

NovaTox

Detailed Quantitative Human Health and Ecological Risk Assessment, Edmonton International Airport

Client

Public Works and
Government Services
Canada

Location

Leduc County, Alberta

Date Completed

2011

NovaTox conducted a risk assessment to evaluate potential adverse effects from hydrocarbons in soil and groundwater at the Airside Operations and Maintenance Centre (AOMC) at the Edmonton International Airport. The site has been used for vehicle and equipment maintenance and fueling since the 1960s until the underground storage tanks (USTs) located on-site were removed and replaced with new fiberglass USTs and a pump island. A Phase III Environmental Site Assessment identified one area of environmental concern (AEC) that had hydrocarbon contamination within the property in both soil and groundwater and potentially generating soil vapour. The volume of soil containing BTEX and petroleum hydrocarbons (PHC) exceeding applicable guidelines was estimated to be 47,000 m³ with about 80–90% of the contaminant mass within a volume of 6,000 m³.



A human health Detailed Quantitative Risk Assessment was completed according to requirements from Health Canada for federal properties. The DQRA addressed potential risks to human receptors present at the site through all relevant exposure pathways as a result of potential exposure to identified impacts in both soil and groundwater. Human receptors included airport staff and construction workers potentially exposed to soil contaminants via dermal contact, ingestion, inhalation of dust, and inhalation of vapours in indoor and outdoor air. Based on the results of the human health DQRA, a requirement was identified for risk management to address the risks associated with benzene in soil.

The ecological component was completed as a Preliminary Quantitative Ecological Risk Assessment (PQERA) according to federal guidance from CCME and Environment Canada. As the property is used for industrial purposes but is located in a rural setting, the ERA focused on plausible ecological receptors including terrestrial plants, soil invertebrates, small mammals (meadow vole and shrew), passerine birds (red-winged blackbird, American robin), and carnivorous birds (red-tailed hawk) potentially exposed to COCs in soil and groundwater via root uptake, ingestion of soil, and ingestion of food items (vegetation and earthworms). Quantitative estimates of risk were calculated using a quotient approach. The results indicated that adverse effects to plant and soil invertebrates from PHCs in soil and groundwater were possible, but exposure pathways were considered to be incomplete due to the impermeable asphalt surface covering the majority of the Site. Risks to aquatic receptors were minimal, based on significant dilution and degradation in groundwater in the airport's storm water drainage system prior to discharge to the nearest down-gradient permanent water body.

The findings of the risk assessment contributed to the adoption of a risk management plan consistent with the continued use of the site as a refuelling depot. A combination of a limited remediation of the areas of greatest contamination and maintenance of existing hard covers was proposed.

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