

**Table 4-2
Groundwater Remedial Technology Screening**

GENERAL RESPONSE ACTION/TECHNOLOGY	SCREENING STATUS		POTENTIAL APPLICATIONS/COMMENTS
	Retained	Eliminated	
<u>No Further Action</u> None	X		Required as a baseline for comparison to other alternatives.
<u>Institutional Actions</u> Institutional Controls	X		Could be used alone or in combination with other alternatives where contaminants remain on site (see Section 4.3)
<u>Environmental Monitoring</u>	X		Groundwater monitoring wells currently exist on Site that can be used in a groundwater monitoring program.
<u>Groundwater Collection</u> Trenches	X		Much of groundwater contamination occurs in bedrock aquifer and trenches would only be an effective means of collecting groundwater for shallow overburden portion of aquifer.
Extraction Wells	X		Many extraction wells would be required due to both the generally low permeability of the glaciomarine soils and the presence of groundwater contamination in the bedrock aquifer. The low permeability of soils and bedrock may inhibit effective groundwater extraction.
<u>Ex Situ Groundwater Treatment</u> UV/Oxidation		X	Oxidizing agents are used to destroy organic contaminants in an ex situ reactor. Potential oxidizing agents are UV radiation, ozone, and/or hydrogen peroxide/ferrous iron, or permanganate. May not be effective for heavier range of DRO

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<u>Ex Situ Groundwater Treatment(cont.)</u>			
Air Stripping	X		Effective for chlorinated VOCs, but will not effectively remove DRO portion of organic contamination
Carbon Adsorption	X		Very effective for DRO and will also remove VOCs at low concentrations.
Precipitation/Flocculation/Oxidation	X		Effective for pre-treating water for removal of metals like iron and manganese that would interfere with organic treatment technologies.
Reverse Osmosis	X		Reverse osmosis treatment reduces the concentration of dissolved solids, including a variety of ions and metals and very fine suspended particles such as asbestos, which may be found in water. An RO device may be installed following a water softener to reduce the concentration of sodium ions exchanged for hardness ions. RO also removes certain organic contaminants, some detergents, and specific pesticides.
Microfiltration		X	Effective for removing metals precipitated from pre-treatment precipitation processes.
Publicly Owned Treatment Works (POTW)		X	Combination of high metal content along with organic load will most likely be in excess of POTW treatment capabilities.

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<u>In Situ Treatment</u>			
Co-Metabolic Treatment		X	Potentially ineffective due to the presence of contaminated groundwater in bedrock. Also. The chlorinated VOCs in the Warehouse 2/3 area are effectively biodegrading and do not need the co-metabolic treatment (see Section 3.2.4.2).
Enhanced Biodegradation		X	Potentially ineffective due to the presence of contaminated groundwater in bedrock. Chlorinated and non-chlorinated VOCs in the Warehouse 2/3 area are effectively biodegrading and have appropriate electron acceptors to support biodegradation (see Sections 3.2.4.1 and 3.2.4.2).
Natural Attenuation	X		Natural attenuation is a passive treatment and relies upon physical and biological process to destroy contaminants in groundwater. Evaluation of potential degradation process demonstrates that biodegradation is occurring in site groundwater, and that appropriate electron acceptors and electron donors are present in site groundwater (see Section 3.2.4).
Air Sparging		X	This technology would require that the vaporized components be removed from the unsaturated zone (vadose zone). Because the vadose zone at the Site consists of either bedrock or soils with low permeability, it would be difficult to accurately and effectively place the wells necessary to recover the vapor.
<u>Disposal</u>			
Groundwater Discharge	X		Effective approach, will require numerous infiltration beds to accommodate treated groundwater

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<u>Disposal (cont.)</u>			
POTW		X	The long-term nature of the disposal and the likely need for pretreatment will preclude use of the POTW.
Surface Water Discharge	X		Potentially effective, however significant permitting will be required to achieve discharge to surface water.