MARINE SEDIMENT AND WATER QUALITY

Study geographic boundaries: Marine Terminal PDA and PEAA.

Study time boundaries: Construction and operation phases.

Project works and activities considered in the study*: All Kitimat Terminal physical works and activities as listed under construction and operations.

Study methods: Sediment quality was measured by looking at characteristics such as the size of particles, levels of organic matter, and presence of specific contaminants (including hydrocarbons, metals, dioxins and furans). Water quality was measured by looking at turbidity, total suspended solids or TSS (solids that can be trapped in a filter), salinity, temperature, pH, and various chemical compounds (such as nutrients, metals and hydrocarbons). Existing sediment and water conditions in Kitimat Arm were assessed through literature review and a field study in the proposed terminal area in winter 2006. In the Marine ERA, the potential environmental effects of Kitimat Terminal Operations on water and sediment quality over a 50 year period were modeled; chemicals of potential concern include benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbon (TPH) fractions; polycyclic aromatic hydrocarbons (PAH), volatile organic carbons (VOC), phenolics, and trace elements.

VEC	Key Issues	KIR	Baseline Results	Measurable Parameter	Potential Project Effects**	Proposed Mitigation	Residual Effects	Cumulative Effects
Marine Sediment and Water Quality	Altered suspended sediment levels. Altered sediment and water chemistry.	n/a	The sediment of Kitimat Arm and Douglas Channel is influenced by fjord and estuarine circulation patterns. Total suspended solids levels are highest in surface waters during the spring freshet period of high runoff from the Kitimat River and other rivers in the area.	Altered suspended sediment levels.	In the area to be dredged for the marine terminal, sediment generally met the criteria set by Environment Canada for disposal of dredged materials in the ocean. Most of the parameters measured also met the sediment quality guidelines set by the Canadian and BC governments to protect marine life. Dredging for construction of the marine terminal may release sediment into the water, resulting in a temporary increase in total suspended sediments (TSS) and turbidity levels, and subsequent resettlement of the sediment.	Use of specific dredging equipment and silt curtains	The potential environmental effects are expected to be localized, of short duration and reversible. Computer modeling of TSS levels shows a plume may develop to the northwest of the dredge area. Changes in TSS levels are expected to be difficult to distinguish from existing conditions at most water depths.	Currently being assessed.
			The general water chemistry of Kitimat Arm and Douglas Channel is influenced by fjord and estuarine circulation patterns. Salinity levels are lowest in surface waters during the spring freshet period of high runoff from the Kitimat River and other rivers in the area. Activities in the Kitimat Arm area have released contaminants over several decades through effluent discharges and air emissions. Activities include the Alcan smelter, the Eurocan pulp and paper mill and sawmill, the former Methanex methanol facility, the municipal wastewater treatment plant, and stormwater discharges. Contaminants of concern include PAH, metals, and dioxins and furans. Sediment PAH levels are high in some areas of Kitimat Arm, due mainly to historic and, to a lesser extent, current air emissions from the Alcan smelter.	Altered sediment and water chemistry.	Sublethal toxicity tests were conducted in the laboratory using two common marine organisms (amphipod and polychaete worm) and did not indicate any toxicity effects of sediment from the project area. The sediment released during dredging for construction may contain contaminants that would result in changes to sediment quality and water quality. During routine operations, the terminal will discharge surface water to Kitimat Arm, away from the terminal.	The discharged water will be treated and at air temperature.	The potential effects will be localized, short-term and reversible, with limited effect on marine organisms. The differences between seawater and effluent temperature and salinity will be localized, of short duration and reversible.	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.