AMCO Superfund Site

Oakland, California

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • February 2015

EPA Requests Public Comments on Engineering Evaluation and Cost Analysis (EE/CA)

The United States Environmental Protection Agency (EPA) will be conducting a Non-Time Critical Removal Action (NTCRA) of volatile organic compounds (VOCs) at the AMCO Superfund Site (Site) located at 1419 3rd Street, Oakland, CA and is seeking public comments on the Engineering Evaluation and Cost Analysis (EE/CA). EPA completed the remedial investigation in 2014 and has found that the Site is contaminated with VOCs, semi-volatile organic compounds, chlorinated hydrocarbons, metals, and pesticides. The contaminants were released into the soil and groundwater while the Site was operated as a chemical distribution facility from the 1960s until 1989.

The EE/CA identifies an area with the highest levels of VOCs, based on soil and groundwater sampling and the presence of light non-aqueous phase liquid (LNAPL) in several monitoring wells. LNAPL at the Site is an oily liquid with a distinctive, sharp smell that floats on the groundwater surface. The contaminated area is located near the center of the Site near the existing warehouse (see Figure 1) and extends from 20 feet to 45 feet below the ground surface (Figure 2). Soil and groundwater sampling information confirms that VOCs are also located under the on-site warehouse (3rd Street and Mandela Parkway).

The EE/CA evaluates six potential cleanup alternatives for the Site on the basis of effectiveness, implementability, and cost (Table 1). The EE/CA does not propose a comprehensive remedy for the Site, and will therefore be followed by a longer-term, final clean-up process. EPA has selected Electric Resistive Heating (a type of in-the -ground [In-Situ] Thermal Heating) as the preferred alternative, but will not make a final decision until all comments are considered. As part of the EE/CA process, EPA is required to consider a No Action alternative. For the AMCO Site, the No Action alternative was determined to not be protective of human health or the environment.

Public Comment Period
February 10 – March 12, 2015

EPA is interested in hearing from the public and is accepting either oral or written comments on the EE/CA document. A copy of the EE/CA may be found at the information repositories listed below and online at **www.epa.gov/region09/Amco**.

Information Repositories:
West Oakland Library
1801 Adeline Street
Oakland, CA 94607
(510) 238-7352

EPA Region 9 Superfund Records Center
95 Hawthorne Street, Ste. 403 S
San Francisco, CA 94105
(415) 820-4700

Comments should be addressed to:
Lynn Suer
U.S. EPA Project Manager
Superfund Division
(415) 972-3148
Suer.lynn@epa.gov

TABLE 1: Ranking of EE/CA Alternatives

Ranking	Technology	Effectiveness	Implementability	Removal Action Timeframe	Cost*
1	Alternative 4 – ISH (In-Situ Thermal Heating)	Good to Excellent	Moderate to Good	6 - 9 Months	$6,800,000
2	Alternative 3 – MPE (Multi-Phase Extraction)	Moderate	Moderate	5 Years	$10,900,000
3	Alternative 2 – Excavation and Offsite Disposal	Moderate	Poor to Moderate	3 - 6 Months	$29,500,000
4	Alternative 6 – AS/SVE (Air Sparging and Soil Vapor Extraction)	Moderate	Moderate	7 Years	$11,300,000
5	Alternative 5 – EISB (Enhanced In-Situ Bioremediation)	Poor to Moderate	Moderate to Good	11 Years	$6,800,000
6	Alternative 1 – No Action	Poor	N/A	N/A	$0

Notes: 1) Ranking is based on a qualitative assessment of all EE/CA guidance criteria (http://www.epa.gov/superfund/policy/remedy/pdfs/540f-94009-s.pdf).
2) * Cost = direct capital + indirect capital + post removal site control costs.
3) Removal action timeframes include construction and projected operation of the treatment system until cleanup goals are met. It does not include decommissioning time or long-term monitoring.

TABLE 2: Contaminant Levels and RAOs* for Primary VOCs at the Site

	SOIL		GROUNDWATER	
VOC Contaminant	**RAO (µg/kg)**	**Sampled (µg/kg)**	**RAO (µg/L)**	**Sampled (µg/L)**
TCE	460	5,600,000	130	5,000
Vinyl Chloride	32	16,000	1.8	15,000
cis-1,2-DCE	190	1,400,000	3,100	66,000

Notes: *These are interim RAOs; final RAOs will be set during the following stage of the clean-up process.

What contaminants will be removed from the Site?

The NTCRA will address the VOCs in groundwater and soil at the Site that pose the highest health risk. The primary drivers identified in the EE/CA are trichloroethene (TCE) in soil, vinyl chloride in groundwater and cis-1,2-dichloroethene (cis-1,2-DCE) in soil. The EE/CA defines the Remedial Action Objectives (RAOs) for each VOC, presented in Table 2.

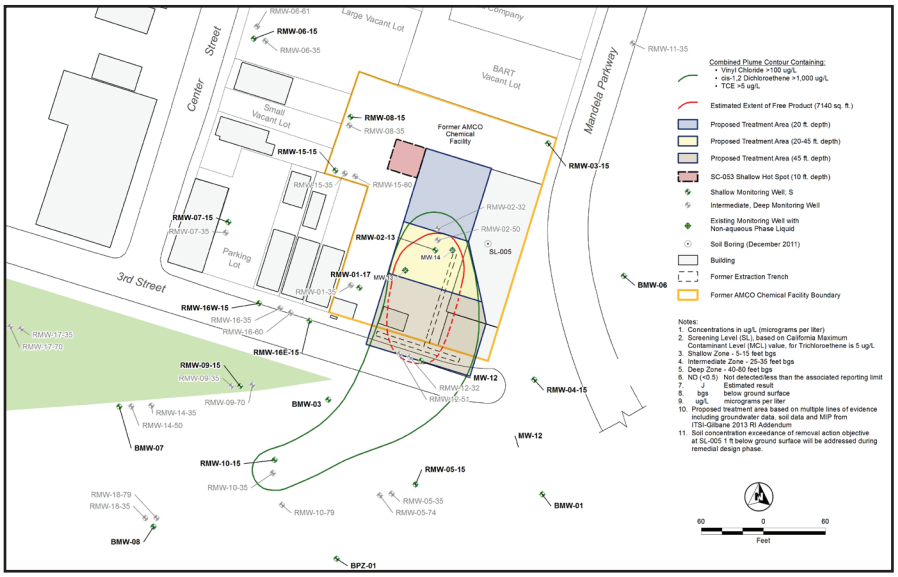

FIGURE 1: Treatment Area and VOC Groundwater Plume Contour Map

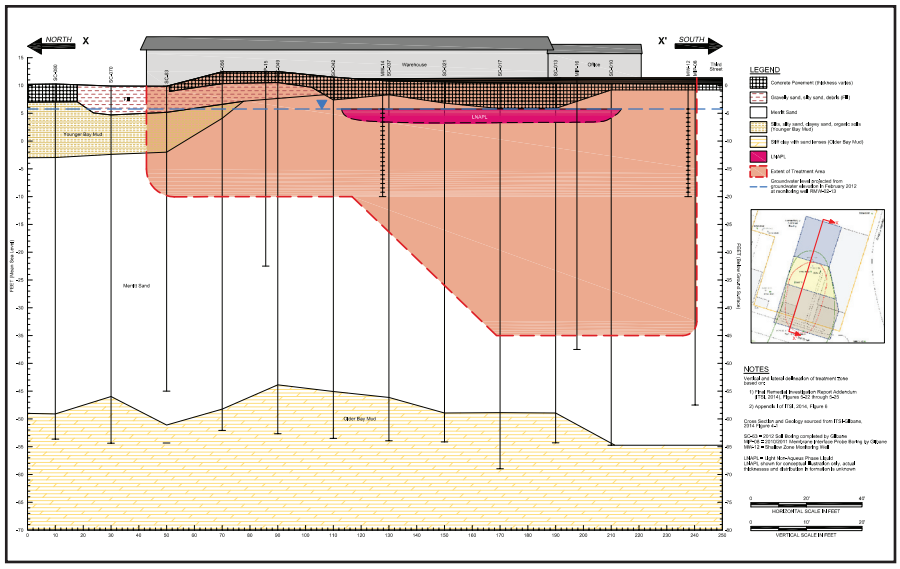

FIGURE 2: Treatment Area Cross Section

What is TCE?

TCE is a nonflammable, colorless liquid with a sweet odor and a somewhat sweet, burning taste.

How is it used? TCE was mainly used as a solvent to remove grease from metal parts. TCE is also used in adhesives and paint removers.

What is cis-1,2-DCE?

Cis-1,2-DCE is a highly flammable, colorless liquid with a sharp, harsh odor.

How is it used? Cis-1,2-DCE is used to make solvents and is an ingredient in a variety of chemical mixtures. Sampling results indicate that cis-1,2-DCE is created when TCE loses a chlorine molecule under natural conditions.

What is Vinyl Chloride?

Vinyl chloride is typically a colorless gas with a mild, sweet odor.

How is it used? It is used primarily to make polyvinyl chloride (PVC) which is used to make a wide variety of plastic products including: pipes, cable coatings, and packaging materials. Sampling results indicate that vinyl chloride is created at the site when cis-1,2-DCE loses a chlorine molecule under natural conditions.

What is Electric Resistive Heating?

Electric Resistive Heating technology uses underground electrodes to heat the soil and groundwater to vaporize the VOC contaminants. Electrodes are installed throughout the treatment zone and transmit an electric current between them to heat the soil. The contaminants are released from the soil and groundwater and become a vapor. The contaminated vapor is then collected by an underground vapor extraction system and transferred to an above ground treatment system. The heat generated by the system increases the mobility of VOCs. EPA will use a vapor and groundwater extraction system to prevent offsite migration.

How ERH will work at AMCO: ERH has been successfully used directly below buildings with no negative impacts observed, such as heated flooring. However, due to the number of high voltage power lines required, the treatment area will not be accessible to the public while the system is operating. EPA estimates that approximately 70 heating electrodes, 52 multi-phase extraction wells, and 24 monitoring points for measurement of temperature, pressure, and VOC vapor concentrations will be installed at the Site and that the heating process will occur over 6-9 months. A typical ERH installation is shown in Figure 4.

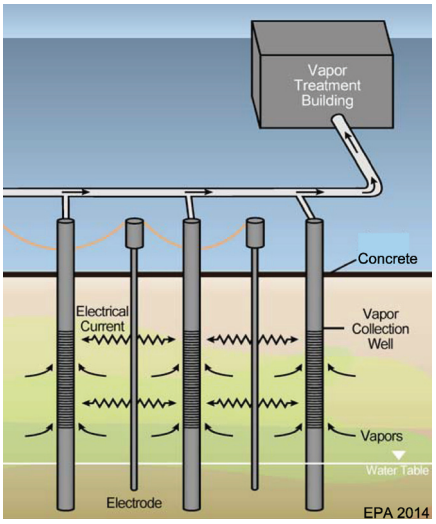

FIGURE 3: ERH Section View

How will the above ground ERH system work? Each extraction well will be fitted with a pump to extract groundwater and soil vapors. The treatment system sends groundwater through a series of steps: contaminated solids are removed by bag filters, contaminated liquids are removed with a separator, and contaminated vapors are sent to the vapor extraction system. Treated groundwater will be re-injected near the heating electrodes to maintain proper moisture levels in the soil and any excess extracted groundwater will be treated and discharged to the East Bay Mud Sanitary District sewer. The contaminated soil vapors are sent through a separate treatment process. The contaminated soil vapor is sent to an air stripper followed by a liquid-phase granular carbon. ERH does not use incineration. As an added safety, all air emissions will be sent through an extra treatment step; a GEO C3 system and granular activated carbon for final polishing. The GEO C3 system cools the air vapor mixture which causes the contaminants to become a liquid. This liquid is collected in a tank and sent off-site for treatment. The cooled air vapor is sent through granular activated carbon as an additional precaution.

Next Steps

After receiving public comments, EPA will continue an internal review process before finalizing the EE/CA document. When the document is finalized and the project has been approved, EPA will attend a community meeting to share the next steps of the cleanup action with everyone in the community.

FIGURE 4: Typical ERH Installation

ERH Q & A:

Will the system create air contamination in my neighborhood?

No. The contaminant vapors are collected underground by a soil vapor extraction system and the Site treatment area will be sealed with a new vapor resistant concrete cap.

Will buried utilities or buildings be damaged?

No. ERH has been used directly below buildings with no damage to the infrastructure. EPA has several monitoring wells within the treatment area which will be removed and rebuilt with heat resistant materials, but nearby utilities that are not in the treatment area are not expected to be impacted. During the cleanup, the Site and warehouse will not be accessible to the public due to the high voltage electric lines required to operate the treatment system.

Is ERH safe?

Yes, it is safe. ERH has been safely used in public spaces such as active shopping malls. As an added measure of precaution, EPA will install a security fence and signage, provide site security and will use an automatic shutoff switch on the treatment system.

Will ERH cause an electric shock?

Yes, if a person tampers with the high voltage electric supply lines to the system it is possible for them to receiver an electric shock. EPA will install a security fence and signage, provide site security and will use an automatic shutoff switch on the treatment system to reduce this risk.

How hot will the ground become while the system is operating?

ERH will heat the soil and groundwater between the electrodes to a maximum of 100 ^{o}C, the boiling point of water. This temperature is required to volatilize the VOCs, but it is low enough to avoid damage to subsurface utilities and building infrastructure.

What if I want more information about the other considered alternatives?

You can read about all of the considered alternatives in the EE/CA document by going to **www.epa.gov/region09/Amco** or visiting one of the above repository locations.

United States Environmental Protection Agency
Region 9
75 Hawthorne Street (SFD-6-3)
San Francisco, CA 94105
Attn: Sarah Cafasso (AMCO 2/15)

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