

MARINE ATMOSPHERIC ENVIRONMENT

Study geographic boundaries: The climate PEAA is an elliptically shaped area approximately 36 km long and 10 km wide stretching southwest to northeast. It includes land on both sides of the Kitimat Arm in Douglas Channel, from southwest of the terminal to the northeast, and includes the District Municipality of Kitimat and Kitamaat Village.

Study time boundaries: Construction and operations phases.

Project works and activities considered in the study*: Hydrocarbon storage tanks at the terminal and marine vessel operations while at berth.

Study methods: Baseline air quality was established by examining ambient air quality data sets at sites located near the pipeline Right-of-Way (RoW) and near the Kitimat terminal. Baseline climate was delineated through a statistical summary of climate and meteorology parameters at sites near the Kitimat

terminal using 30 year climate normals (1971 to 2000). The potential air quality effects of the marine terminal's construction and operations on the health of humans, wildlife, vegetation and other life forms were assessed using dispersion modeling. This science-based system explains how air emissions will likely behave in a particular environmental setting. The predicted air concentrations for each air contaminant are assessed through comparison with provincial and federal ambient air quality objectives and standards.

VEC	Key Issues	KIR	Baseline Results	Measurable Parameter	Potential Project Effects**	Proposed Mitigation	Residual Effects	Cumulative Effects
Climate	Environmental effects of added greenhouse gas emissions.	n/a	Canada, Alberta, British Columbia and the Territories total greenhouse gas emissions (in tonnes per year of CO ₂ equivalents), from 1990 to 2000, with projections for the years 2005-2020 were summarized to provide a broad greenhouse gas emission baseline. The data was based on information provided by Natural Resources Canada in 2005.	Changes to provincial and federal greenhouse gases.	The GHG (CO ₂ e) emissions from operations activities from the terminal are minor when compared with total Canadian CO ₂ e emissions for 2005. It is anticipated that the marine terminal operations will not result in any substantive interaction with the climate in a way that will result in discernible changes to regional, national, or global climate patterns. Therefore, the marine terminal is not expected to result in any significant adverse environmental effects on climate.	Wherever possible, the Best Available Technology Economically Achievable (BATEA) will be incorporated into the terminal's design to reduce greenhouse gas emissions. These measures will help ensure compliance with federal and provincial air quality guidelines throughout all phases of the project. In addition, best practices will be employed at all times to minimize dust and vehicle emissions.	Currently being assessed.	Currently being assessed.

*Refer to Figure 3.3 in section 3, Project description, for the full list of physical works and activities. **The effects of spills and malfunctions will be included in the update for the supplemental filing.

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Air Quality	<p>Environmental effects of added Criteria Air Contaminant (CAC) emissions.</p> <p>Environmental effects of added Hazardous Air Pollutants (HAP) emissions.</p>	n/a	<p>Kitimat has a relatively heavy industrial base and the proposed Kitimat terminal will be close to several industrial sources of air contaminants. Air quality near the Kitimat terminal, while good, is reflective of that proximity.</p> <p>Kitimat’s industrial area is primarily located on the western side of the valley, opposite the residential and commercial district. It includes Alcan’s aluminium smelter and casting facility and Eurocan’s unbleached kraft pulp and paper mill. A decommissioned methanol-ammonia manufacturing facility is now being retrofitted as a condensate import facility. Other industries include an asphalt plant and a cement batch plant. There are also smaller commercial and industrial sources of air contaminants, as well as vehicle and residential emissions.</p> <p>Monitoring results taken from 2000 to 2008 at the Kitimat railway station indicate that the ambient air quality in the terminal area is generally good, with little year-to-year variability. That being said, concentrations of particulate matter (PM), sulphur dioxide (SO₂) and hydrogen sulphide (H₂S) have occasionally exceeded the most stringent ambient air quality objectives.</p>	<p>Changes to Criteria Air Contaminants (CCAC)</p> <ul style="list-style-type: none"> • Sulphur Dioxide (SO₂) • Nitrogen Dioxide (NO₂) • Carbon Monoxide (CO) • Total Suspended Particulates (TSP) • Inhalable Particulate Matter (diameter less than 10 microns - PM10) • Respirable Particulate Matter (diameter less than 2.5 microns - PM2.5) • Hydrogen Sulphide (H₂S) 	<p>The modeling has shown that Kitimat marine terminal has the potential to cause measureable changes in air quality, however, none of these changes are considered to be of concern to human or environmental health.</p> <p>Heavy equipment operating onsite during the construction phase will be responsible for the majority of CAC emissions around the terminal. Light trucks and tugs and barges will also contribute to these emissions, but to a much lesser extent.</p> <p>During operations, the only substantial operational source of CAC emissions will be from the operation of marine vessels loading oil and off-loading condensate at two separate, dedicated tanker berths. Any changes to air quality are expected to occur primarily within the immediate vicinity of the terminal. Offsite concentrations of emissions from the project will not exceed Ambient Air Quality Objectives (AAQO). However, the maximum predicted three-hour and 24-hour average ground-level SO₂ concentrations may occasionally exceed the applicable objectives immediately adjacent to the marine vessels under certain calm weather conditions. Use of low sulphur fuels will help minimize this potential effect.</p>	<p>Steps to minimize CAC emissions will ensure compliance with federal and provincial air quality standards throughout all phases of the project. Wherever possible, the BATEA will be incorporated into the terminal’s design to reduce air contaminants. In addition, best practices will be employed at all times to minimize dust and vehicle emissions.</p>	Currently being assessed.	Currently being assessed.
				<p>Changes to Hazardous Air Pollutants (HAP)</p> <ul style="list-style-type: none"> • Total Volatile Organic Compounds (VOCs) • Benzene, Toluene, Ethylbenzene, Xylene (BTEX) • Hydrogen Fluoride 	<p>While HAPs will be generated by marine vessels at the berthing facilities and from the hydrocarbon storage area, predicted concentrations are well below the AAQO standards. Predicted changes also will occur primarily in the vicinity of the Kitimat terminal.</p>			