Recipe for Remediation Success of 1,2-Dichloroethane Impacted Soil and Groundwater

BlueFrog conducted a due diligence Phase I and II Environmental Site Assessment (ESA) at an industrial site to support a client's acquisition in 2021. Impacts from the site's historical use as a brake manufacturing facility lingered in the ground, specifically 1,2-dichloroethane (1,2-DCA).

Based on the findings from the Phase II ESA, additional soil and groundwater investigative work was completed at the Site to delineate the lateral and vertical extent of the 1,2-DCA impacts. The groundwater impacts extended into the bedrock to a depth of 8 mbgs. Based on the 1,2-DCA concentration in groundwater beneath and upgradient of the on-site building, there was a potential vapour intrusion risk for building occupants.

There are many different recipes that can be used to remediate a site; excavation of impacted soil and entrained groundwater, in-situ remediation of impacted groundwater, pump and treat , risk assessment, etc. Three recipes/options were prepared that included varying combinations of standard remedial approaches and included risk assessment, or in-situ remediation to generic or to risk assessment derived standards. All the options included source removal as a key component of risk management and mitigation along with a sub-slab vapour assessment to evaluate the potential risk to indoor receptors.

The recipe used for this site involved a dash of practicality with generous scoops of powdered activated carbon and substitution of the most impacted soil (source) for fresh soil in a lined baking dish (sliding rale shoring cells).The source removal excavation included the removal of 1,920 m3 of impacted soil and entrained groundwater to a depth of 8 metres below ground surface (source removal) using sliding rail shoring and the application of powdered activated carbon (PAC) at the base of the excavation on top of the bedrock. Following the excavation activities, monitoring wells that were removed during the excavation were replaced and groundwater monitoring and sampling was completed within the excavated area and at other locations across the Site.

Sub-slab vapour pins were installed within the slab of the on-site building within the 1,2-DCA impacted groundwater area and downgradient of it to assess vapour intrusion risk. The sub-slab vapour analytical data along with the groundwater analytical data and the soil quality at the limits of the excavation were used to prepare a due diligence risk assessment (DDRA) for the Site.

The DDRA indicated the concentrations of 1,2-DCA in soil and groundwater at the site post source removal excavation were below the applicable human health and ecological component values under O.Reg. 153/04 (as amended). After four rounds of post remediation groundwater monitoring and sampling a Mann-Kendall trend analysis was completed and the groundwater concentrations for 1,2-DCA were stable below the component values and one of the wells had decreasing concentrations. This groundwater monitoring program was optimized for this site and groundwater monitoring and sampling will occur biennially until groundwater concentrations are below the generic site condition standards.

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Kerry-Anne Pumphrey is a senior project manager with over 20 years of experience in managing contaminated sites and client portfolios across Canada. She has extensive experience with subsurface impacts caused by petroleum hydrocarbons, chlorinated solvents, heavy metals, and road salts. Kerry-Anne's contaminated sites experience has involved hydrogeological modelling to assist in determining the fate and transport of groundwater contaminants. She has experience in using statistical data analysis to assess plume stability and to support long-term monitoring programs. Kerry-Anne provides technical support for in-situ remediation programs, management of chlorinated solvent impacted sites, hydrogeology, and excess soils management.

Kerry-Anne actively works on Records of Site Conditions and supports risk assessments including Modified Generic Risk Assessments and Due Diligence Risk Assessment by preparing and reviewing Phase One and Phase Two Environmental Site Assessments and providing the hydrogeological and contaminant transport assessment to the Risk Assessor.

Thinking outside of the box and understanding client business drivers and effectively communicating complicated projects to stakeholders are her strengths.