



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX

75 Hawthorne Street
San Francisco, CA 94105

ACTION MEMORANDUM

August 17, 2015

SUBJECT: Request for a Non-Time Critical Removal Action at the AMCO Superfund Site,
Oakland, Alameda County, California

Request for Exemption from Statutory Limitation of Removal Actions to Less than \$2
Million and 12 months

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THRU: Caleb Shaffer, Chief
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TO: John Lyons, Acting Assistant Director
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I. PURPOSE

The purpose of this Action Memorandum is to request and document approval to conduct a Non-Time Critical Removal Action (NTCRA) at the AMCO Superfund Site (Site). This memorandum also provides justification for and requests approval to obligate more than \$2,000,000 for a removal action, and to exceed the twelve month limitation applicable to removal actions as stated at 42 U.S.C. § 9604(c)(1).

The NTCRA for the Site will be an interim action to address the portions of the Site with the highest concentrations of volatile organic compounds (VOCs) that pose a threat to human health or the environment. This NTCRA will rapidly reduce vapor intrusion potential in structures above or adjacent to the contamination plume and contributions to groundwater contamination by reducing the VOC source material at the site. The EPA will pursue a process for determining final cleanup of the Site after the NTCRA is completed. The final action will address VOC and non-VOC contamination pathways remaining on site after completion of the NTCRA.

The proposed removal of hazardous substances will be undertaken pursuant to Section 104(a)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §9604(a)(1), and Section 300.415 of the NCP, 40 CFR § 300.415. Response at the Site initially commenced in 1997 using the On-Scene Coordinator's (OSC's) delegation and warrant authority to conduct an emergency response action. The action described in this memorandum was the subject of an Engineering Evaluation/Cost Analysis (EE/CA) issued by the EPA, Region 9 on February 10, 2015.

II. SITE CONDITIONS AND BACKGROUND

SITE NAME: AMCO Chemical
CERCLIS ID#: CA 0001576081
SITE ID#: 09DJ
CATEGORY: Non-Time Critical
SITE LOCATION: Oakland, California
NPL STATUS: Listed on September 29, 2003

A. Site Description

1. Removal site evaluation

The Site was placed on the National Priorities List in 2003. The incidents leading to the contamination of the source area, the subject of the proposed action, occurred during chemical repackaging, transfer and storage operations during the period of operation of the AMCO Chemical Corporation, described in greater detail below (Section A.3 Site Characteristics).

2. Physical Location

The Site is located at 1414 3rd Street at the southeastern corner of the South Prescott neighborhood of West Oakland, one block south of the West Oakland Bay Area Rapid Transit (BART) station (**Attachment 1, Site Location Map**). The Site is an approximately 0.9-acre property bordered on the north by a vacant lot owned by BART, on the west by residences, on the south by 3rd Street and on the east by Mandela Parkway. An industrial property leased to the National Railroad Passenger Corporation (Amtrak) is located directly south of the Site and 3rd Street. A parking lot is located to the east of the Site along Mandela Parkway. The nearest residences are located along 3rd and Center Streets immediately adjacent to the Site.

Due to the neighborhood's mixed-land use, residents live directly adjacent to commercial and industrial properties. BART and the Port of Oakland add traffic congestion to the overburdened community, while the Cypress (I-880) Freeway adds noise and impacted air quality. As a result, the South Prescott community is disproportionately burdened by multiple sources of pollution (see Section VIII for further discussion).

Members of the South Prescott community pride themselves on being active and vocal proponents of environmental justice, and several grassroots organizations have interest in the Site. In 2009, the South Prescott community created a Community Action Group (CAG) to officially participate in the Superfund process. The CAG, consisting of a diverse representation of community members, requests EPA's presence and involvement during their meetings to ensure their voices are heard by the agency. Most notably, the director of the West Oakland Environmental Indicators Project also serves as the CAG's co-chair.

The possibility of adverse impacts on Native American cultural resources was raised during the intensive soil characterization of the source area, conducted in 2011-2013. Soil borings were examined for the presence of Native American artifacts and none were found. There are no structures of historic significance on the Site. While homes with historic value may be near the Site, these will not be impacted by the proposed Action.

3. Site Characteristics

Past studies have consistently found that the geological model of the Site is of a fairly uniform, layered, and laterally continuous system with two unconsolidated aquifers separated by an aquitard above consolidated bedrock. Most of the Site is underlain by undifferentiated fill material typically four to eight

feet thick, although the fill may be thinner in specific locations. Much of the early fill placed in the bay front and wetland areas originated from dredged sediment during the construction of the Oakland Inner Harbor. The fill consists mostly of silty sand to clayey sand, typically with moderate amounts of miscellaneous refuse (brick fragments, glass, concrete, metal debris, wood, etc.). The percentage of fines (i.e., silt plus clay) generally decreases with increasing depth. Poorly graded fine sands are observed below 30 to 45 feet bgs. Thin lenses (ranging from a few inches to 1.5 feet thick) of sandy silt to clay are interbedded throughout the formation. The finer-grained soils in the upper 20 to 25 feet bgs exhibit lower hydraulic conductivity values than the coarser-grained soils found at depth. Groundwater flow is generally to the south.

AMCO Chemical Company owned and operated a chemical repackaging facility at the Site from 1967 until 1989. During operation of the Site, bulk chemicals were off-loaded from a rail spur on-site and stored in drums and storage tanks and later repackaged into smaller containers for resale. Bulk chemical storage facilities included up to 12 aboveground storage tanks (ASTs) and two 10,000-gallon underground storage tanks (USTs), as well as numerous drums. In addition, a pipe network, currently buried between layers of concrete, was used for chemical transfer at the Site. Transfer activities may have included unloading rail and truck tankers, filling tanks and drums, and transferring chemicals between tanks. The pipe network is known to have extended along the rail spur in the central and south central portion of the Site, and, based on field observations, is believed to have extended to the western portion of the Site. While the AMCO Chemical Company was in operation, chemical releases to the environment occurred from sloppy housekeeping and transfer activities.

Available records indicate that a wide range of commercial and industrial chemicals were handled at the Site. The classes of chemicals included: chlorinated and non-chlorinated organic solvents, petroleum hydrocarbons, organochlorine pesticides, organophosphate pesticides, ethylene glycol and other glycol products, organic acids, creosote, and inorganic salts.

The Site was purchased by DC Metals in 1989 under a limited partnership with Cypress Street Investments and was operated as a scrap metal yard until 1998. All drums, ASTs, and damaged structures were removed and a non-engineered concrete cap was installed. The warehouse-office building and two small storage sheds were not removed during this work and are currently on the Site.

In October 2014, EPA became aware that the property owner of the AMCO site signed a 20-year lease with an entrepreneur, who is sub-leasing portions of the warehouse and office buildings to local artists for studio space and other uses, with a vision of serving community artists by providing studio space. The interior of the warehouse is divided into roughly two equal spaces by a concrete masonry unit wall. Currently, the northern end of the warehouse is used as a Cross-fit gym and the southern end has been retrofitted into a glass blowing studio, both of which operate six or seven days per week. The office building, which has been recently remodeled into a locker/changing room with showers, toilets and sinks, is currently used only as a restroom facility.

A reuse study completed by EPA contractors several years ago concluded that the most likely future use scenario for the neighborhood was continued commercial/residential use. The neighborhood's proximity to BART makes it attractive as a commercial/residential/transportation hub. However, many residents of South Prescott want to preserve its identity as a neighborhood of single family homes, and are working with the City to influence zoning to achieve this goal.

4. Release or Threatened Release Into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The primary concern at the Site is potential and ongoing releases of trichloroethylene (TCE) and its degradation products, particularly vinyl chloride, into air and groundwater. Contaminant vapors can move from soil and groundwater into ambient air, and into crawlspace and/or indoor air where preferential pathways through soil and overlying structures allow vapor transport. At the Site, EPA has

documented: 1) VI into four residences adjacent to the Site (these are currently mitigated); 2) ongoing VI in warehouse/office buildings overlying the source area; and, 3) potential and actual exposures of workers to vapors when the concrete cap over the contaminated soils is breached (as during construction activities).

The contaminants of concern (COCs) at the Site are found in the soil, groundwater and in LNAPLs. The Site is currently paved with a non-engineered concrete layer ranging in thickness from 1 to 6 feet, except where there are existing buildings. The concrete layer mitigates potential releases and exposures, including dermal contact or ingestion of contaminated soils and/or inhalation of dust particles. However, when the concrete is breached (e.g., during remedial investigations, utility repairs, implementation of the proposed NTCRA, or during future development of the Site), direct exposures to soil and vapors can and have occurred. In 1995, a utility worker passed out from contaminant vapors during trenching activities in the source area. Soil boring activities in the source area required personal protective equipment to prevent exposures to vapors, soil dust and soils.

Dissolution from light non-aqueous phase liquid (LNAPL) and desorption from contaminated soil in the source area are continuing sources of contamination to groundwater, notably by VOCs, which have migrated down-gradient, beneath homes adjacent to the Site. There are 10 housing units directly adjacent to, and downgradient from, the Site. In the absence of any form of containment, highly concentrated levels of VOCs within the source area will continue to be released into groundwater, creating the potential for release of vapors into structures overlying the plume.

The crawlspaces and indoor air of homes adjacent to the Site were evaluated during the RI, resulting in the 2009 installation of mitigation systems in four homes, based on sampling results. These results, as well as the results of follow-up sampling of the home's crawlspaces, indoor and background air are reported in the 2014 RI Addendum Report. All but one of these systems continues to operate and the homes are periodically sampled (most recently in February 2015) to confirm the effectiveness of the systems.

Although EPA has effectively, temporarily, mitigated VI in residences down-gradient from the Site, uncontrolled modifications of the homes by their owners or tenants could create new pathways, reducing the effectiveness of existing mitigation systems. One of the residential mitigations system has already failed, further underlining the need for a more permanent remedy.

The EPA responded to the new uses in the warehouse by conducting indoor air sampling in October 2014. The sampling results indicated that site-associated vapors were intruding into the warehouse and office space at concentrations that exceeded EPA Region IX's recommended residential response action levels¹. The levels did not exceed the recommended commercial response action levels, however, and were consistent with results of prior indoor air sampling results, obtained during the Remedial Investigation (RI). However, due to the current use of the warehouse, it is possible that commercial screening levels do not adequately assess the risk of exposure to tenants and business clients. Currently the warehouse facility is sublet to an artist/glass-blowing collective and a gym. Each of these uses could result in human exposure beyond those captured in typical commercial use scenarios. Artists may work long hours and utilize facilities as live/work space, and gym staff may work beyond a typical eight or ten hour workday.

5. National Priorities List (NPL) Status

The Site was listed on the NPL on September 29, 2003. The proposed NTCRA will contribute to the final remedial action for the Site which will be initiated after the NTCRA is completed.

¹A 9 July 2014 Memorandum from the EPA Region 9 Superfund Division Director established recommended indoor air interim action levels and recommended response actions for TCE inhalation exposure due to subsurface vapor intrusion from TCE contamination (<http://www.epa.gov/region9/superfund/prg/files/r9-tce-interim-action-levels-response-recs-memo-2014.pdf>).

B. Other Actions to Date

1. Previous Actions

1988: Alameda County Department of Environmental Health (DEH)

The DEH conducted an emergency response at the Site after notification that the Oakland Fire Department had observed leaking drums. The DEH investigators noted more than one hundred 5- and 55-gallon drums, many of which were corroded, bulging, or leaking. Among the drum labels noted in the investigation were acetone; 1,1,1-trichloroethane (1,1,1-TCA); methanol; methyl ethyl ketone (MEK); and dry cleaning solvent (E&E, 2001). The DEH did not find that emergency action was necessary and met with the facility owner regarding required cleanup (E&E, 2001).

1997-1998: EPA Emergency Response, Removal Action

Emergency response activities conducted by the EPA at the Site included the removal of an underground chemical tank from under the sidewalk on the 3rd Street frontage of the Site, the installation of a SVE system, and continued groundwater monitoring to assess the effectiveness of the treatment system. The SVE system was shut down in 1998 in response to community concerns related to air emissions from the off-gas treatment system. The EPA's consultants E&E and CH2M Hill gathered information for the Preliminary Assessment/Site Investigation (PA/SI) and continued monitoring site conditions after the SVE treatment system was shut down.

2009: EPA Installs Vapor Intrusion (VI) Mitigation System in Residence Crawl Spaces

The EPA installed VI mitigation systems in the crawl spaces of four residences adjoining the Site. This action was conducted as a Time-Critical Removal to address the potential for vapor intrusion. The basis for the action was the results of crawl space and indoor air sampling that showed the presence of site-related contaminants in crawl spaces of these homes, though not in indoor air. Due to the limited dataset for indoor air, it seemed prudent to install mitigation systems as a precautionary measure. Since 2010, the effectiveness of these systems has been periodically monitored by sampling and analyzing crawl space air, indoor air and ambient air. Results of the monitoring confirm that these systems have been effectively addressing the potential for indoor air intrusion (ITSI-Gilbane, 2014).

2. Current Actions

EPA is currently monitoring groundwater and indoor air on and near the Site to track potential changes in the nature and extent of the groundwater plume and ongoing and potential releases of vapors to indoor air.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

Until 1996, Department of Toxic Substances Control (DTSC) acted as the lead agency for oversight authority at the Site. EPA Region 9 assumed the role of lead agency and currently coordinates with DTSC.

2. Potential for Continued State/Local Response

The EPA will continue to coordinate with DTSC on the NTCRA and future remedial actions at the Site. This NTCRA will be followed with a process for selecting a final cleanup remedy. If the Site remains fund-lead, the State will pay its cost share for implementation of future remedial actions and will assume responsibility for Operations and Maintenance activities, including enforcement of any Institutional Controls that may be selected as part of any future remedies.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Site present a release, or potential threat of release, of a CERCLA hazardous substance that threaten the public health, or welfare, or the environment based on the factors set forth in the NCP, 40 CFR § 300.415(b)(2). These factors include:

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants; [40 CFR §300.415(b)(2)(i)];

The EPA site team used EPA’s EJSCREEN tool to assess the immediate area surrounding the Site. EJSCREEN’s results indicate potential for cumulative risk in this neighborhood. Compared to the rest of the USA, the site falls in the 96th percentile for National-Scale Air Toxics Assessment (NATA) of Diesel PM, the 90th percentile for NATA’s Air Toxic Cancer Risk, and the 90th percentile for NATA’s Respiratory Hazard Index. Demographic indicators describe a high minority, low income, linguistically isolated, and undereducated population when compared to the national average.

The South Prescott community’s self-identification as an “Environmental Justice community” is further supported by EPA’s EJSCREEN data. In addition to being disadvantaged, the community is overwhelmed by environmental burdens. The community is already encumbered with air pollution that poses significant impacts on health; it is critical to address any Site contributions to the environment, especially regarding vapor intrusion.

There are 10 housing units directly adjacent to the Site. Prior EPA sampling of crawlspaces and indoor air in the adjacent homes indicated significant VI was occurring in excess of health-based screening levels in the crawlspaces, though not in the indoor air. Mitigation systems were installed in all four of the adjacent homes based on these results.

Due to the nature of the current use of the buildings on-site, the tenants in the warehouse could potentially occupy the space for more hours per day than EPA typically uses to determine workplace risk. With a combination of artists and gym members at a conservative number of 20-30 artists and 100-110 gym members each two years, the indoor air exposure for a two year period is determined to be 120-140 people. Results of indoor air data in the warehouse/office sampled during the PA/SI and RI indicated a completed pathway to indoor air, though our limited data indicates levels do not exceed standard commercial use indices, although they exceeded EPA Region IX residential response action levels. However, the commercial screening levels have been exceeded consistently in the office crawlspace. There are no institutional controls on the property to prohibit uses that exceed 10 hours/day.

An additional consideration is the potential for a significant threat to human health within these buildings using OSWER’s calculator to estimate indoor concentrations and associated risks from maximum groundwater concentrations at the Site (Table 1 below). Elevated potential risks and hazards result from high concentrations of contaminants in the source area and very shallow groundwater (approximately 5 feet below ground surface).

Table 1. Vapor Intrusion Risks Calculated from Maximum Groundwater Concentrations in the Site Source Area

Contaminant	Max. GW Concentrations	Calculated* Indoor Air Concentration	RESIDENTIAL		COMMERCIAL	
			VI Cancer Risk	VI Hazard Index	VI Cancer Risk	VI Hazard Index
TCE	5,000 µg /L	2,010 µg /m ³	4.2E-03	970	6.7E-04	230
Vinyl Chloride	15,000 µg /L	17,000 µg /m ³	1.0E-01 (=1 in 10)	160	6.1E-03	39

*OSWER Calculator Version 3.1.1 May 2014 RSLs

The max soil concentration of TCE is 5,570 mg/kg, and of vinyl chloride is 15.8 mg/kg.

TCE, the primary contaminant of concern, is currently considered to be carcinogenic to humans by EPA. The non-cancer effects of concern for TCE exposure include effects on the liver, kidneys, immune system, central nervous system, male reproductive system, and developing fetus. For fetal cardiac malformations, a specific developmental effect, the critical period for exposure is considered to be the approximate 3-week period in the first trimester of pregnancy during which the fetal heart develops.

A non-cancer hazard index of 1 is equal to a TCE exposure concentration of 2 $\mu\text{g}/\text{m}^3$ for a residential exposure and 7 $\mu\text{g}/\text{m}^3$ (based on 10 hour/day exposure) for a commercial scenario. EPA Region 9 considers these levels to be cause for an urgent or accelerated response. Under the current toxicity assessment standard, the concentration levels of TCE with an excess lifetime cancer risk of 1×10^{-6} (1 in one million) is 0.48 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for residential exposure and 3.0 $\mu\text{g}/\text{m}^3$ for commercial exposure.

In addition to threats associated with VI, exposures can occur when the concrete overlying the source area is breached (e.g., during remedial investigation activities, implementation of the proposed NTCRA, repairs of utilities, or Site development). Currently, there are no institutional controls in place that would prevent activities in or outside of the AMCO warehouse facility that could pierce the concrete cap and create preferential pathways for vapor intrusion. For future construction workers, the cancer risk is **1.E-05** and the non-cancer Hazard Index is **23** for exposures to shallow soil. For a hypothetical resident, the cancer for adult plus child (totaling 30 years) is **3.E-04** and the non-cancer hazard is 1 for an adult and **10** for a child resident. In 1995 a utility worker passed out from exposure to vinyl chloride vapors during a trenching activity. During 2013 soil boring activities at the Site, air monitoring indicated the need for drillers to wear Level C personal protective equipment to prevent exposures to vapors, dust and soils.

High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate [§300.415(b)(2)(iv)]

Very high levels of hazardous substances are present in shallow soils and groundwater within the source area. These levels are documented in the RI (Hill, 2010) and the RI Addendum (ITSI-Gilbane 2014). The composition of the LNAPL, maximum groundwater and soil concentrations in the source area are summarized in **Attachment 2 (Light Non-Aqueous Phase Liquid (LNAPL) Composition)**, **Attachment 3 (Maximum VOC Soil Concentrations in Treatment Area)**, and **Attachment 4 (Maximum VOC Concentrations in Groundwater)**, respectively. Excerpts from the cited documents (below) provide additional information relevant to the nature and extent, as well as fate and transport, of the contamination addressed by this Action.

Key findings of the RI are as follows:

Several feet of LNAPLs were observed floating on groundwater beneath the central area of the Site. The LNAPL consists primarily of VOCs, including PCE and TCE, but also contains SVOCs, pesticides, and dioxins/furans. The LNAPL is serving as the primary continuing source of contamination to groundwater, soil, and soil gas.

The highest concentrations of contaminants in groundwater and soil gas (primarily VOCs) were generally observed in the central and south central areas of the Site, corresponding with the known locations of former chemical storage units and buried distribution piping. However, other distinct areas of elevated contamination concentrations in groundwater and soil gas were observed beneath the large vacant lot on Center Street and beneath the UPRR/Amtrak yard south of the facility, suggesting that separate releases of contaminants have occurred in these areas. These releases are not believed to be related to the former activities at the AMCO site and will not be addressed in this NTCRA.

1,4-dioxane has widely migrated in groundwater from the Site, and it is expected to continue migrating. Other contaminants mobilized in groundwater are soluble arsenic, iron, and manganese. Other metals, organochlorine pesticides, PCBs, and dioxins/furans generally have limited mobility in the environment, and the extents of these compounds are limited to the immediate vicinities of their historic suspected source areas.

Groundwater contaminant concentrations beneath the central and south central portions of the Site decrease rapidly with depth. The concentrations in the deepest monitoring wells at the Site are low or below detection levels, indicating that dense non-aqueous phase liquid (DNAPL) has not migrated below approximately 20 to 30 feet bgs at the site.

The VOCs identified as key contaminants (chlorinated solvents and petroleum hydrocarbons) are undergoing significant biodegradation in groundwater.

The distributions of contaminants in soil are less centralized and more widespread than in groundwater, suggesting multiple industrial, non-industrial, and non-point sources. Many contaminants in soil, particularly lead, exceed risk criteria for industrial and residential receptors.

Key findings reported in the RI Addendum:

Fate and Transport Determination

The LNAPL in the central area of the Site continues to contribute COC contamination to groundwater, especially in the shallow zone of the Upper Aquifer. Two significant processes seem to be in effect on the site. The chlorinated solvents are dissolved in the LNAPL rather than forming a DNAPL, which has limited the migration of the contaminants into the deeper groundwater at the Site. The second process is the biodegradation of many of the VOCs at the Site, which has limited the lateral movement of the VOC plume.

Microbial testing conducted as part of the RI Addendum indicated that dehalococoides, the microorganism associated with complete chlorinated ethene biodegradation, are present at concentrations indicative of active reductive dechlorination in groundwater. Additional testing demonstrated the presence of the functional genes associated with degradation of TCE to cDCE, cDCE to VC, and VC to ethene, indicating that complete biodegradation of daughter products such as VC is occurring. Dissolved gases (methane, ethene, and ethane) associated with active biodegradation also are present in groundwater with elevated VOC concentrations.

Soil sampling results

Over 1500 samples were collected at 11 depths (1 ft bgs to 70 ft bgs) from 125 locations. (**Attachment 5, Soil Sampling Results and Combined Plume Map January 2014**) The sampling locations included the Site and the following adjoining properties: the Large Vacant Lot, Small Vacant Lot, and Parking Lot. In addition to the soil sampling effort, a combination cone penetrometer testing (CPT) and membrane interface probe (MIP) was used to characterize the vertical soil stratigraphy and distribution of VOC contamination. 17 CPT-MIP borings were taken at depths that varied from 25.5 feet (MIP-5) to 162 feet bgs (MIP-10).

The sampling results confirmed that the most significant releases of chemicals to soils occurred in the central area of the Site where bulk chemicals were transferred from rail cars or delivery trucks to storage tanks and drums. In this area, NAPL and elevated concentrations of many COCs were found at high levels including: PCE; TCE; cis-1,2-DCE; vinyl chloride; 1,1-DCA; 1,2-DCA; benzene; ethylbenzene; xylenes; 1,2,4-TMB; and 1,4-DCB. These contaminants were found in shallow surface soils to depths of 30 feet bgs. VOCs were not detected in soil samples collected below 60 feet bgs.

SVOCs (such as benzo(a)pyrene) and metals (arsenic and lead) were found in soil (typically less than 5 ft bgs) at concentrations exceeding screening levels, across the Site and the neighboring properties. Pesticides (aldrin, dieldrin, DDT, DDD, and DDE) were also found above their soil screening levels at the Site and the Large Vacant Lot. Pesticide contamination extends to a maximum depth of 30 feet bgs in the source area, while the vertical extent of pesticide contaminated soil at other areas of the Site generally is shallow (5 ft bgs or less).

Groundwater sampling results

Groundwater sampling was conducted at 23 shallow zone wells, 17 intermediate zone wells, and 12 deep zone wells. The highest VOC concentrations were detected in the shallow zone in the central area of the Site. The chlorinated VOC concentrations in the shallow-zone were more than an order of magnitude greater than those in intermediate zone groundwater. LNAPL (as free product) was found at measurable thicknesses in shallow-zone monitoring wells MW-13 and MW-14 (refer to **Attachment 5 Soil Sampling Results and Combined Plume Map January 2014** for locations). LNAPL also was also observed at times in monitoring well RMW-02-13. These three wells are all located in the central area of the Site.

The contaminants of concern in the upper aquifer groundwater at the site included VOCs, SVOCs, metals, PCB-1260, pesticides, and dioxins/furans. Chlorinated VOCs, primarily TCE, cis 1,2-DCE, and vinyl chloride. [**Attachment 4 (Maximum VOC Concentrations in Groundwater)**] These contaminants had a large lateral extent in both the shallow (5-15 feet bgs) and intermediate (25-35 feet bgs) zones of the Upper Aquifer.

1,4-dioxane was found to have the largest lateral footprint at the Site. The shallow zone plume for 1,4-dioxane extended from the northeastern corner of the Site (well RMW-03-15) to beyond monitoring well BMW-08, located approximately 300 feet southwest of Site. In the intermediate zone groundwater, the lateral extent of the 1,4-dioxane plume was smaller, but the concentrations of 1,4-dioxane were higher.

Other VOCs found above screening levels were: toluene and methylated and chlorinated benzenes. The lateral footprint of the plumes for these VOCs includes the RMW-02 and RMW-12 well clusters, with the vertical extent of these VOCs primarily within 15 feet bgs.

Pesticides, PCBs, and dioxin/furan were found in the central portion of the Site. High concentrations of arsenic and iron and, to a lesser degree, manganese, are also present in groundwater associated with the VOC plumes.

Actual or potential contamination of drinking water supplies or sensitive ecosystems

The shallow aquifer in the vicinity of the source area is not currently used for drinking water; however, the water quality varies significantly across the site, with some areas potentially suitable for drinking water, and some not. EPA expects the final Record of Decision (ROD) (which will follow this NTCRA) will set cleanup levels that comply with drinking water Applicable or Relevant and Appropriate Requirements (ARARs) where the aquifer meets the criteria for municipal or domestic water supply, and comply with standards for non-drinking water beneficial uses (e.g. protection of aquatic life, irrigation) where it does not.

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released [§300.415(b)(2)(v)]

The source area is covered with a non-engineered concrete cap, so that the shallow, contaminated aquifer is not significantly affected by rainy/windy weather or other climatic conditions. However, if an

earthquake caused a significant breach of the concrete cap or buildings over or near the Site, a release of contaminant vapors to ambient and/or indoor air could occur.

The availability of other appropriate Federal or State response mechanisms to respond to the release [§300.415(b)(2)(vii)]

The AMCO Superfund Site is an NPL Site. EPA is the appropriate agency to respond to the release at the Site. There are no other identified Federal or State resources or response mechanisms available to respond to the release.

Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release

All hazardous substances in drums or other storage containers were removed during the emergency response activities conduct by EPA in 1997-98.

Threat of fire or explosion

There is currently no threat of fire or explosion at the Site; however, should a fire destroy or damage the floor of the warehouse or office building, releases of contaminant vapors could occur.

IV. ENDANGERMENT DETERMINATION

The underground source area contaminants have been released via vapor intrusion, and continue to pose a threat of release, and represent an imminent and substantial endangerment to public health, welfare, or the environment, via the potential to cause indoor air concentrations in excess of health-based action levels. As long as the source continues to exist, the threat of release and endangerment will persist. The actions proposed in this Action Memo will address these threats.

V. EXEMPTION FROM STATUTORY LIMITS

In accordance with CERCLA Section 104(c) a consistency exemption is proposed for this NTCRA for an exemption to the \$2 Million cost limit and for the 12 month completion requirement.

Section 104(c)(1) of CERCLA generally restricts fund-lead removal actions to a total extramural direct cost of \$2,000,000, and less than 12 months in duration. The proposed removal action at the Site meets the exemption criteria for consistency with the remedial action to be taken. CERCLA 104(c)(1)(C).

Consistency:

The removal action will address the VOCs at the Site, and will not negatively impact future remedial actions at the Site to address the remaining contaminants of concern. Currently, VI is the primary exposure pathway for VOC contamination at the Site. The final Record of Decision (ROD) has not been developed for the site, but any future ROD would be required to address the VOC contaminants, so the proposed NTCRA action is consistent with the expected requirements of the final ROD.

Appropriateness:

The removal action will remove VOCs from the soil, groundwater, and LNAPL at the Site. The VOCs are the source contamination for VI at the Site, which poses a potential threat to the users of the warehouse-office building and to the residents of nearby homes. In addition, VOCs are migrating off-site in the groundwater, so this action will eliminate the continuing migration of VOCs into groundwater and then off-site. The proposed NTCRA will comply with EPA's off-site rule requirements.

Should the removal of the source area contaminants not be completed, the Site will continue to present an immediate or imminent and substantial threat of endangerment to public health, welfare, and the

environment. EPA Region IX recommends that, until the final remedial action is implemented, and includes the removal of all such source-area contaminants, the emergency conditions persist at the Site and warrant the exemption from the \$2,000,000 limitation.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

EPA proposes to implement an In-Situ Thermal Heating (ISH) technology within a specified treatment area (**Attachment 6, Proposed Treatment Area**), as described herein:

Overview of In-Situ Thermal (ISH) Technology:

In-Situ Thermal Heating (ISH) involves heating the soil and groundwater in-situ to volatilize contaminants. The evaporated contaminants are then recovered through vapor extraction and subsequently treated before discharge. In-situ thermal heating technologies that are commonly used for remediation of soils and groundwater in source zones contaminated with chlorinated VOCs and volatile petroleum hydrocarbons include electrical resistive heating (ERH) and thermal conductive heating (TCH) [EPA, 2004]. The heat generated by ERH and TCH technologies increases the mobility of contaminants, potentially increasing migration. Therefore, ISH technologies are often paired with groundwater extraction to provide hydraulic containment and minimize offsite migration.

The EE/CA evaluated the features of both ERH and TCH systems and recommended ERH as the preferred ISH technology for the Site. ERH utilizes electrodes installed within the treatment area. As the electricity flows from one electrode to another through groundwater and soil moisture, heat is generated due to the inherent electrical resistance of the subsurface media. Because ERH relies on groundwater and soil moisture to conduct electricity and generate heat, the maximum achievable temperature is 100 degrees Celsius (boiling point of water at the water table). As the subsurface temperature rises, VOCs volatilize and the generated steam strips the VOCs from the subsurface where they are captured by a vapor recovery system (EPA, 2004).

TCH relies on direct application of heat, generally produced by heater wells. Higher temperatures can be achieved with TCH, but the temperature drops off quickly with increasing distance from each heater well. Because of this, TCH heater wells must be spaced more tightly than ERH electrodes to achieve the even heating throughout the zone of contamination.

The primary difference between ERH and TCH is that TCH relies solely on heat conductance through the soil and groundwater. Therefore, to achieve a uniform heat profile above the boiling point throughout the treatment zone, the TCH heating elements and adjacent soils must reach temperatures up to 400° C or more in some cases. Since ERH uses the soil's electrical resistivity to generate heat, a uniform heat profile can be achieved with temperatures at boiling point. ERH, due to its relatively low temperatures as compared to TCH, has a much lower potential to affect soil matrices, subsurface utilities, and nearby structures. ERH has been applied directly below buildings at several sites with no negative impacts observed. Implementing ERH requires considerably less drilling than TCH and the overall treatment costs are generally lower.

Implementing ERH at the Site:

An estimated 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 on an approximately 20 foot grid, over an area of approximately 17,500 square feet. The electrodes will vary in length from 10 feet to 50 feet depending on their location in the treatment area. Three existing groundwater monitoring wells within the treatment area will be replaced using heat resistant materials,

and eight new groundwater monitoring wells will be installed for performance monitoring. Due to the shallow contamination and groundwater table, the ground surface across the entire treatment area will be sealed with cellular concrete to prevent fugitive VOC emissions and vapor extraction short-circuiting, and to provide thermal insulation.

Inside the warehouse-office building an estimated 16 heating electrodes, eight multi-phase extraction wells, and three monitoring points will be installed through the foundation to monitor and treat contamination underneath the structures.

Each multi-phase extraction well will be fitted with a pneumatic submersible pump for groundwater (and possibly mobile LNAPL) extraction, and the wellhead will be plumbed to the vapor extraction system for recovery of contaminant vapors and steam. Extracted groundwater will pass through a product separator to recover LNAPL, bag filters to remove solids, and a treatment system composed of air stripping and liquid-phase granular activated carbon (GAC) technologies to remove VOCs. Sound insulation will be installed as needed to reduce noise generated by the treatment system. Monitoring and engineering controls will be installed to ensure that LNAPL and VOCs are not spread to new areas and VOCs are not emitted to the surface. A robust sampling and analysis and Quality Analysis/Quality Control plan will be developed for the site during the design phase, for all sampling activities at the site, including the performance monitoring activities.

Treated groundwater will be re-injected at heating electrodes to maintain proper moisture levels (as needed). A portion of the extracted groundwater may be discharged to the East Bay Municipal Utility District (EBMUD) sanitary sewer to maintain hydraulic containment. Injecting groundwater helps prevent electrode overheating, maintains electrical connectivity with the soil, and increases convective heat transfer as the energy produced near the electrodes is spread throughout the treatment zone via fluid flow. Groundwater is typically extracted at a rate approximately 5% higher than it is re-injected in order to provide hydraulic containment and prevent migration of mobilized contaminants. The excess groundwater will be treated and discharged to the sanitary sewer. The treatment system will be designed so that the discharged water meets all appropriate treatment standards, including those of the EBMUD, as well as any RCRA standards that are applicable.

The presence of 1,4-dioxane in the Site groundwater, which is not effectively treated with the proposed technology, should not impact the technical feasibility of ISH. EBMUD does not currently have a discharge limit for 1,4-dioxane, so the presence of this chemical should not impact discharge to the sanitary sewer. EPA proposes to re-inject a portion of the treated groundwater (for purposes of wetting the electrodes) in a manner that will not increase the extent of 1,4-dioxane in the already contaminated aquifer. The California Anti-degradation Policy prohibits any contamination of pristine groundwater resources, or worsening any existing contamination.

The heated soil vapor and steam pulled from each extraction well will first pass through a condenser and knockout tank to condense and remove moisture. Condensate from the condenser and knockout tank will be routed to the inlet of a product separator. The vapor stream will be pumped into a cryogenic vapor treatment system (GEO C3) for primary VOC treatment, followed by granular activated carbon (GAC) for polishing. The GEO C3 system will also be used to treat the VOC-laden air generated by the air stripper. Product recovered by the GEO C3 system and product separator will be pumped into an above grade double-walled tank for temporary storage pending offsite treatment and disposal at a regulated treatment facility. Spent GAC will also be treated and disposed off-site at a regulated treatment facility, consistent with EPA's Off-site Policy.

During the design and implementation of the action, each waste stream will be carefully evaluated for the appropriate handling per the relevant sections of RCRA and the state regulations. Based on a review of the information currently available, the wastes on the site do not meet the definition for RCRA listed wastes, and so will be handled as appropriate. Remediation wastes will be tested to determine whether such wastes must be managed as State or Federal hazardous waste because the waste meets one of more

of the hazardous waste characteristics (toxicity, ignitability, corrosivity or reactivity) set forth in RCRA or state regulations.

Constant air monitoring will be conducted during the implementation of the action at the perimeter of the site and in sensitive areas to ensure that the remedy is protective. In addition, there will be a robust community action plan developed prior to the implementation, which will clearly state the plan and the actions necessary should any exceedance be detected.

Upon completion of the action, the equipment will be removed and the site will be re-graded. There will be no need for Institutional Controls at this time. Site security controls will be implemented as necessary between the NTCRA and final remedial action.

Removal Action Objectives/Performance Measures

The Removal Action Objectives are as follows:

- Protect human health by minimizing vapor intrusion potential in Site structures and prevent migration to adjacent residential housing by removing VOC source material from Site soils, LNAPL, and groundwater.
- Protect workers, local residents, and property during the removal action.
- Support a future ROD for a permanent clean up remedy for all Site media.

At a minimum, this action is anticipated to achieve a 98% reduction in total mass of all VOCs present. This is based on past experience with ISH systems installed at other site plumes with similar sizes, contaminants, and soil characteristics. ISH vendors typically predict 98% VOC mass reduction in similar systems as well.

Pending ISH system design, more defined parameters to measure achievement of performance standards will be determined. Periodic soil and air vapor sampling will be conducted to check on VOC concentration levels, look for asymptotic conditions, and determine when to shut the system off and begin the cool down period. The Performance Monitoring Plan, which will be used to determine the point at which the heating system will be shut off, will be developed during the design using a rigorous QA/QC plan. Additional VOC degradation is expected when the ground temperature decreases which will allow biological processes to continue. These performance measures will not be the final cleanup levels for the Site, which will be established during a subsequent process, culminating in a final ROD.

The SFRWQCB Groundwater Screening Levels for Vapor Intrusion will be used as the groundwater targets, as achieving these levels would be protective of human health by preventing further VI into the warehouse-office building. The most current SFRWQCB soil Environmental Screening Levels (ESLs) will be used to assist with the determination of the targets for the soil performance measures. To remain consistent with previous RI work, and in consideration of the residences located adjacent to the site, both the soil and groundwater performance measures will be based on screening levels developed for residential land use.

2. Contribution to Remedial Performance

The removal action supports the long term remedial actions at the Site by removing the most immediate threat to human health and the environment. The selected alternative, ISH, will remove up to 98% of the VOCs at the Site, which are the source of ongoing and potential VI into the warehouse-office building, nearby residences and potential releases to ambient air during activities that breach the existing cap. Future remedial actions at the Site will address the remaining COCs beneath the concrete cap, as well as the dissolved plume.

3. Engineering Evaluation and Cost Analysis (EE/CA)

The EE/CA Approval Memorandum for this action was signed by Robin Richardson, OSRTI, on July 27, 2014. On February 10, 2015, the EPA released the EE/CA for a 30-day public comment period (**Attachment 10** to this Action Memo, **AMCO Engineering Evaluation/Cost Analysis**).

The alternatives evaluated in the EE/CA were:

1. No Action
2. Excavation and Off-Site Disposal
3. Multi-Phase Extraction (MPE)
4. In-Situ Thermal Heating (ISH)
5. Enhanced In-Situ Bioremediation with Free Product Recovery (EISB)
6. Free Product Recovery Followed by Air Sparging and Soil Vapor Extraction (AS/SVE)

The EPA also issued Fact Sheets describing the NTCRA and hosted an open house on February 22, 2015, to receive comments from the community on the proposed removal action. The EPA prepared a Response to Comments which is included as **Attachment 9** to this Action Memo.

This Action Memorandum is based on the EE/CA and on the administrative record for this NTCRA. The EE/CA ranked the alternatives based on an evaluation of the effectiveness, implementability and cost. In-Situ Thermal Heating, Alternative 4, was selected as the preferred action for the Site. A summary of ISH, and the comparative analysis of the alternatives, are given below:

Selected Removal Action – ISH (Alternative 4):

- ISH provides protection of human health and the environment by removing the highest levels of VOCs from the soil, groundwater and LNAPLs, which are the source material for VI at the Site.
- Of all the removal alternatives considered for the Site, ISH has the highest likelihood of achieving the RAOs for soil and groundwater. ISH addresses LNAPL, vapor phase, dissolved phase, and adsorbed phase VOCs across all depths of the entire treatment area. VOC concentration reductions in excess of 98% are commonly achieved within short removal action timeframes with this technology.
- ISH is expected to provide good to excellent reduction of toxicity, mobility and volume through treatment. Implementing ISH will provide an immediate reduction of vapor intrusion as soon as the system is turned on and the vacuum is applied to the subsurface.
- ISH will provide long-term effectiveness by altering and removing the LNAPL mass from the subsurface. In addition, after the system is shut down, the elevated subsurface temperatures may enhance and accelerate the naturally occurring biodegradation of the remaining VOC contamination.
- ISH is the second least cost alternative that achieves RAOs.
- Over the past 10 years, ISH has become a reliable and proven technology. The equipment and resources for timely and successful implementation of ISH are readily available.
- As the selected alternative, ISH is expected to meet all ARARs.
- The estimated total cost to conduct the NTCRA is \$11,658,248 (includes both extramural and intramural costs).

Comparative Analysis of Alternatives:

Effectiveness:

Alternative 1, the no action alternative, was eliminated because it does not protect human health or the environment. Alternatives 5 (EISB), 2 (Excavation), 3 (MPE) and 6 (AS/SVE) will leave VOCs in the soil, groundwater and LNAPL in varying amounts. These remaining VOCs could migrate to clean areas after the removal action is complete and will continue to pose a threat to human health and the environment via VI into the warehouse-office buildings and nearby residences.

Alternative 4 – In-Situ Thermal Heating scores highest for overall protectiveness of Public Health and the Environment. ISH will effectively address free and residual LNAPL, along with dissolved phase, adsorbed phase, and vapor phase contamination. This will provide the most thorough removal of contamination within the treatment area and the most significant reduction in risk to public health and the environment.

Implementability:

Alternative 4 (ISH) and Alternative 5 (EISB) scored highest for implementability. ISH can effectively remove VOCs from the entire treatment area, including underneath the warehouse-office building and near subsurface utilities on the south side of the property. Continuous security at the Site is required due to the heavy use of copper conductors (subject to theft) and safety concerns associated with high voltage electrical lines.

Site geochemical conditions indicate that reductive dechlorination is already occurring naturally in the subsurface, and could likely be accelerated through the addition of hydrogen donor compounds. However, Alternative 5 is subject to phased approach limitations: reductive dechlorination cannot begin until product recovery is completed, and sulfate addition will not begin until reductive dechlorination has been completed. Success of bioremediation is dependent upon having a source of water to mix with remediation reagents and inject into the subsurface. Ideally, the water would be pumped from the Site to supply the water needed for bioremediation and provide hydraulic containment. If groundwater cannot be extracted from the subsurface in sufficient quantities, municipal water will need to be procured. The success of this alternative is also highly dependent on effective and even distribution of substrates. Subsurface heterogeneity may lead to uneven treatment.

Alternative 6 (AS/SVE) and Alternative 3 (MPE) were ranked next lowest in the EE/CA. The shallow groundwater table and presence of LNAPL complicate the AS/SVE system design. Engineering controls would be required to minimize condensate generation, mounding, surfacing, and migration of LNAPL. Additional monitoring and engineering controls would be needed to optimize system operating parameters at each AS and SVE well, depending on soil properties and vadose zone thickness.

MPE is a reliable method to reduce source mass and VOC flux to soil vapor and shallow groundwater. MPE systems must be run continuously to maintain hydraulic containment of dissolved phase VOCs and LNAPL in groundwater, and to maintain a depressed groundwater table. The technology is subject to fouling, fatigue, and other factors that can lead to down time and reduced treatment effectiveness. MPE is also subject to short-circuiting through preferential pathways in heterogeneous media (prior excavations, trenches, wells, etc.), and will leave residual LNAPL stripped of VOCs.

Alternative 2 (excavation) was ranked lowest for implementability. Excavation is a simple, reliable, and proven technology; however the proximity of nearby structures and subsurface utilities leads to significant geotechnical and engineering concerns. The shallow groundwater table adds to these concerns, necessitating the use of sheet piles and extensive dewatering to reach the desired treatment depths. If selected, the excavation alternative must be implemented during the dry season.

Cost:

The extramural costs for the removal action alternatives considered in this EE/CA rank as follows from least to most expensive:

Alternative 1 – No Action	\$0
Alternative 5 – EISB	\$7,833,951
Alternative 4 – ISH	\$8,522,140
Alternative 3 – MPE	\$11,249,080
Alternative 6 – AS/SVE	\$12,420,716
Alternative 2 – Excavation	\$28,957,017

ARARs:

EPA sent a letter request for State ARARs on January 30, 2015. The response was received on March 3, 2015. See **Attachment 8** for a table of **State and Federal ARARS** for this Action.

Section 300.415(j) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering exigencies of the situation. The selected alternative is expected to meet all ARARs.

Other Requirements

CERCLA waste transferred off-site may only be placed in a facility that operates in compliance with the Resource Conservation and Recovery Act (RCRA). The facility to which any hazardous wastes will be sent must be among the list of approved receiving facilities pursuant to RCRA. In addition, EPA will strive to ensure that the waste shipped off-site is minimized to the maximum extent possible.

Treated groundwater discharged to East Bay Municipal Utility District (EBMUD) publicly-owned treatment works (POTW) will be managed consistent with OSWER's Guide to Discharging CERCLA Aqueous Wastes to Publicly Owned Treatment Works (POTWs) (EPA, 1991) and related EPA guidance.

U.S. Department of Transportation (DOT) Hazardous Material Transportation Rules for manifests and packaging, 40 CFR 262.20, 262.22, and 262.23, 262.30 through 262.33. Off-site transportation of hazardous materials will be governed by U.S. DOT regulations. The substantive provisions of the regulations apply to management of hazardous materials onsite.

29 CFR Parts 1910, 1926, and 1904 OSHA Health and Safety Regulations.

4. Project Schedule

The design phase of the NTCRA is estimated to require 4 months. During this phase, EPA will obtain the necessary city and State regulatory (air, groundwater) and utility agreements. Construction of the system will require approximately 2 months and the system is expected to operate for 6 months. Thereafter, the performance of the removal will continue to be monitored and the extraction/treatment system removed, after it is established that RAOs have been met. The period of performance monitoring for determining whether RAOs have been achieved may require longer than 12 months due to the length of time needed for the heated soils to cool.

B. Estimated Costs

The following costs are based on those presented in the EE/CA for the ISH response action and are updated to reflect new information. The project will be implemented in phases over 3 fiscal years.

Extramural Costs:		
FY2015	Thermal system installation	\$3,500,000
FY2016	Operation and performance monitoring	\$2,613,000
FY2017	Decommissioning of thermal and treatment equipment	\$1,000,000
Subtotal Extramural Costs		\$7,113,000
Extramural Costs Contingency (20%)		\$1,422,600
Total Extramural Costs		\$8,535,600

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the Site conditions, the nature of hazardous substances documented on-site, and the potential exposure pathways to on-site and visiting populations described above, actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response actions selected in this memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

VIII. OUTSTANDING POLICY ISSUES

The South Prescott neighborhood, an EJ community, has been waiting since 1998, when EPA’s first removal action was ended, for further cleanup. South Prescott is disproportionately burdened by multiple sources of pollution and ranks in the top 10 percent of the most impacted communities in California, according to an environmental hazard assessment tool developed by the California Environmental Protection Agency (“CalEPA”) and the Office of Environmental Health Hazard Assessment (“OEHHA”). (This tool, known as the California Communities Environmental Health Screening Tool, shows which portions of the state have higher pollution burdens and vulnerabilities than other areas and are, therefore, most in need of assistance.) Nationally, this neighborhood ranks in the 96th percentile for diesel PM and exceeds the 90th percentile for overall air toxics cancer risk and respiratory hazard.

The South Prescott community has been raising the issue of cumulative environmental impacts for years. EPA Region 9 has responded to these concerns by exercising its risk management discretion to select fully protective response actions when setting Site cleanup levels (1E-6 for cancer risk; HQ=1 for non-cancer hazards), and considering cumulative impacts in setting cleanup priorities. In the South Prescott neighborhood, the removal program addressed an environmental health hazard, lead in residential soils, which was unrelated to the Site but contributed to cumulative impacts. An expedited approach to address VI issues related to the Site contaminants using the EE/CA process is also consistent with Region 9’s approach in the area.

Moreover, vapor intrusion at EPA Superfund sites is one of the top priorities for the Region 9 Superfund Division. TCE vapors are of great concern, especially for women in the first trimester of pregnancy (because of the potential for cardiac malformations to the developing fetus). For fetal cardiac malformations, the critical period for exposure is considered to be the approximate 3-week period during which the heart develops. Region 9 has, therefore, established interim action levels and response action recommendations to protect against potential non-cancer outcomes, including developmental effects such as cardiac malformations. Subsequent to the 2014 EPA Region 9 technical assessment on TCE inhalation exposures, EPA Headquarters issued a memo indicating that the regions are encouraged “to act with a bias for initiating response actions to ensure protection of public health.”²

² See the memo at: http://www.epa.gov/superfund/sites/npl/TCE_compilation_final.pdf

IX. ENFORCEMENT

The strategy is included in a separate **Confidential Enforcement Addendum (Attachment 8)**.

The total EPA costs for this removal action base on full-time accounting practices that will be eligible for cost recovery are estimated to be \$8,535,600 (extramural costs) + \$230,000 (EPA intramural costs) = \$8,765,600 x 1.33 (regional indirect rate) = \$11,658,248.³

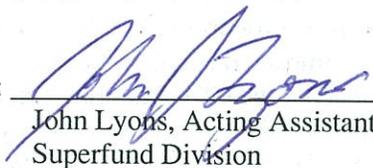
X. RECOMMENDATION

This decision document represents the selected removal action for the AMCO Chemical Superfund Site, in Oakland, California, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the Site meet the NCP section 300.415(b) criteria for a removal, as well as meet the requirements for a consistency exemption to the statutory limitations of removal actions to less than \$2 million and 12 months, and I recommend your approval of the proposed removal action. The total project ceiling, if approved, will be \$8,535,600, all of which will come from Headquarters remedial action funds, since the AMCO Superfund is a fund-lead Site.

Because conditions at the Site meet the NCP criteria for a Non-Time Critical Removal, I recommend that you approve the removal action proposed in this memorandum.

APPROVAL: _____


John Lyons, Acting Assistant Director
Superfund Division

DATE: _____

August 17, 2015

DISAPPROVAL: _____

John Lyons, Acting Assistant Director
Superfund Division

DATE: _____

XI. ATTACHMENTS:

- Attachment 1 Site Location Map
- Attachment 2 Light Non-Aqueous Phase Liquid (LNAPL) Composition
- Attachment 3 Maximum VOC Soil Concentrations in Treatment Area
- Attachment 4 Maximum VOC Concentrations in Groundwater
- Attachment 5 Soil Sampling Results and Combined Plume Map January 2014
- Attachment 6 Proposed Treatment Area
- Attachment 7 Applicable or Relevant and Appropriate Requirements (ARAR) Compliance
- Attachment 8 Enforcement Addendum [CONFIDENTIAL]
- Attachment 9 EPA Response to Comments on the EE/CA and the Proposed Action
- Attachment 10 Engineering Evaluation/Cost Analysis (EE/CA)

³ Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site costs [33% x \$8,765,900], consistent with the full accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual costs from this estimate will affect the United States' right to cost recovery.