atmospheric conditions, time and distance. Given the inherent uncertainly of estimation methods, particularly with nonpoint sources, NO_X and NO_2 emission estimates should be considered equivalent[6].

5.4. Receiver identification

A map of the local area should clearly identify the facility in relationship to surrounding properties and community. Any public areas or locations of interest (such as, First Nations, hospitals, and schools) should be clearly labelled. Please note the receiver identification map does not need to capture the entire supply chain and should focus on the area around the facility boundary.

6 For Level 2 Dispersion Model assessments, the ambient ratio methods shall be used for estimating conversion of NO to NO2 as detailed in the BC Modelling Guidelines.

5.5. Assessment of emissions

The assessment of emissions should use an activity based bottom up approach which very generally can be defined as:

$$\text{Emissions} = \text{Activity} \times \text{Emission Factor} \quad (1)$$

This estimation technique requires that the activity and corresponding emission factors are suitably matched and appropriate to the overall goal of the assessment.

5.5.1. Bottom up – Activity based estimates

The type of activity that may be necessary for the general emissions equation (1) may not be in the same format as reported by the facility or contained in information records. The methods utilized for conversion and aggregation, for example, should be well defined and all assumptions clearly documented within the air assessment report.

5.5.2. Emission factor methodologies

Given the range of primary sources that may be captured within the assessment, the development and characterization of suitable emission factors should be well defined and all assumptions clearly documented within the air assessment report. Please note, the port authority prepares a comprehensive emission inventory for the Port of Vancouver on a regular basis and the emission factors used for mobile equipment in this inventory, including for ships, locomotives, trucks and cargo-handling equipment, can be provided to the proponent upon request. Using the emission factors for mobile sources provided by the port authority may simplify preparation of the proponent's air assessment.

5.6. Reporting of Emissions and Activity Metrics

The reporting of activity and emissions should provide sufficient detail so that during the review process the direct connection between activity, associated emission factors, and resulting emissions is clear. The applicant working with a qualified environmental professional with expertise in air quality will need to find a balance in the reporting of technical particulars, underlying assumptions, key issues, source aggregation, managing details common to air quality assessments, and should follow the outline in Appendix I –Table of contents for an air assessment report.

5.6.1. Comparative scenarios

In order to assess the degree or potential to which a project may impact the environment, a comparison of current conditions (baseline case) is made to a predicted future condition (project case) and between the future project condition and the future no project condition for the facility and supply chain boundary. A comparison between the future project condition (project case) should be made against the best available techniques (BAT case) described in section 5.2.3 Best available techniques case and applied to the facility boundary.

The comparative scenarios should be presented within the assessment for the facility boundary and the supply chain boundary, by primary source and source detail, for significant pollutants and should detail the annual total emissions, the difference in emissions, and the percentage change. It is recommended that the set of scenario tables are presented separately and clearly illustrate the comparative values.

For Level 2 assessments requiring dispersion modelling, the comparative scenarios of current condition (baseline case) to future conditions (project case and/or BAT case) would apply only to the facility boundary.

5.6.2. Activity metrics

Table 2 lists some of the general activity metrics that should be considered and reported when defining the activities for the current and future conditions. Details provided in Table 2 are not comprehensive and professional judgement and experience should be exercised as to their applicability.

Table 2: General activity metrics

Primary Source	Detail	Activity Metric
Marine	Ocean going vessels	• # vessel calls • Load/unloading (annual) (per call - typ) • Hours at berth (annual) (per call - typ) • Hours at anchor (annual) (per call – typ) • Hours maneuvering / transit (annual) • Fleet characterization
	Harbour craft (tugs)	• Hours support (annual) (per call – typ) • Fleet characterization
Rail	Switch locomotive	• # deliveries (annual, per day, per week – typ) • # cars per delivery • Load/unloading (annual) (per car – typ) • Hours locomotive (annual) • Fuel (annual) • Fleet characterization
	Main line locomotive	
	Facility locomotive	
On road	Heavy trucks	• # trips (annual, per day, per week – typ) • Load/unloading (annual) (per trip – typ) • Hours (annual) (per trip – typ) • Average speed (typ) • Fleet characterization
	Light duty	• Hours (annual) • Fuel (annual)
	Misc.	
Non road	Cranes	• Hours (annual) • Fuel (annual) • Throughput (annual) • Fleet characterization
	Loaders	
	Cargo Handling Equipment (CHE)	
	Misc. (sweeper)	
Stationary	Stack	• As applicable to facility
	Process	
Fugitive	Dust	• Throughput (annual, per hour, per day – typ) • Hours (annual)
	Vapours	
Terminal	Commodity	• Throughput (annual) • By supply chain mode (as applicable)

Typ – Typical activity characterization

5.6.3. General Requirements

- At a minimum, the assessment scope, methodology, and key assumptions shall be discussed with the port authority during the preliminary air assessment meeting and prior to any significant assessment work being undertaken
- The assessment area(s) should be clearly identified and justified with maps clearly showing the project and associated supply chain
- Tables and figures should be clearly labeled with units
- Metric units are preferred, US units should be converted
- The assessment should use the most current available information and refer to as up-to-date documentation as practical.

- The report should provide sufficient information to allow another qualified environmental professional to repeat the results of the assessment, particularly in the development of emission factors and activity characterization
- Information used to conduct the assessment should be clearly referenced and available upon request by the port authority
- Any dispersion modeling that may be needed as part of the assessment should be completed in accordance to the most current BC Modeling Guidance published by the BC Ministry of Environment and may be adjusted during the preliminary air assessment meeting. Any divergences or interpretation of the guidance must be clearly stated and supported.
- Numerical values should be presented to three significant figures (or fewer) and a maximum of two decimal places, unless greater resolution in the values is warranted based on the underlying accuracy
- Dates should be reported in the format YYYY-MMM-DD (2013-FEB-10) to reduce confusion between Canadian and USA regional format differences
- The preferred coordinate system is UTM NAD83 Zone 10 (CSRS)
- Assumptions should be reasonable yet conservative and clearly documented within the assessment report. As uncertainty increases so should the level of conservativeness.
- All assessment work shall be completed to the satisfaction of the port authority

5.7. Level 2 assessment – dispersion modeling (as appropriate)

A determination of a Level 2 assessment requirement for the environmental air assessment will be made during the PER preliminary review phase and details discussed during the preliminary air assessment meeting. A Level 2 dispersion modelling assessment within the context of these guidelines requires additional effort and should consider the following:

- Background air quality
- Modelling parameters to capture various sources
- Meteorological drivers
- Local and Regional study areas (areas beyond the source boundaries where impacts may occur)
- Time averaging periods
- Scenario development
- Normal and peak conditions

Please note, if a Level 2 assessment is required, a dispersion modelling plan must be submitted to the port authority for approval prior to conducting the modelling and analysis.

6. Notes/links to other documents

- Vancouver Fraser Port Authority Land Use Plan – http://www.portvancouver.com/development-and-permits/land-use-plan/
- Port of Vancouver Emission Inventories - http://www.portvancouver.com/environment/air-energy-climate-action/clean-air-strategy/
- Air Emissions Management Plan Guideline (AEMP) part of the Vancouver Fraser Port Authority's Project and Environmental Review - http://www.portvancouver.com/development-and-permits/project-and-environmental-reviews/technical-guidelines/
- Transport Canada Marine Emissions Inventory Tool (MEIT) and Port Emissions Inventory Tool (PEIT) - https://www.tc.gc.ca/eng/policy/anre-menu-3019.htm
- Transport Canada Locomotive Emissions - https://www.tc.gc.ca/eng/policy/acs-locomotive-emissions-menu-2155.htm
- Regulatory Impact Analysis: Control of Emissions of Air Pollutions from Cat 3 Marine Diesel Engines, EPA-420-R-09-019, Dec 2009

- Regulatory Impact Analysis: Control of Emissions of Air Pollutions from Locomotive and Marine Compression Engines Less than 30 Litres Per Cylinder, EPA-420-R-08-001a, May 2008
- EPA MOVES and NONROAD model - http://www.epa.gov/otaq/models.htm
- EPA AP 42 factors - http://www.epa.gov/ttnchie1/ap42/
- Air and Waste Management Association, Air Pollution Engineering Manual, 2nd ed.
- Guidelines for Air Quality Dispersion Modelling in British Columbia, BC MOE, November 2015 *http://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-quality-management/modelling*

7. Definitions

Air quality - Air quality in the context of these guidelines is the metric that can be used to quantify the environmental state of the air around us, is something that can be physically measured and tracked over time, can inform health authorities, and support local, regional, and national air shed planning.

BATNEEC: Best Available Technology Not Entailing Excessive Cost

Best available technique (BAT): Best available technique means the most effective and advanced stage in the development of activities and their methods of operation, which is practical and suitable for preventing or reduce emissions and the impact on the environment as a whole.

Continuous improvement: is an ongoing effort to improve products, services or processes. These efforts can seek “incremental” improvement over time or “breakthrough” improvement all at once.

Criteria Air Contaminants (CAC): Air issues such as smog and acid rain result from the presence of, and interactions between, a group of pollutants known as Criteria Air Contaminants and some related pollutants. CAC, in particular, refer to a group of pollutants that include: Sulphur Oxides (SOx); Nitrogen Oxides (NOx); Particulate Matter (PM); Volatile Organic Compounds (VOC); Carbon Monoxide (CO); and, Ammonia (NH3). In addition, Ground-level Ozone (O3); and Secondary Particulate Matter (PM), are often referred to among the CAC because both ground-level ozone and secondary particulate matter are by-products of chemical reactions between the CAC. Within the context of these guidelines ground-level ozone and secondary particulate matter should be reported when describing the background air quality, however are not part of the future prediction models.

Delta (∆): an increment of a variable used to express the change or difference between scenarios as defined within the context of these guidelines.

Facility/project boundary: The facility boundary generally will coincide with the leased area and operations under direct control of the applicant. Activities directly adjacent to the leased area that support operations, for example, rail yards, truck staging and marine vessel berthing, should be included in the facility boundary.

Greenhouse Gases (GHGs): Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. This property causes the greenhouse effect. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary greenhouse gases in the earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

International Maritime Organization (IMO): the International Maritime Organization is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of pollution by ships.

Sensitive Receiver: Residence, school, child care, seniors, hospital, or others of concern that may have a greater sensitivity to changes in air quality.

Supply chain boundary: The supply chain typically includes activities from marine, rail, and trucking. The supply chain boundary is project-specific, dependent on the transportation mode and project location within the Vancouver Fraser Port Authority’s jurisdiction.

Qualified Environmental Professional (QEP): Qualified environmental professionals for the purposes of these guidelines are individuals who have an appropriate breadth, depth of knowledge, and experience to assess environmental impacts related to air quality.

Qualify: to characterize, make more specific, or limit in meaning or applicability

Quantify: to calculate, express, or measure a determinate or estimated value.

8. Contact information

If you require clarification, or assistance with respect to any of these guidelines, contact the Vancouver Fraser Port Authority. Environmental pograms staff can be contacted as follows:

Phone: 604-655-9082 General environmental programs line

Email: EnvironmentalPrograms@portvancouver.com

9. Updates

These guidelines are available for viewing and downloading from our website (www.portvancouver.com). To ensure that you are referring to the most up-to-date document please reference the version date clearly indicated on the front page.

Appendix I –Table of contents for an air assessment report

1. Introduction
   1.1. Facility overview
2. Project description
   2.1. Project overview
   2.2. Baseline case – activity and throughput summary
   2.3. Project case – activity and throughput summary
   2.4. No project case – activity and throughput summary (as appropriate)
3. Geographic scope
   3.1. Facility
   3.2. Supply chain
   3.3. Receivers of interest, identification and proximity
4. Emission sources
   4.1. Primary sources – facility, equipment, truck, rail, marine, etc.
   4.2. Emission variability – discussion of seasonal, daily, hourly
   4.3. Pollutants of concern
5. Current condition
   5.1. Air quality – discussion of local/background air quality
   5.2. Meteorological influences – discussion of local meteorology
   5.3. Historical trends – discussion of facility throughput
6. Future condition
   6.1. Horizon year – rationale
   6.2. Design capacity limitation – discussion of limiting factors
7. Emission estimates
   7.1. Baseline case – calculated results
   7.2. Project case – calculated results
   7.3. No project case – calculated results (as appropriate)
8. Level 2 – Dispersion modelling (as directed by the port authority)
   8.1. Baseline case – modelled results
   8.2. Project case – modelled results
   8.3. No project case (as appropriate)
9. Mitigation potential (best available technique)
   9.1. Use of Best Available Technology Not Entailing Excessive Cost
   9.2. Application of best available procedures
10. Impact potential
    10.1. Compare baseline case to project case
    10.2. Compare project case to no project case (as appropriate)
    10.3. Compare project case to best available technique
    10.4. Conclusion
11. Appendix I – Estimation methodologies
    - Methods for each primary source

12. Appendix II – Dispersion modelling information
    - As appropriate to support the Level 2 assessment
    - Defined case-by-case in cooperation with the port authority's environmental programs department