TABLE 2.6
Technology/Process Option Evaluation—Lower Vadose Zone Soils (35 feet to 65 feet below ground surface)

General Response Action	Remedial Technologies	Process Options	Technical Implementability	Effectiveness	Cost	Comments
No Action	None	None	Good	Poor	None	Not protective of human health due to presence of elevated COPCs. Retained for comparison, per the NCP.
Institutional Actions	Access Restrictions	Fencing	Good	Fair	Low	Fencing to prevent access is incompatible with future redevelopment of the site.
		Land Use Restrictions	Fair	Poor	Low	Future park already slated for site. Community acceptance not viable.
	Monitored Natural Attenuation (MNA)	Monitoring	Good	Poor	Low	Retained. MNA or monitoring in general is critical to the implementation of any alternative.
Containment	Surface Controls	Grading	Not applicable to lower vadose zone soils.			
		Lagoon Buttress	Not applicable to lower vadose zone soils.			
		Revegetation	Not applicable to lower vadose zone soils.			
	Capping	Clay/Synthetic Membrane	Not applicable to lower vadose zone soils.			
		Soil Cover/ Vegetation	Not applicable to lower vadose zone soils.			
		Multimedia	Not applicable to lower vadose zone soils.			
		Asphalt or Concrete Cap	Not applicable to lower vadose zone soils.			
	Horizontal Subsurface Barriers	Block Displacement	Not feasible due to heterogeneous stratigraphy at the site.			

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Technology/Process Option Evaluation—Lower Vadose Zone Soils (35 feet to 65 feet below ground surface)

General Response Action	Remedial Technologies	Process Options	Technical Implementability	Effectiveness	Cost	Comments
		Grout Injection	Not feasible due to heterogeneous stratigraphy at the site.			
In-Situ Treatment	Physical	Electrokinetic Separation	Fair	Poor	High	Not effective for organic COPCs.
		Solidification/ Stabilization	Good	Poor	Moderate	Not effective for high concentrations of chlorinated organic COPCs.
		Solvent Extraction	Fair	Poor	Moderate	Difficult to capture solvents without contamination of subsurface and potential migration to groundwater.
		Vitrification	Good	Good	High	Permanently encapsulates contaminants in a solid matrix. Considerable energy expended during process. Cost-prohibitive in relationship to levels and type of COPCs and depth of contamination.
		Vapor Extraction	Good	Good	Low	Retained. Highly effective for volatile COPCs.
	Chemical	Oxidation/ Reduction	Good	Good	Moderate	Retained. Possible difficulty in dispersing oxidants.
		Reductive Dechlorination	Good	Good	Moderate	Retained. Possible difficulty in dispersing reducing agents.
	Biological	Aerobic/ Bioventing	Good	Poor	Low	Not effective for chlorinated organic COPCs.
		Anaerobic	Good	Fair	Moderate	Retained. Assume mechanism to deliver natural attenuation enhancement compounds to lower vadose zone.
		Soil Flushing	Fair	Poor	High	Not effective for chlorinated organic COPCs.
	Thermal	Electrical Resistance Heating	Good	High	High	Retained. High-energy output required to heat subsurface. Destruction of organic COPCs. Limited full-scale application data to date.

TABLE 2.6
Technology/Process Option Evaluation—Lower Vadose Zone Soils (35 feet to 65 feet below ground surface)

General Response Action	Remedial Technologies	Process Options	Technical Implementability	Effectiveness	Cost	Comments
		Hot Air/Steam Stripping	Fair	Good	High	Difficult to implement due to presence of clay intervals in upper vadose zone soils.
		Radio Frequency Heating	Fair	Good	High	High-energy output required to heat subsurface. Limited full-scale application data to date.

Effectiveness is the ability to perform as part of a comprehensive alternative that can meet RAOs under conditions and limitations that exist at the site. Technical Implementability encompasses the applicability/feasibility of performing the process option under the regulatory, technical, and schedule constraints of the project. Cost is for comparative purposes only, relative to other processes/technologies that perform similar functions.

GAC	Granular activated carbon	RAOs	Remedial Action Objectives
GW	Groundwater	RCRA	Resource Conservation and Recovery Act
NA	Not applicable	SVE	Soil Vapor Extraction
NCP	National Contingency Plan	VOCs	Volatile Organic Contaminants
POTW	Publicly Owned Treatment Works		
TSDF	Treatment, storage, or disposal facility		