Final Report

Human Health Risk Assessment

AMCO Chemical Superfund Site

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Note: This HHRA document was previously published online by the USEPA in October 2010. This version of the HHRA has been revised to remove Attachment 11, which is now incorporated as Section 7 of the main Remedial Investigation document.

Executive Summary

This report presents the methodology, findings, and conclusions of a human health risk assessment (HHRA) prepared as part of the Remedial Investigation (RI) for the AMCO Chemical Superfund Site (the Site). This HHRA includes a quantitative evaluation of the potential adverse health effects to people resulting from exposure to hazardous chemicals in soil at the former AMCO facility and adjacent parcels (on- and off-facility locations) and in groundwater at the Site. In addition, a vapor intrusion evaluation was performed on residential homes near the former AMCO facility as well as the office building on the Site. Screening level evaluations were performed to assess potential exposure to residential contaminated soil and homegrown produce prior to the soil remediation activities. Results from this HHRA will be one of the factors that the EPA uses to determine if cleanup actions are warranted at the Site.

An ecological risk assessment (ERA) was not performed for the Site. Due to the residential and industrial land use in the vicinity of the former AMCO facility, there are no significant populations of ecological receptors or individuals of special status species on the Site. In addition, there are no reasonable and unambiguous pathways for contaminant transport from the Site to any wildlife or sensitive habitats, including Oakland harbor (EPA 2004d). Under current conditions, birds and small mammals may be exposed to site-related chemicals that have been taken up by homegrown produce. This pathway, while potentially complete, was not quantitatively evaluated in this HHRA and is considered to be insignificant compared to exposure by other receptors (humans) and pathways.

ES.1 Study Area

Four separate industrial/commercial exposure areas within the AMCO study area are evaluated as part of this HHRA. These areas are referred to as follows: former AMCO facility, parking lot, small vacant lot, and large vacant lot. Each of these areas is currently paved with concrete ranging from 0.5 foot to more than 3.7 feet in thickness. However, for this assessment it was assumed that no pavement would be present to preclude direct contact with soil.

The groundwater underneath the Site is not being used for drinking or other potable uses. It is extremely unlikely that residents would drink groundwater underneath the Site in the future; however, in accordance with input from the community and regulatory agencies, the potential risk of using groundwater underneath the Site as drinking water is evaluated.

To assess the potential human health risks associated with VOCs migrating from the groundwater into the office at the Site and into nearby residences; crawlspace and ambient air sampling was performed over nine sampling events from September 2004 through June 2009. Soil gas and crawlspace air samples were collected to determine preferential migration pathways and the potential for vapor intrusion. In addition to the crawlspace and ambient air sampling, the June 2009 sampling event included indoor air sampling at some of the nearby residences. Because indoor air was only sampled once, this data represents a snapshot in time and risks and hazards were not calculated using the indoor air data. Crawl space air was used in this evaluation because it is thought to be less affected by the lifestyle choices, such as household product use and smoking, of the building's occupants than indoor air. The evaluation of the results of crawl space air sampling is considered easier to interpret than indoor air sampling results (DTSC 2004).

Prior to the soil removal action, soil was sampled at six residential parcels in the immediate vicinity of the facility. Produce samples were collected from four residences that have gardens and fruit trees to evaluate the potential for chemical exposure through ingestion of this produce.

ES.2 Risk Assessment Methodology

This HHRA was prepared in a manner consistent with EPA's *Risk Assessment Guidance for Superfund, Part A* (EPA 1989), *Part B* (EPA 1991b), *Part E* (EPA 2004b) and *Part F* (EPA 2009), as well as guidelines published by the California Environmental Protection Agency (CalEPA). The assumptions provided for the general public by EPA and incorporated into this HHRA are conservative (i.e., representative highest exposure that is reasonably expected to occur at a site) and thus, health-protective.

This HHRA including both the quantitative and screening level assessments is a baseline evaluation which assumes exposure to contaminated media under baseline conditions without consideration of future remediation or natural attenuation of chemicals.

Data Collection and Data Evaluation

Data were evaluated separately for each of the different industrial and residential site locations. In addition to the data collected for the RI, data from previous investigations were reviewed to gain a better understanding of the site characteristics.

For the industrial areas, soil data collected from depths of 0 to 7 feet below the bottom of the concrete was evaluated. Soil deeper than 7 feet was below the water table. The groundwater evaluation was based on six quarters of groundwater monitoring data. Exposure point concentrations (EPCs) were calculated for soil, groundwater, crawlspace air, and ambient air data. For soil and groundwater the EPC was either the 95 percent upper confidence limit on the mean (95 UCL) or the maximum detected concentration for chemicals with the 95 UCL exceeding the maximum concentration.

All chemicals reported in at least one sample at concentrations greater than the sample detection limit were included as constituents of potential concern (COPCs). Chemicals were not excluded based on comparison to background concentrations. The approach used to evaluate COPCs is appropriate for a conservative baseline HHRA.

Exposure Assessment

The objective of the exposure assessment is to estimate the type and magnitude of exposures to COPCs that are present at or migrating from a site. An exposure-based conceptual site model (CSM) was prepared to identify potential exposure media, exposed populations, and exposure pathways (Figure 1). The exposed populations included on-facility and off-facility adult and child residents, outdoor commercial/industrial workers, construction workers, and excavation/trench workers.

The exposure pathways evaluated included direct contact (incidental ingestion, dermal contact) with soil and groundwater, as well as inhalation of dusts and vapors in ambient air from soil and groundwater. In addition, direct contact with groundwater and outdoor inhalation of vapors from groundwater was evaluated for excavation/trench workers. For residents, ingestion of chemicals in homegrown produce was evaluated by comparing the concentrations detected in the produce collected from backyards occupying the same city block as the former facility to background levels and soil screening levels.

Toxicity Assessment

The objective of the toxicity assessment is to evaluate evidence regarding the potential for COPCs to cause adverse effects in exposed individuals. Toxicity values published in EPA's Integrated Risk Information System (IRIS) were used for the toxicity assessment. Other sources, including those provided in the EPA Regional Screening Levels (RSL) table (EPA 2010b) were used for chemicals not found in IRIS. Slope factors developed by California EPA's Office of Environmental Health Hazard Assessment (OEHHA) and reference exposure levels developed by Air Toxics and Epidemiology Section of OEHHA were used if they were more health-protective than the federal toxicity values.

Residential exposure to lead in soil for residents was evaluated using OEHHA's California Human Health Screening Level (CHHSL) for lead calculated using the California Department of Toxic Substances Control's (DTSC) Lead Risk Assessment Spreadsheet Version 7, LeadSpread 7. The Leadspread model considers exposure to lead in soil by three pathways: ingestion, re-suspension and inhalation, and dermal contact. The Leadspread model was queried for the soil lead concentrations that would produce a 90th percentile estimate of increase in blood lead of 1 μg/dL. Exposure to lead in soil for residents was evaluated using the updated CHHSL of 80 mg/kg (CalEPA 2009).

OEHHA uses EPA's Adult Lead Model (EPA 2005) to estimate CHHSLs for an industrial setting. This CHHSL is intended to protect a fetus that may be carried by a pregnant female worker. It is assumed that a cleanup goal that is protective of a fetus will also afford protection for male or female adult workers. The model was queried directly for the soil lead concentration that would produce a 90th percentile estimate of change in blood lead of 1 μg/deciliter. The updated CHHSL for soil lead at commercial/industrial (i.e. nonresidential) sites is 320 mg/kg (CalEPA 2009).

Risk Characterization

Excess lifetime cancer risk (ELCR) and non-cancer hazard index (HI) were calculated for both residents and industrial/commercial workers for each soil exposure area, site-wide for groundwater. For the vapor intrusion evaluation, ELCRs and HIs were calculated for the office on the former AMCO facility and several residences located on the same block as the facility. Human health risks are compared against EPA's target risk range of 10^{-6} to 10^{-4} for cancer risks and the HI benchmark of 1 for non-cancer hazards (EPA 1991b). Exposure areas with ELCRs less than 10^{-6} or HI less than 1 are characterized as not posing a threat to human health for the evaluated exposed populations and pathways. Because the neighborhood surrounding the site is a vulnerable community, EPA has elected to use an excess lifetime cancer risk of 10^{-6} as the point at which action will be required at this site.

Ambient air and crawlspace air sample results were compared to acute reference exposure levels (RELs) developed by OEHHA and the Agency for Toxic Substances and Disease Registry's (ATSDR) acute minimal risk level (MRLs) for hazardous substances to confirm that contaminant levels would not pose an immediate health threat to residents.

Data from residential soil were compared against background levels and EPA residential RSLs for soil. Results from the homegrown produce samples were compared against background levels based on an evaluation of relevant scientific literature.

ES.3 Results of Quantitative Risk Evaluation

Soil

The ELCRs and HIs for on- and off-facility soil exposure areas are calculated based on all detected compounds except lead. Exposures to lead are evaluated by calculating a lead EPC and comparing it to the CHHSLs (residential or industrial. As a result, in the following sections, the health effects associated with lead are discussed separately from the cancer risks and non-cancer hazards for all other contaminants.

Former AMCO Facility

The chemicals that contribute the most to the cancer risk and non-cancer hazards in this area are vinyl chloride, naphthalene, xylenes, cadmium, manganese, 2-methylnaphthalene, aluminum, aldrin and dieldrin.

For the industrial worker RME scenario, the ELCR is $1x10^{-4}$ for exposure to shallow soil and $1x10^{-4}$ for exposure to deep soil. HIs for exposure to both the shallow soil and deep soil are 1.

For the construction worker RME scenario, the ELCR is $1x10^{-5}$ for exposure to shallow soil and $1x10^{-5}$ for exposure to deep soil. The HI for exposure to shallow soil is 23 and the HI for exposure to deep soil is 20.

For the future on-site residential RME scenario, for both shallow and deep soil the ELCR is $3x10^{-4}$ The HI for the child is 10 for exposure to shallow soil and 11 for exposure to deep soil. For the adult, the HIs for exposure to the shallow soil is 1 and exposure to deep soil is 2.

The lead EPC for shallow soil is 640 mg/kg and for deep soil 605 mg/kg; both of these concentrations exceed the residential CHHSL for lead of 80 mg/kg. These lead concentrations also exceed the CHHSL for an industrial scenario (320 mg/kg).

Parking Lot

The chemicals that contribute the most to the risk in the parking lot are lead, arsenic, cadmium, benzo(a)pyrene and antimony. Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to arsenic levels found in the background data set; therefore, the risk contributions from arsenic may not be site-related.

For the industrial worker RME scenario, the ELCR is $5x10^{-5}$ for exposure to shallow soil and $1x10^{-4}$ for exposure to deep soil. HIs are 1 for both exposure to both shallow and deep soil.

For the construction worker RME scenario, the ELCR is 9×10^{-6} for exposure to shallow soil and 2×10^{-5} for exposure to deep soil. HIs for exposure to both the shallow and deep soil HIs are 30 and 25, respectively.

For the future on-site residential RME scenario, the ELCR is 2×10^{-4} for exposure to shallow soil and 4×10^{-4} for exposure to deep soil. The HI for the child is 26 for exposure to shallow soil and 25 for exposure to deep soil. For the adult, HIs for exposure to both the shallow and deep soil are 1.

The lead EPC for shallow soil is 2,170 mg/kg and for deep soil 1,450 mg/kg; both of these concentrations exceed the CHHSLs for both residential industrial scenarios.

Large Vacant Lot

The chemicals that contribute the most to the risks and hazards at the large vacant lot are lead, arsenic, cadmium, DDT and benzo(a)pyrene. Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to arsenic levels found in background; therefore, the risk contributions from arsenic may not be site-related.

For the industrial worker RME scenario, the ELCR is 6×10^{-5} for exposure to shallow soil and 4×10^{-5} for exposure to deep soil. HIs for exposure to both the shallow and deep soil HIs are less than 1.

For the construction worker RME scenario, the ELCR is 1×10^{-5} for exposure to shallow soil and 7×10^{-6} for exposure to deep soil. The HI for exposure to shallow soil is 12, and the HI for exposure to deep soil HI is 10.

For the future on-site residential RME scenario, the ELCR is $2\times10^{-}$ for exposure to shallow soil and 1×10^{-4} for exposure to deep soil. The HI for the child is 10 for exposure to shallow soil and 7 for exposure to deep soil. For the adult, the HIs for exposure to both the shallow and deep soil are less than 1.

The lead EPC for shallow soil is 4,360 mg/kg and for deep soil 2,750 mg/kg; both of these concentrations exceed the CHHSLs for lead for residential and industrial scenarios.

Small Vacant Lot

Due to the shallow water table at this exposure area, only shallow soil samples were collected. The chemicals that contribute the most to the risks and hazards at the small vacant lot are arsenic, cadmium, aluminum, dieldrin, and DDT. Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to arsenic levels found in background; therefore, the risk contributions from arsenic may not be site-related.

For the industrial worker RME scenario, the ELCR is 4×10^{-5} for exposure to shallow soil. The HI is less than 1.

For the construction worker RME scenario, the ELCR for exposure to shallow soil is 7×10^{-6}. The HI for exposure to shallow soil is 3.

For the potential on-site residential RME scenario, the ELCR for exposure to shallow soil is 3×10^{-4}. The HI for exposure to shallow soil for the child is 12. For the adult the HI is less than 1.

The lead EPC for shallow soil is 386 mg/kg, which exceeds both the residential and industrial CHHSL for lead.

Groundwater

The chemicals that contribute the most to the risk through exposure to groundwater are vinyl chloride, arsenic, cis-1, 2-dichloroethene, benzo(a)pyrene, and aroclor-1260.

For the potential residential RME scenario, the ELCR is $7x10^{-2}$ for exposure to groundwater. The HI for the child is 628; and the HI for the adult is 262.

In addition, at the request of the community's technical advisor, a trench worker's risk from dermal contact with groundwater and inhalation of vapors from groundwater at the Site was evaluated. For the trench worker RME scenario, the ELCR is $1x10^{-4}$ and the HI is 34 for exposure to groundwater.

Vapor Intrusion

To assess the potential human health risks and hazards associated with VOCs migrating from the groundwater into the office at the former AMCO facility and into nearby residences; crawlspace and ambient air sampling was performed over nine sampling events from September 2004 through June 2009. Ambient air and crawlspace air sample results were compared to acute reference exposure levels (RELs) developed by OEHHA and the Agency for Toxic Substances and Disease Registry's (ATSDR) acute minimal risk level (MRLs) for hazardous substances to confirm that contaminant levels would not pose an immediate health threat to residents.

In addition to the crawlspace and ambient air sampling, the June 2009 sampling event included indoor air sampling at some of the nearby residences and the office located on the Site. Because indoor air data was collected only once, it represents a snapshot in time, therefore it is compared to the crawlspace and ambient air data, as well as screening levels. ELCRs and hazards were not calculated using the indoor air data. Crawl space air was used in this evaluation because it is thought to be less affected by the lifestyle choices, such as household product use and smoking, of the building's occupants than indoor air. The evaluation of the results of crawl space air sampling is considered easier to interpret than indoor air sampling results (DTSC 2004).

Industrial Exposure Evaluation

Potential cancer risks and non-cancer hazards were calculated using industrial worker exposure assumptions for the 1414 3rd Street office. Crawlspace air is used to represent the air that could potentially be inhaled by the workers in their offices. Potential cancer risk from exposure to VOCs in crawlspace air at the office building is 6×10^{-5}, which is within the risk management range of 10^{-6} to 10^{-4}. The main contributors to the cancer risk are carbon tetrachloride (35%) and vinyl chloride (18%). The non-cancer HI is below 1 for exposure by an indoor worker.

Residential Exposure Evaluation

All non-facility locations (residential parcels, South Prescott Park, background) were evaluated using residential exposure assumptions. Crawlspace and ambient air is used to represent the air that could potentially be inhaled by the residents inside and outside the living spaces of their homes. Potential cancer risks are within the risk management range at all residences for crawlspace and ambient air with the exception of two of the residential properties for crawlspace (1428 3rd Street and 1432 3rd Street) and one for ambient air (1428 3rd Street). These are also the only locations having non-cancer HIs greater than 1.

Potential cancer risks from inhalation of crawlspace air ranged from 5×10^{-5} to 3×10^{-4}. The primary chemical contributors to risk from inhalation of crawlspace air are vinyl chloride, benzene, 1,2-dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene at the four residences where crawlspace air and ambient air were collected. Crawlspace air HIs range from 0.5 to 8. The primary contributors to the HI in crawlspace air at the two locations that have HIs that exceed 1 are 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

Potential cancer risks from inhalation of ambient air ranged from 2×10^{-5} to 2×10^{-4}. The primary contributors to risk from inhalation of ambient air are naphthalene, benzene, carbon tetrachloride, and vinyl chloride. Vinyl chloride is only a primary contributor at one property - 1436 3rd Street. The HI from exposure to ambient air exceeds 1 at 1428 3rd Street (HI=4). Naphthalene (47%), 1,2,4-trimethylbenzene (18%), and 1,3,5-trimethyl-benzene (18%) are the primary contributors to the ambient air HI.

The background cancer risk estimated using the Lewis Street ambient air data is 3×10^{-5}. The primary contributors to the background cancer risk estimate include benzene (31%), carbon tetrachloride (29%) and naphthalene (17%). The background non-cancer HI (0.5) is less than the non-cancer threshold of 1.

Future Buildings

Potential risks and hazards from vapor intrusion into future buildings from VOCs in groundwater may be as high as when residential use of the groundwater is considered, which are exceedingly high. The cancer risks estimated for future residents using the groundwater as tap water in the home is approximately 7×10^{-2}, which is significantly above the risk management range. Hazard indices for an adult (262) and child (628) resident are also significantly above the non-cancer threshold of 1.

Evaluation of potential vapor intrusion for future buildings using soil gas data at the parking lot, small vacant lot, and large vacant lot was not conducted because of the following uncertainties:

a) Subslab soil gas samples were not collected – only exterior soil gas was collected in residential yards.

b) Exterior soil gas samples may underestimate the concentrations found beneath a building because there is no floor covering the ground surface.

c) Soil gas samples could not be collected at the DTSC recommended depth because the groundwater is less than 5 feet from the ground surface.

d) Use of a generic attenuation factor may over/underestimate the VOC concentrations in indoor air.

If future buildings are constructed in these areas, vapor mitigation systems are recommended.

ES.4 Results for Screening Level Risk Evaluation

Residential Soil

All residential soil borings were completed in areas where there was no concrete or asphalt surface cover. Shallow samples were collected from 0.5 to 1 foot bgs; deeper samples were generally collected from between 2.5 and 3 feet bgs, although one sample was collected from between 2 and 2.5 feet bgs due to obstructions. Subsequent to the collection of the residential soil samples, a soil removal action to address high concentrations of lead was performed at residential properties adjacent to and near the former AMCO facility. These properties include 1428, 1432, and 1436 3rd Street, and 320, 326, 356, 360, and 366/368 Center Street. The soil was excavated until the confirmation sampling indicated that the remaining soil was below the EPA residential screening level of 400 mg/kg, or to a 3-foot maximum depth. The excavation depth was generally between one and three feet. Small areas were excavated to a depth of less than 1 foot in locations where valuable trees or plants might have been damaged by deeper excavation. As a result, the samples collected during the RI are no longer representative of the soil conditions at these properties. The following discussion explains samples results **before** the removal action.

Before the removal action, several chemicals exceeded screening levels in residential soil samples. Lead exceeded the site-specific screening level for soil at each of the residential properties. Polynuclear aromatic hydrocarbons (PAHs), pesticides (DDT, DDE, dieldrin, and heptachlor epoxide), antimony, and iron also exceed soil screening levels in at least one property.

In 2009, soil samples were collected during installation of additional monitoring wells. Tables showing the results of this soil sampling compared with screening levels are presented in Attachment 4.

Homegrown Produce

To evaluate the ingestion of homegrown produce pathway, 15 fruits and vegetables from four gardens were collected and analyzed for selected metals (arsenic, chromium, and lead) and VOCs. Analytical results may reflect soil and dust deposited on the plant surface and possible uptake from soil into the edible portions of the plants.

Of the 47 VOCs analyzed, only methyl acetate and styrene were detected. Methyl acetate was detected in figs, mint, and red chili peppers. Styrene was detected only in cactus. Both methyl acetate and styrene have been detected in ripening produce in concentrations ranging from 0.04 to 0.24 mg/kg (Heikes et al. 1995). Volatile organic compounds like methyl acetate are naturally produced by ripening fruits at less than 1 mg/kg (Fountain et al. 1984).

Produce was also analyzed for selected inorganic compounds of concern: arsenic, chromium, and lead. Concentrations of lead in produce range from 0.16 to 8.47 mg/kg. Lead naturally occurs in all plants at concentrations ranging from 0.1 to 10 mg/kg (Kabata-Pendias and Pendias 2001). The maximum arsenic concentration was detected in the pomegranate sample at 0.08 mg/kg and chromium concentrations in produce range from 0.39 to 1.07 mg/kg. Both arsenic and chromium are found in plants at concentrations ranging from 0.009 to 1.5 mg/kg and 0.02 to 1.5 mg/kg respectively (Kabata-Pendias and Pendias 2001).

ES.5 Uncertainty Evaluation

Uncertainties, which arise at every step in the risk assessment process, are evaluated to provide an indication of the relative degree of conservatism associated with a risk estimate. The uncertainties in this risk assessment can be grouped into three main categories as listed below.

Environmental Sampling and Analysis

Errors in sampling results can arise from the field sampling, laboratory analyses, and data analyses. Errors in laboratory analysis procedures are possible, although the impacts of these sorts of errors on the risk estimates are likely to be low. The environmental sampling at a site is one source of uncertainty in the evaluation. The number and location of samples at each exposure area are considered adequate for the calculation of EPCs at most of the industrial areas and for groundwater. However, the number of samples collected from shallow soil at the small vacant lot and the parking lot are less than what is generally needed to calculate a 95 UCL; therefore, the maximum concentration was used to represent the EPC in these areas. A larger sample size would allow for the calculation of a more representative EPC, and thus decrease uncertainty regarding chemical concentrations used for risk assessment at these locations.

Because of the long history of industrial use at the Site and the associated history of construction and filling, all primary sources may not have been identified. Hot spots and localized areas of contamination in soil or soil vapor that were not sampled may remain unknown in on-facility and off-facility areas. The existence of unknown contamination could lead to an increase in the health risks beyond what has been reported in this document. Data collected from known hot spots have been included in the risk assessment.

Soil gas samples collected in the yards of the homes sampled could not be collected at DTSC's recommended depth of at least 5 feet below ground surface because of the shallow groundwater in the area. Soil gas collected at less than 5 feet below ground surface may be influenced by outdoor air being pulled in by the sample collection pump. This outdoor air would cause the sample to not accurately represent the levels of VOCs in the soil gas. In addition, the soil gas samples were collected in the backyards, in some cases several feet away from the structures. Therefore, there is uncertainty associated with the relationship between the soil gas and crawlspace air or indoor air data presented.

Indoor air sampling was conducted only once in June 2009. Although multiple indoor air samples were collected within each home/office, the indoor air sampling data represents a snapshot in time. As shown by the crawlspace air and ambient air data, the VOC concentrations vary widely from sampling event to sampling event. In addition, it was unusually warm (for the Bay Area) on the days that the sampling was conducted, and many homes had open windows. This condition may not accurately represent VOC concentrations when the windows are closed.

Exposure Pathways and Assumptions

Uncertainties can arise from the types of exposures examined, the points of potential human exposure, the concentrations of COPCs at the points of human exposure, and the intake assumptions. For instance, exposure parameters (e.g., exposure frequency, exposure duration, soil ingestion rates, and skin surface areas) are selected as reasonable maximum exposure (RME) assumptions, resulting in the likely overestimation of risk for most potential exposed populations.

The exposure pathways selected are another source of uncertainty. Exposure routes which were not considered in this evaluation could exist for a particular activity. Such exposures, however, are expected to be lower than the risks and hazards associated with the pathways considered. Dermal exposure has greater uncertainty resulting from uncertainty in several of the inputs including the amount of skin surface area available for exposure and the degree to which soil adheres to skin. Uncertainty in the inhalation route results from the method used for estimating resuspended dust from soil concentrations.

The vapor intrusion pathway is complex and data are variable (i.e., volatile chemicals are detected in one crawlspace sampling event but not in others) causing uncertainty in the evaluation of this pathway.

Characteristics of the COPCs can also present a source of uncertainty. For instance, the amount that each of the COPCs might be absorbed into the body may be quite different from the amount of chemical that is actually contacted (i.e., bioavailability).

Toxicity Criteria and Factors

The availability and quality of toxicological data is another source of uncertainty in the risk assessment. Uncertainties associated with animal and human studies could influence the toxicity criteria. Carcinogenic criteria are classified according to the amount of evidence available that suggests human carcinogenicity. In the establishment of the non-carcinogenic criteria, conservative multipliers, known as uncertainty and modifying factors, are used.

For a number of chemicals detected in the Site media, toxicity values have not been established by EPA or California EPA. Toxicity values based on surrogate chemicals with similar structural and behavioral properties were used where appropriate. If a surrogate chemical was not available, these chemicals were not evaluated quantitatively.

There is uncertainty with the toxicity values used to evaluate trichloroethylene (TCE). EPA has proposed more stringent TCE toxicity values which are pending review (EPA 2009d). This compound is a contaminant of concern in the groundwater at the site but is not a major contributor to risk through the vapor intrusion pathway. Therefore, revising the toxicity values for TCE will not significantly affect the conclusions of the vapor intrusion evaluation presented in this assessment.

ES.6 Summary and Conclusions

This HHRA evaluates potential health risks to workers, as well as future adult and child residents, from exposure to COPCs in soil, groundwater, crawlspace air, and ambient air at the former AMCO facility. Because this is a baseline evaluation which assumes exposure to contaminated media under current conditions without consideration of future remediation or natural attenuation of chemicals, estimated risks and hazards to current and future workers is the same. A screening level risk evaluation was conducted on the soil and homegrown produce in the surrounding residential neighborhood.

Consistent with the CSM, the predominant exposure pathways for workers at the Site are incidental ingestion of soil, inhalation of particulates and vapors, and dermal contact with soil. Current and future residents in the vicinity may be exposed to contaminants through the same pathways described for workers. Groundwater at the Site is not currently used as a potable water source, nor is it likely to be in the future. Oakland residents have their drinking water supplied by the East Bay Municipal Utility District. However, should groundwater be used as a potable water source, residents could be exposed to contaminants through ingestion of groundwater and dermal contact with groundwater while showering or bathing.

Quantitative Soil Risk Estimates

Soil samples were divided into the following four exposure areas: former AMCO facility, parking lot, large vacant lot, and small vacant lot. Risk and hazard estimates for each receptor and exposure area are discussed below.

Industrial Worker: Estimated cancer risks are at the upper end of the risk range for exposure to either shallow or deep soil at each of the four exposure areas. HIs exceed the non-cancer threshold of 1 only at the former AMCO facility.

Construction Worker: Estimated cancer risks are within the risk range of 10^{-6} to 10^{-4} for exposure to shallow or deep soil at each of the four exposure areas. HIs exceeds the non-cancer threshold of 1 at the former AMCO facility, parking lot, and large vacant lot.

Future Residents: Estimated cancer risks are within the risk range for exposure to shallow or deep soil at all four of the exposure areas. HIs also exceed the non-cancer threshold of 1 at all four exposure areas.

In addition, lead levels at all four exposure areas exceed both the residential and industrial CHHSLs.

Groundwater Risk Estimates

The cancer risks and non-cancer HIs significantly exceed the risk range and non-cancer threshold of 1 when residential use of groundwater is considered. However, it is unlikely that groundwater will be used as a source of drinking water in the future.

An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. As noted above, the cancer risks estimated for future residents using the groundwater as tap water in the home is significantly above the risk management range and clearly unacceptable. Hazard indices for an adult and child resident are also significantly above the non-cancer threshold of 1.

Vapor Intrusion - Ambient Air and Crawlspace Air Risk Estimates

Several VOCs, including PCE, TCE, vinyl chloride, carbon tetrachloride, chloroform, benzene, and naphthalene were detected above screening levels in the soil gas, ambient air, crawlspace air, and indoor air samples which indicates vapor intrusion is occurring at the homes near the site. Potential cancer risks and non-cancer hazards were calculated using industrial worker exposure assumptions for the 1414 3rd Street office. Crawlspace air is used to represent the air that could potentially be inhaled by the workers in their offices. Potential cancer risk from exposure to VOCs in crawlspace air at the office building is 6×10^{-5}, which is within the risk management range of 10^{-6} to 10^{-4}. The main contributors to cancer risk are carbon tetrachloride (35%) and vinyl chloride (18%). The non-cancer HI was below 1 for exposure by an indoor worker.

All non-facility locations (residential parcels, South Prescott Park, background) were evaluated using residential exposure assumptions. Crawlspace air and ambient air data is used to represent the air that could potentially be inhaled by the residents in the living spaces of their homes. Potential cancer risks are within the risk management range at all residences for crawlspace air and ambient air with the exception of two of the residential properties for crawlspace air (1428 3rd Street and 1432 3rd Street) and one for ambient air (1428 3rd Street). These were also the only locations having non-cancer HIs greater than 1.

Potential cancer risks from inhalation of crawlspace air ranged from 5×10^{-5} to 3×10^{-4}. The primary chemical contributors to risk from inhalation of crawlspace air are vinyl chloride, benzene, 1,2-dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene at the four residences where crawlspace air and ambient air were collected. Crawlspace air HIs range from 0.5 to 8. The primary contributors to the HI in crawlspace air at the two locations that have HIs that exceed 1 are 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

Potential cancer risks from inhalation of ambient air ranged from 2×10^{-5} to 2×10^{-4}. The primary contributors to risk from inhalation of ambient air are naphthalene, benzene, carbon tetrachloride, and vinyl chloride. Vinyl chloride was only a primary contributor at one property - 1436 3rd Street. The HI from exposure to ambient air exceeds 1 at 1428 3rd Street (HI=4). Naphthalene (47%), 1,2,4-trimethylbenzene (18%), and 1,3,5-trimethylbenzene (18%) are the primary contributors to the ambient air HI.

The background cancer risk estimated using the Lewis Street ambient air data is 3×10^{-5}. The primary contributors to the background cancer risk estimate include benzene (31%), carbon tetrachloride (29%) and naphthalene (17%). The background non-cancer HI (0.5) is less than the non-cancer threshold of 1. The similarity between the risks and hazards for background and the risks and hazards near the site indicates that air quality is poor in the whole area due to other sources of contamination than the site.

Screening Level Evaluation

The screening level risk evaluation was performed for the current or future off-facility resident or park user. Potential pathways include:

- Soil (incidental ingestion, direct contact, outdoor dust and vapor inhalation, indoor vapor inhalation)
- Homegrown Produce (ingestion of homegrown produce)

Subsequent to the collection of the residential soil samples during the RI investigation, a soil removal action was performed at residential properties adjacent to and near the former AMCO facility in August/September 2007. These properties include 1428, 1432, and 1436 3rd

Street, and 320, 326, 356, 360, and 366/368 Center Street. The soil was excavated until the confirmation sampling indicated that the remaining soil was below the EPA residential screening level of 400 mg/kg, or to a 3-foot maximum depth. The excavation depth was generally between one and three feet. Small areas were excavated to a depth of less than 1 foot in locations where valuable trees or plants might have been damaged by deeper excavation. As a result, the samples collected during the RI are no longer representative of the soil or produce conditions at these properties.

Residential Soil

At each of the residential properties, lead exceeds the site-specific screening level for soil based on residential exposure. PAHs, pesticides (DDT, DDE, dieldrin, and heptachlor epoxide), antimony, and iron also exceed soil screening levels in at least one property.

All residential soil borings were completed in areas where there was no concrete or asphalt surface cover. Shallow samples were collected from 0.5 to 1 foot bgs; deeper samples were generally collected from between 2.5 and 3 feet bgs, although one sample was collected from between 2 and 2.5 feet bgs due to obstructions.

In 2009, soil samples were collected during installation of additional monitoring wells. Tables showing the results of this soil sampling compared with screening levels are presented in Attachment 4.

Homegrown Produce

To evaluate the ingestion of homegrown produce pathway, 15 fruits and vegetables from four gardens were collected and analyzed for selected metals (arsenic, chromium, and lead) and VOCs. Analytical results may reflect soil and dust deposited on the plant surface and possible uptake from soil into the edible portions of the plants.

Of the 47 VOCs analyzed, only methyl acetate and styrene were detected. Methyl acetate was detected in figs, mint, and red chili peppers. Styrene was detected only in cactus. Both methyl acetate and styrene have been detected in ripening produce in concentrations ranging from 0.04 to 0.24 mg/kg (Heikes et al. 1995). Volatile organic compounds like methyl acetate are naturally produced by ripening fruits at less than 1 mg/kg (Fountain et al. 1984).

Produce was also analyzed for selected inorganic compounds of concern: arsenic, chromium, and lead. Concentrations of lead in produce range from 0.16 to 8.47 mg/kg. Lead naturally occurs in all plants at concentrations ranging from 0.1 to 10 mg/kg (Kabata-Pendias and Pendias 2001). The maximum arsenic concentration was detected in the pomegranate sample at 0.08 mg/kg and chromium concentrations in produce range from 0.39 to 1.07 mg/kg. Both arsenic and chromium are found in plants at concentrations ranging from 0.009 to 1.5 mg/kg and 0.02 to 1.5 mg/kg respectively (Kabata-Pendias and Pendias 2001).

Because produce samples were analyzed for VOCs as well as metals, none of the produce samples were rinsed or washed before analysis. As a result, the metals concentrations could reflect dust or soil deposited on the plant surfaces in addition to metals that were taken up through the root system.

Contents

Executive Summary .... **i**
ES.1 Study Area i
ES.2 Risk Assessment Methodology ii
Data Collection and Data Evaluation ii
Exposure Assessment ii
Toxicity Assessment iii
Risk Characterization iii
ES.3 Results of Quantitative Risk Evaluation iv
Soil iv
Groundwater vi
Vapor Intrusion vi
ES.4 Results for Screening Level Risk Evaluation vii
Residential Soil viii
Homegrown Produce viii
ES.5 Uncertainty Evaluation ix
Environmental Sampling and Analysis ix
Exposure Pathways and Assumptions x
Toxicity Criteria and Factors x
ES.6 Summary and Conclusions x
Quantitative Soil Risk Estimates xi
Groundwater Risk Estimates xi
Vapor Intrusion - Ambient Air and Crawlspace Air Risk Estimates xi
Screening Level Evaluation xiii

Abbreviations and Acronyms .... **xxi**

1.0 Introduction **1-1**
1.1 Previous Health Studies 1-2
1.1.1 Public Health Assessment 1-2
1.1.2 National Air Toxics Assessment 1-3
1.1.3 Preliminary Endangerment Assessment 1-4
1.1.4 Preliminary Assessment and Site Investigation Report 1-5
1.1.5 The West Oakland Environmental Indicators Project 1-6
1.1.6 Other Relevant Studies: Vulnerable Communities 1-6
1.2 Methodology and Organization of the Risk Assessment 1-7
1.2.1 Data Collection and Data Evaluation 1-7
1.2.2 Exposure Assessment 1-8
1.2.3 Toxicity Assessment 1-8
1.2.4 Risk Characterization 1-8
1.2.5 Organization of the HHRA 1-8

2.0 Data Collection and Data Evaluation **2-1**
2.1 Chemicals of Potential Concern 2-1
2.1.1 Soil 2-1

2.1.2 Groundwater 2-2
2.1.3 Residential Crawlspace Air and Ambient Air 2-2
2.1.4 Residential Soil and Homegrown Produce 2-3

3.0 Exposure Assessment 3-1
3.1 Identification of People and Exposure Pathways 3-1
3.1.1 Exposed Populations 3-1
3.1.2 Exposure Pathways 3-2
3.2 Exposure Point Concentrations 3-4
3.2.1 Soil and Groundwater 3-4
3.2.2 Crawlspace Air and Ambient Air 3-4
3.3 Estimation of Chemical Intake 3-5
3.3.1 General Exposure Assumptions 3-5
3.3.2 Exposure Parameters and Equations for Soil Ingestion 3-6
3.3.3 Exposure Parameters and Equations for Dermal Contact with Soil 3-6
3.3.4 Exposure Parameters and Equations for Inhalation of Particulates and Volatiles from Soil 3-7
3.3.5 Exposure Parameters and Equations for Ingestion of Groundwater 3-9
3.3.6 Exposure Parameters and Equations for Dermal Contact with Groundwater 3-9
3.3.7 Exposure Parameters and Equations for Inhalation of Vapors from Groundwater 3-10
3.3.8 Exposure Parameters and Equations for Inhalation of Vapors from Crawl space Air and Ambient Air 3-13

4.0 Toxicity Assessment 4-1
4.1 Hazard Identification 4-1
4.1.1 Non-cancer Effects 4-1
4.1.2 Cancer Effects 4-1
4.2 Dose-Response Evaluation 4-2
4.2.1 Toxicity Values for Non-cancer Effects 4-2
4.2.2 Toxicity Values for Carcinogens 4-4
4.2.3 Toxicity Values for Lead 4-5
4.2.4 Sources of Toxicity Criteria 4-5

5.0 Risk Characterization 5-1
5.1 Noncarcinogenic Hazard 5-1
5.2 Cancer Risks 5-2
5.2.1 Cancer Risk Perspective 5-3
5.3 Risk Characterization Results 5-3
5.4 Soil Risk Evaluation 5-4
5.4.1 Former AMCO Facility 5-4
5.4.2 Parking Lot 5-5
5.4.3 Large Vacant Lot 5-5
5.4.4 Small Vacant Lot 5-5
5.4.5 Background Soil Risk Evaluation 5-6

5.5 Groundwater Risk Evaluation ... 5-7
5.5.1 Shallow Groundwater ... 5-7
5.5.2 Residential Irrigation Well ... 5-8
5.6 Ambient Air and Crawlspace Air Risk Estimates ... 5-8
5.6.1 Comparison of VOC Data Between Crawlspace and Ambient Air ... 5-9
5.6.2 Comparison of VOC Data Between Ambient Air and Background Air ... 5-9
5.6.3 Comparison of VOC Data Between Groundwater, Soil Gas, and Crawlspace Air ... 5-10
5.6.4 Comparison of VOC Data Between Indoor Air and Crawlspace Air ... 5-11
5.6.5 1414 3rd Street ... 5-11
5.6.6 1428 3rd Street ... 5-12
5.6.7 1432 3rd Street ... 5-13
5.6.8 1436 3rd Street ... 5-14
5.6.9 320 Center Street ... 5-14
5.6.10 326 Center Street ... 5-15
5.6.11 337 Center Street ... 5-15
5.6.12 356 Center Street ... 5-16
5.6.13 360 Center Street ... 5-16
5.6.14 366 Center Street ... 5-16
5.6.15 South Prescott Park ... 5-16
5.6.16 Background ... 5-17
5.7 Residential Screening Level Soil Evaluation ... 5-17
5.7.1 1428 3rd Street ... 5-19
5.7.2 1432 3rd Street ... 5-19
5.7.3 1436 3rd Street ... 5-19
5.7.4 326 Center Street ... 5-20
5.7.5 356 Center Street ... 5-20
5.7.6 360 Center Street ... 5-20
5.7.7 Homegrown Produce Results ... 5-20

6.0 Uncertainty Evaluation ... 6-1
6.1 Environmental Sampling and Analysis ... 6-1
6.1.1 Laboratory and Sampling Results ... 6-2
6.1.2 Reporting Limits ... 6-2
6.2 Exposure Pathways and Assumptions ... 6-3
6.3 Toxicity Criteria and Factors ... 6-5
6.3.1 Uncertainties in Animal and Human Studies ... 6-5
6.3.2 Non-Carcinogenic Toxicity Criteria ... 6-5
6.3.3 Carcinogenic Toxicity Criteria ... 6-6
6.3.4 Additive vs. Synergistic vs. Antagonistic Properties of COPCs ... 6-6
6.3.5 TCE ... 6-6
6.3.6 Surrogates ... 6-7

7.0 Summary and Discussion of Human Health Risk Assessment Results ... 7-1
7.1 On-Facility Quantitative Soil Risk Estimates ... 7-2

7.2 Groundwater Risk Estimates 7-2
7.3 Irrigation Well Results 7-2
7.4 Vapor Intrusion Risk Estimates 7-3
7.5 Screening Level Evaluation on Residential Media 7-4

8.0 References 8-1

Tables

1 2002 National Air Toxics Assessment, Predicted Ambient Air Concentrations for Census Tract 06001401900

2 2002 National Emissions Inventory for Alameda County, CA

3 Chemicals of Potential Concern

4 Soil Exposure Assumptions

5 Groundwater Exposure Assumptions - Future Residents

6 Groundwater Exposure Assumptions – Trench Workers

7 Air Exposure Assumptions – Residents and Workers

8 Exposure Point Concentrations for Soil Exposure Areas

9 Exposure Point Concentrations for Groundwater

10 Exposure Point Concentrations for Crawlspace and Ambient Air

11 Cancer and Non-cancer Toxicity Values for COPCs

12 Summary of Cancer Risks and Non-cancer Hazards - Soil

13 Summary of Cancer Risks and Non-cancer Hazards - Groundwater

14 Summary of Cancer Risks and Non-cancer Hazards – Crawlspace and Ambient Air

15 Irrigation Well Detected Analytical Results

16 Minimum Analyte Reporting Limits Above Applicable Groundwater Screening Level

17 Minimum Analyte Reporting Limits Above Applicable Ambient/Crawlspace Air Screening Level

18 Summary of Surrogate Toxicity Values

Figures

1 Conceptual Site Model Diagram

2 Soil Sampling Location Map

3 Grab and Monitoring Well Sample Locations for Shallow Groundwater Data Used in the Risk Assessment

4a Residential Ambient air, Crawlspace Air, Produce, Soil, and Soil Gas Sample Locations

4b Residential Soil Gas Sample Locations

5 1414 3rd St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Results

6 1428 3rd St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Results

7 1432 3rd St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Results

8 1436 3rd St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Results

9 326 Center St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Results

10 320 Center St. Soil Gas/Crawlspace/Ambient/Indoor Air Sampling Locations and Result

11 337 and 339 Center Street Soil Gas/Ambient/Indoor Air Sampling Locations and Results

12 356 Center St. Soil Gas/Ambient/Indoor Air Sampling Locations and Results

13 360 Center St. Soil Gas/Ambient/Indoor Air Sampling Locations and Results

14 366 Center St. Soil Gas/Ambient/Indoor Air Sampling Locations and Results

15 Prescott Park Soil Gas/Ambient Air Sampling Locations and Results15 Background Ambient Air Sampling Locations and Results

16 322, 323, and 329 Lewis Street Background Sampling Results

17 1428 3rd St. Soil/Produce Sampling Locations and Results

18 1432 3rd St. Soil/Produce Sampling Locations and Results

19 1436 3rd St. Soil/Produce Sampling Locations and Results

20 326 Center St. Soil/Produce Sampling Locations and Results

21 356 Center St. Soil/Produce Sampling Locations and Results

22 360 Center St. Soil/Produce Sampling Locations and Results

Attachments

1 Detailed Risk and Hazard Results for Exposure to Soil

2 Detailed Risk and Hazard Results for Exposure to Groundwater

3 Detailed Risk and Hazard Results for Exposure for Vapor Intrusion Evaluation

4 Residential Neighborhood Screening Tables

5 ATSDR ToxFaqs (on CD)

6 proUCL Outputs (on CD)

7 Response to DTSC Comments on the HHRA

8 Response to TAG Advisor Comment on the HHRA

9 Comments on the HHRA from the California Department of Public Health

10 Handouts Provided at October 16, 2010 Public Meeting

Abbreviations and Acronyms

μg	micrograms
ADD	average daily dose
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BaP	Benzo(a)Pyrene
BART	Bay Area Rapid Transit
bgs	below ground surface
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CDC	Centers for Disease Control and Prevention
CDHS	California Department of Health Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHHSL	California Human Health Screening Level
COPC	constituent of potential concern
CSBCA	Chester Street Block Club Association
CSF	cancer slope factor
CSM	conceptual site model
DHHS	U.S. Department of Health and Human Services
dL	deciliter
DTSC	California Department of Toxic Substances Control
ELCR	excess lifetime cancer risk
EPA	Environmental Protection Agency
EPC	exposure point concentration
ft	feet
HERO	Human and Ecological Risk Office
HHRA	human health risk assessment

HI	hazard index
HQ	hazard quotient
hr	hour
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilogram
L	liter
LADD	lifetime average daily dose
LMS	linearized multistage
LOAEL	Lowest Observed Adverse Effect Level
m	meter
m^3	cubic meter
MCL	maximum contaminant level
mg	milligram
min	minute
MRL	Minimal Risk Level
NAPL	non-aqueous phase liquids
NATA	National Air Toxics Assessment
NCEA	National Center for Environmental Assessment
NCHS	National Center for Health Statistics
NCP	National Contingency Plan
NEI	National Emissions Inventory
NOAEL	No Observed Adverse Effect Level
OEHHA	California EPA's Office of Environmental Health Hazard Assessment
PA/SI	Preliminary Assessment and Site Investigation
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PEA	Preliminary Endangerment Assessment

PEF	particulate-emission factor
PG&E	Pacific Gas & Electric
PHA	public health assessment
PPRTV	provisional peer reviewed toxicity values
PTTIL	Provisional Total Tolerable Intake Levels
ppm	parts per million
REL	reference exposure level
RfC	reference concentration
RfD	reference dose
RfDi	inhalation reference doses
RfDo	oral reference doses
RI	remediation investigation
RME	reasonable maximum exposure
RSL	Regional Screening Levels
RWQCB	Regional Water Quality Control Board
s	second
SES	socioeconomic status
Site	AMCO Chemical Superfund Site
SPNA	South Prescott Street Neighborhood Association
SVOC	semivolatile organic compounds
SWDS	Solid Waste Disposal Site
TAG	Technical Advisor Grant
TCE	trichloroethylene
TDS	total dissolved solids
UCL	upper confidence level
VF	volatilization factor
VOC	volatile organic compound
WOA	West Oakland Alliance

1.0 Introduction

The Human Health Risk Assessment (HHRA) described in this appendix was prepared as part of the Remedial Investigation (RI) for the AMCO Chemical Superfund Site (the Site). This HHRA includes a quantitative evaluation of the potential adverse health effects to people from exposure to hazardous chemicals in soil at the former AMCO facility and adjacent parcels and in groundwater at the Site. In addition, a vapor intrusion evaluation of exposure to air (ambient and crawlspace) which has been impacted by contaminants in groundwater, was performed on residential parcels adjacent to the former AMCO facility and South Prescott Park as well as the office at the former AMCO facility. Screening level evaluations were performed to assess potential exposure to contaminated soil and homegrown produce at the residential properties. Results from the HHRA will be one of the factors that EPA uses to determine if cleanup actions are warranted at the Site.

This HHRA was prepared in a manner consistent with EPA's *Risk Assessment Guidance for Superfund, Part A* (EPA 1989), *Part B* (EPA 1991b), *Part E* (EPA 2004b), and *Part F* (EPA 2009) and supporting documents and guidelines published by the California Environmental Protection Agency (CalEPA). The assumptions provided for the general public by EPA and incorporated into this HHRA are conservative (i.e., representative highest exposure that is reasonably expected to occur at a site) and thus, health-protective.

As part of this HHRA, a conceptual site model (CSM) a schematic diagram that identifies the primary source of contamination in the environment (e.g. releases from leaking storage tank or waste material poured onto the ground) and shows how chemicals at the original point of release move in the environment (e.g. a chemical in soil might percolate into groundwater or might volatilize into air) and identifies the different types of human populations (e.g., residents and workers) who might come in contact with contaminated media. The models also lists the potential exposure pathways (e.g., ingestion of contaminated water) The CSM for the former AMCO facility is presented in Figure 1. The risk assessment will assist EPA in the following areas

- Evaluating the need for a comprehensive remedial action to address contaminated groundwater and soil.
- Provide a basis for performing a remedial action, including a no-action alternative
- Determine what exposure pathways need to be remediated.

The overall goals of the RI are to characterize site conditions, collect sufficient data to determine the nature and extent of contamination, and to support informed risk management decisions regarding human health and the environment.

In order to meet these objectives, six separate evaluations specific to each of these environmental media were conducted in this HHRA:

1. On-facility soil from the former AMCO facility and off-facility soil from the surrounding large vacant lot, small vacant lot, and parking lot

2. Groundwater beneath the former AMCO facility and surrounding areas
3. Soil gas, ambient air, and crawlspace air at the office on the former AMCO site and at eight adjacent residential properties
4. Soil gas and ambient air at South Prescott Park
5. Off-facility soil at six adjacent residential properties
6. Homegrown produce at four adjacent residential properties

A description of the Site, as well as operational history, can be found in Section 1 of the RI report.

1.1 Previous Health Studies

The primary objective of this HHRA is to evaluate the extent to which exposure to hazardous chemicals increases the likelihood of adverse effects occurring in adult and child residents, industrial workers, construction workers, and trench workers at the former AMCO facility. Several previous studies have evaluated potential health issues associated with the Site, as described below. A brief summary of previous health studies conducted at the Site is presented in the following sections to provide relevant background and site history.

1.1.1 Public Health Assessment

The California Department of Health Services (CDHS) prepared a Public Health Assessment (PHA) for the AMCO Chemical Superfund Site under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) (CDHS 2005). ATSDR is a federal agency within the U.S. Department of Health and Human Services (DHHS) and is authorized by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) to conduct PHAs at hazardous waste sites.

A PHA is conducted to evaluate potential adverse health impacts to people coming into contact with chemicals at hazardous waste sites. A health assessor derives an estimated dose of the substances that people in the community might be exposed to; this dose is compared to regulatory standards. A PHA may consider information from citizens about actual exposures, including any health data that might be available. CDHS collected community health concerns as part of the PHA process from a variety of sources including the South Prescott Street Neighborhood Association (SPNA), the Chester Street Block Club Association (CSBCA), and the West Oakland Alliance (WOA). The community expressed concerns including breathing problems, miscarriages, and cancer.

Using available data, CDHS concluded that the Site has four complete exposure pathways, two potentially complete exposure pathways, and four pathways that can be eliminated from consideration**.** The breathing of vapors from subsurface excavations by utility workers is considered a public health hazard. The potential present and future exposure to soil gas contamination at the facility office and abutting residences are considered indeterminate public health hazards. The potential future exposure to subsurface soil contamination at the Site is also considered an indeterminate public health hazard. On the basis of CDHS review of the site data and understanding of the neighborhood, CDHS is concerned that people may have already, or could potentially in the future, come into contact with chemicals at the Site at levels that could result in adverse health effects. The concentrations of chemicals that remain at the Site could pose health risks to utility workers, on-facility workers, and neighboring residents in the future. Findings from the PHA helped define sampling areas of the RI and HHRA.

1.1.2 National Air Toxics Assessment

In June 2009, EPA released the results of its national-scale assessment of 2002 air toxics emissions (http://www.epa.gov/ttn/atw/nata2002/). The purpose of the National Air Toxics Assessment (NATA) is to identify and prioritize air toxics, emission source types, and locations which are of greatest concern in terms of contributing to population-wide health risks. A subset of 2002 NATA results for census tract 06001401900, which includes the vicinity of the former AMCO facility (Oakland, CA), is presented in Table 1 (note that all tables are located at the end of this report).

The national-scale assessment includes 180 air pollutants (a subset of the air toxics on the Clean Air Act's list of 187 air toxics plus diesel particulate matter). This study provides an indication of the background level for some chemicals of concern. Attribution of air pollution sources can be challenging in industrial areas such as West Oakland which have multiple potential release points. Despite this limitation, the NATA study provides an indication of the background level for some chemicals of relevance for the Site study area.

NATA is a screening level assessment, and is therefore most appropriately used as a relative indicator of air toxics concerns. NATA results are most accurate when comparing between census tracts and over large geographic areas. The NATA assessment includes the following four objectives:

1. Compiling a national emissions inventory of air toxics emissions from outdoor sources,
2. Estimating ambient concentrations of air toxics,
3. Estimating population exposures,
4. Characterizing potential public health risk due to inhalation of air toxics including both cancer and non-cancer effects.

EPA generally updates air toxics emissions inventories every 3 years. The data evaluated as part of this HHRA are from 2002 since these data are the most complete and up-to-date available. The next national-scale assessment, likely to be available in 2010, will focus on the 2005 emissions inventory. The presentation of results for a single census tract is meant only to illustrate the magnitude of concentrations that may be expected in ambient air in the vicinity of the former AMCO facility, and the types of sources that may be contributing to those concentrations including potential sources coming from the facility.

Selected information from the 2002 National Emissions Inventory (NEI) for Alameda County is presented in Table 2. The NEI is a national database of air emissions prepared by EPA, based on input from State and local air agencies, tribes, and industry. The database includes estimates of annual emissions, by source, for every county in all 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands.

With respect to the information presented below, it is important to note the following:

- Carbon tetrachloride is a global pollutant, with an atmospheric lifetime in excess of 50 years and minimal local sources throughout the United States. While sometimes considered a chemical of potential concern from a health perspective, the main contribution to ambient concentrations of carbon tetrachloride is global transport and nearly never local.
- Two other chemicals of potential concern, benzene and ethylbenzene, are emitted primarily by mobile sources, including on-road cars and trucks and non-road sources, such as aircraft, commercial marine, trains, lawn and garden, and construction equipment. While there could be impacts from local, stationary sources of these pollutants, the largest contribution to the widespread concentrations of these pollutants is likely to be mobile sources, especially in West Oakland, where there are several major freeways as well as truck, rail, and commercial marine vessels operating around the Port.
- Three of the chemicals of potential concern—chloroform, trichloroethylene (TCE), and vinyl chloride—are emitted nearly entirely by stationary sources, including both local contributions and long-range transport. Further information on the potential sources of these pollutants may be found in EPA's NEI (using EPA's Air Data web site, http://www.epa.gov/oar/data/) or California's state inventory (http://www.arb.ca.gov/ei/emissiondata.htm).

  The top five stationary sources for vinyl chloride in Alameda County in 2002 (EPA 2002) include:

  - Crow Canyon Solid Waste Disposal Site (SWDS) (Hayward)
  - Galbraith Golf Course (Oakland)
  - Fiberboard Emeryville
  - Tri-Cities Recycling (Fremont)
  - Republic Services Vasco Rd. (Livermore)

1.1.3 Preliminary Endangerment Assessment

In September 2001, the 7th Street McClymonds Corridor Neighborhood Improvement Initiative prepared a Preliminary Endangerment Assessment (PEA) for the Site (7th Street 2001). The objectives of the PEA included identification of potential pathways for human exposure, calculations of cancer risk and non-cancer health hazard for each of the contaminated media, and recommendations for further remedial action.

Based on the PEA results, exposure to contaminated groundwater represents nearly all the cancer risk and over 90% of the non-cancer hazard. The primary contributor to risk is vinyl chloride. The potential excess cancer risk for the Site calculated using the California EPA Department of Toxic Substances Control (DTSC) PEA methodology is 2.7×10^{-1}, or nearly three cancers per ten persons with lifetime exposure to the Site. This is thousands of times higher than the target risk level of 1×10^{-6} (one per million persons with lifetime exposure). Similarly, the non-cancer HI for the Site is calculated to be 940, nearly 1000 times higher than the non-cancer threshold of 1.

1.1.4 Preliminary Assessment and Site Investigation Report

Community interest in the former AMCO facility began in 1996, when DTSC presented information on hazardous materials found on property related to the California Department of Transportation (Caltrans) Cypress Construction Project. Pacific Gas and Electric Company (PG&E) employees who had worked on the construction of a utility trench on Center Street in June of 1995 expressed concern over possible chemical exposure. Investigations conducted on behalf of PG&E and Caltrans in 1996 documented the presence of vinyl chloride and other chlorinated solvents in soil and groundwater at sample locations on 3rd Street, south of the former AMCO facility. Sampling conducted in 1996 on behalf of DC Metals documented the presence of vinyl chloride on the property (E&E 2001).

EPA Region 9 first became aware of the former AMCO facility in 1996, when DTSC requested assistance. To ensure that people living near the Site were protected, the EPA took immediate action under its Emergency Response program. The EPA conducted a Removal Assessment in October 1996 and initiated an Emergency Response action in December 1996, installing a groundwater and soil vapor treatment system that operated until July 1998. The treatment system was shut down in response to community concern over potential exposure to contaminants from the system's exhaust stack.

Following the shutdown of the treatment system, EPA conducted groundwater, soil, and air sampling in December 1998, September 1999, and April 2000 to verify that residents near the property were not at risk from contamination. The results of the investigation are presented in the Preliminary Assessment and Site Investigation [PA/SI] Report (E&E 2001). Additional sampling of groundwater, soil gas, and crawlspace air was conducted in August 2002 following the PA/SI.

The following are the most significant findings from EPA's investigation of the Site:

- Significant concentrations of chemicals have been found in soil on the on- and off-facility properties. However, the majority of the ground surface at these properties is covered with concrete. Therefore, the potential for current workers and residents to come into direct contact with contaminated soil is minimized.
- Significant concentrations of vinyl chloride and other chemicals have been found in groundwater monitoring wells on and near the former AMCO facility that establish a release of chemicals to the regional groundwater. However, the regional groundwater is not used for drinking water, and there are no drinking water wells within 4 miles of the Site.
- A release to air of hazardous substances was observed in 1996, during the excavation of a trench for an on-facility treatment system. A sample collected at the time of the observed release documented that vinyl chloride, trichloroethene, and other volatile organic compounds (VOCs) were present in the vapor observed emanating from the trench.
- Sampling at nearby homes documented the presence of very low levels of vinyl chloride in crawlspace air and soil gas in September 1999. However, vinyl chloride was not detected in either soil gas or crawlspace air in sampling conducted in April 2000. The

EPA does not expect that the very low levels of vinyl chloride found in 1999 could affect the health of people living in the homes where samples were collected.

1.1.5 The West Oakland Environmental Indicators Project

The former AMCO facility is located in West Oakland, approximately one block south of the West Oakland BART Station. In 2002, a collaboration of grassroots advocacy groups, community residents, and a research organization released an independent report, "Neighborhood Knowledge for Change: The West Oakland Environmental Indicators Project". After in-depth discussion with a neighborhood-based steering committee, the Pacific Institute created a set of 17 indicators to track environmental conditions in West Oakland (Pacific Institute 2002).

The indicators look at issues ranging from air pollution and toxic contamination to gentrification and voting. The 17 indicators include: amount of air pollution released by large polluters, air pollution health risks to neighborhood residents, asthma rates, voting power, vulnerability to displacement/housing affordability, community stability/market trends, subsidized housing supply, new business development, illegal dumping, land use conflict, neighborhood toxic volumes, resident toxic exposure sensitive area toxic hazard exposure, lead poisoning, lead abatement, transit mobility, and bike-able streets.

The report states that residents of West Oakland face five times more toxic pollution per person than residents of the city of Oakland with nearly 82 percent living within 1/8 mile of an industrial area. Children in West Oakland were reportedly seven times more likely to be hospitalized for asthma than the average child in the state of California. In addition, only 31 percent of area residents can afford the median rent on available housing units.

1.1.6 Other Relevant Studies: Vulnerable Communities

In discussing the population near the Site, it is important to note that the socioeconomic profile for the surrounding community of West Oakland is characterized by low socioeconomic status and racial diversity (SES) (Census 2000). Characteristics of low SES include low income and associated conditions including poor housing and inadequate health care and education systems.

Research in the area of environmental justice suggests that chemical facilities that pose increased environmental health hazards are disproportionately located in communities characterized by low SES such as West Oakland (Arista et al. 2004). A proposed explanation for this discrepancy is the "diminished response capacity" among low-income and minority communities to resist toxic exposure or to participate in pollution production decisions (Heiman 1996). Based on exposure to chemical concentrations evaluated in the Preliminary Endangerment Assessment, the potential cancer risk for residents living near the Site is several orders of magnitude greater than the levels acceptable to the EPA.

In addition to having more exposure to toxic chemicals, it has been suggested that individuals in such communities are potentially more vulnerable to the effects of exposure to hazardous chemicals due to impaired body defenses. A recent study by deFur et al. (2007) evaluated factors that could hinder an individual's ability to resist adverse impacts associated with chemical exposures. Characteristics of an individual's household, their community and local institutions (e.g. schools and medical facilities) can impact an individual's vulnerability to toxic agents. Typical stress factors associated with low SES neighborhoods include increased levels of family instability, crowding and incidents of violence and crime. Higher rates of disease and increased mortality among individuals living in low SES neighborhoods support the concept of increased vulnerability among these populations.

1.2 Methodology and Organization of the Risk Assessment

This HHRA was prepared in a manner consistent with EPA's *Risk Assessment Guidance for Superfund, Part A* (EPA 1989)*, Part B* (EPA 1991), *Part E* (EPA 2004c), and *Part F* (EPA 2009) and supporting documents and guidelines published by the California Environmental Protection Agency. The assumptions provided by EPA guidance documents and incorporated into this HHRA are conservative and thus, health-protective.

Risk assessments are typically performed in following four steps:

1. Data collection and data evaluation
2. Exposure assessment
3. Toxicity assessment
4. Risk characterization

A summary of the four steps is presented below.

1.2.1 Data Collection and Data Evaluation

Samples of environmental media such as soil, water, air, and homegrown produce are collected in order to characterize the nature and extent of contamination at a site. The data evaluation step consists of reviewing and evaluating available data. Data evaluation allows for the identification of constituents of potential concern (COPCs). In addition to data collected for the RI, data from previous investigations were reviewed to gain a better understanding of the site characteristics. With the exception of residential soil sampling, homegrown produce sampling, and facility office crawlspace sampling, which were not included the original scope of the field investigation, the sampling activities were performed in accordance with the methods and rationale described in the SAP. EPA added sampling of residential soil, homegrown produce, and facility crawlspace air to the RI based on information collected during the course of the RI.

Soil data were evaluated separately for each of the on- and off-facility exposure area. A quantitative evaluation was performed using groundwater data and a vapor intrusion evaluation was performed using crawlspace air and ambient air data evaluated separately for each residential property. A screening level risk evaluation was performed for residential soil and homegrown produce data prior to the soil removal action.

All chemicals reported in at least one sample at concentrations greater than the sample detection limit were included as COPCs. Chemicals were not excluded based on comparison to background concentrations. The approach used to evaluate COPCs is appropriate for a conservative baseline HHRA.

1.2.2 Exposure Assessment

In the exposure assessment step, the potential exposure pathways for COPCs and the potential human populations that could be exposed to these constituents, either now or in the future are identified. Exposure point concentrations (EPCs) are estimated from measured or modeled concentrations, and pathway-specific intake (doses) are estimated for use in the subsequent risk calculations. People who might be exposed and how they are exposed to each chemical are identified in this step. For the former AMCO facility, potential exposed populations included both current and future residents and workers.

1.2.3 Toxicity Assessment

The purpose of the toxicity assessment is to evaluate the potential for COPCs to cause adverse health effects. The derivation of toxicity values is a complex process which must evaluate many factors relating to toxicological data including the type of exposure route, duration of exposure, dose administered, physiology of the species tested, and the type of adverse health effect observed. In the toxicity assessment step, toxicity values are compiled that characterize potential adverse health effects from exposure to COPCs.

1.2.4 Risk Characterization

Risk characterization is the final step in the risk assessment process. It combines the results of the previous three steps to quantitatively characterize potential risks to human health associated with exposure to COPCs. Potential cancer risk, adverse non-cancer health effects, and an evaluation of potential effects from exposure to lead are estimated. Uncertainties associated with or inherent to risk assessments are also evaluated as part of the HHRA process. Section 6.0 presents a review of these uncertainties to provide context for interpreting the results of the HHRA.

In the risk characterization, theoretical non-cancer hazards and theoretical lifetime excess cancer risks (ELCR) associated with exposure to chemicals are estimated. Theoretical hazard for non-carcinogenic (i.e., not cancer causing) chemicals at a site are evaluated by comparison to a target-hazard index of 1 (unity). To evaluate cancer effects, EPA considers a target risk range of 10^{-6} to 10^{-4} to be "safe and protective of public health" (56 F.R. 3535), although EPA has discretion to take action in this range depending on site-specific circumstances. Even risks slightly greater than 1 x 10^{-4} may be considered adequately protective based on site-specific conditions, including any uncertainties about the nature and extent of contaminants and associated risks. The lifetime theoretical cancer excess cancer risk represents the additional, or excess, risk compared to the actual incidence of cancer that is unrelated to a site. The observed incidence of cancer cases in the United States is approximately 1-in-2 for men and 1-in-3 for women and is due to factors such as smoking, poor nutrition, excessive exposure to sunlight, and other causes including a person's genetics (American Cancer Society 2007). Because the surrounding neighborhoods are a vulnerable community, EPA has decided to use an excess lifetime cancer risk of 10^{-6} as the point at which action will be required at this site.

1.2.5 Organization of the HHRA

Attachments to this document include the following:

- Attachment 1: Detailed Risk and Hazard Results for Exposure to Soil

- Attachment 2: Detailed Risk and Hazard Results for Exposure to Groundwater
- Attachment 3: Detailed Risk and Hazard Results for Vapor Intrusion Evaluation
- Attachment 4: Residential Neighborhood Screening Tables
- Attachment 5: ATSDR Toxicity Profiles for Compounds that Contribute the Most Risk/Hazard
- Attachment 6: Outputs from proUCL
- Attachment 7: Response to DTSC Comments on the HHRA
- Attachment 8: Response to TAG Advisor Comments on the HHRA
- Attachment 9: Comments on the HHRA from the California Department of Public Health
- Attachment 10: Handouts Provided at the October 16, 2010 Public Meeting

2.0 Data Collection and Data Evaluation

Samples of environmental media such as soil, water, air, and homegrown produce are collected during the remedial investigation of a site in order to characterize the nature and extent of contamination. The data evaluation step consists of reviewing and evaluating available data.

This section describes the data collected to identify contaminant distribution at the former AMCO facility. A detailed discussion of the data collected for the site and used in this HHRA is presented in the RI Report. The analytical data were reviewed according to the data evaluation procedures specified in EPA guidance documents, including *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part A* (EPA 1989) and *Guidance for Data Usability in Risk Assessment* (EPA 1990b). These procedures include the evaluation of analytical methods, quantitation limits, qualified data, blank contamination, and background concentrations.

2.1 Chemicals of Potential Concern

All chemicals reported in at least one sample at concentrations greater than the sample detection limit were included as COPCs. Chemicals were not excluded based on comparison to background soil concentrations. Potential risks associated with ambient levels of metals in soil were also calculated to provide an understanding of the total risks at the Site (i.e., potential risks from site-related COPCs and ambient levels of metals). Screening criteria were used to focus on chemicals that would contribute the most to the risk and were not used to eliminate or screen out chemicals. The approach used to evaluate COPCs is appropriate for a conservative baseline HHRA. Section 5.1 of the RI Report, Screening Level Determination, provides the rationale for the screening criteria selected for this Site. Table 3 presents the COPCs for each media.

All chemicals reported in at least one sample from the data sets compiled for this risk assessment were included as COPCs, except calcium, magnesium, potassium, and sodium, which are known to be essential human nutrients. Elements considered to be essential human nutrients were eliminated as COPCs. EPA and DTSC guidance state that these elements can be deleted from the list of COPCs because of their low toxicity when detected at ambient concentrations (EPA 1989; DTSC 1992). Even if these constituents are present at concentrations slightly above naturally-occurring levels, they are eliminated as COPCs because they are toxic only at very high doses.

2.1.1 Soil

A non-engineered concrete cap exists over the majority of the former AMCO facility and varies from 6 to more than 40 inches thick. In accordance with the SAP, shallow soil samples were generally collected from between 1 and 2 feet below the concrete or below ground surface in unpaved areas. Soil sampling was completed using a slide hammer to drive a sampling “shoe” containing a 2-inch diameter, 6-inch long stainless steel sleeve. In accordance with EPA method 5035, immediately after retrieval of the sample, three

Encore™ sample containers were used to collect soil for VOC analysis from "undisturbed" soil core remaining in the sampling "shoe". For more detail on the sampling procedures, refer to Appendix C, Section C.1.8.2.

For this HHRA, soil samples were divided into the following four exposure areas:

- Former AMCO facility (includes 21 shallow and 11 deep samples),
- Parking lot (includes 3 shallow and 3 deep samples),
- Large vacant lot (includes 14 shallow and 9 deep samples),
- Small vacant lot (includes 2 shallow samples).

Sampling locations were approved by EPA prior to sample collection and were based on a 50-foot grid and historical aerial photographs. If contaminant concentrations greater than screening levels were detected, additional samples were collected to define the extent of contamination. The soil sampling locations for these four exposure areas are shown on Figure 2. Background concentrations for soil were obtained for naturally occurring metals from the city of Oakland (City of Oakland Urban Land Redevelopment Program 1995).

2.1.2 Groundwater

Groundwater samples were collected directly from the discharge line into the sample container using standard procedures for filling VOAs. For more detail on the sampling procedures, refer to Appendix C, Sections C.1.1.2 and C.1.6. The groundwater sample results used for this HHRA are from first, third, and fourth quarters of 2005, and the first, second, and third quarters of 2006, and the grab groundwater samples (September 2004). VOC data from groundwater samples collected from second quarter 2005 were not used in the risk assessment data set due to quality issues (EPA 2006b). Groundwater samples were not collected from monitoring wells with floating non-aqueous phase liquids (NAPL) (MW-13 and MW-14). Evidence of NAPL was observed in the soil during the construction of on-facility wells in the central and south-central portion of the facility. Results of groundwater samples collected from locations with suspected NAPL were included in the data set that was used to calculate the exposure point concentrations used in the groundwater risk calculations. Groundwater sample locations used in the risk assessment are shown on Figure 3.

During the RI, the shallow water table fluctuated from approximately 2.5 to 6.5 feet below ground surface (bgs). In the dry season (May through October), flow generally appears to be toward the southwest; in the wet season (November through April), flow is generally to the south. The highest concentration of contaminants is observed in shallow groundwater (less than 25 feet bgs) in the central and south-central areas of the former AMCO facility, west of the warehouse and office. Contaminant concentrations beneath the central and south-central portions of the former facility decrease rapidly with increasing depth.

2.1.3 Residential Crawlspace Air and Ambient Air

Crawlspace and/or ambient air sampling was conducted between September 2004 and June 2009. Samples were collected from the office located at the former AMCO facility located at 1414 3rd Street, as well as at residential properties occupying the same block as the facility, including 320 Center Street, 326 Center Street, 360 Center Street, 1428 3rd Street, 1432 3rd Street, and 1436 3rd Street. Ambient air sampling was also conducted at 337 Center St., 356

Center St., 360 Center St., 366 Center St., South Prescott Park and from nearby "background locations" measured at 322, 323, and 329 Lewis Street.

Crawlspace and ambient air samples were collected as described below:

- 1414 3rd Street – Crawlspace air samples were collected in the office crawlspace beginning in November 2006. The office has been sampled eight times at two locations during each sampling event.
- 320 Center Street—Ambient air and crawlspace air samples were collected at this residence beginning in August 2008. Sampling at one crawlspace location and one ambient air location have occurred during five sampling events except during the June 2009 sampling, the crawlspace was sampled in two locations.
- 326 Center Street—Crawlspace air samples were collected during nine sampling events. Ambient air samples were collected during eight events (access was not granted during the June 2009 sampling event).
- 360 Center Street— The foundation of this residence consists of a slab-on-grade; therefore, no crawlspace air samples were collected. Ambient air samples were collected during six sampling events from September 2004 to June 2009.
- 1428 3rd Street—During each sampling event, two crawlspace air samples were collected at this residence. Due to remodeling of the house, the initial crawlspace locations were no longer accessible so alternate sampling locations were used. Figure 6 indicates the sampling locations and number of sampling events at each location. Ten sampling events have been conducted at this residence both at crawlspace and at ambient air locations.
- 1432 3rd Street—One ambient air and one crawlspace air sample were collected during the ten sampling events occurring at this residence except during the June sampling, two crawlspace and two ambient air locations were sampled.
- 1436 3rd Street—The foundation of this residence consists of a slab-on-grade; therefore, no crawlspace air samples were collected. Ambient air samples were collected during six sampling events from September 2004 to October 2008.

During the June 2009 sampling event, 3 additional residences were sampled for soil gas, indoor air, and ambient air.

- 337 Center Street
- 356 Center Street
- 366 Center Street

Crawlspaces were not present at these homes. Figure 4a shows the locations of the soil gas sampling.

2.1.4 Residential Soil and Homegrown Produce

Soil sampling was conducted at six residential properties adjacent to or near the facility. Soil sampling locations were sited either along the property boundary or in areas where produce was grown. Produce samples were collected from four of the residences with gardens.

Figure 4b shows the produce and soil sampling locations at the six residential properties. Produce samples were collected from backyards at 356 and 360 Center Street, and 1428 and 1432 3rd Street. No produce was present at 326 Center Street and 1428 3rd Street. At the time of the RI sampling, access had not been granted at 320 Center Street, therefore, no produce sampling was performed at this property. At each of the four residences where produce samples were collected, one sample was collected for each type of produce grown.

3.0 Exposure Assessment

Exposure assessment is the determination or estimation (qualitative or quantitative) of the magnitude, frequency, duration, and route of exposure. Exposure assessments may consider past, present, and future exposures, using varying assessment techniques for each phase. The objective of the exposure assessment is to estimate the type and magnitude of exposures to COPCs that are present at or migrating from a site.

The three primary steps in exposure assessment are site characterization, exposure pathway identification and quantification of exposure. A CSM is a tool used to assist with the identification of potential exposure media, human receptors, and exposure pathways.

3.1 Identification of People and Exposure Pathways

Exposure pathways are the different ways that a receptor may contact a chemical. Each of the following components must be present for an exposure pathway to be complete (EPA 1989):

- A potential source of a toxic substance in an environmental media, such as soil or air
- A potential receptor, such as a resident living near or on the potential source
- A contact point, such as a resident planting a garden in soil contaminated with some substance
- A route for the substance to enter the body, such as the inhalations of dust particles or the ingestion of soil particles by a resident working in a garden.

The exposure routes and pathways considered in this HHRA are described below. Figure 1 presents a CSM illustrating these exposure routes and pathways.

3.1.1 Exposed Populations

Potential exposed populations are members of a community who may be exposed to contaminated media during the course of daily living and working in the area of concern. The exposed populations evaluated in the HHRA were identified based on current land use and input from the South Prescott community via Spanish and English focus groups, the Technical Advisor Grant (TAG) recipient, and the technical advisor. Receptors evaluated quantitatively in the HHRA include adult and child residents who currently live immediately adjacent to the facility or may in the future live within the boundaries of the facility.

For the Site, use of a CSM (Figure 1) resulted in the identification of the following potential receptors:

- Future on-facility adult and child residents and current and future off-facility adult and child residents,
- Outdoor commercial/industrial workers,

- Construction workers, and
- Excavation/trench workers.

Potential exposure to workers is over a shorter period of time than residents. The assumed exposure for a worker is 250 days per year over 25 years, while a resident is assumed to be exposed for 350 days per year over 30 years. Based on the common assumption that workers take two weeks of vacation per year, EPA assumes that a resident will be away from home approximately 15 days per year.

Industrial, construction, and trench workers may be exposed to the same chemical concentrations as a resident (by the same pathways), but for a much shorter duration. Thus, the cumulative risk faced by workers from all exposure pathways might be significantly lower than residents for all exposure pathways and routes of exposure evaluated. Exposure assumptions for both future residents and workers are presented in Table 4 for exposure by workers and future residents to soil, Table 5 for exposure by future residents to groundwater, and Table 6 for exposure by trench workers to groundwater. Table 7 presents the exposure assumptions for workers and residents exposed to crawlspace air and ambient air.

3.1.2 Exposure Pathways

An exposure pathway represents how a chemical moves through the environment from the source to a receptor. Exposure pathways are identified by analysis of the distribution of COPCs in the environment and the physical and chemical properties of each COPC. The following exposure pathways for residential, occupational, construction and trench worker scenarios at the Site are considered complete for this risk assessment:

- **Residential**: Current residents (adults and children) that are immediately adjacent to the former AMCO facility may be exposed to groundwater, soil, air, and produce that have been impacted by site-related chemicals. For future residents, this HHRA conservatively assumes that residential development would consist of single-family dwellings within the facility boundaries. This assumption is health-protective and yields conservative risk estimates that are greater than the risk estimates for multi-family dwellings such as apartments or condominiums.
- **Recreational**: Recreational exposure may occur in Prescott Park which is across the street from the former AMCO facility. Both adults and children visiting the park may be exposed to site-related chemicals by outdoor inhalation of VOCs that may emanate from groundwater and soil gas at the park.
- **Industrial**: Current commercial and industrial workers (non-construction) at the former AMCO facility may be exposed to site-related chemicals primarily through inhalation of VOCs emanating from soil, groundwater, and soil gas.
- **Construction/Trench worker**: Under current and future conditions, construction and excavation workers are assumed to be engaged in subsurface disturbance activities that may extend to 10 ft below ground surface (bgs). Such activities may include utility work, repairs, maintenance and construction. This is potentially the most significant exposure pathway for subsurface workers.

- **Ecological:** Under current conditions, birds and small mammals may be exposed to site-related chemicals that have been taken up by homegrown produce. This pathway, while potentially complete, was not quantitatively evaluated in this HHRA and is considered to be insignificant compared to exposure by other pathways.

In addition, risks for unrestricted residential use of groundwater were also evaluated in accordance with input from the regulatory agencies and the community.

Residents/Workers could be exposed to COPCs through any of the following pathways:

- Incidental soil ingestion
- Dermal absorption due to direct soil contact
- Inhalation of airborne suspended soil particulates
- Inhalation of VOCs from soil or groundwater
- Ingestion of homegrown produce
- Dermal absorption due to direct groundwater contact (trench worker only)
- Inhalation of VOCs in indoor air from vapor intrusion

Incidental soil ingestion by adults and children primarily occurs through hand-to-mouth contact as a result of hands and fingers being placed in the mouth after contact with soil while gardening or playing. This scenario assumes that adults ingest 100 milligrams of soil per day (mg/day), 350 days per year (EPA 1991a). A child resident that plays in the soil may ingest twice as much as the average adult (200 mg/day). Based on the common assumption that workers take two weeks of vacation per year, EPA assumes that a resident will be away from home approximately 15 days per year (EPA 1991a).

Dermal absorption of COPCs is a result of chemicals being absorbed into the body from soil particles after any direct skin contact with contaminated soil. Hands and fingers are typically the primary body parts in contact with soil. Chemicals absorbed through the skin are absorbed into the bloodstream. The soil adherence factor is based on gardening and play activities.

Inhalation of airborne suspended soil particles occurs when soil grains are picked up by the wind and dispersed into the air. Once these soil particles are airborne, people in the vicinity can inhale them. Particles typically less than 10 microns in size are inhaled. Once inhaled into the lungs, chemicals are absorbed from the soil particle and absorbed into the bloodstream. Larger particles do not reach the lungs but are coughed up and swallowed.

Inhalation of VOCs which volatilize from soil or groundwater into air (outdoor and indoor air) can be absorbed into the bloodstream after being inhaled.

Residents may be exposed to COPCs through **ingestion of homegrown produce.** Various types of produce are grown and consumed in the neighborhood adjacent to the former AMCO facility. Produce grown in the residential gardens include mint, figs, guava, cilantro, and grapes. Produce may take up COPCs into roots or have soil deposited on aboveground plant parts.

Oakland residents have their drinking water supplied by the East Bay Municipal Utility District. It is unlikely that residents would drink groundwater in the future; however, in accordance with input from the regulatory agencies and the community, groundwater use for drinking water and household use is included in the evaluation of future residential use of the AMCO property.

3.2 Exposure Point Concentrations

EPCs are representative of the concentration of the chemical of potential concern to which receptors may be exposed over a period of time. EPCs were calculated for on-facility soil, groundwater, and crawlspace and ambient air for each residential property and the office at 1414 3rd Street. Because a screening level risk evaluation was conducted on the residential soil and homegrown produce sample results, these data were not grouped and individual sample results were compared with screening levels. Detected concentrations from each sample/media were compared to their appropriate screening levels.

Exposure point concentration estimates do not include physical, chemical, or biological processes that could result in the reduction of chemical concentrations over time. The EPCs are assumed to remain constant at levels reflected in the analytical results. This general assumption of steady state conditions also applies to sources and contaminant release mechanisms. This assumption may result in a conservative evaluation of long-term exposure conditions.

3.2.1 Soil and Groundwater

The measure of exposure appropriate for a risk assessment is the average concentration of a contaminant throughout an area to which humans are exposed. The premise is based on the assumption that over a long enough period of time a receptor would contact all parts of the exposure area. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 UCL on the mean; 95% UCLs were calculated for the soil and groundwater datasets using ProUCL3 software (EPA 2004c). ProUCL outputs for each COPC in each medium are provided in Attachment 5.

ProUCL computes parametric UCLs based on normal, lognormal, or gamma distributions, and nonparametric UCLs using one of several nonparametric methods. The UCLs that are selected as the EPCs are based on the data distribution and the associated skewness. If the dataset contained four or fewer samples, the maximum sample concentration was used as the EPC because a 95% UCL could not be calculated. EPCs are the lesser of the maximum-detected concentration and the 95% UCL.

Table 8 summarizes the EPCs for each soil exposure area. Table 9 summarizes the EPCs for the groundwater dataset. Table 10 summarizes the EPCs for the crawlspace air and ambient air data.

3.2.2 Crawlspace Air and Ambient Air

95% UCLs were calculated for workers in the onsite office and each resident using the crawlspace air and ambient air data from the multiple sampling events. 95% UCLs were calculated for the crawl space air and ambient air datasets using ProUCL4 software (EPA 2010c).

At the residential locations, during the early sampling events (2004, 2005, and 2006) the crawlspace air samples were collected over a 4-hour time period. During more recent sampling events (2007 to 2009), the air samples were collected over a 24-hour time period.

At the office, during the 2006 and 2007 sampling events, the crawlspace air samples were collected over a 24-hour time period and starting in 2008, the air samples were collected over an 8-hour time period to represent a worker scenario in the office only. Concentrations measured using each of these two sampling approaches were consistent; so there were no adjustments made to the data for this evaluation.

3.3 Estimation of Chemical Intake

Exposure (or intake) is defined as contact of an organism with a chemical. Intake is normalized for time and body weight and is expressed as milligrams of chemical per kilogram of body weight per day (mg/kg-day). Six basic factors are used to estimate intake: chemical concentration, contact rate, exposure frequency, exposure duration, body weight, and averaging time.

Intake estimates are calculated for each COPC and exposure pathway. For non-carcinogenic effects, the intake is averaged over the period of time that receptors are exposed to the COPCs and is referred to as the average daily dose (ADD). For carcinogenic effects, the intake is averaged over a receptor's lifetime (i.e., assumed to be 70 years) and is referred to as the lifetime average daily dose (LADD).

The quantification of exposure intake considers chemical EPCs, as well as general exposure assumptions or parameters. The intake assumptions are based on information that is highly conservative in nature and are intended to overestimate exposure to be protective of sensitive members of the population such as children.

EPA guidance states that actions at Superfund sites should be based on an estimate of the "reasonable maximum exposure" (RME) (EPA 1989). The RME is defined as the "highest exposure that is reasonably expected to occur at a site." The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible values. To the extent possible, the risk assessment has selected values for the exposure factors that result in an estimate of the RME scenario.

The parameters used to assess exposure in this HHRA are summarized in the sections below and are provided in Table 4 for soil, Tables 5 and 6 for groundwater (exposure by residents and trench workers, respectively), and Table 7 for crawlspace and ambient air. The parameters based on RME exposure are recommended values from EPA's *Regional Screening Levels (RSLs)* and California Department of Toxic Substances Control (DTSC) and Human and Ecological Risk Office (HERO) recommended default exposure factors for use in risk assessment at California Military Facilities (DTSC 2005).

3.3.1 General Exposure Assumptions

General exposure assumptions are used in the intake calculations for all exposure pathways evaluated in the HHRA. General exposure assumptions include exposure frequency, exposure duration, body weight, and averaging time. These assumptions are detailed below:

- **Exposure Frequency**—It was assumed that adult and child residents would be exposed to chemicals at the site 350 days per year (EPA 1991a). For workers the assumed exposure duration is 250 days per year (EPA 1991a).

- **Exposure Duration**—A total resident exposure of 30 years is assumed (i.e., 24 years for an adult and 6 years for a child). An industrial worker exposure of 25 years at the same location is assumed (EPA 1991a). The construction worker is assumed to be exposed for a period of 1 year.
- **Body Weight**—It was assumed that the body weight for an adult (for both resident and worker) is 70 kilograms (kg). A body weight of 15 kg is used for a child.
- **Averaging Time**—Intake calculations are averaged over a period of time. For non-carcinogenic effects, the averaging time is equal to the period of time that receptors are exposed to the COPC, or 365 days per year multiplied by the exposure duration. The averaging time for non-carcinogenic effects for residential adults and children are 8,760 and 2,190 days, respectively (corresponding to 24 years for an adults and 6 years for a child). For workers, an averaging time of 1 year or 365 days, is assumed. For carcinogenic effects (for both resident and worker), the averaging time is equal to a receptor's lifetime of 365 days per year multiplied by 70 years. The averaging time for carcinogenic effects is 25,500 days.

3.3.2 Exposure Parameters and Equations for Soil Ingestion

To calculate intake by incidental ingestion of soil, soil ingestion rates were applied (Table 4). The soil ingestion rates identified for assessing a residential exposure are 100 mg/kg for an adult and 200 mg/kg for a child. Soil ingestion rates of 100 mg/kg and 330 mg/kg are assumed for the industrial worker and construction workers, respectively.

Chemical intake via ingestion of soil was estimated according to the following equation (EPA 1989):

Intake =

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
Cs	=	EPC in soil (mg/kg)
IngR	=	Ingestion Rate (mg/day)
EF	=	Exposure frequency (day/years)
ED	=	Exposure duration (years)
CF	=	Conversion factor (1×10^{-6} kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

3.3.3 Exposure Parameters and Equations for Dermal Contact with Soil

Exposure assumptions used in the intake calculations for the dermal contact with soil exposure pathways include body surface area and soil adherence factor (Table 4). Chemical specific dermal absorption factors are also applied. These factors are detailed below:

- **Body Surface Area**—The body surface area is the total amount of skin surface that can be exposed to contaminated soil. The adult resident was assumed to wear a short-sleeved shirt, shorts, and shoes with an exposed skin surface area of 5,700 cm^2 which included head, hands, forearm, and lower legs. The surface area for a child is 2,900 cm^2

which includes exposure to the head, hands, forearms, lower legs, and feet. Both industrial and construction workers are assumed to have an exposed skin surface area of 5,700 cm^2.

- **Soil-adherence Factor**—The soil-adherence factor is a measure of the amount of soil that can adhere to an area of skin surface. EPA's (2004b) recommended soil-adherence factor for adults is 0.07 mg/cm^2. This is based on the body-part specific adherence factor presented in Kissel et al. (1996) and Holmes et al. (1999). The activity pattern selected to be representative of the average urban suburban resident is the outdoor gardener. This scenario is considered to represent the most common residential activities, since it included activities as weeding, pruning, picking fruit, digging small irrigation trenches, and cleaning up. The recommended soil-adherence factor for a child resident is 0.2 mg/cm^2 (EPA 1999a), and is used to represent a sensitive population with activity patterns that could contribute to increased exposure. The age group/activity used to determine the adherence factor is children at play. The assumed soil-adherence factor for industrial workers is 0.2 mg/cm^2; for construction workers, a soil-adherence factor of 0.8 mg/cm^2 is used.
- **Dermal–absorption Factor**—The dermal absorption factor is a chemical-specific factor that measures a chemical's ability to be absorbed into the human body. An absorption factor of 0.1 assumes that 10 percent of the chemical will be absorbed into the body and be bioavailable to cause a toxic effect. Dermal-absorption factors were obtained for all chemicals from EPA (1999). Dermal-absorption factors are compiled in Table 1-4 (located in Attachment 1).

Chemical Intake via dermal contact with soil was estimated according to the following equation (EPA 1989):

$$\text{Intake} = \frac{Cs \times SA \times EF \times ED \times AF \times ABS \times CF}{BW \times AT}$$

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
Cs	=	EPC in soil (mg/kg)
SA	=	Body Surface area (cm^2)
EF	=	Exposure frequency (day/years)
ED	=	Exposure duration (years)
AF	=	Soil-adherence factor (mg/cm^2)
ABS	=	Absorption factor
CF	=	Conversion factor (1×10^{-6} kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

3.3.4 Exposure Parameters and Equations for Inhalation of Particulates and Volatiles from Soil

There are two types of exposure pathways evaluated in this HHRA to address inhalation of chemicals. One is inhalation of particulates in which nonvolatile chemicals of potential concern (i.e., DDT and lead) are sorbed to airborne dust and subsequently inhaled by receptors. The other pathway evaluated is inhalation of volatile compounds that have migrated from soil to air. Exposure assumptions used in the intake calculations for the inhalation of particulates and volatiles from soil include inhalation rate and exposure time. A particulate emission factor (PEF) and chemical specific volatilization factors are also applied. These factors are detailed below and summarized in Table 4.

- **Inhalation Rate**—For adults (both workers and residents) the inhalation was assumed to be 0.83 cubic meters per hour (m^3/hr). For children 6 to 8 years of age, an inhalation rate of 0.42 m^3/hr is recommended. This is the highest recommended inhalation rate for a child within the age range of 1 through 6 years.
- **Exposure Time**—Inhalation pathways are unique in that an exposure time parameter can be applied to the intake estimates to account for the amount of time during one day that a receptor can potentially inhale chemicals. The exposure time is assumed to be 24 hours for both the adult and child resident, which is conservative given that residents are typically not exposed all day to chemicals in soil at their homes. For workers, an exposure time of 8 hours is assumed.
- **Particulate-emission and Volatilization Factors**—The inhalation pathways incorporate a PEF for nonvolatile chemicals and a chemical specific volatilization factor (VF) for volatile chemicals. These factors relate chemical concentrations in soil to chemical concentrations in air that can be inhaled by receptors. A PEF of 1.32×10^9 cubic meters per kilogram (m^3/kg) was applied to resident and industrial worker exposures. It was derived by assuming a continuous and contact emission rate over an extended period of time. This PEF was used to evaluate inhalation of the nonvolatile chemicals. A PEF of 1.0×10^6 was applied to construction worker inhalation exposures (DTSC 2005). When available for volatile chemicals, chemical-specific VFs were used.

Chemical intake via inhalation of particulates from soil is estimated according to the following equation (EPA 1989):

$$\text{Intake} = \frac{Cs \times InhR \times EF \times ET \times ED}{PEF \times BW \times AT}$$

Chemical intake via inhalation of volatiles from soil is estimated according to the following equation:

$$\text{Intake} = \frac{Cs \times InhR \times EF \times ET \times ED}{VF \times BW \times AT}$$

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
Cs	=	EPC in soil (mg/kg)
InhR	=	Inhalation Rate (m^3/day)
EF	=	Exposure frequency (day/years)
ET	=	Exposure time (hours)
ED	=	Exposure duration (years)
PEF	=	Particulate-emission factor (m^3/kg)
VF	=	Volatilization factor (m^3/kg)
BW	=	Body weight (kg)

AT = Averaging time (days)

3.3.5 Exposure Parameters and Equations for Ingestion of Groundwater

Specific equations used to estimate chemical exposures for each complete pathway are presented in Table 5 for exposure by residents and Table 6 for exposure by trench workers.

Although groundwater beneath the Site is not currently used by residents as a drinking water source, risks were calculated for a hypothetical exposure assuming that future residents might use the groundwater at the Site for drinking and for household use. The groundwater ingestion rates identified for assessing a residential exposure were 2 L/day for an adult and 1 L/day for a child.

Chemical intake from ingestion of chemicals in groundwater was calculated using the following equation (EPA 1989):

$$\text{Intake} = \frac{C_{gw} \times IngR \times EF \times ED}{BW \times AT}$$

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
Cgw	=	EPC in groundwater (mg/kg)
IngR	=	Ingestion Rate (L/day)
EF	=	Exposure frequency (day/years)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

3.3.6 Exposure Parameters and Equations for Dermal Contact with Groundwater

Dermal contact with groundwater used in the home as tap water could occur as a result of bathing or showering. Calculation of exposure through this pathway varies depending on the nature of the chemical involved as well as the length of the exposure and the amount of "lag time" assumed to occur following the exposure period.

The general chemical intake equation for dermal contact with groundwater is as follows (EPA 2004b):

$$\text{Intake} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$$

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
DA_{event}	=	Absorbed dose per event per area of skin exposed (mg/cm^2-event)
SA	=	Body surface area (cm^2)
EF	=	Exposure frequency (day/years)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

DA_{event} is calculated differently for organic and inorganic chemicals.

For inorganic chemicals DA_{event} is calculated as follows:

$$DA_{event} = K_p \times C_{gw} \times t_{event}$$

For organic chemicals DA_{event} is calculated using the following equations:

If $t_{event} > t^*$

$$DA_{event} = FA \times K_p \times C_{gw} \left[\frac{t_{event}}{1+B} + 2t\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

If $t_{event} \leq t^*$

$$DA_{event} = 2\,FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$$

Where:

C_{gw}	=	EPC concentration in groundwater (mg/L)
FA	=	Fraction absorbed (unitless)
K_p	=	Skin permeability constant for chemicals in groundwater (cm/hour)
t_{event}	=	Exposure Time (hrs)
t*	=	Time to reach steady state (hrs)
τ	=	Lag time per event
□	=	Pi
B	=	Dimensionless coefficient (cm/hr)

3.3.7 Exposure Parameters and Equations for Inhalation of Vapors from Groundwater

Assuming that groundwater under the former AMCO facility is used in the home as tap water, volatile chemicals within this water that became airborne could be inhaled by residents within their homes during bathing or showering. Assumptions regarding exposure duration and frequency are the same as those used for the soil inhalation pathway described above with the exception that the inhalation pathway is only assumed to occur for volatile chemicals and the VF for each of these chemicals is assumed to be 0.5.

Inhalation of chemicals in groundwater was calculated using the following equation:

$$\text{Intake} = \frac{C_{gw} \times InhR \times VF \times ET \times EF \times ED}{BW \times AT}$$

Where:

Intake	=	Intake, or dose for each chemical (mg/kg-day)
C_{gw}	=	EPC in groundwater (mg/L)
InhR	=	Inhalation Rate (m^3/day)
VF	=	Volatilization factor (L/m^3)

ET	=	Exposure time (hours)
EF	=	Exposure frequency (day/years)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

Since the groundwater is present at the Site at depths less than 10 feet bgs, trench workers may be exposed to groundwater under the former AMCO facility, based on the assumption of standing groundwater in the ditch during digging. For estimating steady-state concentrations of VOCs released to ambient air during trenching activity, the following equations (EPA 1988, EPA 1994, EPA 1995a) were applied:

The chemical specific gas-phase mass-transfer coefficient, k_{iG} for each groundwater COPC is derived as follows:

$$k_{iG} = \left(\frac{MW_{H_2O}}{MW_i}\right)^{0.335} x \left(\frac{T}{298}\right)^{1,005} x k_{G,H_2O}$$

Where:

K_{iG}	=	Chemical-specific gas-phase mass-transfer coefficient (cm/s)
MW_{H2O}	=	Molecular weight of water (g/mol) 18
MW_i	=	Chemical-specific molecular weight (g/mol)
T	=	Average temperature (Kelvin)
k_{GH2O}	=	Gas phase mass transfer coefficient for water vapor at 25 degrees Centigrade (cm/s) 8.33E-01 (EPA 1995a)

The chemical-specific liquid-phase mass-transfer coefficient, K_{iL} for each groundwater COPC is derived as follows:

$$k_{iL} = \sqrt{\frac{MW_{O_2}}{MW_i}} \quad x \quad \frac{T}{298} \quad x \quad k_{L,O2}$$

Where:

K_{iL}	=	Chemical-specific liquid-phase mass-transfer coefficient, (cm/s)
MW_{O2}	=	Molecular weight of oxygen (g/mol) 32
MW_i	=	Chemical-specific molecular weight (g/mol)
T	=	Average temperature (Kelvin)
$k_{L,O2}$	=	Liquid phase mass transfer coefficient for oxygen at 25 degrees Centigrade (cm/s), 2.0E-03 (EPA 1995a)

The overall mass-transfer coefficient for each groundwater COPC is derived as follows:

$$\frac{1}{K_i} = \left(\frac{1}{k_{iL}}\right) + \left(\frac{RT}{H_i k_{IG}}\right)$$

Where:

K_i	=	Chemical-specific overall mass-transfer coefficient (cm/s)
k_{iL}	=	Chemical-specific liquid-phase mass-transfer coefficient (cm/s)
R	=	Gas constant, (atm-m^3/mol-K), 8.2E-05
T	=	Average temperature (Kelvin)
H_i	=	Chemical-specific Henry's Law Constant (atm-m^3/mol)
K_{iG}	=	Chemical-specific gas-phase mass-transfer coefficient (cm/s)

For a conservative risk evaluation, assume an infinite VOC source. At steady state, the emission rate for each VOC can be calculated as below:

$$E_i = K_i \times C_w \times A_w$$

Where:

E_i	=	Emission rate of the VOC (mg/s)
K_i	=	Overall mass-transfer coefficient (cm/s)
C_w	=	Concentration of VOC in groundwater (mg/cm^3)
A_w	=	Bottom area of the trench covered with contaminated water (cm^2)

The box model was used to estimate the concentration of VOCs in the breathing zone of the construction worker using the following equation:

$$C_{air} = \frac{E_i \times CF}{u \times H \times W}$$

Where:

C_{air}	=	Concentration of VOCs in breathing zone (µg/m^3)
E_i	=	VOC emission rate within the trench (mg/s)
CF	=	Conversion factor (µg/mg)
u	=	Assumed velocity of air in the trench (m/s)
H	=	Mixing height, adult breathing zone (m)
W	=	Width of the trench perpendicular to wind direction (m)

Trench dimensions are assumed to be 10 ft (w) x 10 ft (l) with 70% water coverage in the bottom of the trench assuming dewatering. The mixing height is assumed to be 6 feet. With respect to wind speed in the trench, 0.152 m/s (30 ft/min) is a reasonable lower bound on air flow in the trench (EPA 1994).

3.3.8 Exposure Parameters and Equations for Inhalation of Vapors from Crawl space Air and Ambient Air

This HHRA evaluated COPC-specific intakes by estimating the amount of a chemical absorbed daily by the residents near the former AMCO facility and on-facility workers. The following general equation was used to estimate intake from inhalation (USEPA 2009):

$$I = \frac{C \times ET \times EF \times ED}{AT}$$

where:

I = Intake: the amount of chemical absorbed daily via inhalation (µg/m^3).

C = Chemical concentration in air (µg/m^3).

ET = Exposure time (hours/day).

EF = Exposure frequency: number of exposure occurrences per given time (e.g., 350 days per year).

EF = Exposure frequency (days/year).

ED = Exposure duration (years).

AT = Averaging time (lifetime in years x 365 days/year x 24 hours/day)

Exposure assumptions used for a industrial worker, adult, and child resident are presented in Table 7.

4.0 Toxicity Assessment

The toxicity assessment seeks to develop a reasonable association between the degree of exposure to a chemical and the possibility of adverse health effects. A chemical may not cause adverse toxic effects in biological systems unless the agent, or its metabolic byproducts, reach critical receptor sites in the body at specific levels and for a period of time sufficient to elicit a particular effect. Whether a toxic response occurs depends on the chemical and physical properties of the toxic agent, the degree of exposure to the agent, and the susceptibility of an individual to the particular effect. To characterize the toxicity of a particular chemical, the type of effects it can produce, and how much is needed to produce those effects must be known.

The toxicity assessment consists of two components:

- **Hazard Identification**—The process of determining what adverse human health effects, if any, could result from exposure to a particular chemical.
- **Dose-response Evaluation**—A quantitative examination of the relationship between the level of exposure and the probability of adverse health effects in an exposed population.

4.1 Hazard Identification

Health effects are divided into two categories—non-cancer and cancer effects. The division is based on the different mechanisms of action associated with each category. Chemicals with non-cancer effects may have cancer effects as well. These chemicals are assessed in both categories.

4.1.1 Non-cancer Effects

Non-cancer or systemic effects are assumed to occur only after a finite level of exposure (i.e., toxic threshold) is exceeded. Exposure levels below the threshold can be tolerated by the organisms without causing an adverse health effect. Non-cancer health effects include a variety of toxicological end points and may include effects on specific organs (e.g., pulmonary toxicants affect lungs) or systems (e.g., neurotoxicants affect the nervous system).

Non-cancer health effects fall in two basic categories—acute effects and chronic effects. Acute toxicological effects typically occur after a short exposure, and the effects are usually observed within 1 to 7 days. Chronic toxicological effects usually occur after repeated exposure and are observed weeks, months, or years after the initial exposure.

4.1.2 Cancer Effects

Carcinogenesis is generally thought to be a phenomenon for which risk evaluation based on presumption of a threshold is inappropriate. For carcinogens, it is assumed that a small number of molecular events can evoke changes in a single cell that can eventually lead to cancer. This hypothesized mechanism for carcinogenesis is referred to as "non-threshold," because there is assumed to be essentially no level of exposure that does not pose a finite probability, however small, of generating a carcinogenic response.

EPA has developed a carcinogen classification system (EPA 1989) that uses a weight-of-evidence approach to classify the likelihood of a chemical being a human carcinogen. Information considered in developing the classification includes human studies that associate cancer incidence with exposure. Also considered are long-term animal studies under controlled laboratory conditions. Other supporting evidence considered includes short-term tests for genotoxicity, metabolic and pharmacokinetics properties; toxicological effects other than cancer; structure-activity relationships; and physical and chemical properties of the chemical.

EPA classifies the chemical into one of the following groups, according to the weight-of-evidence from epidemiologic and animal studies:

- Carcinogenic to Humans
- Likely to be Carcinogenic to Humans
- Suggestive Evidence of Carcinogenic Potential
- Inadequate Information to Assess Carcinogenic Potential
- Not Likely to be Carcinogenic to Humans

The CSFs for COPCs are presented in Table 11.

4.2 Dose-Response Evaluation

Toxicity values are quantitative expressions of the dose-response relationship for a chemical. These values are expressed as cancer slope factors and non-cancer reference doses, both of which are specific to the route of exposure.

4.2.1 Toxicity Values for Non-cancer Effects

The toxicity value used to describe the dose-response relationship for non-cancer health effects is the reference dose (RfD). The EPA defines the RfD as:

> ". . . an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human populations (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime" (EPA 1989).

The oral RfD is generally expressed in units of milligrams per kilogram of body weight per day (mg/kg-day). RfDs for effects associated with inhalation of a particular chemical are given as a reference concentration (RfC) (mg/m^3) that can be converted to an intake (RfD in terms of mg/kg-day).

Dose-response criteria for assessing the potential for non-cancer health effects from exposure to chemicals have been developed by EPA on the principle supported by scientific data that non-cancer health effects occur only after a threshold dose is reached. A threshold dose is the dose below which most people can be exposed without adverse effects occurring. This threshold dose is usually estimated from the No Observed Adverse Effect Level (NOAEL) or the Lowest Observed Adverse Effect Level (LOAEL) determined from long-term chronic animal studies. The NOAEL is defined as the highest dose at which no adverse effects are observed, while the LOAEL is defined as the lowest dose at which adverse effects are observed.

Uncertainty factors or safety factors are applied to the NOAEL or LOAEL determined from animal studies and sometimes enhanced with human epidemiologic information to establish RfDs. A chronic RfD represents the dose to which human populations are continuously exposed and are likely to be without significant risk of adverse health effects over a lifetime.

In most cases, the RfD is extrapolated using nontoxic exposure levels in animals to humans and reduced further using individual uncertainty factors ranging from 1 to 10. Uncertainty factors are used in an attempt to account for limitations in the quality or quantity of available dose-response data. An uncertainty factor of 1 to 10 is applied to account for the application of high-dose animal toxicity endpoints to low-dose human exposure. If the toxic endpoints are based upon animal studies, but applied to humans an additional factor of 1 to 10 is applied. Ideally, the RfD is based upon the NOAEL; in those cases where only the LOAEL is available, another factor of 1 to 10 is applied. Similarly, if only subchronic data are available, then an uncertainty factor of 1 to 10 is applied. Finally, RfDs can be adjusted using a modifying factor of 1 to 10 to account for the quality of the toxicological studies or results. The uncertainty factors and the modifying factors provide an inherently more conservative RfD. If all uncertainty and modifying factors are applied at their maximum value, then the endpoints observed in animal studies may be reduced by an overall factor of 10,000.

- For DDT, the experimental NOAEL is 0.05 milligrams per kilogram per day (mg/kg-day). A cumulative uncertainty factor of 100 was applied to this NOAEL (10 for the uncertainty of interspecies conversion and 10 for the protection of sensitive human subpopulations). This results in an RfD for DDT of 0.0005 mg/kg-day (EPA 2006a).
- For Aroclor-1254, the LOAEL is 0.005 mg/kg-day. An uncertainty factor of 300 was applied to this LOAEL, which results in an RfD of 0.00002 mg/kg-day.
- For naphthalene, the adjusted LOAEL is 71 mg/kg-day. An uncertainty factor of 3000 was applied to the NOAEL (10 for extrapolation from rats to humans, 10 for protection of sensitive humans, 10 for extrapolation from subchronic to chronic exposure, and 3 to account for database deficiencies including the lack of chronic oral exposure studies and 2-generation reproductive toxicity studies). The resulting RfD is 0.02 mg/kg-day.
- For vinyl chloride, the NOAEL reported is 0.09 mg/kg-day. An uncertainty factor of 30 was applied to this NOAEL (10 for protection of sensitive human subpopulations and 3 for animal-to-human extrapolation) resulting in an RfD of 0.003 mg/kg-day.

RfDs developed by EPA are used to evaluate non-cancer health hazards in the HHRA. The RfDs were compiled from EPA's Integrated Risk Information System (IRIS) (EPA 2010a). The non-cancer toxicity values for the chemicals of potential concern are listed in Table 11. This table also identifies the toxic endpoints observed in each investigation used to derive the RfD, as well as the cumulative uncertainty factor used to derive each RfD. Route-to-route extrapolations were frequently used when there were no toxicity values available for a given route of exposure. Oral reference doses (RfDo) were used for both oral and inhaled exposures for organic compounds lacking inhalation values. Inhalation reference doses (RfDi) were used for both inhaled and oral exposures for organic compounds lacking oral values. Route extrapolations were not performed for inorganics due to portal of entry effects and known differences in absorption efficiency for the two routes of exposure. An additional route extrapolation is the use of oral toxicity values for evaluating dermal exposures. In general, dermal toxicity values are not listed in EPA databases and consequently must be estimated from oral toxicity information.

4.2.2 Toxicity Values for Carcinogens

The dose-response relationship for cancer effects is usually expressed as a cancer slope factor (CSF). Generally, the CSF is a plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime. The CSF is usually, but not always, the upper 95 percent confidence limit of the slope of the dose-response curve and is expressed as the inverse of milligrams of chemical per kilogram of body weight per day $(mg/kg\text{-}day)^{-1}$. CSFs associated with inhalation of a particular chemical are given as inhalation unit risk (IURs). IURs can be defined as the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 $\mu g/m^3$ in air.

Chemical carcinogens are generally divided into two classes based upon the mechanism by which they cause cancer. The two classes are genotoxic agents (capable of causing DNA damage) and non-genotoxic (toxic through mechanism not related to DNA damage). For genotoxic carcinogens, it is generally assumed that no threshold exists below which the agent cannot cause cancer. In other words, no matter how small the dose, there is some carcinogenic response, even if that response cannot be measured in animal experiments or in an exposed human population. In contrast, non-genotoxic carcinogens are likely to have a threshold dose, below which no adverse toxicological impact would be expected to occur.

The dose-response curve used by regulatory agencies is typically derived using the linearized multistage (LMS) model, which extrapolates the tumor response in animals exposed to high doses to a theoretical cancer risk for human exposed to low doses. EPA acknowledges that this approach likely overestimates cancer risks:

> "It should be emphasized that the linearized multistage procedure leads to a plausible upper limit to risk that is consistent with some proposed mechanisms of carcinogenesis. Such an estimate, however, does not necessarily give a realistic prediction of the risk. The true value of the risk is unknown and may be as low as zero. The range of risks defined by the upper limit given by the chosen model and the lower limit, which may be as low as zero, should be explicitly stated. An established procedure does not yet exist for making 'most likely' or 'best' estimated of risk within a range of uncertainty defined by the upper and lower limit estimates"(EPA 1986)

The linearized multistage procedure is used to develop chemical-specific CSFs. A CSF is a measure of the carcinogenic potency of a chemical. As the slope factor increases, the toxicity of the chemical also increases.

- For example, the CSF for vinyl chloride is 1.5 $(mg/kg\text{-}day)^{-1}$ based on the assumption of continuous lifetime exposure from birth.

- For aldrin, a CSF of 17 $(mg/kg\text{-}day)^{-1}$ was selected based on the geometric mean of 3 separated studies.
- For benzo[a]pyrene, a CSF of 7.3 $(mg/kg\text{-}day)^{-1}$ was calculated based on a geometric mean of four slope factors obtained by different modeling procedures.

There is uncertainty and conservatism built into the risk extrapolation approach. Cancer risks estimated by this method produce an estimate that provides a rough but plausible upper limit of risk (i.e., it is not likely that the true risk would be much more than the estimated risk, but could be considerably lower) (EPA 1989).

4.2.3 Toxicity Values for Lead

Intakes of lead are assessed differently than for other chemicals. Currently, EPA has not established CSFs or RfDs for lead. Much of the toxicological data collected on the effects of lead on the human body relates exposure and effect in terms of the amount of lead in blood associated with an observed effect, expressed as micrograms of lead per deciliter of blood (µg lead/dL blood). California EPA has identified childhood blood levels of 1 µg/dL as the level of concern above which significant health risks may occur (CalEPA 2009).

For workers exposed to lead in soil, the screening level is assumed to be the OEHHA CHHSL of 320 mg/kg (CalEPA 2009). DTSC uses the Adult Lead Model to estimate CHHSLs for an industrial setting. This CHHSL is intended to protect a fetus that may be carried by a pregnant female worker. It is assumed that a cleanup goal that is protective of a fetus will also afford protection for male or female adult workers. The Leadspread model was queried for the soil lead concentrations that would produce a 90th percentile estimate of increase in blood lead of 1 µg/dL.

4.2.4 Sources of Toxicity Criteria

The hierarchy of human health toxicity values used by EPA follows Directive 9.85.7-53 issued by EPA's Office of Solid Waste and Emergency Response on December 5, 2003 (EPA 2003b):

- Tier 1 – EPA's IRIS database (EPA 2010a)
- Tier 2 – EPA's Provisional Peer Reviewed Toxicity Value (PPRTV)
- Tier 3 – Health Effects Assessment Summary Tables (EPA 1997), EPA's National Center for Environmental Assessment (NCEA), CalEPA

Slope factors developed by California EPA's OEHHA and reference exposure levels developed by Air Toxics and Epidemiology Section of OEHHA were used if they were more health-protective than the federal toxicity values. In addition, where available, OEHHA child-specific reference doses are used.

For this assessment, toxicity values presented in the EPA RSL tables (EPA 2010b) were used if other toxicity values were not available.

5.0 Risk Characterization

Information presented in the exposure assessment and toxicity assessment is integrated in this section to characterize risks to workers, residents, and recreational users exposed to COPCs from the Site. Theoretical non-cancer hazards and lifetime-excess carcinogenic health risks are characterized and discussed. The critical uncertainties affecting risk calculations are discussed in Section 6.0.

In this risk characterization, numerical risk estimates calculated for each COPC and exposure pathway were combined to estimate non-cancer HIs and, for carcinogens, total ELCR. In keeping with the most recent guidance, professional judgment has been relied upon to select the most significant uncertainties (those that define and explain the risk estimates) for discussion in the risk characterization.

Under RME conditions, the calculated risks are not likely to be exceeded by any member of the exposed population because of the health-protective exposure assumptions used. A risk assessment does not measure the actual health effects that hazardous substances at a site have on people. Conservative safety margins are built into a risk assessment analysis to ensure protection of the public. Therefore, people will not necessarily be affected even if they are exposed to chemicals at higher dose levels than those estimated in the HHRA. In other words, the most vulnerable people (e.g., children) are carefully considered to make sure all members of the public will be protected.

5.1 Non-carcinogenic Hazard

Non-carcinogenic effects for each exposure route and chemical are evaluated by comparing the average dose over a specified time period. The ratio of the average daily dose to RfD is called a hazard quotient (HQ), which is calculated as follows:

$$HQ = \frac{ADD}{RfD}$$

Where:

HQ	=	Theoretical non-cancer hazard quotient for chemical and exposure pathway
ADD	=	Average Daily Dose (mg/kg-day) for chemical and exposure pathway
RfD	=	Reference Dose (mg/kg-day) for chemical and exposure pathway

The HQ assumes that there is a dose below which adverse health effects are unlikely (EPA 1989). If the average daily dose is below the threshold RfD (i.e., the ratio is less than 1), it is unlikely that non-carcinogenic effects would occur. To assess the overall potential for non-carcinogenic effects from a particular exposure scenario, HQ for the relevant individual soil exposure pathways (i.e., ingestion, dermal contact, and inhalation) and chemicals are summed to obtain the HI for the population evaluated:

$$HI = \text{Sum of HQs for chemicals and pathways}$$

When the total HI exceeds 1, a segregated HI analysis is used to further evaluate adverse non-cancer health hazards associated with exposure to COPCs in soil and groundwater. Segregated HIs are prepared because adverse non-cancer health effects of chemicals that affect different target organs are generally not additive (EPA 1989). Segregated HIs are the sums of chemical-specific HQs grouped according to affected target organ and corresponding to the lowest adverse-effect levels (that is, the critical effects) identified by EPA. A segregated HI that exceeds 1 indicates the potential for adverse non-cancer health effects (EPA 1989). A segregated HI that does not exceed 1 indicates that no appreciable risk exists for adverse non-cancer health effects.

For assessing non-cancer hazards for a 30-year residential exposure, the child (6 year exposure) and adult (24-year exposure) residential HI are calculated separately. A 30-year exposure scenario is consistent with EPA national guidance, as explained in the Preamble to the NCP (55 Fed. Reg. 8710). The Preamble states that Superfund remedial projects will address lifetime excess cancer risks using a reasonable maximum exposure scenario. EPA national Superfund guidance calculates lifetime risk over 70 years based on a reasonable maximum exposure scenario, which is defined as a 30-year exposure in the case of residents and 25-year exposure in the case of workers. The concept of lifetime risk does not automatically imply exposure over an entire 70 year lifetime.

A HI at or below 1 indicates that there is unlikely to be any increased health risk even for sensitive populations. At the same time a HI greater than 1 does not necessarily indicate that adverse effects will occur, because the RfD used in the calculation contains substantial measure of conservatism. The RfD is conservative because it is typically derived by applying multiple safety factors to a level at which no adverse effects have been observed or to the lowest level at which effects have been observed in the most sensitive animal species that have been tested.

5.2 Cancer Risks

The theoretical lifetime-excess cancer risks associated with the lifetime average daily doses are calculated as the product of the LADD and the CSF for each chemical and exposure pathway as shown below:

Risk = CSF x LADD

Where:

Risk = Theoretical lifetime-excess cancer risk for chemical and pathway
CSF = Slope Factor for chemical and exposure pathway
LADD = Lifetime Average Daily Dose for chemical and exposure pathway

The quantitative risk estimates for suspected carcinogens are expressed as the lifetime-theoretical-excess (or additional) risk of contracting cancer above the background incidence of cancer if no exposure to chemicals occurs. In the U.S. population, the likelihood of developing cancer over one’s lifetime is approximately 1-in-2 males and 1-in-3 females (American Cancer Society 2007). The total upper-bound theoretical excess cancer risk is calculated by combining the risks across pathways and chemicals as follows:

Total lifetime-theoretical-excess risk = Sum of risks for chemicals and pathways

For assessing excess cancer risk for a 30-year residential exposure, the child (6-year exposure) and adult (24-year exposure) residential cancer risks are summed.

5.2.1 Cancer Risk Perspective

EPA has provided guidance on the role of the risk assessment in federal Superfund remedy selection (EPA 1991b). EPA considers a target lifetime-theoretical-excess risk range of 10^{-6} to 10^{-4}, to be "safe and protective of public health" (56 F.R. 3535), although EPA has discretion to take action in this range depending on site-specific circumstances.

According to EPA, where the cumulative lifetime-theoretical-excess cancer risk to an individual based on RME assumptions is less than 10^{-4}, and the theoretical non-cancer HI is less than 1, remedial action is generally not warranted unless there are other adverse environmental impacts or an applicable or relevant and appropriate requirement (ARAR) is exceeded. Even risks slightly greater than 1×10^{-4} may be considered adequately protective based on site-specific conditions, including any uncertainties about the nature and extent of contaminants and associated risks. Alternatively, on a case-by-case basis, action may be recommended for sites within the 10^{-6} to 10^{-4} risk range. Where remedial action is warranted, guidance for remedy selection is provided in the EPA directive entitled *Land Use in the CERCLA Remedy Selection Process* (EPA 1995b). The directive notes that it is not EPA's intent that acceptable risk standards be based solely on categories of land use (i.e., with residential cleanup at a 10^{-6} level or industrial at a 10^{-4} level). Rather, the risk range provides the risk manager with the necessary flexibility to address technical and cost limitations, and performance and risk uncertainties in all site remediation efforts.

When it is stated that exposure to cancer-causing chemicals results in a cancer risk of one-in-a-million, it means that each individual exposed to that chemical, at that level over his or her lifetime, has a one-in-a-million chance above the background risk of getting cancer from that particular exposure. In order to take into account the uncertainties in the science, the risk numbers are calculated using conservative assumptions, which results in conservative estimates of risk. The risk is the plausible upper limit of the true risk. In actuality, the extra risk is probably somewhat less than those calculated and presented in the following sections.

5.3 Risk Characterization Results

In this section, the quantitative evaluations of theoretical non-cancer hazards and lifetime-theoretical excess cancer risks are presented for each scenario evaluated in the HHRA. Quantitative risks and hazards were estimated under RME conditions for the soil, groundwater, crawlspace air, and ambient air datasets described in Section 2, Data Collection and Data Evaluation. In addition to the risk and hazards estimated for these datasets, a screening level risk evaluation was conducted for residential soil and produce on adjacent residential properties.

Attachment 1 (Tables 1-7 through 1-126) provides detailed risk and hazard results for exposure to soil; Attachment 2 (Tables 2-1 through 2-27) provides detailed risk and hazard results for exposure to groundwater; Attachment 3 (Tables 3-1 through 3-20) and Attachment 4 (Tables 4-1 through 4-47) summarizes the results of the residential screening risk evaluation. Results are also summarized for soil in Table 12, for groundwater in Table 13, and crawlspace and ambient air in Table 14.

5.4 Soil Risk Evaluation

Throughout the following sections, shallow soil risk refers to risk from exposure to soil contamination in the upper 2 feet of soil. A non-engineered concrete cap exists over the majority of the former AMCO facility and varies from 6 to more than 40 inches thick. In accordance with the SAP, shallow soil samples were generally collected from between 1 and 2 feet below the concrete or below ground surface in unpaved areas. Deep soil risk or subsurface risk refers to risk from exposure to contamination from surface to the maximum sample depth of approximately 7 feet. It is important to note that the on- and off-facility properties are mostly paved so the potential for current contact with the soil is minimized. The evaluation of RME risk for both commercial/industrial and construction workers assumes no pavement. The evaluation of RME risk for the future on-facility resident assumes the on- and off-facility properties are developed for homes and are not paved.

To evaluate the on-facility soil, soil samples were divided into the following four exposure areas: former AMCO facility, parking lot, large vacant lot, and small vacant lot.

5.4.1 Former AMCO Facility

One-hundred-ten chemicals were detected in soil samples collected from the former AMCO facility, including 18 metals, 17 pesticides or polychlorinated biphenyls (PCBs), 30 semivolatile organic compounds (SVOCs) , 30 VOCs and 15 dioxins or furans (Attachment 1, Table 1-1 and Table 1-2). At present, the former AMCO facility is paved, and concrete in some areas is present to a depth of approximately 3 feet. As with the other paved soil areas, it was assumed that no pavement would be present to preclude direct contact with soil. Theoretical excess lifetime-cancer risks and non-cancer HI for all exposure scenarios are shown in Attachment 1, Table 1-109.

For the industrial worker RME scenario, the ELCR is 1×10^{-4} for the shallow soil and for deep soil is 1×10^{-4}. Both the shallow and deep soil HIs are 1.

For the construction worker RME scenario, the ELCR is 1×10^{-5} for both the shallow and deep soil. The shallow soil HI is 23 and deep soil HI is 20.

For the future on-facility residential RME scenario, for both shallow and deep soil, the ELCR is 3×10^{-4}. The HI for the child is 10 for the shallow soil and 11 for the deep soil. For the adult, both the shallow and deep soil HI is 1 and 2, respectively.

The lead exposure point concentration for shallow soil is 640 mg/kg and for deep soil 605 mg/kg (Attachment 1, Tables 1-5 and 1-6); both exceed the residential (80 mg/kg) and industrial (320 mg/kg) CHHSLs for lead.

The chemicals that contribute most to the risk include vinyl chloride, xylenes, naphthalene, 2-methylnaphthalene, manganese, aluminum, cadmium, aldrin, and dieldrin (Attachment 1, Tables 1-11, 1-12, 1-17, 1-18, 1-23, 1-24, 1-29, and 1-30).

5.4.2 Parking Lot

In soil at the parking lot, there are 67 chemicals detected in soil, including 18 metals, 8 pesticides or PCBs, 18 SVOCs, 6 VOCs, and 17 dioxins or furans (Attachment 1, Table 1-1 and Table 1-2). At present the parking lot is paved. As with the other evaluated soil areas, it was assumed that no pavement would be present to preclude direct contact with soil.

For the industrial worker RME scenario, the ELCR is 5 x 10^{-5} for the shallow soil. The total ELCR for deep soil was 1 x 10^{-4}. Both the shallow and deep soil HI is 1.

For the construction worker RME scenario, the ELCR is 9 x 10^{-6} for the shallow soil. The ELCR for deep soil was 2 x 10^{-5}. The shallow and deep soil HI values are 30 and 25, respectively.

For the future on-facility residential RME scenario, the ELCR is 2 x 10^{-4} for shallow soil and 4 x 10^{-4} for deep soil. The HI for the child is 26 for the shallow soil and 25 for deep soil. For the adult, both the shallow and deep HI is 1.

The lead exposure point concentration for shallow soil is 2,170 mg/kg and for deep soil 1,450 mg/kg; both the residential (80 mg/kg) and industrial (320 mg/kg) CHHSLs for lead(Attachment 1, Tables 1-31 and 1-32).

The chemicals that contribute most to the risk include lead, arsenic, benzo(a)pyrene and antimony (Attachment 1, Tables 1-37, 1-38, 1-43, 1-44, 1-49, 1-50, 1-55, and 1-56).

5.4.3 Large Vacant Lot

In soil at the large vacant lot, there are 73 chemicals detected in soil, including 18 metals, 18 pesticides or PCBs, 23 SVOCs, and 14 VOCs (Attachment 1, Table 1-1 and Table 1-2). At present the large vacant lot is paved. As with the other evaluated soil areas, it was assumed that no pavement would be present to preclude direct contact with soil.

For the industrial worker RME scenario, the ELCR is 6 x 10^{-5} for the shallow soil. The ELCR for deep soil is 4 x 10^{-5}. Both the shallow and deep soil HIs are less than 1.

For the construction worker RME scenario, the shallow soil ELCR is 1 x 10^{-5}. The ELCR for deep soil is 7 x 10^{-6}. The shallow soil HI is 12, and the deep soil HI is 10.

For the future on-facility residential RME scenario, the ELCR is 2 x 10^{-4} for shallow soil. The ELCR calculated for deep soil is 1 x 10^{-4}. The HI for the child is 10 for the shallow soil and 7 for the deep soil. For the adult, both the shallow and deep soil HIs are less than 1.

The lead EPC for shallow soil is 4,360 mg/kg and for deep soil 2,750 mg/kg; both the residential (80 mg/kg) and industrial (320 mg/kg) CHHSLs for lead. (Attachment 1, Tables 1-57 and 1-58).

The chemicals that contribute most to the risk estimate are lead, arsenic, DDT, cadmium and benzo(a)pyrene (Attachment 1, Tables 1-63, 1-64, 1-69, 1-70, 1-75, 1-76, 1-81, and 1-82).

5.4.4 Small Vacant Lot

In soil at the small vacant lot property, there are 23 chemicals detected in soil, including 17 metals and 6 pesticides or PCBs (Attachment 1, Table 1-1). Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to arsenic levels found in the background data set; therefore, the risk contributions from arsenic may not be site-related. At present the small vacant lot is paved. As with the other evaluated soil areas, it is assumed that in the future no pavement would be present to preclude direct contact with soil. Only shallow soil samples were collected due to the shallowness of the water table at this location.

For the industrial worker RME scenario, the ELCR is 4×10^{-5} for the shallow soil. The HI is less than 1.

For the construction worker RME scenario, for shallow soil the ELCR is 7×10^{-6}. The shallow soil HI is 7.

For the potential on-facility residential RME scenario, the ELCR is 3×10^{-4} for shallow soil. The HI for the child is 12. For the adult, the HI is less than 1.

The lead exposure point concentration for shallow soil is 386 mg/kg (Attachment 1, Table 1-1), which exceeds both the residential (80 mg/kg) and industrial (320 mg/kg) CHHSLs for lead.

The chemicals that contribute most to the risk and HI are lead, arsenic, dieldrin, aluminum, cadmium, and DDT (Attachment 1, Tables 1-88, 1-89, 1-94, 1-95).

5.4.5 Background Soil Risk Evaluation

Many substances, such as metals, are naturally occurring elements in the environment and are commonly present in all environmental samples. For these constituents, it is important to determine what fraction of the concentration detected is due to the site-related contamination, and what fraction represents background for the former AMCO facility. Background refers to the average concentration of the chemical in similar nearby reference areas that have not been impacted by the Site.

Risks and hazards from exposure to background concentrations of metals in soil were estimated using the City of Oakland *Survey of Background Metal Concentration Studies* (colluvium and fill) (City of Oakland 1995). Table 1-96 (located in Attachment 1) provides the exposure point concentrations associated with the City of Oakland's background data. For a child resident, the ELCR is 2×10^{-4}. The arsenic EPC for the background data is 14 mg/kg. Arsenic contributed over 99% of the total background risk. The HI is 10 for the child resident and 1 for the adult. Thallium contributed 89% to the total background HI.

For industrial workers the ELCR from exposure to background soil is 6×10^{-5}. The HI for industrial workers is less than 1. For construction workers the ELCR is 9×10^{-6}, and the HI is 3. As with the residential scenario, risks from exposure to background concentrations are driven by arsenic, while non-cancer hazards are driven almost entirely by thallium.

Some naturally-occurring concentrations of metals (i.e., arsenic) in Oakland soils are higher than the thresholds calculated by risk-based models. In these cases, EPA typically conducts community outreach activities to educate and advise the community about the potential risks to the public and to communicate precautions that they might take to lower the risk from arsenic exposure. Superfund cleanups are not conducted where the sole or principal threat is from natural background sources.

5.5 Groundwater Risk Evaluation

Currently, residents are using drinking water supplied by the East Bay Municipal Utility District who obtains the water from Sierra Nevada. The groundwater underneath the Site is not being used for drinking or other potable uses. It is extremely unlikely that residents would drink groundwater underneath the Site in the future; however, in accordance with input from the community and regulatory agencies the potential risk of using groundwater underneath the Site as drinking water is evaluated.

Total Dissolved Solids (TDS) is the water quality parameter typically used to determine whether groundwater is potentially of "beneficial use". TDS concentrations over 3,000 mg/L are considered too high for "beneficial use" as drinking water (RWQCB 2004). Across the RI area, TDS concentrations ranged from 730 to 53,000 mg/L. With the exception of RMW-03-15, which had a TDS concentration of 3,600 mg/L, all samples north of 3rd Street were below the drinking water threshold of 3,000 mg/L. TDS concentrations in all wells south of 3rd Street were above 3,000 mg/L.

5.5.1 Shallow Groundwater

For the potential residential RME scenario, the excess lifetime cancer risk is 7×10^{-2} for groundwater. The HI for the child was 628, and the HI for the adult was 262 (Attachment 2, Table 2-22).

In addition, at the request of the community's technical advisor, a trench worker's risk from contact with groundwater underneath the Site is evaluated. For the trench worker RME scenario, the total lifetime-excess cancer risk was 1×10^{-4} for groundwater (Table 2-14). The HI for the trench worker was 34 (Attachment 2, Table 2-15).

The chemicals that contribute most to the risk through exposure to groundwater include vinyl chloride, arsenic, cis-1, 2-dichloroethene, benzo(a)pyrene, and aroclor-1260 (Attachment 2, Tables 2-10, 2-11, 2-14 and 2-15).

An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. As noted above, the cancer risks estimated for future residents using the groundwater as tap water in the home is significantly above the risk management range and clearly unacceptable. Hazard indices for an adult and child resident are also significantly above the non-cancer threshold of 1.

To confirm that the risks for vapor intrusion are similar as the risks from drinking the groundwater, selected VOCs that contribute the most to the risk and hazard estimates were modeled using the DTSC screening groundwater vapor intrusion model. Defaults were used as inputs into the model except the depth to groundwater was adjusted to 5 feet below ground surface and sand was used as the SCS soil type. Below is the table of results:

VOC	Exposure Point Concentration (μg/L)	Incremental Risk from Vapor Intrusion to Indoor Air	Hazard Quotient from Vapor Intrusion to Indoor Air
Vinyl chloride	1,627	2.2×10^{-1}	80
TCE	57	6.0×10^{-6}	0.014
PCE	12	6.2×10^{-6}	0.083
Cis-1,2-DCE	13,700	NA	22
Trans-1,2-DCE	400	NA	0.83
Totals		2×10^{-1}	103

These results show that the risks and hazards related to vapor intrusion are significantly above the risk management range and clearly unacceptable.

5.5.2 Residential Irrigation Well

One of the residents living adjacent to the facility owns a well located in his backyard shed. According to the property owner, the well is primarily used for backyard irrigation. The well is not used as a source of drinking water. The residential irrigation well was sampled on three occasions: September 2, 2004; June 24, 2005; and October 12, 2005. A summary of the results is presented in Table 13.

As indicated on this table, the only analyte that exceeds the maximum contaminant level (MCL) is lead. However, boron, manganese, mercury, and sodium are at concentrations that exceed their agricultural water quality limit (Ayers and Westcot 1985).

5.6 Ambient Air and Crawlspace Air Risk Estimates

Several VOCs have been detected in soil gas, ambient air, crawlspace air, and indoor air at the former AMCO facility and in adjacent residences indicating that vapor intrusion is occurring in crawlspaces at homes. As a precautionary measure, mitigation systems have been installed in selected homes nearest the site. Potential cancer risks and non-cancer hazards are evaluated using the ambient air and crawlspace air data. Potential cancer risks and non-cancer hazards were calculated for office workers and residents assuming that the crawlspace air concentrations are representative of indoor air. Soil gas results for each property are briefly summarized to provide information about the potential source of the VOCs found in the ambient and crawlspace air.

Because the indoor air has been sampled only during one sampling event, it represents a snapshot in time; therefore, potential chronic risks and hazards were not estimated from exposure to indoor air. Crawl space air was used in this evaluation because it is thought to be less affected by the lifestyle choices, such as household product use and smoking, of the building's occupants than indoor air. The evaluation of the results of crawl space air sampling is considered easier to interpret than indoor air sampling results (DTSC 2004).

Indoor air locations and results are provided on Figures 4 through 14 for each structure where indoor air was sampled.

5.6.1 Comparison of VOC Data Between Crawlspace and Ambient Air

A comparison of EPCs for each VOC detected in both crawlspace and ambient air at the same location can provide valuable information regarding the source of crawlspace air contaminants. When crawlspace concentrations are similar to ambient air concentrations, it is difficult to associate the source of the VOCs to vapor intrusion. Only two chemicals, 1,2-dichloroethane (1,2-DCA) and TCE had concentrations in crawlspace air that were greater than the ambient air concentrations in all cases.

The VOCs which have significantly higher (greater than 5 times) EPCs in crawlspace air than the EPCs in ambient air at each residence include:

- 1428 3rd Street: 1,2-DCA, Chloroform, Chloromethane, TCE, Vinyl chloride
- 1432 3rd Street: 1,2,4-Trimethylbenzene, 1,2-DCA, 1,3,5-Trimethylbenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Benzene, Chlorobenzene, Ethylbenzene, Styrene, Tetrachloroethene, Toluene, TCE, m&p-Xylenes, o-Xylenes
- 320 Center Street: 1,2-DCA, 1,4-Dichlorobenzene, TCE
- 326 Center Street: 1,2-DCA, Styrene, TCE

The air samples were analyzed for a list of 42 VOCs. The fact that most VOCs are at similar concentration levels in crawlspace air and ambient air suggest that some of the VOCs in crawlspace air may be coming from sources other than vapor intrusion. For the other chemicals measured in crawlspace air no obvious correlations with ambient air concentrations were observed.

5.6.2 Comparison of VOC Data Between Ambient Air and Background Air

Naphthalene and benzene have been detected above screening levels in ambient air collected from the residences sampled. Generally, the levels of these VOCs at most of the properties are consistent with levels found in the background air samples collected. For example, in the 1432 3rd Street ambient air samples (2004 through 2009), benzene was detected from 0.24 to 1.6 $\mu g/m^3$ and from 0.3 to 1.5 $\mu g/m^3$ in the background samples. Similarly, naphthalene was detected at 0.27 to 0.74 $\mu g/m^3$ in the ambient air and 0.09 to 0.7 $\mu g/m^3$ in the background samples. The exception is at 1428 3rd Street where one high detection of benzene in 5.6 $\mu g/m^3$ was found in September 2004. Since then, the benzene has ranged from 0.33 to 1.8 $\mu g/m^3$. Also at 1428 3rd Street, there was one high detection of naphthalene 16 $\mu g/m^3$ found in December 2008. The other detected concentrations of naphthalene at this residence in ambient air are 0.12 and 0.63 $\mu g/m^3$.

At 1436 3rd Street, vinyl chloride was detected above screening levels in ambient air but has not been detected in background air samples. At 360 Center Street, carbon tetrachloride was detected above screening levels in ambient air and has been detected at similar concentrations in the background samples.

The air data indicate that vinyl chloride is a primary chemical of concern in crawlspace and ambient air on the facility property and at one nearby residence. Because it was never detected in the up-wind background locations, vinyl chloride is likely a site-related chemical of concern.

5.6.3 Comparison of VOC Data Between Groundwater, Soil Gas, and Crawlspace Air

A qualitative comparison of VOCs detected in soil gas and in groundwater also provided some preliminary information regarding source contributions to the chemicals identified in crawlspace air. For example, the primary contributors to HI at 1428 3rd Street and 1432 3rd Street, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene, were contributors to the HI from inhalation of VOCs from groundwater. However, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were only detected in one of six soil gas samples, at levels below the laboratory reporting limit; and these chemicals were detected in ambient air at levels comparable to those measured in crawlspace air suggesting that these VOCs may be coming from other outdoor sources (such as local industry and traffic) and not necessarily from vapor intrusion.

Soil gas concentrations were also found to have only a limited correlation with the chemical concentrations detected in crawlspace air samples for other chemicals. For example, vinyl chloride, the primary contributor to potential cancer risk at 1428 3rd Street was only detected at a very low concentration in one of four soil gas samples collected at this residence. By contrast, vinyl chloride was one of the primary contributors to potential cancer risk from inhalation of VOCs from groundwater for the trench worker scenario and the residential scenario (inhalation of VOCs while showering). It should be noted that soil gas samples collected in the yards of the homes sampled could not be collected at DTSC's recommended depth of at least 5 feet below ground surface (DTSC 2005) because of the shallow groundwater in the area. Soil gas collected at less than 5 feet below ground surface may be influenced by outdoor air being pulled in by the sample collection pump and may not be representative of actual soil gas conditions in the subsurface below the structures. It should also be noted that the entire groundwater data set from the site was used to calculate exposure point concentrations which were used to evaluate risk from exposure to groundwater. At the time of this evaluation, there were no groundwater monitoring wells located on the residential properties. Figure 3 shows the location of the groundwater monitoring wells and the nearby residential properties where air sampling was performed. Because of these uncertainties with the groundwater and soil gas results, there are uncertainties with comparisons of chemical results between media.

5.6.4 Comparison of VOC Data Between Indoor Air and Crawlspace Air

In June 2009, the indoor air was sampled in nine homes occupying the same block as the facility. Because the indoor air has been sampled only during one sampling event, it represents a snapshot in time; therefore, potential chronic risks and hazards were not estimated from exposure to indoor air. For each property, medium-specific tables were generated showing a comparison of the 2009 data to the range of concentrations found from 2004 through 2008. Attachment 4 presents tables with these comparisons. A comparison of the crawlspace exposure point concentrations (representing data from 2004 through 2008) to the 2009 indoor air data is presented in Table 4-2 (1414 3rd St.), Table 4-5 (1428 3rd St.), Table 4-9 (1432 3rd St.), Table 4-15 (320 Center St.), and Table 4-18 (326 Center St.). As shown on these tables, most of the VOCs which exceed EPA's Regional Screening Levels (RSL) (EPA 2010b) for residential air are less than or within the range of concentrations detected in crawlspace air. This would lead to the conclusion that the risks and hazards from exposure to indoor air would be similar or less than the risks and hazards estimated from exposure to crawlspace air. There are two notable exceptions where a VOC was detected at significantly higher levels in indoor air than crawlspace air. When VOC levels are higher in indoor air than crawlspace air, it may indicate that there is a source within the residences for these VOCs. The exceptions are:

- Tetrachloroethene (PCE) was detected at 58 $\mu g/m^3$ in indoor sample collected in the center of the master bedroom at 1428 3rd Street and the crawlspace EPC is 1.73 $\mu g/m^3$ (Table 4-5). There were four other indoor air samples collected downstairs in the home and the PCE results were much lower (below 5 $\mu g/m^3$). Also, in the four samples collected upstairs in the same structure (1430 3rd Street), PCE was detected a less than 1 $\mu g/m^3$. Common sources of PCE in indoor air include dry cleaning, auto brake cleaners, suede protectors, and water repellents.

- Naphthalene was detected in indoor air sample collected in the living room area at 110 $\mu g/m^3$ and 75 $\mu g/m^3$ (in the duplicate sample) at 1432 3rd Street and the crawlspace EPC is 0.887 $\mu g/m^3$. One other sample was collected in this home and one sample was collected in the upstairs in the same structure (1434 3rd Street) and the naphthalene results were below 2 $\mu g/m^3$. Naphthalene is used in mothballs and may be produced during cooking.

A summary of the potential cancer risks and non-cancer hazards for each property is provided in Table 14. The risk calculation spreadsheets are provided in Attachment 3. The following sections provide a summary of the findings for each property.

5.6.5 1414 3rd Street

Crawlspace air was measured at two locations in the office building at 1414 3rd Street. Figure 5 presents the sampling locations and exceedances of screening levels. All estimated risks and hazards were calculated based on detected VOCs. The potential cancer risk for an office worker is 6×10^{-5}. The main contributors to potential cancer risk are carbon tetrachloride (35%) and vinyl chloride (18%). The carbon tetrachloride EPC (6.05 $\mu g/m^3$) was influenced by one high result (17 $\mu g/m^3$) measured during the September 2007 sampling event. There is uncertainty associated with this result because carbon tetrachloride was detected in the field duplicate at 0.45 $\mu g/m^3$ and all of the other carbon tetrachloride results from the office were below 1 μg/m³. The vinyl chloride EPC (1.62 μg/m³) is influenced by one sample result (November 2006) where it was detected at 7.6 μg/m³. The vinyl chloride results from the other locations and other sampling events were below 2 μg/m³. The non-cancer HI for this office worker is 0.6, which is below the non-cancer threshold of 1.

Ambient air has not been sampled on the 1414 3rd Street property and soil gas has not been sampled since 2004 except for RSP-07. Vinyl chloride has been sporadically detected at RSP-07 but carbon tetrachloride has not been found above screening levels at this location. Carbon tetrachloride has been detected at low levels in the background samples but vinyl chloride has not been found. Both compounds have been detected in groundwater. It is unclear whether these compounds are entering the crawlspace air through vapor intrusion.

In the indoor air samples, only PCE was detected above its screening level (for an industrial worker). The PCE concentration found at air sample location CMI-IA02 is 2.2 μg/m³ which is just above the industrial RSL of 2.1 μg/m³. The other indoor air sample location (CMI-IA01) had a PCE concentration of 1.2 μg/m³. PCE was also detected in the crawlspace air samples (1.2 to 19 μg/m³) and soil gas samples collected around the warehouse indicating that vapor intrusion is a possible source.

5.6.6 1428 3rd Street

Crawlspace and ambient air data were collected and evaluated at this residence. The potential cancer risk from exposure to crawlspace air is 3×10^{-4}. The primary contributor to risk from inhalation of crawlspace air is vinyl chloride (61%). The EPC (1.58 μg/m³) for vinyl chloride is influenced by one sampling event (November 2006) where it was detected at 10 μg/m³ at one location and 1.5 μg/m³ at a second crawlspace location. All other crawlspace sampling results indicated vinyl chloride was either not detected or detected at much lower concentrations.

The potential cancer risk from ambient air at this residence is 2×10^{-4}. The primary contributors to risk are naphthalene (47%) and benzene (25%). The EPC for naphthalene (5.72 μg/m³) in ambient air is influenced by the sample result from December 2008 when it was detected at 16 μg/m³. There is uncertainty associated with this result because all of the other ambient air results from this location were either not detected or below 1 μg/m³ and because naphthalene was not detected in the field duplicate (<4.1 μg/m³) of this sample.

For crawlspace air the non-cancer HI is 7. The primary non-cancer contributors to the HI are 1,2,4-trimethylbenzene (65%) and 1,3,5-trimethylbenzene (21%). The HI for exposure to ambient air is 4. The main non-cancer contributor for ambient air is naphthalene (46%).

The indoor air samples showed exceedances of screening levels for several VOCs (Figure 6), however, the concentrations are similar or less than the concentrations found in crawlspace air, with the exception of one sample with a high concentration of PCE described in Section 2.5 above. The PCE concentration found in the other eight air samples collected both downstairs and upstairs in this home is less than 5 μg/m³. Since PCE has been found in the soil gas and crawlspace air, it's possible that PCE from the site is contributing to some of the PCE in the indoor air. However the one high detection of PCE may be coming from an indoor source since it's been detected at much lower levels in the crawlspace.

A comparison of EPCs for crawlspace air and ambient air data indicates that the primary contributor (vinyl chloride) to cancer risk in crawlspace were found at concentrations greater than 10 times levels detected in ambient air. Vinyl chloride was detected in two of six soil gas samples at very low concentrations (0.024 μg/m^3 and 0.009 μg/m^3). These results suggest vapor intrusion is occurring for vinyl chloride.

EPCs of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were less in crawlspace air than ambient air. These compounds were each detected in only one sample at levels below the laboratory reporting limit (J qualified). Naphthalene was not detected above the detection limit in any of the soil gas samples. The lines of evidence suggest that the trimethylbenzenes and naphthalene are not entering the crawlspace through vapor intrusion but may be coming from an ambient source.

5.6.7 1432 3rd Street

Crawlspace and ambient air data were collected and evaluated at this residence. The potential cancer risk from exposure to crawlspace air is 6×10^{-4}. The primary contributors to risk from inhalation of crawlspace air are vinyl chloride (54%) and benzene (34%). The vinyl chloride EPC (2.8 μg/m^3) is the maximum detected concentration from the sample collected in November 2006. The other crawlspace air samples at this location indicated vinyl chloride concentrations of less than 0.2 μg/m^3. The benzene EPC (16 μg/m^3) is the maximum detected concentration (collected in September 2004). The other crawlspace air samples collected from this location indicated benzene concentrations at less than 2 μg/m^3.

The potential cancer risk from inhalation of ambient air is 4×10^{-5}. The primary contributors to risk are benzene (27%) and naphthalene (28%). Vinyl chloride was detected in both of the June 2009 ambient air samples collected at 0.11 μg/m^3 and 0.12 μg/m^3.

Exposure to crawlspace air results in a HI of 8. The primary contributors to the HI are 1,2,4-trimethylbenzene (55%) and 1,3,5-trimethylbenzene (23%). The EPCs for both of these chemicals was influenced by elevated concentrations detected in September 2004. The HI from inhalation of ambient air is 0.8, which is less than the non-cancer threshold of 1.

The chemicals that contributed the most to risk from exposure to crawlspace air (vinyl chloride, benzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) were not detected at levels of concern in the indoor air. Benzene barely exceeded its screening level in one indoor air sample (detected at 0.32 μg/m^3, screening level 0.31 μg/m^3) and was found at levels consistent with the ambient and background air. As described in Section 5.2, naphthalene was detected in one air sample location at a high level. Although naphthalene has been sporadically detected in the soil gas samples collected in yard, it was found at much lower levels indicating a possible indoor source for the high level of naphthalene detected in the living room area.

Vinyl chloride was detected in soil gas at this location during three sampling events. It was detected at 1.1 μg/m^3 and at 0.014 μg/m^3 in October 2008. In November 2006, it was detected at 0.014 μg/m^3 and in June 2009, it was detected at 0.024 μg/m^3. These vinyl chloride concentrations are below soil gas screening levels. Benzene was detected in four of five sampling events at concentrations ranging from 0.32 to 1 μg/m^3, also below soil gas screening levels. 1,2,4-Trimethylbenzene was detected at least once during four of five sampling events at concentrations ranging from 0.15 to 6.5 μg/m^3. 1,3,5-Trimethylbenzene was detected during the September 2007, October 2008, and June 2009 sampling events at concentrations of 0.13 and 6 μg/m^3. Because the levels of these compounds in soil gas are less than the concentrations found in crawlspace air, it is unlikely these compounds in the crawlspace air are solely from vapor intrusion.

5.6.8 1436 3rd Street

The foundation at 1436 3rd Street is slab on grade so crawlspace samples could not be collected at this residence. In indoor air, several VOCs were detected above their screening levels. The VOCs which exceeded their screening levels by the largest margin include chloroform and naphthalene. Chloroform levels in ambient air ranges from 0.09 to 0.39 μg/m^3. The concentrations of chloroform found in soil gas (1.6 to 7.6 μg/m^3) are much higher than the levels found in indoor air (ND to 3 μg/m^3), which indicates that vapor intrusion may be occurring for chloroform. Naphthalene levels in ambient air has ranged from 0.069 to 0.62 μg/m^3. Naphthalene concentrations in soil gas range from ND to 1.3 μg/m^3 and in indoor air from ND to 1.2 μg/m^3. It is unclear whether the naphthalene is coming from the soil gas or an indoor source.

Potential risks were calculated from exposure to ambient air at this residence. The potential cancer risk from inhalation of ambient air is 1×10^{-4}. The primary contributors to risk from inhalation of ambient air are vinyl chloride (58%) and benzene (13%). Vinyl chloride was only detected once at 0.7 μg/m^3 out of the six ambient air samples and this detected concentration was selected as the EPC. Exposure to ambient air resulted in a HI of 0.8 which is below the non-cancer threshold of 1. Vinyl chloride has never been detected in the background air samples collected from the upwind location. However, the benzene concentrations found in the ambient air samples at this residence (0.24 to 0.8 μg/m^3) are similar to the benzene concentrations in background (0.26 to 1.5 μg/m^3).

A review of soil gas data from this location indicates that vinyl chloride was detected in one of five soil samples (October 2008) at 1.1 μg/m^3. Benzene was detected in four of five soil gas samples at concentrations ranging from 0.61 to 1.2 μg/m^3.

5.6.9 320 Center Street

Crawlspace and ambient air data were collected and evaluated at this residence. Potential cancer risks from exposure to crawlspace air is 5×10^{-5}. The primary contributors to risk from inhalation of crawlspace air are benzene (29%) and 1,2-dichloroethane (23%).

Potential cancer risk from exposure to ambient air is 6×10^{-5}. The primary contributors to risk from inhalation of ambient air are naphthalene (43%) and benzene (26%). Naphthalene was only detected once out of five times at 1.9 μg/m^3 in June 2009. Exposure to crawlspace air results in an HI of 0.6 and to exposure to ambient air is 1, which do not exceed the non-cancer threshold of 1.

A comparison of EPCs in crawlspace air and ambient air indicates that benzene concentrations are similar in the two media. 1,2-Dichloroethane was detected at 15 times greater concentration in crawlspace air than in ambient air. Naphthalene has not been detected in crawlspace air. Soil gas samples indicated the presence of benzene at 1.1 μg/m^3 and 1,2-dichloroethane at 0.026 at μg/m^3 which is much lower than the concentrations found in crawlspace air (benzene at 0.3 to 2 μg/m^3 and 1,2-dichloroethane at 0.037 to 1.2

μg/m³) which suggests that these VOCs are not coming from vapor intrusion but may be from an indoor or outdoor source.

Benzene and 1,2-dichloroethane were also detected above screening levels in the indoor air samples. The levels of benzene detected in indoor air are similar to the levels found in the outdoor air and background. The levels of 1,2-dichloroethane found in indoor air are higher than the levels found in the crawlspace samples. This may indicate that these VOCs are not coming from vapor intrusion but from an outdoor or indoor source.

5.6.10 326 Center Street

Crawlspace and ambient air data were collected and evaluated at this residence. Potential cancer risk from exposure to crawlspace air is 8×10^{-5}. The primary contributors to risk from inhalation of crawlspace air are 1,2-dichloroethane (22%), benzene (15%), and 1,4-dichlorobenzene (14%). The EPC (2.3 μg/m³) for 1,4-dichlorobenzene is influenced by one sampling event (September 2004) when it was detected at 6 μg/m³. For 1,2-dichloroethane and benzene, the highest concentrations were detected during the same sampling event (October 2008). Potential cancer risk from exposure to ambient air is 3×10^{-5}. The primary contributor to risk from inhalation of ambient air is benzene (37%). Exposure to crawlspace air results in a HI of 0.5; and exposure to ambient air results in a HI of 0.4. For both exposures, the HI is below the non-cancer threshold of 1.

A comparison of EPCs in crawlspace air and ambient air indicates that 1,4-dichlorobenzene and 1,2-dichloroethane were detected at approximately 9 and 15 times higher concentrations in crawlspace air than in ambient air, respectively. Benzene was detected at a similar concentration in crawlspace air and ambient air.

A review of soil gas data indicates that benzene and 1,2-dichloroethane were each detected in two of four samples. Benzene was detected at 0.46 and 0.58 μg/m³. 1,2-dichloroethane was detected at 0.023 and 0.054 μg/m³; both levels are below the laboratory reporting limit. Carbon tetrachloride was detected once (September 2007) at 0.46 μg/m³. 1,4-dichloro-benzene was not detected in soil gas. The lines of evidence for these compounds (low soil gas concentrations, ambient air less than crawlspace air) indicate that vapor intrusion is not occurring into crawlspace but there may be an indoor source of VOCs at this residence.

Four indoor air samples were collected in the upstairs unit. 1,2-Dichloroethane, benzene, and 1,4-dichlorobenzene were detected in the indoor air at levels that exceed screening levels. The levels of benzene and 1,4-dichlorobenzene are consistent with the levels of these VOCs found in the outdoor air (2004 through 2008). Access to sample the outdoor air and soil gas was not obtained for the June 2009 sampling event.

5.6.11 337 Center Street

Table 4-26 presents the soil gas, downstairs indoor air, upstairs indoor air, and outdoor air sample results collected at 337 Center Street. Crawlspace samples were not collected at this residence. Concentrations of VOCs detected in the indoor air are similar to the concentrations found in the outdoor air and background air samples. Some of the VOCs that exceed screening levels include benzene and naphthalene. There is not a strong indication that these compounds are coming from vapor intrusion as the concentrations found in the soil gas sample collected from the backyard are either less than those found indoors or not detected. Also, the highest naphthalene concentration was found in a sample collected from the upstairs unit which may indicate an indoor source. Chloroform was detected at a higher concentration in the soil gas sample than in the indoor air samples which may indicate vapor intrusion is occurring.

5.6.12 356 Center Street

Table 4-27 presents the soil gas, indoor air, and outdoor air sample results collected at 356 Center Street. Crawlspace samples were not collected at this residence. The VOCs which are most above their screening levels include benzene, naphthalene, and 1,2,4-trimethylbenzene. Although Table 4-27 shows that these VOCs are significantly higher than the soil gas sample result, Figure 12 shows that historically, benzene was detected above screening levels in the soil gas. The levels of naphthalene and 1,2,4-trimethylbenzene in soil gas do not indicate that vapor intrusion is occurring.

5.6.13 360 Center Street

The foundation at 360 Center Street appears to be slab on grade. No crawlspace samples were collected at this residence. Risks were calculated for exposure to ambient air. The potential cancer risk from inhalation of ambient air is 4×10^{-5}. The primary contributors to risk from inhalation of ambient air are benzene (41%) and carbon tetrachloride (27%). The highest concentration for each of these chemicals was measured in October 2008. Exposure to ambient air results in a HI of 1. The primary contributor to this HI is 1,2,4-trimethylbenzene (62%).

A review of soil gas data indicates that benzene was detected in 14 of 16 soil gas samples at concentrations ranging from 0.36 to 3.6 $\mu g/m^3$. Carbon tetrachloride was detected in 8 of 16 samples at 0.22 to 1.1 $\mu g/m^3$; and 1,2,4-trimethylbenzene was detected in 9 of 16 samples at 0.21 to 5.7 $\mu g/m^3$.

Several VOCs were detected above their screening levels in indoor air. The VOCs which exceeded their screening levels by the largest margin include benzene and naphthalene. The range of benzene concentrations detected in indoor air is 0.32 to 1.2 $\mu g/m^3$ which falls within the range of benzene concentrations detected in outdoor air is 0.28 to 2 $\mu g/m^3$. Only one of the four air samples detected naphthalene. Naphthalene was also detected at similar levels in the soil gas samples collected in the backyard of this residence. Vapor intrusion is a possible source of the naphthalene in indoor air.

5.6.14 366 Center Street

Table 4-28 presents the soil gas, indoor air, and outdoor air sample results collected at 366 Center Street. Crawlspace samples were not collected at this residence. The VOCs which are most above their screening levels are benzene and naphthalene. Naphthalene was detected in only one of the four indoor air samples and not detected in the soil gas or ambient air samples. Benzene was detected at higher concentrations in the indoor samples than the soil gas sample or ambient air sample. This indicates that these VOCs may be present in the indoor air due to an indoor source.

5.6.15 South Prescott Park

Risks and hazards were calculated for exposure to ambient air at South Prescott Park. The cancer risk from inhalation of ambient air is 3×10^{-5}. The primary contributors to the potential cancer risk from inhalation of ambient air are benzene (34%), carbon tetrachloride (31%) and chloroform (11%). Exposure to ambient air results in a HI of 0.5, which is less than the non-cancer threshold of 1.

A review of soil gas data indicates that benzene was detected in 18 of 21 soil gas samples collected from 9 locations (Figure 15) at levels ranging from 0.4 to 14 µg/m^3. Carbon tetrachloride was detected in 12 of 21 samples at 0.064 to 0.56 µg/m^3; and chloroform was detected in 14 of 21 samples at 0.66 to 590 µg/m^3.

5.6.16 Background

Ambient air samples measured at three locations (322, 323, and 329 Lewis Street) were used to evaluate background ambient air concentrations. Sample results and locations are shown in Figure 16. Inhalation of background ambient air results in a cancer risk of 3×10^{-5} and a HI of 0.5. The primary contributors to potential cancer risk from inhalation of background ambient air are benzene (31%), carbon tetrachloride (29%) and naphthalene (17%). The similarity between the risks and hazards for background and the risks and hazards near the site indicates that air quality is poor in the whole area due to other sources of contamination than the site.

5.6.17 Future Buildings

Potential risks and hazards from vapor intrusion into future buildings from VOCs in groundwater may be as high as when residential use of the groundwater is considered, which are exceedingly high. The cancer risks estimated for future residents using the groundwater as tap water in the home is approximately 7×10^{-2}, which is significantly above the risk management range. Hazard indices for an adult (262) and child (628) resident are also significantly above the non-cancer threshold of 1.

Evaluation of potential vapor intrusion for future buildings using soil gas data at the parking lot, small vacant lot, and large vacant lot was not conducted because of the following uncertainties:

a) Subslab soil gas samples were not collected – only exterior soil gas was collected in residential yards.

b) Exterior soil gas samples may underestimate the concentrations found beneath a building because there is no floor covering the ground surface.

c) Soil gas samples could not be collected at the DTSC recommended depth because the groundwater is less than 5 feet from the ground surface.

d) Use of a generic attenuation factor may over/underestimate the VOC concentrations in indoor air.

If future buildings are constructed in these areas, vapor mitigation systems are recommended.

5.7 Residential Screening Level Soil Evaluation

Subsequent to the collection of the residential soil samples during the RI investigation, a soil removal action was performed at residential properties adjacent to and near the former AMCO facility in August/September 2007. These properties include 1428, 1432, and 1436 3rd Street, and 320, 326, 356, 360, and 366/368 Center Street. The soil was generally excavated until the confirmation sampling indicated that the remaining soil was below the EPA residential screening level of 400 mg/kg, or to a 3-foot maximum depth. The excavation depth was generally between one and three feet. Small areas were excavated to a depth of less than 1 foot in locations where valuable trees or plants might have been damaged by deeper excavation. As a result, the soil samples collected during the RI are no longer representative of the soil conditions at these properties.

A screening level evaluation was performed on the soil data collected from the residential yards adjacent to or near the former AMCO facility. The concentrations detected in soil were compared to their respective screening levels to determine if they may pose a potential health risk. Screening levels are used to distinguish those substances that clearly do not pose a significant health threat because their concentrations in soil are low, from those that require additional evaluation for potential health risks. Screening levels selected for soil were EPA Residential RSLs.

The residential soil screening levels for arsenic are 0.39 mg/kg for cancer risks and 22 mg/kg for non-cancer hazards. The non-cancer screening level for arsenic was used in the residential screening evaluation because an arsenic level of 0.39 mg/kg is significantly less than what was found in background samples (14 mg/kg) (City of Oakland Urban Land Redevelopment Program 1995).

For mixtures of carcinogenic PAHs, the reference chemical is benzo(a)pyrene. Benzo(a)pyrene was chosen as the reference chemical because the toxicity of the chemical is well characterized. The toxicity equivalency factor for each carcinogenic PAH is an estimate of the relative toxicity (by an order of magnitude) of the congener compared to benzo(a)pyrene. A summary of PAH toxicity equivalence factors is provided below.

Toxicity Equivalence Factors for Carcinogenic PAHs

Carcinogenic PAHs	Toxicity Equivalency Factor*
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenzo(a,h)anthracene	0.4
Indeno(1,2,3-cd)pyrene	0.1

In the San Francisco Bay area, PAH cleanup levels of 0.9 mg/kg (DTSC 1998) and 1.8 mg/kg BaP Equivalents concentrations (U.S. Navy 2006) have been used for residential cleanup. These levels are considered safe for residential use.

Soil was sampled at six residential parcels in the immediate vicinity of the facility. Generally, within samples from each boring, the highest contaminant concentrations were observed in the shallow soil. VOCs were sparsely detected at concentrations below screening levels. Below is a brief summary of the findings by parcel.

In 2009, soil samples were collected during installation of additional monitoring wells. Tables showing the results of this soil sampling are compared with screening levels and are presented in Attachment 4.

5.7.1 1428 3rd Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Five locations were sampled at this residence, four locations along the property boundary and one in the center of the yard (Figure 17). The soil sampling at 1428 3rd Street indicated lead, PAHs, antimony, iron and 4,4'-DDT at levels above screening levels (Attachment 4, Table 4-30). The lead concentrations ranged from 224 to 4,170 mg/kg which is significantly above the site-specific screening levels (194 mg/kg for lead exposure including the homegrown produce pathway and 340 mg/kg without homegrown produce). Antimony and iron only exceeded in the shallow portion of two samples collected on the eastern boundary. Arsenic exceeded the non-cancer screening level of 22 mg/kg in one sample at a concentration of 35.1 mg/kg. 4,4'-DDT slightly exceeded the screening level of 1.7 mg/kg in one shallow sample.

5.7.2 1432 3rd Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Three locations were sampled at this residence, two along the property boundary and one in the vegetable garden (Figure 18). The soil sampling at 1432 3rd Street indicated lead, PAHs, 4,4'-DDT, and iron at concentrations above screening levels (Attachment 4, Table 4-31). Lead concentrations range from 524 to 2,280 mg/kg which is significantly above the screening levels. Antimony, iron, and 4,4'-DDT slightly exceeded their screening levels in one shallow sample. BaP Equivalents exceeded its screening level in all the shallow samples.

5.7.3 1436 3rd Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Two locations were sampled at this residence, one in the vegetable garden and one next to the lemon tree (Figure 19). The soil sampling at 1436 3rd Street indicated lead, PAHs, dieldrin, and iron at levels above screening levels (Attachment 4, Table 4-32). Lead concentrations range from 216 to 3,630 mg/kg which is significantly above screening levels. Dieldrin significantly exceeds its screening level in one shallow sample and barely exceeds in the other shallow sample. Iron slightly exceeds its screening level in both shallow samples. BaP Equivalents exceeds its screening level in both shallow samples.

5.7.4 326 Center Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Five locations were sampled at this residence, four along the property boundary with the large vacant lot and one along the property boundary with the former facility (Figure 20). The soil sampling at 326 Center Street indicated lead, PAHs Attachment 4, Table 4-33, dieldrin, 4,4′-DDT, 4,4′-DDE, iron, and arsenic at levels above screening levels . Lead was detected at concentrations ranging from 170 to 53,000 mg/kg. Three of the locations had samples with lead concentrations below the EPA residential screening level of 400 mg/kg. However two of the locations had lead concentrations that significantly exceeded the screening level. Arsenic was detected above the screening level in every soil sample collected; however, concentrations detected across the RI Study Area are generally less than or equal to background concentrations typical of the San Francisco Bay Area with the exception of the sample collected location 326SSd. Arsenic was detected at concentrations greater than background in shallow (451 mg/kg) and deeper (125 mg/kg) soil at this location. Iron is only slightly greater than its screening level in one shallow sample. 4,4′-DDE and dieldrin are slightly greater than their screening level in one shallow sample. 4,4′-DDT was detected at concentrations ranging from 0.59 to 11 mg/kg in two sample locations.

5.7.5 356 Center Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Three locations were sampled at this residence—one location was in a small yard behind the house, and two locations were in the dirt floor of a recently vacated chicken coop (Figure 21). The soil sampling at 356 Center Street indicated benzo(a)pyrene and lead at levels above screening levels (Attachment 4, Table 4-34). Lead was detected at concentrations ranging from 26.2 to 822 mg/kg. Of the six soil samples collected, five were above screening levels. Although three samples had benzo(a)pyrene that exceeded its screening level, none of the samples exceeded the BaP Equivalents criteria.

5.7.6 360 Center Street

As described above, soil was removed from this property during the August/September 2007 removal action, therefore all exceedances discussed below are no longer representative of current conditions. Two locations were sampled at this residence, one location along the northern parcel boundary, and one location in the southeastern corner (Figure 22). The soil sampling at 360 Center Street indicated lead, benzo(a)pyrene, Aroclor-1254, and heptachlor epoxide at levels above screening levels (Attachment 4, Table 4-35). Lead concentrations ranged from 193 to 2230 mg/kg which is significantly higher than the screening level. Aroclor-1254 (screening level of 0.22 mg/kg) was detected at 2.4 to 11 mg/kg at one location, and heptachlor epoxide (screening level of 0.53 mg/kg) was detected at 0.31 mg/kg in only the shallow sample at the same location.

5.7.7 Homegrown Produce Results

Four of the residents whose properties are adjacent to the former AMCO facility have gardens and fruit trees. The detection of TCE, PCE, and vinyl chloride in shallow groundwater and the potential for shallow groundwater to migrate into residential areas containing these gardens prompted concerns that contaminants from the Site could be taken up and transferred into edible fruit or vegetables. To evaluate the ingestion of the homegrown produce pathway, 15 fruits and vegetables from four gardens were collected and analyzed for selected metals (arsenic, chromium, and lead) and VOCs. Because produce samples were analyzed for VOCs as well as metals, none of the produce were rinsed or washed before analysis. As a result, the metals concentrations could reflect soil and dust deposited on the plant surfaces and possible uptake from soil through the roots into the edible portions of the plants. Produce samples collected and analyzed include:

- Fruit: Apple (2), Cactus, Blackberries, Pomegranate, Grapes, Fig, Lemon
- Fruiting Vegetables: Tomatillo, Tomatoes (2), Red Chili Pepper, Green Chili Pepper, Bell Pepper
- Leafy Vegetables and Herbs: Mint
- Root Vegetables: Root vegetables were not collected because none were available in the gardens that were sampled.

Results of the produce analyses are presented in Attachment 4, Tables 4-43, 4-44, 4-45 and 4-46. In summary, of the 47 VOCs analyzed, only methyl acetate and styrene were detected. Methyl acetate was detected in figs, mint, and red chilies. Styrene was detected only in cactus. Both methyl acetate and styrene have been detected in ripening produce in concentrations ranging from 0.04 - 0.24 mg/kg. (Heikes et al. 1995). Volatile organic compounds like methyl acetate are naturally produced by ripening fruits at less than 1 mg/kg (Fountain et al. 1984).

Urban gardens have been assessed extensively since the 1970s and provide the foundation for evaluating metals in garden soil. Plants absorb various metals from different soils related to the metals properties, soil properties (pH, metal concentration in soil, organic matter, cation exchange capacity, and level of other metals in soil) and plant properties (plant age, species, type of crop edible portion (leafy, root or garden fruit). Some metals, like zinc, cadmium, and selenium are easily absorbed and transferred to food chain plant tissues. Some metals like lead, iron, mercury, and chromium are strongly bound or precipitated in soil or in the root fibers and are not transferred to plant foliage in unsafe amounts even when soils are greatly enriched. Other metals like copper, nickel and arsenic are easily absorbed and transferred to plant foliage but phytotoxicity to the crop may limit plant levels of the metal. (Chaney et al 1984). Important to note; plants with higher surface areas green leafy vegetables such as lettuce, collard greens and swiss chard tend to easily attach dust and soil which may remain after rinsing.

Lead concentrations in the soil samples collected in the residential garden areas adjacent to the former AMCO facility ranged from 1,060 to 2,910 mg/kg with corresponding lead produce concentrations from 0.16 to 8.47 mg/kg. These lead concentrations reflect that none of the produce samples were rinsed or washed before analysis; thus, the lead concentrations could reflect dust or soil deposited on the plant surfaces in addition to lead that was taken up through the root system.

A study by Finster et al. (2003) investigated the relationship between lead concentrations in urban garden soils and homegrown produce grown in these soils, with a focus on the levels of lead detected in the edible portion of the plants. In this study, all produce were washed with water or detergent and detection limits were 10 mg/kg.

By comparison, the homegrown produce samples were not washed and the lead detection limits were 0.06 mg/kg. The lead soil concentrations in the Finster study ranged from 27 to 4,580 mg/kg. Concentrations of lead in residential shallow soils ranged from 167 to 28,600 mg/kg. The lead concentrations in the Finster study produce ranged from non-detect (ND) at 10 mg/kg to 81 mg/kg. The lead concentrations in the residential produce ranged from 0.15 to 8.47 mg/kg.

The risk posed by eating lead containing produce depends on the frequency and the amount of consumption. U.S. Food and Drug Administration (FDA) recommends Provisional Total Tolerable Intake Levels (PTTIL) for all age groups, which are defined at 6 μg lead/day for children up to 6 years of age, 15 μg lead/day for children 7 years and older, 25 μg lead/day for pregnant women and 75 μg lead/day for other adults (FDA 1993).

The highest lead concentrations in produce were detected in mint at 8.47 mg/kg. Mint is an extremely strong herb with 1 gram of mint equal to approximately 20 leaves (U.S. Department of Agriculture [USDA] 2002). Only two leaves of fresh mint, weighing 0.1 g, are needed for tea. Consider tea made with mint - 2 leaves fresh mint weighs 0.1 g x 8.47 μg/g = 0.847 μg lead/day. Even if this mint were ingested from the garden unwashed, lead levels would be below PTTIL.

Other metals analyzed in produce include arsenic and chromium. Arsenic concentrations in produce range from 0.06 to 0.08 mg/kg, Arsenic is commonly found in most plants from 0.009 to 1.7 mg/kg dry weight. (Kabatas-Pendias et al 2001). Leafy vegetables like lettuce or spinach contain more arsenic than fruits. Mushrooms are found to be relatively high arsenic accumulators. Chromium concentrations in produce range from 0.39 to 1.07 mg/kg, Levels of chromium commonly found in plants range from 0.02 to 1.5 mg/kg dry weight (Kabatas-Pendias et al 2001). All produce collected from residential gardens adjacent to or near the former AMCO facility had chromium concentrations within this range.

6.0 Uncertainty Evaluation

A risk characterization incorporates information on the uncertainty associated with the risk assessment, including data gaps in toxicological or exposure assessment information and the conservative assumptions or scientific judgments used to bridge these data gaps (EPA 1992). These uncertainties, which are associated with every step in the risk assessment process, are evaluated to provide an indication of the relative degree of conservatism associated with a risk estimate. This section presents a qualitative discussion of the uncertainties associated with the overall assessment process.

Risk assessments are not intended to estimate actual risks to a receptor associated with exposure to chemicals in the environment. In fact, estimating actual risks is impossible because of the variability in the exposed or potentially exposed populations. Therefore, risk assessment is a means of estimating the upper bound probability that an adverse health effect (e.g., cancer) may occur in a receptor at some point in the future. The multitude of conservative assumptions used in the process ensures that the risk results are not likely to be underestimated.

Risk estimates are calculated by combining site data, assumptions about individual receptor's exposures to impacted media, and toxicity data. The uncertainties in this risk assessment can be grouped into three main categories that correspond to these steps:

- Uncertainties in environmental sampling and analysis
- Uncertainties in assumptions concerning exposure scenarios
- Uncertainties in toxicity data and dose-response extrapolations

6.1 Environmental Sampling and Analysis

This risk assessment is based on the sampling results obtained from the remedial investigations at the Site. Errors in sampling results can arise from the field sampling, laboratory analyses, and data analyses. Errors in laboratory analysis procedures are possible, although the impacts of these sorts of errors on the risk estimates are likely to be low. The environmental sampling at a site is one source of uncertainty in the evaluation. The number and location of samples at the Site are considered adequate for input in the risk assessment. The type of contaminants and exposure concentrations identified are also considered representative of site conditions.

Because of the long history of the Site's industrial use and the associated history of construction and filling, all primary sources may not have been identified. Hot spots and localized areas of contamination in soil or soil vapor that were not sampled may remain unknown in on-facility and off-facility areas. The existence of unknown contamination could lead to an increase in the health risks beyond what has been reported in this document. Data collected from known hot spots have been included in the risk assessment.

The number and location of samples at each exposure area are considered adequate for the calculation of EPCs at most of the industrial areas and for groundwater. However, for the small vacant lot and the parking lot, the number of samples varied from 2 to 6 for each of the chemicals analyzed. This sample size is less than what is generally needed to calculate a 95 UCL; therefore, the maximum concentration was used to represent the EPCs where UCLs could not be calculated. A larger sample size would allow for the calculation of a more representative EPC and thus decrease uncertainty regarding chemical concentrations used for risk assessment at these locations.

Soil gas samples collected in the yards of the homes sampled could not be collected at DTSC's recommended depth of at least 5 feet below ground surface because of the shallow groundwater in the area. Soil gas collected at less than 5 feet below ground surface may be influenced by outdoor air being pulled in by the sample collection pump. This outdoor air would cause the sample to not accurately represent the levels of VOCs in the soil gas. In addition, the soil gas samples were collected in the backyards, in some cases several feet away from the structures. Therefore, there is uncertainty associated with the relationship between the soil gas and crawlspace air or indoor air data.

Indoor air sampling was conducted only once in June 2009. Although multiple indoor air samples were collected within each home/office, the indoor air sampling data represents a snapshot in time. As shown by the crawlspace air and ambient air data, the VOC concentrations vary widely from sampling event to sampling event. In addition, it was unusually warm (for the Bay Area) on the days that the sampling was conducted, and many homes had open windows. This condition may not accurately represent VOC concentrations when the windows are closed.

6.1.1 Laboratory and Sampling Results

Potential laboratory errors can also result in uncertainty in the chemical concentrations used in the exposure assessment. For well-designed analysis methods there should be no significant systematic error. However, uncertainty in measured concentrations due to random errors cannot be eliminated. These random errors result from:

- Precision of analytical measurements
- Random fluctuations in equipment performance
- Normal variations in analytical technique

These errors are expected to be small but nonetheless will affect the overall uncertainty in the results.

6.1.2 Reporting Limits

During the project planning phase, analytical methods are selected that provide sufficient sensitivity to meet the project screening levels. Positive results for all analytes were reported above the method detection limit. Because of the uncertainty that a specific analyte will be detected at concentrations below the reporting limit, analytes not detected are reported as not detected at the method reporting limit, generally 2 to 5 times higher than the method detection limit. In general, there are two reasons that the final analyte result is reported as not detected at a concentration above the screening limit:

1. The best available analytical methods does not provide the necessary sensitivity;

2. The sample contains high concentrations of one or more target analytes that require dilution, raising the final reporting limit for non-detected analytes above the screening level.

In both cases, some uncertainty exists whether the actual analyte concentration exceeds the screening level. The level of uncertainty is smaller in cases where the screening level is only slightly lower than the reporting limit. In addition, the level of uncertainty is mitigated in part because all positive results are reported to the method detection and in general, the method detection limit (MDL) is two to five times less than the reporting limit. As discussed in the following sections by media, this uncertainty is associated with a small number of analytes and there should be little or no effect on the final outcome of the risk assessment.

Soil

The failure to achieve the screening levels was due to both high concentrations of some target analytes in the sample that required dilution and percent moisture adjustments, raising the final reporting limit for non-detected analytes. However, three analytes were reported as not detected at a minimum reporting limit that exceeded the screening levels: benzo(a)pyrene, dibenz(a,h)anthracene, and n-nitroso-di-n-propylamine. This is a method limitation because of the low screening limit.

Groundwater

The failure to achieve the screening levels was primarily due to high concentrations of some target analytes in the sample that required dilution, thereby raising the reporting limit above the screening levels. Table 16 lists the minimum analyte reporting limits that were above the applicable groundwater screening level.

For 1,1,1,2-tetrachloroethane, 1,2,3-trichloropropane, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, and n-nitroso-n-propylamine the required analytical method cannot achieve the screening levels. For the remaining analytes, dilution was required in many cases which elevated the reporting limit above the screening levels.

Air

The failure to achieve the screening levels for ambient air and crawlspace air samples was primarily due to method sensitivity limitations with respect to the very low concentration screening levels. Table 17 lists the minimum analyte reporting limits that were above the applicable ambient/crawlspace air screening level. Where the percentages are lower than 100 percent, the target analyte was detected in several of the samples.

6.2 Exposure Pathways and Assumptions

Risk assessments are designed to provide a margin of safety to protect public health and the environment by using conservative assumptions that assure risks are not underestimated. Actual human exposures and associated risks are likely to be less than those calculated for the risk assessment because each input value is conservative. Uncertainties can arise from the types of exposures examined, the points of potential human exposure, the concentrations of COPCs at the points of human exposure, and the intake assumptions.

- The exposure parameters—exposure frequency, exposure duration, soil ingestion rates, and skin surface areas—are selected as reasonable maximum exposure assumptions. To minimize the possibility of underestimating risk, such factors are generally conservative and represent the portion of the population with the greatest potential for exposure. For example, the potential future resident at the former AMCO facility is assumed to be present for 350 days of the year over a 30 years period including the sensitive childhood period from birth to the age of six. These potential residents are assumed to play or garden daily in the soil. Few people, including children, are likely to be home and in direct contact with the soil daily for the entire 30 years. The HHRA assumes that the potential resident lives in a home that has a backyard and is unpaved. However, the degree of direct soil exposure would be reduced if the potential resident lived in a condominium with a backyard that was paved.

- The selection of exposure pathways is a process, often based on professional judgment that attempts to identify the most probable potentially harmful exposure scenarios. In an evaluation, risks are sometimes not calculated for all of the exposure scenarios that may occur, possibly causing some underestimation of risk. In this evaluation, potential risks are estimated for residential and worker exposure scenarios at the Site. Risks to potential receptors are estimated for a number of different exposure pathways (e.g., inhalation of fugitive dust). While other exposure routes could exist for a particular activity, these exposures are expected to be lower than the risks and hazards associated with the pathways considered.

- The amount that each of the COPCs might be absorbed into the body may be quite different from the amount of chemical that is actually contacted (i.e., bioavailability). In this assessment, bioavailability of ingested and inhaled chemicals is conservatively assumed to be 100 percent. Actual chemical- and site-specific values are likely to be much less than this conservative default value.

- Many factors contribute to the uncertainty of dermal contact exposure in risk assessment. There are uncertainties associated with each of the input parameters used in the equations to estimate risk. Additional uncertainties originate from factors that are not sufficiently characterized to be included in the risk equations. These include issues related to the degree and uniformity with which soil adheres to skin, exposed body surfaces, the frequency and duration of exposure, and the rate and amount of contaminant absorption.

- The method for estimating resuspended dust from soil concentrations using a PEF introduces large uncertainties in the resulting air concentrations and subsequent risk estimates. The assumption that the dust concentration remains constant may over-estimate the amount of dust in the air over time and, consequently, the concentration of contaminants present in dust. This could result in an overestimate of the inhalation as a particulate.

- Potential vapor intrusion into future buildings that may be located in the parking lot, small vacant lot, and large vacant lot exposure areas have been evaluated and all potential risks and hazards are exceedingly high. This represents an uncertainty for future development. If future buildings are constructed in these areas, vapor mitigation systems are recommended.

- The potential effect of the LNAPL on the shallow groundwater on indoor air risk estimation and as a long-term source of VOCs has not been addressed. However, it is acknowledged that the risks and hazards from exposure to VOCs would be unacceptable if buildings were to be located over the LNAPL before remediation takes place.
- For a construction worker, the EPA model used to estimate the amount of VOCs that would volatilize from groundwater used an assumed wind velocity factor in the trench. If risks and hazards were calculated using the Trench Worker Model recommended by the Virginia Department of Environmental Quality which assumes no wind, the results show a risk greater than 10^{-4} (6×10^{-4}) and an HI that exceeds 1 (34).

6.3 Toxicity Criteria and Factors

The availability and quality of toxicological data is another source of uncertainty in the risk assessment. Carcinogenic criteria are classified according to the amount of evidence available that suggests human carcinogenicity. In the establishment of the non-carcinogenic criteria, conservative multipliers, known as uncertainty and modifying factors, are used.

6.3.1 Uncertainties in Animal and Human Studies

Extrapolation of toxicological data from animal tests is one of the largest sources of uncertainty in a risk assessment. There may be important, but unidentified, differences in uptake, metabolism, and distribution of chemicals in the body between the test species and humans. For the most part, these uncertainties are addressed through use of conservative assumptions in establishing values for RfDs and CSFs, which results in the likelihood that the risk is overstated.

Typically, animals are administered high doses (e.g., maximum tolerated dose) of a chemical in a standard diet or in air. Humans may be exposed to much lower doses in a highly variable diet, which may affect the toxicity of the chemical. In these studies, animals, usually laboratory rodents, are exposed daily to the chemical agent for various periods of time up to their 2-year lifetimes. Humans are assumed to have an average 70-year lifetime and may be exposed either intermittently or regularly for an exposure period ranging from months to a full lifetime. Because of these differences, extrapolation error is a large source of uncertainty in a risk assessment.

6.3.2 Non-Carcinogenic Toxicity Criteria

In the establishment of the non-carcinogenic criteria, conservative multipliers, known as uncertainty factors, are used. Most of the chronic non-carcinogenic toxicity criteria that were located in the IRIS database have uncertainty factors of 1,000. This means that the dose corresponding to a toxicological endpoint (e.g., LOAEL was divided by 1,000). The purpose of the uncertainty factor is to account for the extrapolation of toxicity data from animals to humans and to insure the protection of sensitive individuals. However, in accomplishing these purposes, the uncertainty in the actual toxicity of the chemical in humans is greatly increased.

6.3.3 Carcinogenic Toxicity Criteria

For chemicals that are probable human carcinogens and lack human evidence of carcinogenicity, the EPA method for developing cancer slope factors extrapolates data from high-dose animal experiments to low-dose human exposures and thus is associated with a high potential for overestimating risk. Actual slope factors could be lower but are unlikely to be higher. The LMS assumes that there is no threshold for carcinogenic substances; that is, exposure to even one molecule of a carcinogen is sufficient to cause cancer. This is a highly conservative assumption because the body has several mechanisms to protect against cancer.

Toxicity values derived using the LMS are intended for chemicals with cancer risks below 1 x 10^{-2}. For scenarios producing risks greater than 1 x 10^{-2}, an alternative equation for calculating risk is suggested. The residential risk calculations from groundwater exceed 1 x 10^{-2} for arsenic and vinyl chloride, suggesting the use of an alternative risk characterization model. Use of such a model could slightly change the calculated ELCR. However, since the conclusions derived by using an alternate equation for these two chemicals would not change, the LMS method was retained (EPA 1989).

6.3.4 Additive vs. Synergistic vs. Antagonistic Properties of COPCs

When humans are exposed to more than one chemical in a medium, it is normally assumed that the adverse effects of the different chemicals are additive. However, in some cases, synergistic or antagonist interaction may occur. Although there are no data to suggest that synergistic or antagonist interactions occur between chemicals at this Site, this is a source of uncertainty in the HHRA. The term synergism describes the situation wherein the aggregated risks from simultaneous exposure to multiple chemicals is more than the sum of the risks from each alone. Antagonism is when the aggregated risks are less than the sum.

Synergism and antagonism represent complex interactions between two or more chemicals. Two chemicals may exert synergistic effects on one aspect of each other's toxicity, but not on other toxic effects. The synergy may be apparent within one range of exposure levels, but not within another range of exposure to the two chemicals. Addition of a third chemical may inhibit the synergy between the first two chemicals. Thus quantifying synergism or antagonism in a risk assessment can be problematic and requires a thorough understanding of the potential interactions between multiple chemicals and the development of relevant risk/toxicity values.

Superfund risk assessment guidelines (RAGS, Part A, Section 8.4.2) notes that "[i]n the absence of adequate information, carcinogenic risks should be treated as additive and that non-cancer hazard indices should also be treated as additive." It is a goal of the EPA to incorporate synergistic and antagonistic effects into risk assessments when there is sufficient credible scientific evidence that either exists and appropriate risk assessment tools are available. However, there are very few data available on synergism or antagonism of specific mixtures that are useful in a risk assessment context.

6.3.5 TCE

Toxicity values are not currently available for TCE in EPA's Integrated Risk Information System (EPA 2006a). EPA withdrew its previously published toxicity values for TCE in 1988 because of uncertainties relating to the science of TCE toxicity. The guidance lists Tier 1 as

IRIS, Tier 2 as PPRTV, and Tier 3 as other sources including NCEA and OEHHA. A more current inhalation factor of 0.007 $(mg/kg\text{-}day)^{-1}$ is available from another Tier 3 source (OEHHA 2006). EPA has proposed more stringent TCE toxicity values which are pending review (EPA 2009d).

6.3.6 Surrogates

A number of chemicals detected in Site media do not have established toxicity criteria. Where available, appropriate surrogate toxicity factors were used for detected chemicals without toxicity factors. Use of surrogate toxicity factors assumes the toxicity of structurally similar compounds is equivalent, which may result in under- or over-estimate of risks. If a surrogate chemical was not available, these chemicals were not evaluated quantitatively. A list of chemicals used as surrogates is presented in Table 18.

7.0 Summary and Discussion of Human Health Risk Assessment Results

The HHRA described in this appendix evaluated potential health risks to current and future workers, as well as future adult and child residents from exposure to hazardous chemicals in soil and groundwater at the former AMCO facility and adjacent parcels. In addition, a vapor intrusion evaluation was performed on hesidential homes near the former AMCO facility as well as the office building on the Site. Screening level risk evaluations were also conducted on the soil and homegrown produce from residential lots that are occupying the same city block as the former AMCO facility. Results from this HHRA will be one of the factors that EPA uses to determine if cleanup actions are warranted at the Site. Possible remedial actions in areas that have unacceptable risks will be addressed in the FS for the former AMCO facility. The baseline HHRA provides estimates of the human health risks and hazards that the former AMCO facility could pose if no action were taken. Standard EPA risk assessment procedures were used to conduct this risk assessment.

Consistent with the conceptual site model, the predominant exposure pathways for current and future workers to soil would be incidental ingestion of soil, inhalation of particulates and vapors, and dermal contact with soil. Current and future residents in the vicinity may potentially be exposed to contaminants through the same pathways as listed above for workers. In addition, residents could potentially be exposed by ingestion of contaminated groundwater and dermal contact with groundwater while showering. Vapor intrusion was evaluated using crawlspace air and ambient air data from nearby homes and the office on the former AMCO facility. Residents were also evaluated for exposure to soil in their yards and ingestion of homegrown produce.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an “excess lifetime cancer risk” because it would be in addition to the risks of cancer an individual faces from other causes, such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. EPA’s target risk range for site-related exposures is 10^{-6} to 10^{-4}. An excess lifetime cancer risk of 10^{-4} is the point at which action is generally required at a site (EPA 1991b). Because the surrounding neighborhoods are a vulnerable community, EPA has decided to use an excess lifetime cancer risk of 10^{-6} as the point at which action will be required at this site.

The cancer risk estimates and non-cancer HIs calculated for each exposure scenario are summarized in Attachment 1, Table 1-109. The risk estimates are based on reasonable maximum exposure concentrations and were developed by taking into account various conservative assumptions about the frequency and duration of exposure to contaminated materials as well as the toxicity of the chemicals of potential concern.

7.1 On-Facility Quantitative Soil Risk Estimates

Soil samples were divided into the following four exposure areas: former AMCO facility, parking lot, large vacant lot, and small vacant lot. An exposure area is a portion of the property that is contacted on a regular basis by a worker or resident. Risk estimates are discussed for each exposure area below.

Industrial Worker: Estimated cancer risks were at the upper end of the risk range for exposure to either shallow or deep soil at each of the four exposure areas. HIs were either at the non-cancer threshold of 1 or below 1 at all four exposure areas.

Construction Worker: Estimated cancer risks were within the risk range of 10^{-6} to 10^{-4} for exposure to shallow or deep soil at each of the 4 exposure areas. HIs exceeded the non-cancer threshold of 1 at all four exposure areas.

Residents: Estimated cancer risks exceeded the risk range for exposure to shallow or deep soil at all four of the exposure areas. HIs exceeded the non-cancer threshold of 1 at all four exposure areas.

In addition, lead levels at all four exposure areas exceed both the residential and industrial CHHSLs.

7.2 Groundwater Risk Estimates

The cancer risks and non-cancer hazards are significantly above the risk range when residential use of groundwater is considered. However, it is extremely unlikely that groundwater will be used as a source of drinking water.

An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. As noted above, the cancer risks estimated for future residents using the groundwater as tap water in the home is 7×10^{-2} which is significantly above the risk management range and clearly unacceptable. Hazard indices for an adult (262) and child (628) resident are also significantly above the non-cancer threshold of 1.

7.3 Irrigation Well Results

During the RI, a previously unidentified well was discovered at a residence near the former AMCO facility. According to the property owner, the well is primarily used for backyard irrigation. The well is not a source of drinking water. The residential irrigation well was sampled on three occasions: September 2, 2004, June 24, 2005, and October 12, 2005. A summary of the results is presented in Table 13. As indicated in this table, the only analyte that exceeds the screening level is lead. However, boron, manganese, mercury, and sodium are at concentrations that exceed their agricultural water quality limit.

7.4 Vapor Intrusion Risk Estimates

To assess the potential human health risks and hazards associated with VOCs migrating from the groundwater into the office at the former AMCO facility and into nearby residences; crawlspace and ambient air sampling was performed over nine sampling events from September 2004 through June 2009. Ambient air and crawlspace air sample results were compared to acute reference exposure levels (RELs) developed by OEHHA and the Agency for Toxic Substances and Disease Registry's (ATSDR) acute minimal risk level (MRLs) for hazardous substances to confirm that contaminant levels would not pose an immediate health threat to residents.

In addition to the crawlspace and ambient air sampling, the June 2009 sampling event included indoor air sampling at some of the nearby residences and the office at the former AMCO facility. Because indoor air data was collected only once, it represents a snapshot in time, therefore it is compared to the crawlspace and ambient air data, as well as screening levels. ELCRs and hazards were not calculated using the indoor air data.

Industrial Exposure Evaluation

Potential cancer risks and non-cancer hazards were calculated using industrial worker exposure assumptions for the 1414 3rd Street office. Crawlspace air is used to represent the air that could potentially be inhaled by the workers in their offices. Potential cancer risk from exposure to VOCs in crawlspace air at the office building is 6×10^{-5}, which is within the risk management range of 10^{-6} to 10^{-4}. The main contributors to the cancer risk are carbon tetrachloride (35%) and vinyl chloride (18%). The non-cancer HI is below 1 for exposure by an indoor worker.

Residential Exposure Evaluation

All non-facility locations (residential parcels, South Prescott Park, background) were evaluated using residential exposure assumptions. Crawlspace and ambient air is used to represent the air that could potentially be inhaled by the residents inside and outside the living spaces of their homes. Potential cancer risks are within the risk management range at all residences for crawlspace and ambient air with the exception of two of the residential properties for crawlspace (1428 3rd Street and 1432 3rd Street) and one for ambient air (1428 3rd Street). These are also the only locations having non-cancer HIs greater than 1.

Potential cancer risks from inhalation of crawlspace air ranged from 5×10^{-5} to 3×10^{-4}. The primary chemical contributors to risk from inhalation of crawlspace air are vinyl chloride, benzene, 1,2-dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene at the four residences where crawlspace air and ambient air were collected. Crawlspace air HIs range from 0.5 to 8. The primary contributors to the HI in crawlspace air at the two locations that have HIs that exceed 1 are 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

Potential cancer risks from inhalation of ambient air ranged from 2×10^{-5} to 2×10^{-4}. The primary contributors to risk from inhalation of ambient air are naphthalene, benzene, carbon tetrachloride, and vinyl chloride. Vinyl chloride is only a primary contributor at one property - 1436 3rd Street. The HI from exposure to ambient air exceeds 1 at 1428 3rd Street (HI=4). Naphthalene (47%), 1,2,4-trimethylbenzene (18%), and 1,3,5-trimethyl-benzene (18%) are the primary contributors to the ambient air HI.

No VOC detections exceeded acute reference concentrations, indicating that there is no immediate health threat to residents. As a precautionary measure mitigation systems have been installed in selected homes nearest the site.

The background cancer risk estimated using the Lewis Street (located 3 blocks upwind of the site) ambient air data is 3×10^{-5}. The primary contributors to the background cancer risk estimate include benzene (31%), carbon tetrachloride (29%) and naphthalene (17%). The background non-cancer HI (0.5) is less than the non-cancer threshold of 1. The similarity in the risks and hazards between background and the residences near the site indicates that air quality is poor in the whole area due to sources of contamination other than the site.

Future Buildings

For future buildings, the potential vapor intrusion risk is exceedingly high. In a worst case scenario, the risks and hazards from vapor intrusion may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home is significantly above the risk management range and clearly unacceptable. Hazard indices for an adult and child resident are also significantly above the non-cancer threshold of 1.

Evaluation of future vapor intrusion risk from the soil gas data into future buildings at the parking lot, small vacant lot, and large vacant lot was not conducted because of the following uncertainties:

a) Subslab soil gas samples were not collected – only exterior soil gas was collected in residential yards.

b) Exterior soil gas samples may underestimate the concentrations found beneath a building because there is no floor covering the ground surface.

c) Soil gas samples could not be collected at the DTSC recommended depth because the groundwater is less than 5 feet from the ground surface.

d) Use of a generic attenuation factor may over/underestimate the VOC concentrations in indoor air.

If future buildings are constructed in these areas, vapor mitigation systems are recommended.

7.5 Screening Level Evaluation on Residential Media

Subsequent to the collection of the residential soil samples during the RI investigation, a soil removal action was performed at residential properties adjacent to and near the former AMCO facility in August/September 2007 based on the RI results. These properties include 1428, 1432, and 1436 3rd Street, and 320, 326, 356, 360, and 366/368 Center Street. The soil was generally excavated to a depth of approximately three feet; however, excavations were shallower in some areas if confirmation sampling indicated remaining lead concentrations were below screening levels. As a result, the soil and produce samples collected during the RI are no longer representative of the soil conditions at these properties.

Soil: PAHs, pesticides (DDT, DDE, dieldrin, and heptachlor epoxide), antimony, and iron also exceed screening levels in at least one property. Generally, within samples from each boring, the highest contaminant concentrations were observed in the shallow soil. VOCs were sparsely detected at concentrations below screening levels. Benzo(a)pyrene and lead were detected at all residential parcels at concentrations above the screening level.

Homegrown Produce: The detection of TCE, PCE, and vinyl chloride in shallow groundwater and the potential for shallow groundwater to migrate into residential areas containing gardens prompted concerns that contaminants from the Site could be taken up and transferred into edible fruit or vegetables. To evaluate the ingestion of the homegrown produce pathway, 15 fruits and vegetables from four gardens located adjacent to the Facility were collected and analyzed for selected metals (arsenic, chromium, and lead) and VOCs. Arsenic concentrations in produce range from 0.06 to 0.08 mg/kg Chromium concentrations in produce range from 0.39 to 1.07 mg/kg. The lead concentrations in the homegrown produce ranged from 0.15 to 8.47 mg/kg.

Of the 47 VOCs analyzed for, only methyl acetate and styrene were detected. Methyl acetate was detected in figs, mint and red chili peppers. Styrene was detected only in cactus. The highest lead concentrations in produce were detected in mint at 8.47 mg/kg. However, even if this mint were ingested from the garden unwashed, lead levels would be below the FDA's PTTIL.

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Tables

TABLE 1
1999 National Air Toxics Assessment, Predicted Ambient Air Concentrations for Census Tract 06001401900
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

	Predicted Concentration ($\mu g/m^3$)	Percent Contribution by Source Type				
		Stationary Sources		Mobile Sources		
		Major	Area & Other	On-Road	Non-Road	Back-ground
Chloroform	0.14	0.1%	67.6%	0.0%	0.0%	32.3%
1,4-Dichlorobenzene	0.13	1.1%	98.9%	0.0%	0.0%	0.0%
1,4-Dioxane	0.001	56.7%	43.3%	0.0%	0.0%	0.0%
Benzene	3.5	1.4%	5.6%	65.7%	14.0%	13.3%
Carbon tetrachloride	0.27	0.0%	0.3%	0.0%	0.0%	99.7%
Ethylbenzene	1.4	1.9%	10.6%	76.7%	10.8%	0.0%
Naphthalene	0.13	0.5%	46.0%	36.9%	16.6%	0.0%
Styrene	0.11	0.5%	3.0%	83.6%	12.9%	0.0%
1,1,2,2-Tetrachloroethane	0.098	9.2%	7.4%	0.0%	0.0%	83.3%
Toluene	9.8	7.7%	24.4%	60.6%	7.3%	0.0%
Trichloroethene	0.12	14.5%	23.9%	0.0%	0.0%	61.7%
Vinyl Chloride	0.12	18.3%	14.6%	0.0%	0.0%	67.2%
Xylenes	8.0	1.3%	12.2%	61.9%	22.5%	2.1%

Source: EPA's NATA web site, http://www.epa.gov/ttn/atw/nata1999/

TABLE 2
2002 National Emissions Inventory for Alameda County, CA
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Percent Contribution by Source Type			
		Point Sources		Mobile Sources	
	Emissions (tons/year)	Major	Area and Other	On-Road	Non-Road
Benzene	548	0.2%	14.7%	24.1%	60.9%
Ethylbenzene	295	0.4%	11.7%	15%	72.9%
Chloroform	1.94	100.0%	0.0%	0.0%	0.0%
Trichloroethylene	25.3	31.0%	68.9%	0.0%	0.0%
Vinyl Chloride	3.77	18.6%	81.4%	0.0%	0.0%

Source: EPA's AirData web site, http://www.epa.gov/oar/data/

TABLE 3
Chemicals of Potential Concern
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Site					Residential					BG and PP	
	Soil		Groundwater		Soil Gas	Soil		Soil Gas	Ambient Air	Crawl Space Air	Soil Gas	Ambient Air
	Shallow	Deep	Grab	MW		Shallow	Deep					
Metals												
Aluminum	X	X	---	X	---	X	X	---	---	---	---	---
Antimony	X	X	---	X	---	X	X	---	---	---	---	---
Arsenic	X	X	---	X	---	X	X	---	---	---	---	---
Barium	X	X	---	X	---	X	X	---	---	---	---	---
Beryllium	X	X	---	X	---	X	X	---	---	---	---	---
Boron	---	---	---	X	---	---	---	---	---	---	---	---
Cadmium	X	X	---	X	---	X	X	---	---	---	---	---
Chromium	X	X	---	X	---	X	X	---	---	---	---	---
Cobalt	X	X	---	X	---	X	X	---	---	---	---	---
Copper	X	X	---	X	---	X	X	---	---	---	---	---
Iron	X	X	---	X	---	X	X	---	---	---	---	---
Lead	X	X	---	X	---	X	X	---	---	---	---	---
Manganese	X	X	---	X	---	X	X	---	---	---	---	---
Mercury	X	X	---	X	---	X	X	---	---	---	---	---
Molybdenum	---	---	---	X	---	---	---	---	---	---	---	---
Nickel	X	X	---	X	---	X	X	---	---	---	---	---
Selenium	X	X	---	X	---	X	X	---	---	---	---	---
Silver	X	X	---	X	---	X	X	---	---	---	---	---
Thallium	X	X	---	X	---	X	X	---	---	---	---	---
Vanadium	X	X	---	X	---	X	X	---	---	---	---	---
Zinc	X	X	---	X	---	X	X	---	---	---	---	---
Hexavalent Chromium												
Chromium, hexavalent	---	---	---	X	---	---	---	---	---	---	---	---
Cyanide												
Cyanide	ND	ND	---	X	---	X	ND	---	---	---	---	---
Organochlorine Pesticides												
4,4'-DDD	X	X	---	X	---	X	X	---	---	---	---	---
4,4'-DDE	X	X	---	X	---	X	X	---	---	---	---	---
4,4'-DDT	X	X	---	X	---	X	X	---	---	---	---	---
Aldrin	X	X	---	X	---	X	X	---	---	---	---	---
alpha-BHC	X	X	---	X	---	X	X	---	---	---	---	---
alpha-Chlordane	X	X	---	X	---	X	X	---	---	---	---	---
beta-BHC	X	X	---	X	---	X	X	---	---	---	---	---
delta-BHC	X	X	---	X	---	X	X	---	---	---	---	---
Dieldrin	X	X	---	X	---	X	X	---	---	---	---	---
Endosulfan I	X	X	---	X	---	X	X	---	---	---	---	---
Endosulfan II	X	X	---	X	---	X	X	---	---	---	---	---
Endosulfan sulfate	X	X	---	X	---	X	X	---	---	---	---	---
Endrin	X	X	---	X	---	X	X	---	---	---	---	---
Endrin aldehyde	X	X	---	X	---	X	X	---	---	---	---	---
Endrin ketone	X	X	---	X	---	X	X	---	---	---	---	---

TABLE 3
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Analyte	Site					Residential					BG and PP	
	Soil		Groundwater		Soil Gas	Soil		Soil Gas	Ambient Air	Crawl Space Air	Soil Gas	Ambient Air
	Shallow	Deep	Grab	MW		Shallow	Deep					
Organochlorine Pesticides												
gamma-BHC	X	X	---	X	---	X	X	---	---	---	---	---
gamma-Chlordane	X	X	---	X	---	X	X	---	---	---	---	---
Heptachlor	X	X	---	X	---	X	X	---	---	---	---	---
Heptachlor epoxide	X	X	---	X	---	X	X	---	---	---	---	---
Methoxychlor	X	ND	---	X	---	X	X	---	---	---	---	---
Organophosphorus Pesticides												
Diazinon	---	---	---	X	---	---	---	---	---	---	---	---
Herbicides												
Atrazine	ND	ND	---	X	---	ND	ND	---	---	---	---	---
PCBs												
Aroclor-1254	ND	ND	---	ND	---	X	X	---	---	---	---	---
Aroclor-1260	X	X	---	X	---	ND	ND	---	---	---	---	---
Semivolatile Organic Compounds												
1,1'-Biphenyl	X	X	---	X	---	X	ND	---	---	---	---	---
1,4-Dioxane (p-dioxane)	ND	X	X	X	X	ND	X	X	X	X	ND	X
2,4,6-Trichlorophenol	ND	ND	---	X	---	ND	ND	---	---	---	---	---
2,4-Dichlorophenol	ND	ND	---	X	---	ND	ND	---	---	---	---	---
2,4-Dimethylphenol	ND	ND	---	X	---	X	ND	---	---	---	---	---
2,6-Dinitrotoluene	ND	ND	---	ND	---	X	X	---	---	---	---	---
2-Chlorophenol	ND	ND	---	X	---	ND	ND	---	---	---	---	---
2-Methylnaphthalene	X	X	---	X	---	X	X	---	---	---	---	---
2-Methylphenol	X	ND	---	X	---	ND	ND	---	---	---	---	---
2-Nitroaniline	ND	ND	---	X	---	ND	ND	---	---	---	---	---
3&4-Methylphenol	---	---	---	X	---	---	---	---	---	---	---	---
3-Nitroaniline	ND	ND	---	ND	---	X	ND	---	---	---	---	---
4-Chloro-3-methylphenol	X	ND	---	X	---	ND	ND	---	---	---	---	---
4-Methylphenol	X	X	---	X	---	ND	ND	---	---	---	---	---
4-Nitrophenol	ND	ND	---	ND	---	X	ND	---	---	---	---	---
Acenaphthene	X	X	---	X	---	X	ND	---	---	---	---	---
Acenaphthylene	X	X	---	X	---	X	X	---	---	---	---	---
Acetophenone	X	X	---	X	---	ND	ND	---	---	---	---	---
Anthracene	X	X	---	X	---	X	X	---	---	---	---	---
Benzo(a)anthracene	X	X	---	X	---	X	X	---	---	---	---	---
Benzo(a)pyrene	X	X	---	X	---	X	X	---	---	---	---	---
Benzo(b)fluoranthene	X	X	---	X	---	X	X	---	---	---	---	---
Benzo(g,h,i)perylene	X	X	---	X	---	X	X	---	---	---	---	---
Benzo(k)fluoranthene	X	X	---	X	---	X	X	---	---	---	---	---
Benzyl butyl phthalate	X	X	---	ND	---	X	X	---	---	---	---	---
bis(2-Chloroethoxy)methane	ND	ND	---	X	---	ND	ND	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	X	X	---	X	---	X	X	---	---	---	---	---
Caprolactam	X	X	---	X	---	X	X	---	---	---	---	---

TABLE 3
Chemicals of Potential Concern
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Analyte	Site					Residential					BG and PP	
	Soil		Groundwater		Soil Gas	Soil		Soil Gas	Ambient Air	Crawl Space Air	Soil Gas	Ambient Air
	Shallow	Deep	Grab	MW		Shallow	Deep					
Semivolatile Organic Compounds												
Carbazole	X	ND	---	X	---	X	X	---	---	---	---	---
Chrysene	X	X	---	X	---	X	X	---	---	---	---	---
Dibenz(a,h)anthracene	X	X	---	X	---	ND	ND	---	---	---	---	---
Dibenzofuran	X	X	---	ND	---	X	X	---	---	---	---	---
Diethylphthalate	ND	X	---	X	---	ND	ND	---	---	---	---	---
Di-n-butyl phthalate	X	X	---	X	---	X	X	---	---	---	---	---
Di-n-octyl phthalate	ND	ND	---	X	---	X	ND	---	---	---	---	---
Fluoranthene	X	X	---	X	---	X	X	---	---	---	---	---
Fluorene	X	X	---	X	---	X	X	---	---	---	---	---
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	ND	ND
Hexachloroethane	ND	ND	---	X	---	ND	ND	---	---	---	---	---
Indeno(1,2,3-c,d)pyrene	X	X	---	X	---	X	X	---	---	---	---	---
Naphthalene	X	X	X	X	X	X	X	X	X	X	X	X
Nitrobenzene	ND	ND	---	X	---	ND	ND	---	---	---	---	---
N-Nitrosodi-n-propylamine	ND	ND	---	X	---	ND	ND	---	---	---	---	---
N-Nitrosodiphenylamine	ND	ND	---	X	---	ND	ND	---	---	---	---	---
Pentachlorophenol	ND	X	---	X	---	ND	ND	---	---	---	---	---
Phenanthrene	X	X	---	X	---	X	X	---	---	---	---	---
Phenol	X	X	---	X	---	ND	X	---	---	---	---	---
Pyrene	X	X	---	X	---	X	X	---	---	---	---	---
Volatile Organic Compounds												
1,1,1-Trichloroethane	X	X	X	X	X	ND	ND	X	X	X	X	X
1,1,2,2-Tetrachloroethane	ND	ND	ND	X	X	ND	ND	X	X	X	X	X
1,1,2-Trichloroethane	X	ND	ND	X	X	ND	ND	X	X	X	ND	ND
1,1-Dichloroethane	X	X	X	X	X	ND	X	X	ND	X	X	X
1,1-Dichloroethene	X	X	X	X	X	ND	X	X	ND	ND	ND	X
1,2,3-Trichlorobenzene	ND	ND	X	X	---	ND	ND	---	---	---	---	---
1,2,4-Trichlorobenzene	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	X	X	X	X	ND	X	X	X	X	X
1,2-Dibromo-3-chloropropane	ND	ND	X	ND	---	ND	ND	---	---	---	---	---
1,2-Dibromoethane	ND	ND	ND	ND	X	ND	ND	ND	ND	X	ND	ND
1,2-Dichlorobenzene	X	X	X	X	X	ND	X	X	X	X	ND	ND
1,2-Dichloroethane	X	X	X	X	X	ND	ND	X	X	X	X	X
1,2-Dichloropropane	ND	ND	X	X	ND	ND	ND	ND	X	X	ND	X
1,3,5-Trimethylbenzene	ND	ND	X	X	X	ND	ND	X	X	X	X	X
1,3-Butadiene	---	---	---	---	ND	---	---	ND	---	---	X	---
1,3-Dichlorobenzene	X	X	X	X	X	ND	ND	X	X	X	ND	ND
1,4-Dichlorobenzene	X	X	X	X	X	ND	X	X	X	X	X	X
2,2,4-Trimethylpentane	---	---	---	---	X	---	---	ND	---	---	X	---
2,2-Dichloropropane	---	---	ND	X	---	---	---	---	---	---	---	---
2-Chlorotoluene	---	---	X	ND	---	---	---	---	---	---	---	---

TABLE 3
Chemicals of Potential Concern
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Site					Residential					BG and PP	
	Soil		Groundwater		Soil Gas	Soil		Soil Gas	Ambient Air	Crawl Space Air	Soil Gas	Ambient Air
	Shallow	Deep	Grab	MW		Shallow	Deep					
Volatile Organic Compounds												
2-Hexanone	ND	ND	---	X	ND	ND	ND	ND	---	---	ND	---
4-Ethyltoluene	---	---	---	---	X	---	---	X	---	---	ND	---
Acetone	X	X	X	X	X	X	X	X	---	---	X	---
Benzene	X	X	X	X	X	X	X	X	X	X	X	X
Bromoform	ND	ND	ND	X	ND	ND	ND	ND	---	---	ND	---
Bromomethane	ND	ND	ND	ND	X	ND	ND	X	X	X	X	X
Carbon disulfide	X	X	---	X	X	X	X	X	---	---	X	---
Carbon tetrachloride	ND	ND	X	X	X	ND	ND	X	X	X	X	X
Chlorobenzene	X	X	X	X	X	ND	X	X	X	X	ND	X
Chloroethane	X	X	X	X	X	ND	ND	X	X	X	X	X
Chloroform	ND	ND	X	X	X	ND	ND	X	X	X	X	X
Chloromethane	X	ND	X	X	X	ND	ND	X	X	X	X	X
cis-1,2-Dichloroethene	X	X	X	X	X	ND	X	X	X	X	X	X
cis-1,3-Dichloropropene	ND	ND	X	X	ND	ND	ND	ND	X	X	ND	X
Cyclohexane	X	X	---	X	X	ND	ND	ND	---	---	X	---
Ethanol	---	---	---	---	X	---	---	X	---	---	X	---
Ethyl tert-butyl ether	ND	ND	---	X	---	ND	ND	---	---	---	---	---
Ethylbenzene	X	X	X	X	X	X	ND	X	X	X	X	X
Freon 11	ND	ND	ND	X	X	X	X	X	X	X	X	X
Freon 113	X	ND	ND	ND	X	ND	ND	X	X	X	X	X
Freon 114	---	---	---	---	ND	---	---	ND	X	X	ND	X
Freon 12	ND	ND	ND	ND	X	ND	ND	X	X	X	X	X
Freon 134a	---	---	---	---	X	---	---	X	---	---	X	---
Isopropanol	---	---	---	---	X	---	---	X	---	---	X	---
Isopropyl ether	---	---	---	X	---	ND	ND	---	---	---	---	---
Isopropylbenzene (cumene)	X	X	X	X	X	ND	ND	ND	---	---	ND	---
Methyl acetate	ND	X	---	X	---	X	ND	---	---	---	---	---
Methyl ethyl ketone	X	X	X	X	X	X	X	X	---	---	X	---
Methyl isobutyl ketone	X	X	---	X	ND	ND	ND	ND	---	---	ND	---
Methyl tert-butyl ether	X	X	X	X	X	ND	ND	ND	X	X	ND	X
Methylcyclohexane	X	X	---	X	---	ND	ND	---	---	---	---	---
Methylene chloride	X	X	X	X	X	X	ND	X	X	X	X	X
n-Butylbenzene	---	---	X	X	---	---	---	---	---	---	---	---
n-Heptane	---	---	---	---	X	---	---	X	---	---	X	---
n-Propylbenzene	---	---	X	X	X	---	---	ND	---	---	ND	---
p-Cymene (p-isopropyltoluene)	---	---	X	X	---	---	---	---	---	---	---	---
sec-Butylbenzene	---	---	X	X	---	---	---	---	---	---	---	---
Styrene	X	ND	ND	X	X	ND	ND	X	X	X	X	X
tert-Butyl alcohol	ND	ND	---	X	---	ND	ND	---	---	---	---	---
tert-Butylbenzene	---	---	ND	X	---	---	---	---	---	---	---	---
Tetrachloroethene	X	X	X	X	X	X	X	X	X	X	X	X

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Analyte	Site					Residential					BG and PP	
	Soil		Groundwater		Soil Gas	Soil		Soil Gas	Ambient Air	Crawl Space Air	Soil Gas	Ambient Air
	Shallow	Deep	Grab	MW		Shallow	Deep					
Volatile Organic Compounds												
Tetrahydrofuran	---	---	---	---	X	---	---	X	---	---	X	---
Toluene	X	X	X	X	X	X	X	X	X	X	X	X
Total hexanes	---	---	---	---	X	---	---	X	---	---	X	---
trans-1,2-Dichloroethene	X	X	X	X	X	ND	ND	X	X	ND	X	ND
trans-1,3-Dichloropropene	ND	ND	ND	X	ND	ND	ND	ND	X	X	ND	X
Trichloroethene	X	X	X	X	X	X	X	X	X	X	X	X
Vinyl chloride	X	X	X	X	X	ND	X	X	X	X	X	ND
Xylenes, m & p	X	ND	---	X	X	X	ND	X	X	X	X	X
Xylenes, o	X	ND	---	X	X	X	ND	X	X	X	X	X
Xylenes, total	X	X	---	X	---	---	---	---	---	---	---	---
Dioxins/Furans												
1,2,3,4,6,7,8-HpCDD	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,4,6,7,8-HpCDF	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,4,7,8,9-HpCDF	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,4,7,8-HxCDD	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,4,7,8-HxCDF	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,6,7,8-HxCDD	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,6,7,8-HxCDF	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,7,8,9-HxCDD	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,7,8,9-HxCDF	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,7,8-PeCDD	X	---	---	X	---	---	---	---	---	---	---	---
1,2,3,7,8-PeCDF	X	---	---	X	---	---	---	---	---	---	---	---
2,3,4,6,7,8-HxCDF	X	---	---	X	---	---	---	---	---	---	---	---
2,3,4,7,8-PeCDF	X	---	---	X	---	---	---	---	---	---	---	---
2,3,7,8-TCDD	X	---	---	ND	---	---	---	---	---	---	---	---
2,3,7,8-TCDF	X	---	---	X	---	---	---	---	---	---	---	---
OCDD	X	---	---	X	---	---	---	---	---	---	---	---
OCDF	X	---	---	X	---	---	---	---	---	---	---	---
Total Petroleum Hydrocarbons												
Diesel c10-c24	X	X	---	---	---	X	X	---	---	---	---	---
Gasoline c6-c10	X	X	---	---	---	ND	X	---	---	---	---	---
General												
Alkalinity, bicarbonate (as $CaCO_3$)	---	---	---	X	---	---	---	---	---	---	---	---
Alkalinity, total (as $CaCO_3$)	---	---	---	X	---	---	---	---	---	---	---	---

BG Background
PP Prescott Park
MW Monitoring Well
X Detected
--- Not analyzed
ND Not detected

Table 4

Soil Exposure Assumptions

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Parameter		Units	Reasonable Maximum Exposure (RME) Scenario: Occupational Worker		Construction Worker		Residential Adult		Residential Child		Intake Equation
Incidental Ingestion of Soil											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Ingestion Rate	IngR	mg/day	100	EPA, 1989	330	EPA, 1989	100	EPA, 1989	200	EPA, 1989	
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	$\frac{Cs \times IngR \times EF \times ED \times CF}{BW \times AT}$
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	
Conversion Factor	CF	kg/mg	1.00E-06		1.00E-06		1.00E-06		1.00E-06		
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	
Inhalation of Particulates											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Inhalation Rate	InhR	m^3/day	20	EPA, 1989	20	EPA, 1989	20	EPA, 1989	10	EPA, 1989	
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	$\frac{Cs \times InhR \times EF \times ED \times [(1/PEF)+(1/VF)]}{BW \times AT}$
1/Particulate Emission Factor	1/PEF	kg/m^3	7.60E-10	EPA, 1996	1.00E-06	EPA, 1996	7.60E-10	EPA, 1996	7.60E-10	EPA, 1996	
1/Volatilization Factor	1/VF	kg/m^3	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	
Dermal Contact with Soil											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	
Skin Surface Area	SA	cm^2	5700	CalEPA, 2005	5700	CALEPA, 2005	5700	CalEPA, 2005	2900	CalEPA, 2005	$\frac{Cs \times SA \times EF \times ED \times AF \times ABS \times CF}{BW \times AT}$
Soil-Skin Adherence Factor	AF	mg/cm^2/day	0.2	CalEPA, 2005	0.8	CALEPA, 2005	0.07	CalEPA, 2005	0.2	CalEPA, 2005	
Absorption Factor	ABS	unitless	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	
Conversion Factor	CF	kg/mg	1.00E-06		1.00E-06		1.00E-06		1.00E-06		
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	

Notes:

AT_C = 70 years x 365 days/year

AT_{NC} = ED (years) x 365 days/year

PEF = 1.32E-09 m^3/kg

RME = Reasonable maximum exposure.

EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.

EPA, 1996: Soil Screening Guidance.

EPA, 2004: User's Guide and Background Technical Document for Preliminary Remediation Goals (PRG). Region 9. October.

CalEPA, DTSC, HERD, 2005: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.

Table 5
Groundwater Exposure Assumptions - Future Residents
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

			Reasonable Maximum Exposure (RME) Scenario				
			Residential		Residential		
Exposure Parameter		**Units**	**Adult**		**Child**		**Intake Equation**
Ingestion of Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		
Ingestion Rate	IngR	L/day	2	EPA, 1989	1	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	$\frac{C_{gw} \times IngR \times EF \times ED}{BW \times AT}$
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 2004[b]	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Inhalation of VOCs in Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		
Inhalation Rate	InhR	m^3/day	20	EPA, 1989	10	EPA, 1989	
Volatilization Factor	VF	L/m^3	0.5	EPA, 2004[b]	0.5	EPA, 2004[b]	$\frac{C_{gw} \times InhR \times VF \times ET \times EF \times ED}{BW \times AT}$
Exposure Time	ET	hours/day	24	EPA, 1989	24	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Dermal Contact with Groundwater While Showering							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Event Duration	t_{event}	hours/event	0.58	EPA, 2004[a]	1	EPA, 2004[a]	Where for Organics:
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Permeability Constant for chemicals in groundwater	K_P	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	If $t_{event} > t^*$
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	$DA_{event} = FA \times K_p \times C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Surface Area	SA	cm^2/day	18,000	EPA, 1997	6,600	EPA, 2004[a]	If $t_{event} < t^*$
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1997	15	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	$DA_{event} = K_p \times C_{gw} \times t_{event}$

Notes:

AT_C = 70 years x 365 days/year

AT_{NC} = ED (years) x 365 days/year

RME = Reasonable maximum exposure.

EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.

EPA, 1997: Exposure Factors Handbook. Volume I, General Factors. August.

EPA, 2004[a]: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.

EPA, 2004[b]: User's Guide and Background Technical Document for Preliminary Remediation Goals Table. Region 9. October.

Table 6
Groundwater Exposure Assumptions - Trench Workers
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Units	Reasonable Maximum Exposure (RME) Scenario Trench Worker		Intake Equation
Inhalation of VOCs in Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Concentration (VOCs) in breathing zone	C_{air}	ug/m^3	Chemical specific	CalEPA, 2006	
Total emission rate	Ei	mg/s	Chemical specific	CalEPA, 2006	$\frac{C_{air} \times InhR \times ET \times EF \times ED \times CF_1}{BW \times AT}$
Inhalation Rate	InhR	m^3/hour	2.5	CalEPA, 2005	
Assumed velocity of air in the trench	u	m/s	0.152	CalEPA, 2006	
Mixing Height (adult breating zone)	H	m	1.83	CalEPA, 2006	
Width of trench perpendicular to wind direction	W	m	3.05	CalEPA, 2006	
Overall mass transfer coefficient	Ki	cm/s	Chemical specific	CalEPA, 2006	
Bottom area of the trench covered with contaminated water	A_w	cm^2	65,032	CalEPA, 2006	$C_{air} = \frac{E_i \times CF_2}{u \times H \times W}$
Exposure Time	ET	hours/day	8	CalEPA, 2005	
Exposure Frequency	EF	days/year	90	CalEPA, 2006	
Exposure Duration	ED	years	1	CalEPA, 2006	
Conversion Factor$_1$	CF_1	mg/ug	0.001		
Conversion Factor$_2$	CF_2	ug/mg	1000		$E_i = K_i \times A_w \times C_{gw}$
Body Weight	BW	kg	70	EPA, 1989	
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	
Dermal Contact with Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004	$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Event Duration	t_{event}	hours/event	8	CalEPA, 2005	For Organics:
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004	
groundwater	K_P	cm/hour	Chemical specific	EPA, 2004	If t_{event} < t*
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004	$DA_{event} = FA \times K_p C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004	
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004	
Skin Surface Area	SA	cm^2/day	5,700	CalEPA, 2005	If t_{event} > t*
Exposure Frequency	EF	days/year	90	CalEPA, 2006	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	1	CalEPA, 2006	
Body Weight	BW	kg	70	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	$DA_{event} = K_p \times C_{gw} \times t_{event}$

Notes:
RME = Reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 2004: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.
CalEPA, DTSC, HERD, 2005: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.
CalEPA, DTSC, HERD, 2006: Memorandum: Risk Assessment Issues, PAHs and Exposure Routes…,T.Taros, Staff Toxicologist, DTSC, 8810 Cal Center Drive, Sacramento, CA. August 11.

Table 7
Air Exposure Assumptions
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Parameter	Parameter Code	Units	Reasonable Maximum Exposure (RME) Scenario: Adult Industrial Worker	Source	Adult Future Resident	Source	Child Future Resident	Source
Exposure Frequency	EF	days/yr	250	Site Specific	350	EPA, 1989	350	EPA, 1989
Exposure Time for inhalation of volatiles	ET	hr/day	8	CalEPA, 2005	24	EPA, 1991	24	EPA, 1991
Exposure Duration	ED	years	25	CalEPA, 2005	24	EPA, 1989	6	EPA, 1989
Averaging Time for carcinogens	ATc	yr	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989
Averaging Time for noncarcinogens	ATnc	yr	25	CalEPA, 2005	24	EPA, 1989	6	EPA, 1989

Notes:
ATc = 70 years x 365 days/year
ATnc = ED (years) x 365 days/year

Intake Equation

$$I = \frac{C \times ET \times EF \times ED}{AT}$$

Sources:
CalEPA, DTSC, HERD, 2005. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.
EPA, 1989: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A).
EPA, 1991: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). USEPA
EPA, 2004a: Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual. (Part E, Supplemental Guidance for Dermal Risk Assessment, Final). July.

Table 8
Exposure Point Concentrations for Soil Exposure Areas
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Former AMCO Chemical Facility - Shallow			
Metals			
Aluminum	mg/kg	12,600	95% Student's-t UCL
Antimony	mg/kg	14	95% Chebyshev (MVUE) UCL
Arsenic	mg/kg	8	95% Approximate Gamma UCL
Barium	mg/kg	513	95% Approximate Gamma UCL
Beryllium	mg/kg	1	95% Approximate Gamma UCL
Cadmium	mg/kg	2	95% H-UCL
Chromium	mg/kg	1,410	99% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	9	95% Approximate Gamma UCL
Copper	mg/kg	229	95% Chebyshev (MVUE) UCL
Iron	mg/kg	26,100	95% Approximate Gamma UCL
Lead	mg/kg	640	95% Approximate Gamma UCL
Manganese	mg/kg	1,140	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/kg	42	95% Student's-t UCL
Selenium	mg/kg	3	Maximum Result
Silver	mg/kg	1	95% Approximate Gamma UCL
Thallium	mg/kg	3	95% Chebyshev (Mean, Sd) UCL
Vanadium	mg/kg	42	95% Approximate Gamma UCL
Zinc	mg/kg	591	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	ug/kg	9,160	95% Adjusted Gamma UCL
4,4'-DDE	ug/kg	3,560	95% Adjusted Gamma UCL
4,4'-DDT	ug/kg	325	99% Chebyshev (Mean, Sd) UCL
Aldrin	ug/kg	1,290	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	ug/kg	26	Maximum Result
alpha-Chlordane	ug/kg	40	95% Chebyshev (MVUE) UCL
beta-BHC	ug/kg	35	Maximum Result
delta-BHC	ug/kg	4	Maximum Result
Dieldrin	ug/kg	1,340	95% Adjusted Gamma UCL
Endosulfan sulfate	ug/kg	2	Maximum Result
Endrin	ug/kg	5	Maximum Result
Endrin aldehyde	ug/kg	1	Maximum Result
Endrin ketone	ug/kg	12	Maximum Result
gamma-Chlordane	ug/kg	109	99% Chebyshev (Mean, Sd) UCL
Heptachlor	ug/kg	9	Maximum Result
Methoxychlor	ug/kg	4	Maximum Result
Aroclor-1260	ug/kg	640	Maximum Result
SVOCs/VOCs			
1,2,4-Trichlorobenzene	ug/kg	1,540	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	ug/kg	54,700	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	ug/kg	2,020	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	ug/kg	25,500	99% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	ug/kg	114,000	95% Hall's Bootstrap UCL
2-Methylphenol	ug/kg	990	Maximum Result
4-Chloro-3-methylphenol	ug/kg	7,200	Maximum Result
4-Methylphenol	ug/kg	3,600	Maximum Result
Acenaphthene	ug/kg	9,180	99% Chebyshev (Mean, Sd) UCL
Anthracene	ug/kg	1,100	Maximum Result
Benzo(a)anthracene	ug/kg	550	Maximum Result
Benzo(a)pyrene	ug/kg	500	Maximum Result
Benzo(b)fluoranthene	ug/kg	420	Maximum Result
Benzo(g,h,i)perylene	ug/kg	430	Maximum Result
Benzo(k)fluoranthene	ug/kg	430	Maximum Result
Benzyl butyl phthalate	ug/kg	7,600	Maximum Result
Biphenyl (diphenyl)	ug/kg	4,400	Maximum Result

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Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
bis(2-Ethylhexyl)phthalate	ug/kg	9,850	99% Chebyshev (Mean, Sd) UCL
Caprolactam	ug/kg	95	Maximum Result
Carbazole	ug/kg	1,100	Maximum Result
Chrysene	ug/kg	910	Maximum Result
Dibenz(a,h)anthracene	ug/kg	120	Maximum Result
Dibenzofuran	ug/kg	4,100	Maximum Result
Di-n-butyl phthalate	ug/kg	2,900	Maximum Result
Fluoranthene	ug/kg	4,200	Maximum Result
Fluorene	ug/kg	8,310	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	ug/kg	440	Maximum Result
Naphthalene	ug/kg	52,800	99% Chebyshev (Mean, Sd) UCL
Phenanthrene	ug/kg	12,100	99% Chebyshev (Mean, Sd) UCL
Pyrene	ug/kg	3,970	95% Approximate Gamma UCL
1,1,1-Trichloroethane	ug/kg	25	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	ug/kg	10,100	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	ug/kg	68	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	ug/kg	61	95% Chebyshev (Mean, Sd) UCL
Acetone	ug/kg	226	95% Approximate Gamma UCL
Benzene	ug/kg	1,930	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	ug/kg	6	95% Student's-t UCL
Chlorobenzene	ug/kg	10,100	99% Chebyshev (Mean, Sd) UCL
Chloroethane	ug/kg	24	95% Chebyshev (Mean, Sd) UCL
Chloromethane	ug/kg	127	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	ug/kg	149,000	95% Hall's Bootstrap UCL
Cyclohexane	ug/kg	2,550	99% Chebyshev (Mean, Sd) UCL
Ethylbenzene	ug/kg	22,400	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	ug/kg	5,350	95% Hall's Bootstrap UCL
Methyl ethyl ketone	ug/kg	314	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	ug/kg	5,740	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	ug/kg	4	Maximum Result
Methylcyclohexane	ug/kg	10,200	95% Hall's Bootstrap UCL
Methylene chloride	ug/kg	8	95% Student's-t UCL
Styrene	ug/kg	514	99% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	ug/kg	88	99% Chebyshev (Mean, Sd) UCL
Toluene	ug/kg	116,000	95% Hall's Bootstrap UCL
trans-1,2-Dichloroethene	ug/kg	638	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	ug/kg	521	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	ug/kg	1,280	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	ug/kg	157,000	95% Hall's Bootstrap UCL

Table 8
Exposure Point Concentrations for Soil Exposure Areas
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Dioxins/Furans			
1,2,3,4,6,7,8-HpCDD	ng/kg	972	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	ng/kg	160	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	ng/kg	8	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	ng/kg	16	Maximum Result
1,2,3,4,7,8-HxCDF	ng/kg	2	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	ng/kg	74	Maximum Result
1,2,3,6,7,8-HxCDF	ng/kg	15	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	ng/kg	41	Maximum Result
1,2,3,7,8,9-HxCDF	ng/kg	9	Maximum Result
1,2,3,7,8-PeCDD	ng/kg	15	Maximum Result
2,3,4,6,7,8-HxCDF	ng/kg	15	95% Student's-t UCL
2,3,4,7,8-PeCDF	ng/kg	37	95% Student's-t UCL
2,3,7,8-TCDF	ng/kg	5	95% Student's-t UCL
OCDD	ng/kg	8,200	95% Student's-t UCL
OCDF	ng/kg	325	95% Student's-t UCL
Former AMCO Chemical Facility - Deep			
Metals			
Aluminum	mg/kg	12,500	95% Student's-t UCL
Antimony	mg/kg	21	99% Chebyshev (Mean, Sd) UCL
Arsenic	mg/kg	8	95% Approximate Gamma UCL
Barium	mg/kg	555	95% H-UCL
Beryllium	mg/kg	1	95% Approximate Gamma UCL
Cadmium	mg/kg	2	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	495	95% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	8	95% Approximate Gamma UCL
Copper	mg/kg	145	95% Approximate Gamma UCL
Iron	mg/kg	23,400	95% Approximate Gamma UCL
Lead	mg/kg	605	95% Approximate Gamma UCL
Manganese	mg/kg	843	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/kg	37	95% Student's-t UCL
Selenium	mg/kg	3	95% Chebyshev (Mean, Sd) UCL
Silver	mg/kg	1	95% Approximate Gamma UCL
Thallium	mg/kg	3	95% Chebyshev (Mean, Sd) UCL
Vanadium	mg/kg	41	95% Approximate Gamma UCL
Zinc	mg/kg	441	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	ug/kg	8,400	95% Hall's Bootstrap UCL
4,4'-DDE	ug/kg	5,640	99% Chebyshev (Mean, Sd) UCL
4,4'-DDT	ug/kg	247	99% Chebyshev (Mean, Sd) UCL
Aldrin	ug/kg	924	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	ug/kg	26	Maximum Result
alpha-Chlordane	ug/kg	70	99% Chebyshev (Mean, Sd) UCL
beta-BHC	ug/kg	35	Maximum Result
delta-BHC	ug/kg	4	Maximum Result
Dieldrin	ug/kg	2,080	99% Chebyshev (Mean, Sd) UCL
Endosulfan sulfate	ug/kg	2	Maximum Result
Endrin	ug/kg	5	Maximum Result
Endrin aldehyde	ug/kg	1	Maximum Result
Endrin ketone	ug/kg	12	Maximum Result
gamma-BHC	ug/kg	3	Maximum Result
gamma-Chlordane	ug/kg	88	99% Chebyshev (Mean, Sd) UCL
Heptachlor	ug/kg	9	Maximum Result
Methoxychlor	ug/kg	4	Maximum Result
Aroclor-1260	ug/kg	980	Maximum Result
SVOCs/VOCs			

Table 8
Exposure Point Concentrations for Soil Exposure Areas
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
1,2,4-Trichlorobenzene	ug/kg	1,050	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	ug/kg	40,200	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	ug/kg	1,380	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	ug/kg	17,600	99% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	ug/kg	872	95% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	ug/kg	402,000	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	ug/kg	990	Maximum Result
4-Chloro-3-methylphenol	ug/kg	7,200	Maximum Result
4-Methylphenol	ug/kg	3,600	Maximum Result
Acenaphthene	ug/kg	8,320	99% Chebyshev (Mean, Sd) UCL
Acetophenone	ug/kg	8,730	99% Chebyshev (Mean, Sd) UCL
Anthracene	ug/kg	1,100	Maximum Result
Benzo(a)anthracene	ug/kg	550	Maximum Result
Benzo(a)pyrene	ug/kg	500	Maximum Result
Benzo(b)fluoranthene	ug/kg	420	Maximum Result
Benzo(g,h,i)perylene	ug/kg	430	Maximum Result
Benzo(k)fluoranthene	ug/kg	430	Maximum Result
Benzyl butyl phthalate	ug/kg	7,600	Maximum Result
Biphenyl (diphenyl)	ug/kg	7,100	Maximum Result
bis(2-Ethylhexyl)phthalate	ug/kg	8,860	99% Chebyshev (Mean, Sd) UCL
Caprolactam	ug/kg	95	Maximum Result
Carbazole	ug/kg	1,100	Maximum Result
Chrysene	ug/kg	3,500	Maximum Result
Dibenz(a,h)anthracene	ug/kg	120	Maximum Result
Dibenzofuran	ug/kg	4,100	Maximum Result
Di-n-butyl phthalate	ug/kg	2,900	Maximum Result
Fluoranthene	ug/kg	5,900	Maximum Result
Fluorene	ug/kg	8,100	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	ug/kg	440	Maximum Result
Naphthalene	ug/kg	51,000	99% Chebyshev (Mean, Sd) UCL
Pentachlorophenol	ug/kg	6,700	Maximum Result
Phenanthrene	ug/kg	15,100	99% Chebyshev (Mean, Sd) UCL
Pyrene	ug/kg	7,300	99% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	ug/kg	23	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	ug/kg	7,300	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	ug/kg	53	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	ug/kg	43	95% Chebyshev (Mean, Sd) UCL
Acetone	ug/kg	209	95% Approximate Gamma UCL
Benzene	ug/kg	1,420	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	ug/kg	7	95% Student's-t UCL
Chlorobenzene	ug/kg	6,890	99% Chebyshev (Mean, Sd) UCL
Chloroethane	ug/kg	19	95% Chebyshev (Mean, Sd) UCL
Chloromethane	ug/kg	88	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	ug/kg	134,000	95% Hall's Bootstrap UCL
Cyclohexane	ug/kg	2,380	99% Chebyshev (Mean, Sd) UCL
Ethylbenzene	ug/kg	25,200	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	ug/kg	14,700	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	ug/kg	281	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	ug/kg	4,190	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	ug/kg	4	Maximum Result
Methylcyclohexane	ug/kg	16,200	95% Hall's Bootstrap UCL
Methylene chloride	ug/kg	9	95% Student's-t UCL
Styrene	ug/kg	174	95% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	ug/kg	509	99% Chebyshev (Mean, Sd) UCL
Toluene	ug/kg	494,000	95% Hall's Bootstrap UCL
trans-1,2-Dichloroethene	ug/kg	529	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	ug/kg	2,630	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	ug/kg	895	99% Chebyshev (Mean, Sd) UCL

Table 8
Exposure Point Concentrations for Soil Exposure Areas
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Xylenes, total	ug/kg	140,000	95% Hall's Bootstrap UCL
Dioxins/Furans			
1,2,3,4,6,7,8-HpCDD	ng/kg	972	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	ng/kg	160	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	ng/kg	8	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	ng/kg	16	Maximum Result
1,2,3,4,7,8-HxCDF	ng/kg	2	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	ng/kg	74	Maximum Result
1,2,3,6,7,8-HxCDF	ng/kg	15	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	ng/kg	41	Maximum Result
1,2,3,7,8,9-HxCDF	ng/kg	9	Maximum Result
1,2,3,7,8-PeCDD	ng/kg	15	Maximum Result
2,3,4,6,7,8-HxCDF	ng/kg	15	95% Student's-t UCL
2,3,4,7,8-PeCDF	ng/kg	37	95% Student's-t UCL
2,3,7,8-TCDF	ng/kg	5	95% Student's-t UCL
OCDD	ng/kg	8,200	95% Student's-t UCL
OCDF	ng/kg	325	95% Student's-t UCL
Parking Lot - Shallow			
Metals			
Aluminum	mg/kg	13,500	Maximum Result
Antimony	mg/kg	216	Maximum Result
Arsenic	mg/kg	20	Maximum Result
Barium	mg/kg	3,800	Maximum Result
Beryllium	mg/kg	1	Maximum Result
Cadmium	mg/kg	11	Maximum Result
Chromium	mg/kg	102	Maximum Result
Cobalt	mg/kg	15	Maximum Result
Copper	mg/kg	418	Maximum Result
Iron	mg/kg	74,500	Maximum Result
Lead	mg/kg	2,170	Maximum Result
Manganese	mg/kg	1,110	Maximum Result
Nickel	mg/kg	72	Maximum Result
Selenium	mg/kg	5	Maximum Result
Silver	mg/kg	1	Maximum Result
Thallium	mg/kg	5	Maximum Result
Vanadium	mg/kg	64	Maximum Result
Zinc	mg/kg	8,030	Maximum Result
Pesticides/PCBs			
4,4'-DDD	ug/kg	10	Maximum Result
4,4'-DDE	ug/kg	4	Maximum Result
4,4'-DDT	ug/kg	10	Maximum Result
Endrin	ug/kg	6	Maximum Result
Endrin ketone	ug/kg	14	Maximum Result
gamma-Chlordane	ug/kg	2	Maximum Result
Methoxychlor	ug/kg	10	Maximum Result
SVOCs/VOCs			
2-Methylnaphthalene	ug/kg	170	Maximum Result
Acenaphthylene	ug/kg	690	Maximum Result
Anthracene	ug/kg	860	Maximum Result
Benzo(a)anthracene	ug/kg	1,300	Maximum Result
Benzo(a)pyrene	ug/kg	2,600	Maximum Result
Benzo(b)fluoranthene	ug/kg	1,700	Maximum Result
Benzo(g,h,i)perylene	ug/kg	2,300	Maximum Result
Benzo(k)fluoranthene	ug/kg	1,500	Maximum Result
Biphenyl (diphenyl)	ug/kg	160	Maximum Result
Chrysene	ug/kg	1,800	Maximum Result

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Fluoranthene	ug/kg	3,000	Maximum Result
Fluorene	ug/kg	500	Maximum Result
Indeno(1,2,3-c,d)pyrene	ug/kg	2,300	Maximum Result
Naphthalene	ug/kg	160	Maximum Result
Phenanthrene	ug/kg	4,400	Maximum Result
Pyrene	ug/kg	4,400	Maximum Result
Acetone	ug/kg	50	Maximum Result
cis-1,2-Dichloroethene	ug/kg	2	Maximum Result
Methyl ethyl ketone	ug/kg	21	Maximum Result
Methylene chloride	ug/kg	4	Maximum Result
Toluene	ug/kg	9	Maximum Result
Xylenes, total	ug/kg	5	Maximum Result

Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)	
Dioxins/Furans				**Dioxin/Furans TEQ**
1,2,3,4,6,7,8-HpCDD	ng/kg	35	Maximum Result	0.351
1,2,3,4,6,7,8-HpCDF	ng/kg	31	Maximum Result	0.308
1,2,3,4,7,8,9-HpCDF	ng/kg	3	Maximum Result	0.0283
1,2,3,4,7,8-HxCDD	ng/kg	3	Maximum Result	0.283
1,2,3,4,7,8-HxCDF	ng/kg	17	Maximum Result	1.74
1,2,3,6,7,8-HxCDD	ng/kg	6	Maximum Result	0.559
1,2,3,6,7,8-HxCDF	ng/kg	11	Maximum Result	1.13
1,2,3,7,8,9-HxCDD	ng/kg	4	Maximum Result	0.375
1,2,3,7,8,9-HxCDF	ng/kg	4	Maximum Result	0.379
1,2,3,7,8-PeCDD	ng/kg	3	Maximum Result	3.37
1,2,3,7,8-PeCDF	ng/kg	4	Maximum Result	0.1173
2,3,4,6,7,8-HxCDF	ng/kg	16	Maximum Result	1.55
2,3,4,7,8-PeCDF	ng/kg	33	Maximum Result	9.96
2,3,7,8-TCDD	ng/kg	1	Maximum Result	0.898
2,3,7,8-TCDF	ng/kg	8	Maximum Result	0.822
OCDD	ng/kg	357	Maximum Result	0.1071
OCDF	ng/kg	19	Maximum Result	0.00564
Total TEQs	ng/kg			22

Parking Lot - Deep

Metals			
Aluminum	mg/kg	13,000	95% Student's-t UCL
Antimony	mg/kg	216	Maximum Result
Arsenic	mg/kg	13	95% Student's-t UCL
Barium	mg/kg	3,500	95% Approximate Gamma UCL
Beryllium	mg/kg	1	95% Approximate Gamma UCL
Cadmium	mg/kg	11	Maximum Result
Chromium	mg/kg	80	95% Student's-t UCL
Cobalt	mg/kg	12	95% Approximate Gamma UCL
Copper	mg/kg	307	95% Student's-t UCL
Iron	mg/kg	57,400	95% Approximate Gamma UCL
Lead	mg/kg	1,450	95% Student's-t UCL
Manganese	mg/kg	857	95% Approximate Gamma UCL
Nickel	mg/kg	59	95% Student's-t UCL
Selenium	mg/kg	4	95% Approximate Gamma UCL
Silver	mg/kg	1	95% Student's-t UCL
Thallium	mg/kg	4	95% Approximate Gamma UCL
Vanadium	mg/kg	50	95% Student's-t UCL
Zinc	mg/kg	8,030	Maximum Result
Pesticides/PCBs			
4,4'-DDD	ug/kg	61	95% Approximate Gamma UCL
4,4'-DDE	ug/kg	24	95% Chebyshev (Mean, Sd) UCL
4,4'-DDT	ug/kg	9	95% Chebyshev (Mean, Sd) UCL
Dieldrin	ug/kg	9	95% Chebyshev (Mean, Sd) UCL
Endrin	ug/kg	4	95% Approximate Gamma UCL
Endrin ketone	ug/kg	13	95% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	ug/kg	1	95% Approximate Gamma UCL
Methoxychlor	ug/kg	10	Maximum Result
SVOCs/VOCs			
2-Methylnaphthalene	ug/kg	1,910	95% Chebyshev (Mean, Sd) UCL
Acenaphthylene	ug/kg	1,200	Maximum Result
Anthracene	ug/kg	940	Maximum Result
Benzo(a)anthracene	ug/kg	4,140	95% Approximate Gamma UCL
Benzo(a)pyrene	ug/kg	8,900	Maximum Result
Benzo(b)fluoranthene	ug/kg	5,600	Maximum Result

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Benzo(g,h,i)perylene	ug/kg	9,000	Maximum Result	
Benzo(k)fluoranthene	ug/kg	3,400	95% Approximate Gamma UCL	
Biphenyl (diphenyl)	ug/kg	160	Maximum Result	
Chrysene	ug/kg	6,500	Maximum Result	
Dibenz(a,h)anthracene	ug/kg	1,020	95% Chebyshev (Mean, Sd) UCL	
Fluoranthene	ug/kg	12,000	Maximum Result	
Fluorene	ug/kg	423	95% Approximate Gamma UCL	
Indeno(1,2,3-c,d)pyrene	ug/kg	8,300	Maximum Result	
Naphthalene	ug/kg	799	95% Chebyshev (Mean, Sd) UCL	
Phenanthrene	ug/kg	4,400	Maximum Result	
Pyrene	ug/kg	16,000	Maximum Result	
Acetone	ug/kg	34	95% Student's-t UCL	
cis-1,2-Dichloroethene	ug/kg	2	Maximum Result	
Methyl ethyl ketone	ug/kg	19	95% Chebyshev (Mean, Sd) UCL	
Methylene chloride	ug/kg	4	Maximum Result	
Toluene	ug/kg	8	95% Student's-t UCL	
Xylenes, total	ug/kg	5	Maximum Result	
Dioxins/Furans				**Dioxin/Furans TEQ**
1,2,3,4,6,7,8-HpCDD	ng/kg	35	Maximum Result	0.351
1,2,3,4,6,7,8-HpCDF	ng/kg	31	Maximum Result	0.308
1,2,3,4,7,8,9-HpCDF	ng/kg	3	Maximum Result	0.0283
1,2,3,4,7,8-HxCDD	ng/kg	3	Maximum Result	0.283
1,2,3,4,7,8-HxCDF	ng/kg	17	Maximum Result	1.74
1,2,3,6,7,8-HxCDD	ng/kg	6	Maximum Result	0.559
1,2,3,6,7,8-HxCDF	ng/kg	11	Maximum Result	1.13
1,2,3,7,8,9-HxCDD	ng/kg	4	Maximum Result	0.375
1,2,3,7,8,9-HxCDF	ng/kg	4	Maximum Result	0.379
1,2,3,7,8-PeCDD	ng/kg	3	Maximum Result	3.37
1,2,3,7,8-PeCDF	ng/kg	4	Maximum Result	0.1173
2,3,4,6,7,8-HxCDF	ng/kg	16	Maximum Result	1.55
2,3,4,7,8-PeCDF	ng/kg	33	Maximum Result	9.96
2,3,7,8-TCDD	ng/kg	1	Maximum Result	0.898
2,3,7,8-TCDF	ng/kg	8	Maximum Result	0.822
OCDD	ng/kg	357	Maximum Result	0.1071
OCDF	ng/kg	19	Maximum Result	0.00564

Large Vacant Lot - Shallow

Metals			
Aluminum	mg/kg	9,210	95% Approximate Gamma UCL
Antimony	mg/kg	4	95% Approximate Gamma UCL
Arsenic	mg/kg	27	95% Approximate Gamma UCL
Barium	mg/kg	937	95% Chebyshev (Mean, Sd) UCL
Beryllium	mg/kg	0	95% Student's-t UCL
Cadmium	mg/kg	2	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	154	95% Approximate Gamma UCL
Cobalt	mg/kg	7	95% Student's-t UCL
Copper	mg/kg	149	95% Approximate Gamma UCL
Iron	mg/kg	24,900	95% Approximate Gamma UCL
Lead	mg/kg	4,360	99% Chebyshev (Mean, Sd) UCL
Manganese	mg/kg	360	95% Student's-t UCL
Nickel	mg/kg	26	95% Student's-t UCL
Selenium	mg/kg	3	Maximum Result
Silver	mg/kg	1	95% Approximate Gamma UCL
Thallium	mg/kg	3	Maximum Result
Vanadium	mg/kg	33	95% Approximate Gamma UCL
Zinc	mg/kg	453	95% Approximate Gamma UCL
Pesticides/PCBs			

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Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
4,4'-DDD	ug/kg	9,090	95% Adjusted Gamma UCL
4,4'-DDE	ug/kg	5,260	95% Adjusted Gamma UCL
4,4'-DDT	ug/kg	140,000	Maximum Result
alpha-BHC	ug/kg	6	Maximum Result
alpha-Chlordane	ug/kg	81	Maximum Result
beta-BHC	ug/kg	24	Maximum Result
Dieldrin	ug/kg	86	Maximum Result
Endosulfan sulfate	ug/kg	4	Maximum Result
Endrin	ug/kg	14	Maximum Result
Endrin aldehyde	ug/kg	5	Maximum Result
Endrin ketone	ug/kg	7	Maximum Result
gamma-BHC	ug/kg	347	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	ug/kg	83	Maximum Result
Heptachlor	ug/kg	1	Maximum Result
Heptachlor epoxide	ug/kg	3	Maximum Result
Methoxychlor	ug/kg	7	Maximum Result
Aroclor-1260	ug/kg	33	Maximum Result
SVOCs/VOCs			
1,2-Dichlorobenzene	ug/kg	8	95% Student's-t UCL
1,4-Dichlorobenzene	ug/kg	2	Maximum Result
2-Methylnaphthalene	ug/kg	3,870	99% Chebyshev (Mean, Sd) UCL
Acetophenone	ug/kg	260	95% Student's-t UCL
Benzo(a)anthracene	ug/kg	488	95% H-UCL
Benzo(a)pyrene	ug/kg	651	95% H-UCL
Benzo(b)fluoranthene	ug/kg	640	95% Chebyshev (Mean, Sd) UCL
Benzo(g,h,i)perylene	ug/kg	660	95% H-UCL
Benzo(k)fluoranthene	ug/kg	623	95% Chebyshev (Mean, Sd) UCL
bis(2-Ethylhexyl)phthalate	ug/kg	1,070	95% Chebyshev (Mean, Sd) UCL
Caprolactam	ug/kg	230	Maximum Result
Chrysene	ug/kg	797	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	ug/kg	313	95% Student's-t UCL
Fluoranthene	ug/kg	668	95% H-UCL
Indeno(1,2,3-c,d)pyrene	ug/kg	694	95% H-UCL
Naphthalene	ug/kg	283	95% Student's-t UCL
Phenanthrene	ug/kg	378	95% H-UCL
Pyrene	ug/kg	1,350	95% Chebyshev (Mean, Sd) UCL
Acetone	ug/kg	150	Maximum Result
Chlorobenzene	ug/kg	22	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	ug/kg	21	95% Chebyshev (Mean, Sd) UCL
Ethylbenzene	ug/kg	21	95% Chebyshev (Mean, Sd) UCL
Isopropylbenzene (cumene)	ug/kg	338	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	ug/kg	24	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	ug/kg	7	95% Student's-t UCL
Methylcyclohexane	ug/kg	346	99% Chebyshev (Mean, Sd) UCL
Methylene chloride	ug/kg	7	95% Student's-t UCL
Tetrachloroethene	ug/kg	7	95% Student's-t UCL
Toluene	ug/kg	69	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	ug/kg	4	Maximum Result
Xylenes, total	ug/kg	291	99% Chebyshev (Mean, Sd) UCL

Large Vacant Lot - Deep

Metals			
Aluminum	mg/kg	8,240	95% Student's-t UCL
Antimony	mg/kg	3	95% H-UCL
Arsenic	mg/kg	18	95% Approximate Gamma UCL
Barium	mg/kg	652	95% Chebyshev (Mean, Sd) UCL
Beryllium	mg/kg	0	95% Approximate Gamma UCL

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Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Cadmium	mg/kg	2	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	166	95% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	6	95% Student's-t UCL
Copper	mg/kg	114	95% Approximate Gamma UCL
Iron	mg/kg	21,400	95% Approximate Gamma UCL
Lead	mg/kg	2,750	99% Chebyshev (Mean, Sd) UCL
Manganese	mg/kg	324	95% Student's-t UCL
Nickel	mg/kg	25	95% Student's-t UCL
Selenium	mg/kg	4	Maximum Result
Silver	mg/kg	0	95% H-UCL
Thallium	mg/kg	3	Maximum Result
Vanadium	mg/kg	29	95% Approximate Gamma UCL
Zinc	mg/kg	321	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	ug/kg	3,790	95% Adjusted Gamma UCL
4,4'-DDE	ug/kg	2,100	95% Adjusted Gamma UCL
4,4'-DDT	ug/kg	80,500	99% Chebyshev (MVUE) UCL
alpha-BHC	ug/kg	6	Maximum Result
alpha-Chlordane	ug/kg	81	Maximum Result
beta-BHC	ug/kg	24	Maximum Result
Dieldrin	ug/kg	86	Maximum Result
Endosulfan I	ug/kg	1	Maximum Result
Endosulfan sulfate	ug/kg	4	Maximum Result
Endrin	ug/kg	14	Maximum Result
Endrin aldehyde	ug/kg	5	Maximum Result
Endrin ketone	ug/kg	7	Maximum Result
gamma-BHC	ug/kg	216	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	ug/kg	83	Maximum Result
Heptachlor	ug/kg	1	Maximum Result
Heptachlor epoxide	ug/kg	3	Maximum Result
Methoxychlor	ug/kg	7	Maximum Result
Aroclor-1260	ug/kg	33	Maximum Result
SVOCs/VOCs			
1,1-Dichloroethane	ug/kg	7	95% Student's-t UCL
1,2-Dichlorobenzene	ug/kg	1,050	99% Chebyshev (Mean, Sd) UCL
1,3-Dichlorobenzene	ug/kg	2	Maximum Result
1,4-Dichlorobenzene	ug/kg	74	95% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	ug/kg	1,360	95% Chebyshev (Mean, Sd) UCL
Acetophenone	ug/kg	236	95% Student's-t UCL
Anthracene	ug/kg	81	Maximum Result
Benzo(a)anthracene	ug/kg	495	95% Chebyshev (Mean, Sd) UCL
Benzo(a)pyrene	ug/kg	617	95% Chebyshev (Mean, Sd) UCL
Benzo(b)fluoranthene	ug/kg	501	95% Chebyshev (Mean, Sd) UCL
Benzo(g,h,i)perylene	ug/kg	581	95% Chebyshev (Mean, Sd) UCL
Benzo(k)fluoranthene	ug/kg	495	95% Chebyshev (Mean, Sd) UCL
Benzyl butyl phthalate	ug/kg	270	Maximum Result
bis(2-Ethylhexyl)phthalate	ug/kg	904	95% Chebyshev (Mean, Sd) UCL
Caprolactam	ug/kg	230	Maximum Result
Chrysene	ug/kg	597	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	ug/kg	267	95% Student's-t UCL
Fluoranthene	ug/kg	735	95% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	ug/kg	600	95% Chebyshev (Mean, Sd) UCL
Naphthalene	ug/kg	249	95% Student's-t UCL
Phenanthrene	ug/kg	308	95% Student's-t UCL
Pyrene	ug/kg	1,020	95% Chebyshev (Mean, Sd) UCL
Acetone	ug/kg	61	95% Approximate Gamma UCL
Chlorobenzene	ug/kg	2,240	99% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	ug/kg	18	95% Chebyshev (Mean, Sd) UCL

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Chemical of Potential Concern	Units	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Ethylbenzene	ug/kg	10	95% Student's-t UCL
Isopropylbenzene (cumene)	ug/kg	105	95% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	ug/kg	18	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	ug/kg	7	95% Student's-t UCL
Methylcyclohexane	ug/kg	107	95% Chebyshev (Mean, Sd) UCL
Methylene chloride	ug/kg	6	95% Student's-t UCL
Tetrachloroethene	ug/kg	6	95% Student's-t UCL
Toluene	ug/kg	44	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	ug/kg	4	Maximum Result
Vinyl chloride	ug/kg	1	Maximum Result
Xylenes, total	ug/kg	91	95% Chebyshev (Mean, Sd) UCL

Small Vacant Lot - Shallow

Metals			
Aluminum	mg/kg	8,020	Maximum Result
Arsenic	mg/kg	14	Maximum Result
Barium	mg/kg	278	Maximum Result
Beryllium	mg/kg	0	Maximum Result
Cadmium	mg/kg	2	Maximum Result
Chromium	mg/kg	34	Maximum Result
Cobalt	mg/kg	7	Maximum Result
Copper	mg/kg	96	Maximum Result
Iron	mg/kg	16,300	Maximum Result
Lead	mg/kg	386	Maximum Result
Manganese	mg/kg	312	Maximum Result
Nickel	mg/kg	24	Maximum Result
Selenium	mg/kg	1	Maximum Result
Silver	mg/kg	1	Maximum Result
Thallium	mg/kg	1	Maximum Result
Vanadium	mg/kg	27	Maximum Result
Zinc	mg/kg	736	Maximum Result
Pesticides/PCBs			
4,4'-DDD	ug/kg	6	Maximum Result
4,4'-DDE	ug/kg	18	Maximum Result
4,4'-DDT	ug/kg	45	Maximum Result
alpha-Chlordane	ug/kg	8	Maximum Result
Dieldrin	ug/kg	1	Maximum Result
gamma-Chlordane	ug/kg	6	Maximum Result

Table 9
Exposure Point Concentrations for Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
Metals			
Aluminum	ug/L	9,398	97.5% Chebyshev (Mean, Sd) UCL
Antimony	ug/L	1.5	95% Student's-t UCL
Arsenic	ug/L	287	95% H-UCL
Barium	ug/L	168	95% H-UCL
Beryllium	ug/L	0.8	95% Chebyshev (Mean, Sd) UCL
Boron	ug/L	4,307	95% Approximate Gamma UCL
Cadmium	ug/L	1.3	95% Chebyshev (Mean, Sd) UCL
Chromium	ug/L	36	97.5% Chebyshev (Mean, Sd) UCL
Chromium (VI)	ug/L	0.4	Maximum Result
Cobalt	ug/L	8.9	95% Approximate Gamma UCL
Copper	ug/L	47	95% H-UCL
Iron	ug/L	53,504	95% Chebyshev (MVUE) UCL
Lead	ug/L	40	95% H-UCL
Manganese	ug/L	4,331	95% Approximate Gamma UCL
Mercury	ug/L	0.1	95% Student's-t UCL
Molybdenum	ug/L	5.6	95% Chebyshev (Mean, Sd) UCL
Nickel	ug/L	55	95% H-UCL
Selenium	ug/L	19	95% Chebyshev (Mean, Sd) UCL
Silver	ug/L	0.1	Maximum Result
Thallium	ug/L	0.1	Maximum Result
Vanadium	ug/L	32	97.5% Chebyshev (Mean, Sd) UCL
Zinc	ug/L	303	95% H-UCL
Cyanide	ug/L	63	Maximum Result
Pesticides/PCBs			
4,4'-DDD	ug/L	5.0	99% Chebyshev (Mean, Sd) UCL
4,4'-DDE	ug/L	0.8	97.5% Chebyshev (Mean, Sd) UCL
4,4'-DDT	ug/L	0.2	Maximum Result
Aldrin	ug/L	0.4	97.5% Chebyshev (Mean, Sd) UCL
alpha-BHC	ug/L	0.3	Maximum Result
alpha-Chlordane	ug/L	0.3	97.5% Chebyshev (Mean, Sd) UCL
Atrazine	ug/L	2.0	Maximum Result
beta-BHC	ug/L	0.4	97.5% Chebyshev (Mean, Sd) UCL
delta-BHC	ug/L	0.2	Maximum Result
Diazinon	ug/L	0.3	95% Chebyshev (Mean, Sd) UCL
Dieldrin	ug/L	0.9	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan I	ug/L	0.3	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan II	ug/L	0.2	Maximum Result
Endosulfan sulfate	ug/L	0.1	Maximum Result
Endrin	ug/L	0.6	97.5% Chebyshev (Mean, Sd) UCL
Endrin aldehyde	ug/L	0.1	Maximum Result
Endrin ketone	ug/L	0.2	Maximum Result
gamma-BHC	ug/L	0.3	97.5% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	ug/L	0.3	Maximum Result
Heptachlor	ug/L	0.1	97.5% Chebyshev (Mean, Sd) UCL
Heptachlor epoxide	ug/L	0.1	Maximum Result
Methoxychlor	ug/L	0.1	Maximum Result
Aroclor-1260	ug/L	1.0	95% Chebyshev (Mean, Sd) UCL
SVOCs/VOCs			
1,4-Dioxane (p-dioxane)	ug/L	780	Maximum Result
2,4,6-Trichlorophenol	ug/L	7	97.5% Chebyshev (Mean, Sd) UCL
2,4-Dimethylphenol	ug/L	79	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorophenol	ug/L	4.3	Maximum Result

Table 9
Exposure Point Concentrations for Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
2-Methylnaphthalene	ug/L	226	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	ug/L	123	97.5% Chebyshev (Mean, Sd) UCL
2-Nitroaniline	ug/L	10	Maximum Result
3,4-methylphenol	ug/L	840	Maximum Result
4-Chloro-3-methylphenol	ug/L	24	95% Chebyshev (Mean, Sd) UCL
4-Methylphenol	ug/L	194	97.5% Chebyshev (Mean, Sd) UCL
Acenaphthene	ug/L	4.5	Maximum Result
Acenaphthylene	ug/L	10	97.5% Chebyshev (Mean, Sd) UCL
Anthracene	ug/L	3.2	Maximum Result
Benzo(a)anthracene	ug/L	0.9	Maximum Result
Benzo(a)pyrene	ug/L	0.5	Maximum Result
Benzo(b)fluoranthene	ug/L	0.8	Maximum Result
Benzo(g,h,i)perylene	ug/L	0.2	Maximum Result
Benzo(k)fluoranthene	ug/L	0.5	Maximum Result
Biphenyl (Diphenyl)	ug/L	1.3	Maximum Result
bis(2-Chloroethoxy)methane	ug/L	0.2	Maximum Result
bis(2-Ethylhexyl)phthalate	ug/L	17	97.5% Chebyshev (Mean, Sd) UCL
Bromoform	ug/L	12	Maximum Result
Caprolactam	ug/L	2.4	Maximum Result
Carbazole	ug/L	13	99% Chebyshev (Mean, Sd) UCL
Chrysene	ug/L	1.1	Maximum Result
Dibenz(a,h)anthracene	ug/L	0.0	Maximum Result
Diethylphthalate	ug/L	10	95% Chebyshev (Mean, Sd) UCL
Di-n-butyl phthalate	ug/L	12	95% Chebyshev (Mean, Sd) UCL
Fluoranthene	ug/L	2.4	Maximum Result
Fluorene	ug/L	2.6	Maximum Result
Hexachloroethane	ug/L	1.0	Maximum Result
Indeno(1,2,3-c,d)pyrene	ug/L	0.2	Maximum Result
Naphthalene	ug/L	136	99% Chebyshev (Mean, Sd) UCL
Nitrobenzene	ug/L	2.0	Maximum Result
N-Nitrosodi-n-propylamine	ug/L	2.0	Maximum Result
N-Nitrosodiphenylamine	ug/L	1.2	Maximum Result
Pentachlorophenol	ug/L	11	97.5% Chebyshev (Mean, Sd) UCL
Phenanthrene	ug/L	6.0	Maximum Result
Pyrene	ug/L	2.4	Maximum Result
1,1-Dichloroethane	ug/L	557	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	ug/L	42	97.5% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	ug/L	118	97.5% Chebyshev (Mean, Sd) UCL
1,1,2-Trichloroethane	ug/L	13	97.5% Chebyshev (Mean, Sd) UCL
1,1,2,2-Tetrachloroethane	ug/L	13	97.5% Chebyshev (Mean, Sd) UCL
1,2,3-Trichlorobenzene	ug/L	2.7	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trichlorobenzene	ug/L	15	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trimethylbenzene	ug/L	278	99% Chebyshev (Mean, Sd) UCL
1,2-Dibromo-3-chloropropane	ug/L	2.4	Maximum Result
1,2-Dichlorobenzene	ug/L	734	99% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	ug/L	14	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dichloropropane	ug/L	5.1	Maximum Result
1,3-Dichlorobenzene	ug/L	27	97.5% Chebyshev (Mean, Sd) UCL
1,3,5-Trimethylbenzene	ug/L	110	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	ug/L	218	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorotoluene	ug/L	2.9	97.5% Chebyshev (Mean, Sd) UCL
2-Hexanone	ug/L	24	95% Chebyshev (Mean, Sd) UCL
2,2-Dichloropropane	ug/L	0.5	Maximum Result

Table 9
Exposure Point Concentrations for Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis	
Acetone	ug/L	485	97.5% Chebyshev (Mean, Sd) UCL	
Benzene	ug/L	400	99% Chebyshev (Mean, Sd) UCL	
Carbon disulfide	ug/L	3.1	Maximum Result	
Carbon tetrachloride	ug/L	0.3	Maximum Result	
Chlorobenzene	ug/L	674	99% Chebyshev (Mean, Sd) UCL	
Chloroethane	ug/L	97	99% Chebyshev (Mean, Sd) UCL	
Chloroform	ug/L	4.4	Maximum Result	
Chloromethane	ug/L	7.4	Maximum Result	
cis-1,2-Dichloroethene	ug/L	13,720	99% Chebyshev (Mean, Sd) UCL	
cis-1,3-Dichloropropene	ug/L	4.2	Maximum Result	
Cyclohexane	ug/L	18	Maximum Result	
Ethyl tert-butyl ether (ETBE)	ug/L	1.2	Maximum Result	
Ethylbenzene	ug/L	449	99% Chebyshev (Mean, Sd) UCL	
Isopropyl ether	ug/L	430	Maximum Result	
Isopropylbenzene (cumene)	ug/L	27	97.5% Chebyshev (Mean, Sd) UCL	
Methyl acetate	ug/L	23	97.5% Chebyshev (Mean, Sd) UCL	
Methyl ethyl ketone	ug/L	430	97.5% Chebyshev (Mean, Sd) UCL	
Methyl isobutyl ketone	ug/L	4,858	99% Chebyshev (Mean, Sd) UCL	
Methyl tert-butyl ether	ug/L	20	97.5% Chebyshev (Mean, Sd) UCL	
Methylcyclohexane	ug/L	25	97.5% Chebyshev (Mean, Sd) UCL	
Methylene chloride	ug/L	8.2	97.5% Chebyshev (Mean, Sd) UCL	
n-Butylbenzene	ug/L	6.1	97.5% Chebyshev (Mean, Sd) UCL	
n-Propylbenzene	ug/L	56	99% Chebyshev (Mean, Sd) UCL	
p-Cymene (p-isopropyltoluene)	ug/L	79	99% Chebyshev (Mean, Sd) UCL	
Phenol	ug/L	48	97.5% Chebyshev (Mean, Sd) UCL	
sec-Butylbenzene	ug/L	5.6	97.5% Chebyshev (Mean, Sd) UCL	
Styrene	ug/L	14	97.5% Chebyshev (Mean, Sd) UCL	
tert-Butylbenzene	ug/L	2.1	Maximum Result	
tert-Butyl alcohol	ug/L	117	97.5% Chebyshev (Mean, Sd) UCL	
Tetrachloroethene	ug/L	12	Maximum Result	
Toluene	ug/L	6,112	99% Chebyshev (Mean, Sd) UCL	
trans-1,2-Dichloroethene	ug/L	401	99% Chebyshev (Mean, Sd) UCL	
trans-1,3-Dichloropropene	ug/L	4.1	Maximum Result	
Trichloroethene	ug/L	57	97.5% Chebyshev (Mean, Sd) UCL	
Vinyl chloride	ug/L	1,627	99% Chebyshev (Mean, Sd) UCL	
m,p-Xylene	ug/L	944	99% Chebyshev (Mean, Sd) UCL	
o-Xylene	ug/L	445	99% Chebyshev (Mean, Sd) UCL	
Xylenes, total	ug/L	1,600	99% Chebyshev (Mean, Sd) UCL	
Dioxans/Furans				**Dioxin/Furans TEQ**
1,2,3,4,6,7,8-HpCDD	pg/L	464	99% Chebyshev (Mean, Sd) UCL	4.64
1,2,3,4,6,7,8-HpCDF	pg/L	95	99% Chebyshev (Mean, Sd) UCL	0.95
1,2,3,4,7,8,9-HpCDF	pg/L	10	99% Chebyshev (Mean, Sd) UCL	0.098
1,2,3,4,7,8-HxCDD	pg/L	2.6	95% Chebyshev (Mean, Sd) UCL	0.26
1,2,3,4,7,8-HxCDF	pg/L	8.5	99% Chebyshev (Mean, Sd) UCL	0.85
1,2,3,6,7,8-HxCDD	pg/L	13	99% Chebyshev (Mean, Sd) UCL	1.33
1,2,3,6,7,8-HxCDF	pg/L	1.6	95% Chebyshev (Mean, Sd) UCL	0.16
1,2,3,7,8,9-HxCDD	pg/L	4.4	95% Chebyshev (Mean, Sd) UCL	0.44
1,2,3,7,8,9-HxCDF	pg/L	3.9	99% Chebyshev (Mean, Sd) UCL	0.39
1,2,3,7,8-PeCDD	pg/L	1.1	95% H-UCL	1.08
1,2,3,7,8-PeCDF	pg/L	2.3	95% Chebyshev (Mean, Sd) UCL	0.068
2,3,4,6,7,8-HxCDF	pg/L	3.9	99% Chebyshev (Mean, Sd) UCL	0.39
2,3,4,7,8-PeCDF	pg/L	2.6	95% Chebyshev (Mean, Sd) UCL	0.79
2,3,7,8-TCDF	pg/L	1.7	95% Chebyshev (Mean, Sd) UCL	0.17

Table 9
Exposure Point Concentrations for Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis	
OCDF	pg/L	744	99% Chebyshev (Mean, Sd) UCL	0.22
OCDD	pg/L	2180	95% Hall's Bootstrap UCL	0.65
Total TEQs	pg/L			12.5

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1414 3rd St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	15.8	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.041	Maximum Result
1414 3rd St	Crawlspace Air	1,1-Dichloroethane	$\mu g/m^3$	21.3	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	1,1-Dichloroethene	$\mu g/m^3$	1.05	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	2.14	95% H-UCL
1414 3rd St	Crawlspace Air	1,2-Dibromoethane	$\mu g/m^3$	0.11	Maximum Result
1414 3rd St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	0.802	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.0619	95% KM (t) UCL
1414 3rd St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.364	95% KM (Percentile Bootstrap) UCL
1414 3rd St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.417	95% KM (t) UCL
1414 3rd St	Crawlspace Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.724	Too Few Unique Detected Values *
1414 3rd St	Crawlspace Air	Benzene	$\mu g/m^3$	0.724	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.189	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	6.05	95% Chebyshev (Mean, Sd) UCL
1414 3rd St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.0878	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.384	95% KM (Percentile Bootstrap) UCL
1414 3rd St	Crawlspace Air	Chloroform	$\mu g/m^3$	1.35	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	Chloromethane	$\mu g/m^3$	24.2	97.5% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	cis-1,2-Dichloroethene	$\mu g/m^3$	272	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.056	Maximum Result
1414 3rd St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	1.11	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.68	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.675	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 12	$\mu g/m^3$	4.23	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.0777	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	0.801	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Naphthalene	$\mu g/m^3$	0.638	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Styrene	$\mu g/m^3$	0.347	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	9.47	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Toluene	$\mu g/m^3$	9.3	95% Student's-t UCL
1414 3rd St	Crawlspace Air	trans-1,2-Dichloroethene	$\mu g/m^3$	0.635	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.057	Maximum Result
1414 3rd St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	13.6	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	1.61	95% KM (BCA) UCL
1414 3rd St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	3.86	95% Student's-t UCL
1428 3rd St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	0.985	95% Student's-t UCL
1428 3rd St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0941	95% KM (t) UCL
1428 3rd St	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.159	95% KM (t) UCL
1428 3rd St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	4.74	95% Chebyshev (MVUE) UCL
1428 3rd St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.126	95% KM (Percentile Bootstrap) UCL
1428 3rd St	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0513	95% KM (t) UCL
1428 3rd St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	4.09	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	51	Maximum Result
1428 3rd St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	1.14	95% KM (t) UCL
1428 3rd St	Ambient Air	Benzene	$\mu g/m^3$	3.2	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Bromomethane	$\mu g/m^3$	0.244	95% KM (t) UCL
1428 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.565	95% Student's-t UCL
1428 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.3	Maximum Result
1428 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.089	95% KM (t) UCL
1428 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	0.208	95% KM (Percentile Bootstrap) UCL
1428 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	1.28	95% Student's-t UCL
1428 3rd St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.052	Maximum Result
1428 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	12	Maximum Result
1428 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	2.08	95% Student's-t UCL
1428 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.672	95% Student's-t UCL
1428 3rd St	Ambient Air	Freon 114	$\mu g/m^3$	0.13	Maximum Result
1428 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.71	95% Student's-t UCL
1428 3rd St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.023	Maximum Result

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1428 3rd St	Ambient Air	Methylene chloride	μg/m^3	6.26	95% KM (t) UCL
1428 3rd St	Ambient Air	Naphthalene	μg/m^3	5.18	95% KM (t) UCL
1428 3rd St	Ambient Air	Styrene	μg/m^3	6.8	Maximum Result
1428 3rd St	Ambient Air	Tetrachloroethene	μg/m^3	1.16	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Toluene	μg/m^3	12.5	95% Chebyshev (MVUE) UCL
1428 3rd St	Ambient Air	trans-1,2-Dichloroethene	μg/m^3	0.042	Maximum Result
1428 3rd St	Ambient Air	trans-1,3-Dichloropropene	μg/m^3	0.041	Maximum Result
1428 3rd St	Ambient Air	Trichloroethene	μg/m^3	0.261	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Vinyl chloride	μg/m^3	0.0385	Too Few Unique Detected Values *
1428 3rd St	Ambient Air	Xylenes, m & p	μg/m^3	44	Maximum Result
1428 3rd St	Ambient Air	Xylenes, o	μg/m^3	18	Maximum Result
1428 3rd St	Ambient Air	1,1,1-Trichloroethane	μg/m^3	0.114	95% KM (t) UCL
1428 3rd St	Ambient Air	1,1,2,2-Tetrachloroethane	μg/m^3	0.074	Maximum Result
1428 3rd St	Ambient Air	1,1,2-Trichloroethane	μg/m^3	0.065	Maximum Result
1428 3rd St	Ambient Air	1,1-Dichloroethane	μg/m^3	0.026	Maximum Result
1428 3rd St	Ambient Air	1,2,4-Trimethylbenzene	μg/m^3	33.5	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,2-Dibromoethane	μg/m^3	0.034	Maximum Result
1428 3rd St	Ambient Air	1,2-Dichloroethane	μg/m^3	2.1	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,2-Dichloropropane	μg/m^3	0.0906	95% KM (t) UCL
1428 3rd St	Ambient Air	1,3,5-Trimethylbenzene	μg/m^3	9.46	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,4-Dichlorobenzene	μg/m^3	0.565	95% KM (t) UCL
1428 3rd St	Ambient Air	Benzene	μg/m^3	1.1	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Bromomethane	μg/m^3	0.185	95% KM (t) UCL
1428 3rd St	Ambient Air	Carbon tetrachloride	μg/m^3	0.501	95% KM (BCA) UCL
1428 3rd St	Ambient Air	Chlorobenzene	μg/m^3	0.0372	95% KM (t) UCL
1428 3rd St	Ambient Air	Chloroethane	μg/m^3	0.178	95% KM (BCA) UCL
1428 3rd St	Ambient Air	Chloroform	μg/m^3	2.53	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Chloromethane	μg/m^3	8.88	97.5% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Ethylbenzene	μg/m^3	1.26	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	Freon 11	μg/m^3	2.95	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Freon 113	μg/m^3	0.654	95% KM (t) UCL
1428 3rd St	Ambient Air	Freon 12	μg/m^3	2.54	95% KM (t) UCL
1428 3rd St	Ambient Air	Methylene chloride	μg/m^3	2.17	95% KM (t) UCL
1428 3rd St	Ambient Air	Naphthalene	μg/m^3	1.09	95% KM (t) UCL
1428 3rd St	Ambient Air	Styrene	μg/m^3	0.498	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Tetrachloroethene	μg/m^3	1.74	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Toluene	μg/m^3	12.6	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	trans-1,3-Dichloropropene	μg/m^3	0.018	Maximum Result
1428 3rd St	Ambient Air	Trichloroethene	μg/m^3	3.37	99% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Vinyl chloride	μg/m^3	1.58	95% KM (t) UCL
1428 3rd St	Ambient Air	Xylenes, m & p	μg/m^3	5.49	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	Xylenes, o	μg/m^3	3.43	95% Chebyshev (MVUE) UCL
1432 3rd St	Ambient Air	1,1,1-Trichloroethane	μg/m^3	0.0823	95% KM (t) UCL
1432 3rd St	Ambient Air	1,2,4-Trimethylbenzene	μg/m^3	0.983	95% KM (Chebyshev) UCL
1432 3rd St	Ambient Air	1,2-Dichlorobenzene	μg/m^3	0.13	Maximum Result
1432 3rd St	Ambient Air	1,2-Dichloroethane	μg/m^3	0.0557	95% KM (t) UCL
1432 3rd St	Ambient Air	1,2-Dichloropropane	μg/m^3	0.0438	95% KM (t) UCL
1432 3rd St	Ambient Air	1,3,5-Trimethylbenzene	μg/m^3	0.354	95% KM (Chebyshev) UCL
1432 3rd St	Ambient Air	1,3-Dichlorobenzene	μg/m^3	0.092	Maximum Result
1432 3rd St	Ambient Air	1,4-Dichlorobenzene	μg/m^3	0.25	Maximum Result
1432 3rd St	Ambient Air	Benzene	μg/m^3	0.852	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Bromomethane	μg/m^3	1.18	95% KM (Chebyshev) UCL
1432 3rd St	Ambient Air	Carbon tetrachloride	μg/m^3	0.525	95% Student's-t UCL
1432 3rd St	Ambient Air	Chlorobenzene	μg/m^3	0.022	Maximum Result
1432 3rd St	Ambient Air	Chloroethane	μg/m^3	0.0991	95% KM (t) UCL
1432 3rd St	Ambient Air	Chloroform	μg/m^3	0.234	95% KM (t) UCL
1432 3rd St	Ambient Air	Chloromethane	μg/m^3	1.21	95% Student's-t UCL
1432 3rd St	Ambient Air	cis-1,3-Dichloropropene	μg/m^3	0.051	Maximum Result

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1432 3rd St	Ambient Air	Ethylbenzene	µg/m³	0.642	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Freon 11	µg/m³	2.05	95% Student's-t UCL
1432 3rd St	Ambient Air	Freon 113	µg/m³	0.645	95% Student's-t UCL
1432 3rd St	Ambient Air	Freon 114	µg/m³	0.13	Maximum Result
1432 3rd St	Ambient Air	Freon 12	µg/m³	2.52	95% Student's-t UCL
1432 3rd St	Ambient Air	Methyl tert-butyl ether	µg/m³	0.019	Maximum Result
1432 3rd St	Ambient Air	Methylene chloride	µg/m³	1.78	95% KM (t) UCL
1432 3rd St	Ambient Air	Naphthalene	µg/m³	0.74	Maximum Result
1432 3rd St	Ambient Air	Styrene	µg/m³	0.193	95% KM (t) UCL
1432 3rd St	Ambient Air	Tetrachloroethene	µg/m³	0.239	95% KM (t) UCL
1432 3rd St	Ambient Air	Toluene	µg/m³	3.96	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	trans-1,3-Dichloropropene	µg/m³	0.046	Maximum Result
1432 3rd St	Ambient Air	Trichloroethene	µg/m³	0.102	95% KM (t) UCL
1432 3rd St	Ambient Air	Xylenes, m & p	µg/m³	2.12	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Xylenes, o	µg/m³	0.704	95% Approximate Gamma UCL
1432 3rd St	Crawlspace Air	1,1,1-Trichloroethane	µg/m³	0.0961	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,2,4-Trimethylbenzene	µg/m³	30.9	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	1,2-Dichlorobenzene	µg/m³	0.16	Maximum Result
1432 3rd St	Crawlspace Air	1,2-Dichloroethane	µg/m³	0.627	97.5% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	1,2-Dichloropropane	µg/m³	0.0615	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,3,5-Trimethylbenzene	µg/m³	11	Maximum Result
1432 3rd St	Crawlspace Air	1,3-Dichlorobenzene	µg/m³	63	Maximum Result
1432 3rd St	Crawlspace Air	1,4-Dichlorobenzene	µg/m³	1.63	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,4-Dioxane (p-dioxane)	µg/m³	0.26	Maximum Result
1432 3rd St	Crawlspace Air	Benzene	µg/m³	16	Maximum Result
1432 3rd St	Crawlspace Air	Bromomethane	µg/m³	0.33	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Carbon tetrachloride	µg/m³	0.531	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Chlorobenzene	µg/m³	0.146	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloroethane	µg/m³	0.166	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloroform	µg/m³	0.389	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloromethane	µg/m³	3.07	95% H-UCL
1432 3rd St	Crawlspace Air	cis-1,3-Dichloropropene	µg/m³	0.036	Maximum Result
1432 3rd St	Crawlspace Air	Ethylbenzene	µg/m³	20	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	Freon 11	µg/m³	2.16	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Freon 113	µg/m³	0.676	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Freon 114	µg/m³	0.23	Maximum Result
1432 3rd St	Crawlspace Air	Freon 12	µg/m³	2.54	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Methyl tert-butyl ether	µg/m³	0.019	Maximum Result
1432 3rd St	Crawlspace Air	Methylene chloride	µg/m³	1.37	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Naphthalene	µg/m³	0.882	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Styrene	µg/m³	5.56	95% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Tetrachloroethene	µg/m³	2.21	97.5% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Toluene	µg/m³	30.6	95% Approximate Gamma UCL
1432 3rd St	Crawlspace Air	trans-1,3-Dichloropropene	µg/m³	0.04	Maximum Result
1432 3rd St	Crawlspace Air	Trichloroethene	µg/m³	0.886	95% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Vinyl chloride	µg/m³	2.8	Maximum Result
1432 3rd St	Crawlspace Air	Xylenes, m & p	µg/m³	93.7	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	Xylenes, o	µg/m³	32.9	99% Chebyshev (Mean, Sd) UCL
1436 3rd St	Ambient Air	1,1,1-Trichloroethane	µg/m³	0.099	95% KM (t) UCL
1436 3rd St	Ambient Air	1,2,4-Trimethylbenzene	µg/m³	1.59	95% Student's-t UCL
1436 3rd St	Ambient Air	1,2-Dichlorobenzene	µg/m³	0.1	Maximum Result
1436 3rd St	Ambient Air	1,2-Dichloroethane	µg/m³	0.061	95% KM (t) UCL
1436 3rd St	Ambient Air	1,3,5-Trimethylbenzene	µg/m³	0.537	95% Student's-t UCL
1436 3rd St	Ambient Air	1,3-Dichlorobenzene	µg/m³	0.074	Maximum Result
1436 3rd St	Ambient Air	1,4-Dichlorobenzene	µg/m³	0.204	95% KM (t) UCL
1436 3rd St	Ambient Air	1,4-Dioxane (p-dioxane)	µg/m³	0.22	Maximum Result
1436 3rd St	Ambient Air	Benzene	µg/m³	1.32	95% Student's-t UCL
1436 3rd St	Ambient Air	Bromomethane	µg/m³	0.295	95% KM (t) UCL

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1436 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.568	95% Student's-t UCL
1436 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.048	Maximum Result
1436 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.0689	95% KM (t) UCL
1436 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	0.274	95% KM (BCA) UCL
1436 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	7.27	95% Chebyshev (Mean, Sd) UCL
1436 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.57	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	1.98	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.692	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 114	$\mu g/m^3$	0.14	Maximum Result
1436 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.81	95% Student's-t UCL
1436 3rd St	Ambient Air	Methylene chloride	$\mu g/m^3$	6.99	95% KM (t) UCL
1436 3rd St	Ambient Air	Naphthalene	$\mu g/m^3$	0.62	Maximum Result
1436 3rd St	Ambient Air	Styrene	$\mu g/m^3$	0.314	95% KM (t) UCL
1436 3rd St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.252	95% KM (t) UCL
1436 3rd St	Ambient Air	Toluene	$\mu g/m^3$	14	Maximum Result
1436 3rd St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.189	95% KM (t) UCL
1436 3rd St	Ambient Air	Vinyl chloride	$\mu g/m^3$	0.627	Too Few Unique Detected Values *
1436 3rd St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	7.9	Maximum Result
1436 3rd St	Ambient Air	Xylenes, o	$\mu g/m^3$	1.65	95% Student's-t UCL
320 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0868	95% Student's-t UCL
320 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.72	95% Student's-t UCL
320 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0785	95% Student's-t UCL
320 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.83	Maximum Result
320 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.19	Maximum Result
320 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.35	95% Student's-t UCL
320 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.18	Maximum Result
320 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.546	95% Student's-t UCL
320 Center St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.02	Maximum Result
320 Center St	Ambient Air	Chloroform	$\mu g/m^3$	0.311	95% KM (t) UCL
320 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.1	Maximum Result
320 Center St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.046	Maximum Result
320 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.27	95% Student's-t UCL
320 Center St	Ambient Air	Freon 11	$\mu g/m^3$	3.09	95% Approximate Gamma UCL
320 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.736	95% KM (t) UCL
320 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.66	95% Student's-t UCL
320 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	3.01	95% KM (t) UCL
320 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.9	Maximum Result
320 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.315	95% KM (t) UCL
320 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.27	Maximum Result
320 Center St	Ambient Air	Toluene	$\mu g/m^3$	8.71	95% Student's-t UCL
320 Center St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.037	Maximum Result
320 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.1	Maximum Result
320 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	6.4	Maximum Result
320 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	2.2	Maximum Result
320 Center St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.117	95% Student's-t UCL
320 Center St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.94	95% H-UCL
320 Center St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	1.17	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.14	Maximum Result
320 Center St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.678	95% Chebyshev (Mean, Sd) UCL
320 Center St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.916	95% KM (t) UCL
320 Center St	Crawlspace Air	Benzene	$\mu g/m^3$	1.32	95% Student's-t UCL
320 Center St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.353	95% KM (t) UCL
320 Center St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	0.537	95% Student's-t UCL
320 Center St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.032	Maximum Result
320 Center St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.029	Maximum Result
320 Center St	Crawlspace Air	Chloroform	$\mu g/m^3$	0.353	95% KM (BCA) UCL
320 Center St	Crawlspace Air	Chloromethane	$\mu g/m^3$	1.04	95% Student's-t UCL
320 Center St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.053	Maximum Result

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
320 Center St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	1.67	95% Chebyshev (Mean, Sd) UCL
320 Center St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.71	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.64	95% Student's-t UCL
320 Center St	Crawlspace Air	Freon 12	$\mu g/m^3$	2.5	95% Student's-t UCL
320 Center St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.022	Maximum Result
320 Center St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	4.4	95% KM (BCA) UCL
320 Center St	Crawlspace Air	Styrene	$\mu g/m^3$	0.462	95% Student's-t UCL
320 Center St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	0.539	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	Toluene	$\mu g/m^3$	14.1	95% Student's-t UCL
320 Center St	Crawlspace Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.047	Maximum Result
320 Center St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	1.19	95% Student's-t UCL
320 Center St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	0.0202	95% KM (t) UCL
326 Center St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	5.8	95% Chebyshev (Mean, Sd) UCL
326 Center St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	2.02	95% Chebyshev (Mean, Sd) UCL
326 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0861	95% KM (t) UCL
326 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.612	95% Approximate Gamma UCL
326 Center St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.083	Maximum Result
326 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0526	95% KM (t) UCL
326 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.511	95% KM (Chebyshev) UCL
326 Center St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.047	Maximum Result
326 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.85	Maximum Result
326 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.01	95% Approximate Gamma UCL
326 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.269	95% KM (BCA) UCL
326 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.516	95% Student's-t UCL
326 Center St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.015	Maximum Result
326 Center St	Ambient Air	Chloroethane	$\mu g/m^3$	0.0629	95% KM (t) UCL
326 Center St	Ambient Air	Chloroform	$\mu g/m^3$	0.255	95% KM (Chebyshev) UCL
326 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.19	95% KM (t) UCL
326 Center St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.052	Maximum Result
326 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.06	95% Approximate Gamma UCL
326 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.58	95% Student's-t UCL
326 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.66	95% Student's-t UCL
326 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.61	95% KM (t) UCL
326 Center St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.023	Maximum Result
326 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	3.14	Too Few Unique Detected Values *
326 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	0.036	Maximum Result
326 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.0831	95% KM (t) UCL
326 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.26	95% KM (t) UCL
326 Center St	Ambient Air	Toluene	$\mu g/m^3$	10	Maximum Result
326 Center St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.048	Maximum Result
326 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.0761	95% KM (t) UCL
326 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	3.99	95% Approximate Gamma UCL
326 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	1.31	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0864	95% KM (t) UCL
326 Center St	Crawlspace Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.39	Too Few Unique Detected Values *
326 Center St	Crawlspace Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.076	Maximum Result
326 Center St	Crawlspace Air	1,1-Dichloroethane	$\mu g/m^3$	0.015	Maximum Result
326 Center St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.08	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.13	Maximum Result
326 Center St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	1.57	97.5% KM (Chebyshev) UCL
326 Center St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.102	95% KM (t) UCL
326 Center St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.22	95% KM (t) UCL
326 Center St	Crawlspace Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.096	Maximum Result
326 Center St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	2.5	95% KM (BCA) UCL
326 Center St	Crawlspace Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.18	Maximum Result
326 Center St	Crawlspace Air	Benzene	$\mu g/m^3$	0.978	95% Student's-t UCL
326 Center St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.204	95% KM (t) UCL
326 Center St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	0.519	95% Student's-t UCL

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
326 Center St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.033	95% KM (t) UCL
326 Center St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.0607	95% KM (t) UCL
326 Center St	Crawlspace Air	Chloroform	$\mu g/m^3$	0.272	95% KM (BCA) UCL
326 Center St	Crawlspace Air	Chloromethane	$\mu g/m^3$	1.06	95% Student's-t UCL
326 Center St	Crawlspace Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.018	Maximum Result
326 Center St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.039	Maximum Result
326 Center St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	1	95% Student's-t UCL
326 Center St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.14	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.668	95% Student's-t UCL
326 Center St	Crawlspace Air	Freon 114	$\mu g/m^3$	0.11	Maximum Result
326 Center St	Crawlspace Air	Freon 12	$\mu g/m^3$	2.84	95% Student's-t UCL
326 Center St	Crawlspace Air	Hexachlorobutadiene	$\mu g/m^3$	0.68	Maximum Result
326 Center St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.016	Maximum Result
326 Center St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	2.12	95% KM (t) UCL
326 Center St	Crawlspace Air	Styrene	$\mu g/m^3$	0.508	95% KM (BCA) UCL
326 Center St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	0.469	95% KM (t) UCL
326 Center St	Crawlspace Air	Toluene	$\mu g/m^3$	16.2	95% Student's-t UCL
326 Center St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	1.69	95% KM (Chebyshev) UCL
326 Center St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	0.0357	95% KM (t) UCL
326 Center St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	3.78	95% Student's-t UCL
326 Center St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	0.913	95% Student's-t UCL
339 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.062	Maximum Result
339 Center St	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.18	Maximum Result
339 Center St	Ambient Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.033	Maximum Result
339 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.37	Maximum Result
339 Center St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.22	Maximum Result
339 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.067	Maximum Result
339 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.16	Maximum Result
339 Center St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.19	Maximum Result
339 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.24	Maximum Result
339 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.38	Maximum Result
339 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.41	Maximum Result
339 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.4	Maximum Result
339 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	0.92	Maximum Result
339 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.21	Maximum Result
339 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.1	Maximum Result
339 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.45	Maximum Result
339 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2	Maximum Result
339 Center St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.03	Maximum Result
339 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.46	Maximum Result
339 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.1	Maximum Result
339 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.096	Maximum Result
339 Center St	Ambient Air	Toluene	$\mu g/m^3$	1.2	Maximum Result
339 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.13	Maximum Result
339 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	0.67	Maximum Result
339 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.28	Maximum Result
356 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.065	Maximum Result
356 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.79	Maximum Result
356 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.054	Maximum Result
356 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.19	Maximum Result
356 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.62	Maximum Result
356 Center St	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.89	Maximum Result
356 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.41	Maximum Result
356 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.36	Maximum Result
356 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.5	Maximum Result
356 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	0.98	Maximum Result
356 Center St	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.031	Maximum Result
356 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.53	Maximum Result

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
356 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.2	Maximum Result
356 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.68	Maximum Result
356 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.4	Maximum Result
356 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.6	Maximum Result
356 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.9	Maximum Result
356 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.12	Maximum Result
356 Center St	Ambient Air	Toluene	$\mu g/m^3$	2.1	Maximum Result
356 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.034	Maximum Result
356 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	1.2	Maximum Result
356 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.57	Maximum Result
360 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.103	95% KM (t) UCL
360 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	5.8	Maximum Result
360 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.106	95% KM (t) UCL
360 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	1.12	95% KM (t) UCL
360 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.243	95% KM (t) UCL
360 Center St	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.36	Maximum Result
360 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.47	95% KM (t) UCL
360 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.311	95% KM (t) UCL
360 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.666	95% Student's-t UCL
360 Center St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.052	Maximum Result
360 Center St	Ambient Air	Chloroethane	$\mu g/m^3$	0.075	Maximum Result
360 Center St	Ambient Air	Chloroform	$\mu g/m^3$	0.272	95% KM (t) UCL
360 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.18	95% Student's-t UCL
360 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	3.5	Maximum Result
360 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.63	95% Student's-t UCL
360 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.626	95% Student's-t UCL
360 Center St	Ambient Air	Freon 114	$\mu g/m^3$	0.12	Maximum Result
360 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.6	Maximum Result
360 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	3.25	95% KM (t) UCL
360 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	0.041	Maximum Result
360 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.397	95% KM (t) UCL
360 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.322	95% KM (t) UCL
360 Center St	Ambient Air	Toluene	$\mu g/m^3$	34	Maximum Result
360 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.151	95% KM (t) UCL
360 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	12	Maximum Result
360 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	3.4	Maximum Result
366 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.051	Maximum Result
366 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.32	Maximum Result
366 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.11	Maximum Result
366 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.11	Maximum Result
366 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.42	Maximum Result
366 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.48	Maximum Result
366 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.2	Maximum Result
366 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.74	Maximum Result
366 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.1	Maximum Result
366 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.52	Maximum Result
366 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2	Maximum Result
366 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.78	Maximum Result
366 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.23	Maximum Result
366 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.26	Maximum Result
366 Center St	Ambient Air	Toluene	$\mu g/m^3$	2	Maximum Result
366 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.045	Maximum Result
366 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	2.5	Maximum Result
366 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.85	Maximum Result
Prescott Park	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0983	95% Student's-t UCL
Prescott Park	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.024	Maximum Result
Prescott Park	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.751	95% KM (t) UCL
Prescott Park	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.183	95% KM (t) UCL

Table 10
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
Prescott Park	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.245	95% KM (t) UCL
Prescott Park	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.891	Too Few Unique Detected Values *
Prescott Park	Ambient Air	Benzene	$\mu g/m^3$	0.937	95% Student's-t UCL
Prescott Park	Ambient Air	Bromomethane	$\mu g/m^3$	1.12	95% KM (t) UCL
Prescott Park	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.577	95% Student's-t UCL
Prescott Park	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.034	Maximum Result
Prescott Park	Ambient Air	Chloroethane	$\mu g/m^3$	0.0833	95% KM (t) UCL
Prescott Park	Ambient Air	Chloroform	$\mu g/m^3$	0.373	95% KM (t) UCL
Prescott Park	Ambient Air	Chloromethane	$\mu g/m^3$	1.2	Maximum Result
Prescott Park	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.038	Maximum Result
Prescott Park	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.651	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 11	$\mu g/m^3$	1.84	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 113	$\mu g/m^3$	0.719	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 12	$\mu g/m^3$	2.8	95% Student's-t UCL
Prescott Park	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.0097	Maximum Result
Prescott Park	Ambient Air	Methylene chloride	$\mu g/m^3$	0.4	Maximum Result
Prescott Park	Ambient Air	Styrene	$\mu g/m^3$	0.231	95% KM (t) UCL
Prescott Park	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.314	95% Student's-t UCL
Prescott Park	Ambient Air	Toluene	$\mu g/m^3$	3.45	95% Student's-t UCL
Prescott Park	Ambient Air	Trichloroethene	$\mu g/m^3$	0.105	95% KM (t) UCL
Prescott Park	Ambient Air	Xylenes, m & p	$\mu g/m^3$	1.96	95% Student's-t UCL
Prescott Park	Ambient Air	Xylenes, o	$\mu g/m^3$	0.688	95% Student's-t UCL
Combined Background	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0797	95% KM (t) UCL
Combined Background	Ambient Air	1,1-Dichloroethane	$\mu g/m^3$	0.011	Maximum Result
Combined Background	Ambient Air	1,1-Dichloroethene	$\mu g/m^3$	0.0392	Too Few Unique Detected Values *
Combined Background	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.639	95% H-UCL
Combined Background	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0535	95% KM (t) UCL
Combined Background	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0448	95% KM (t) UCL
Combined Background	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.272	95% KM (Chebyshev) UCL
Combined Background	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.0948	95% KM (t) UCL
Combined Background	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.383	Too Few Unique Detected Values *
Combined Background	Ambient Air	Benzene	$\mu g/m^3$	0.8	95% Approximate Gamma UCL
Combined Background	Ambient Air	Bromomethane	$\mu g/m^3$	0.682	95% KM (Chebyshev) UCL
Combined Background	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.526	95% Student's-t UCL
Combined Background	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.0268	95% KM (t) UCL
Combined Background	Ambient Air	Chloroethane	$\mu g/m^3$	0.0484	95% KM (t) UCL
Combined Background	Ambient Air	Chloroform	$\mu g/m^3$	0.154	95% KM (BCA) UCL
Combined Background	Ambient Air	Chloromethane	$\mu g/m^3$	1.16	95% Student's-t UCL
Combined Background	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.025	Maximum Result
Combined Background	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.0593	95% KM (t) UCL
Combined Background	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.582	95% H-UCL
Combined Background	Ambient Air	Freon 11	$\mu g/m^3$	1.89	95% Student's-t UCL
Combined Background	Ambient Air	Freon 113	$\mu g/m^3$	0.674	95% Student's-t UCL
Combined Background	Ambient Air	Freon 114	$\mu g/m^3$	0.12	Maximum Result
Combined Background	Ambient Air	Freon 12	$\mu g/m^3$	2.56	95% Student's-t UCL
Combined Background	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.23	95% KM (t) UCL
Combined Background	Ambient Air	Methylene chloride	$\mu g/m^3$	0.233	95% KM (t) UCL
Combined Background	Ambient Air	Naphthalene	$\mu g/m^3$	0.376	95% KM (t) UCL
Combined Background	Ambient Air	Styrene	$\mu g/m^3$	0.182	95% KM (BCA) UCL
Combined Background	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.286	95% KM (BCA) UCL
Combined Background	Ambient Air	Toluene	$\mu g/m^3$	3.31	95% H-UCL
Combined Background	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.056	Maximum Result
Combined Background	Ambient Air	Trichloroethene	$\mu g/m^3$	0.089	95% KM (t) UCL
Combined Background	Ambient Air	Xylenes, m & p	$\mu g/m^3$	2.5	95% Chebyshev (Mean, Sd) UCL
Combined Background	Ambient Air	Xylenes, o	$\mu g/m^3$	0.853	95% Chebyshev (Mean, Sd) UCL

Table 11
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Oral RfD (mg/kg-day)	References	REL or Reference Conc (mg/m^3)	Inhalation RFD (mg/kg-day)	References	Primary Target Organ/Effect	Uncertainty/ Modifying Factors	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	References	Inhalation Unit Risk (mg/m^3)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$	References
Aluminum	1	PPRTV	0.005	0.0014	PPRTV	NA	--	NA	--	NA	NA	--
Antimony	0.0004	IRIS	NA	NA	--	Blood (glucose), Mortality	--	NA	--	NA	NA	--
Arsenic	0.0003	IRIS	NA	NA	--	Skin, Circulatory System	--	1.5	IRIS	4.3	15.1	IRIS
Arsenic	NA	--	1.5E-05	0.000004	OEHHA	--	--	1.5	OEHHA	3.3	12	OEHHA
Barium	0.2	IRIS	0.0005	0.00014	HEAST	Kidney	--	NA	--	NA	NA	--
Beryllium	0.002	IRIS	2.0E-05	0.000006	IRIS	GI (Small intestinal lesions)	--	NA	--	NA	8.4	IRIS
Beryllium	NA	--	7.0E-06	0.000002	OEHHA	--	--	NA	--	2.4	8.4	OEHHA
Boron	0.2	IRIS	2.0E-02	0.0057	HEAST	Testes	--	NA	--	NA	NA	--
Cadmium	0.0005	IRIS	1.0E-05	0.000003	ATSDR	Kidney	--	NA	--	NA	6.3	IRIS
Cadmium	0.000011	OEHHA*	0.02	0.000006	OEHHA	--	--	NA	--	4.2	14.7	OEHHA
Chromium	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Hexavalent Chromium	0.003	IRIS	1.0E-04	0.000029	IRIS	NOAEL	--	0.5	NJ	84	2.9E+02	IRIS
Cobalt	0.0003	PPRTV	6.0E-06	0.000002	PPRTV	Circulatory	--	NA	--	9	3.2E+01	PPRTV
Copper	0.04	HEAST	NA	NA	--	GI	--	NA	--	NA	NA	--
Iron	0.7	PPRTV	NA	NA	--	NA	--	NA	--	NA	NA	--
Lead	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Manganese	0.024	IRIS	5.0E-05	0.000014	IRIS	CNS	--	NA	--	NA	NA	--
Manganese	0.03	OEHHA*	9.0E-05	0.000026	OEHHA	--	--	NA	--	NA	NA	--
Mercury	0.0003	IRIS	NA	NA	--	CNS	--	NA	--	NA	NA	--
Molybdenum	0.005	IRIS	NA	NA	--	Kidney	--	NA	--	NA	NA	--
Nickel	0.02	IRIS	9.0E-05	2.6E-05	ATSDR	Whole body	--	NA	--	NA	NA	--
Nickel	0.011	OEHHA*	5.0E-02	1.4E-02	OEHHA	--	--	NA	--	0.26	0.91	OEHHA
Selenium	0.005	IRIS	0.02	0.0057	OEHHA	Respiratory system - selenosis	--	NA	--	NA	NA	--
Silver	0.005	IRIS	NA	NA	--	Skin	--	NA	--	NA	NA	--
Thallium	0.000066	IRIS	NA	NA	--	NA	3000/1	NA	--	NA	NA	--
Vanadium	0.005	RSL	NA	NA	--	NA	--	NA	--	NA	NA	--
Zinc	0.3	IRIS	NA	NA	--	Red blood cells	--	NA	--	NA	NA	--
Cyanide	0.02	IRIS	NA	NA	--	Weight loss, thyroid effects and myelin degeneration	100/5	NA	--	NA	NA	--
4,4'-DDD	NA	--	NA	NA	--	--	--	0.24	IRIS	0.069	0.24	OEHHA/ Route Extrapolation
4,4'-DDE	NA	--	NA	NA	--	--	--	0.34	IRIS	0.097	0.34	OEHHA/ Route Extrapolation
4,4'-DDT	0.0005	IRIS	NA	NA	--	Liver	--	0.34	IRIS	0.097	0.34	IRIS
Aldrin	0.00003	IRIS	NA	NA	--	Liver	1000/1	17	IRIS	4.9	17.2	IRIS/OEHHA
alpha-BHC	0.0005	NCEA	NA	NA	--	NA	NA	6.3	IRIS	1.8	6.3	IRIS
alpha-BHC	NA	--	NA	NA	--	--	NA	2.7	OEHHA	0.77	2.7	OEHHA
alpha-Chlordane	0.0005	IRIS	7.0E-04	0.0002	IRIS	Liver	300/1	0.35	IRIS	0.1	0.35	IRIS
alpha-Chlordane	0.000033	OEHHA*	NA	NA	--	--	300/1	1.3	OEHHA	0.34	1.2	OEHHA
beta-BHC	NA	--	NA	NA	--	--	NA	1.8	IRIS	0.53	1.9	IRIS
beta-BHC	NA	--	NA	NA	--	--	NA	1.5	OEHHA	0.43	1.5	OEHHA
delta-BHC	NA	--	NA	NA	--	--	NA	NA	--	NA	NA	--
Diazinon	0.0007	ATSDR	NA	NA	--	Liver	--	NA	--	NA	NA	--

Table 11
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Oral RfD (mg/kg-day)	References	REL or Reference Conc (mg/m^3)	Inhalation RFD (mg/kg-day)	References	Primary Target Organ/Effect	Uncertainty/ Modifying Factors	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	References	Inhalation Unit Risk (mg/m^3)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$	References
Dieldrin	0.00005	IRIS	NA	NA	--	Liver	100/1	16	IRIS	4.6	16.1	IRIS
Endosulfan I	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endosulfan II	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endosulfan sulfate	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endrin	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
Endrin aldehyde	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
Endrin ketone	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
gamma-BHC	0.0003	IRIS	NA	NA	--	Liver	1000/1	1.1	Cal/EPA	NA	NA	--
gamma-BHC	NA	--	NA	NA	--	--	1000/1	1.1	OEHHA	0.31	1.1	OEHHA
gamma-Chlordane	0.0005	IRIS	7.0E-04	0.0002	IRIS	Liver	300/1	0.35	IRIS	0.1	0.35	IRIS
gamma-Chlordane	0.000033	OEHHA*	NA	NA	--	--	300/1	1.2	OEHHA	0.34	1.2	OEHHA
Heptachlor	0.0005	IRIS	NA	NA	--	Liver	300/1	4.5	IRIS	1.3	4.55	IRIS
Heptachlor	0.00003	OEHHA*	NA	NA	--	--	300/1	4.1	OEHHA	NA	4.1	OEHHA
Heptachlor epoxide	0.000013	IRIS	NA	NA	--	Liver	1000/1	9.1	IRIS	NA	9.1	IRIS
Heptachlor epoxide	0.000013	OEHHA*	NA	NA	--	--	1000/1	5.5	OEHHA	NA	5.5	OEHHA
Methoxychlor	0.005	IRIS	NA	NA	--	Reproductive	1000/1	NA	--	NA	NA	--
Methoxychlor	0.00002	OEHHA*		NA	--	--	NA	NA	--	NA	NA	--
Toxaphene	NA	--	NA	NA	--	--	NA	1.1	IRIS	0.34	1.2	IRIS
Toxaphene	NA	--	NA	NA	--	--	NA	1.2	OEHHA	0.34	1.2	OEHHA
Aroclor-1016	0.00007	IRIS	NA	NA	--	Reduced birth weight	100/1	0.07	IRIS	0.02	0.07	IRIS
Aroclor-1221	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	0.57	2	IRIS
Aroclor-1232	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	0.57	2	IRIS
Aroclor-1242	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	0.57	2	IRIS
Aroclor-1248	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	0.57	2	IRIS
Aroclor-1254	0.00002	IRIS	NA	NA	--	Eyes	300/1	2	IRIS	0.57	2	IRIS
Aroclor-1260	0.00002	Surrogate	NA	NA	--	Eyes	300/1	2	IRIS	0.57	2	IRIS
1,2,4,5-Tetrachlorobenzene	0.0003	IRIS	NA	NA	--	--	--	NA	--	NA	NA	--
2,4,5-Trichlorophenol	0.1	IRIS	NA	NA	--	--	--	NA	--	NA	NA	--
2,4,6-Trichlorophenol	0.001	PPRTV	NA	NA	--	--	--	0.011	IRIS	0.02	0.07	IRIS
2,4,6-Trichlorophenol	NA	--	NA	NA	--	--	--	0.07	OEHHA	0.02	0.07	OEHHA
2,2-Dichloropropane	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
2,4-Dichlorophenol	0.003	IRIS	NA	NA	--	Decreased delayed hypersensitivity response	100/1	NA	--	NA	NA	--
2,4-Dimethylphenol	0.02	IRIS	NA	NA	--	Clinical signs (lethargy, prostration, ataxia) and hematological changes	3000/1	NA	--	NA	NA	--
2,4-Dinitrophenol	0.002	IRIS	NA	NA	--	Cataract formation	1000/1	NA	--	NA	NA	--
2,4-Dinitrotoluene	0.002	IRIS	NA	NA	--	Neurotoxicity, Heinz bodies and biliary tract hyperplasia	100/1	0.68	IRIS	0.089	0.31	Cal/EPA

Table 11
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Chemical of Potential Concern	Oral RfD (mg/kg-day)	References	REL or Reference Conc (mg/m^3)	Inhalation RFD (mg/kg-day)	References	Primary Target Organ/Effect	Uncertainty/ Modifying Factors	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	References	Inhalation Unit Risk (mg/m^3)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$	References
2,4-Dinitrotoluene	NA	--	NA	NA	--	--	100/1	0.31	OEHHA	0.089	0.31	OEHHA
2,6-Dinitrotoluene	0.001	PPRTV	NA	NA	--	--	--	NA	--	NA	NA	--
2-Chloronaphthalene	0.08	IRIS	NA	NA	--	Dyspnea, abnormal appearance, liver enlargement	3000/1	NA	--	NA	NA	--
2-Chlorophenol	0.005	IRIS	NA	NA	--	Reproductive effects	1000/1	NA	--	NA	NA	--
2-Chlorotoluene	0.02	IRIS	NA	NA	--	Decrease in body weight gain	1000/1	NA	--	NA	NA	--
2-Methylnaphthalene	0.004	IRIS	NA	NA	--	Pulmonary alveolar proteinosis	1000/1	NA	--	NA	NA	--
2-Methylphenol	0.05	IRIS	0.6	0.17	Cal/EPA	Decreased body weight & Neurotoxicity	1000/1	NA	--	NA	NA	--
2-Nitroaniline	0.01	X	0.00005	0.000014	X	NA	--	NA	--	NA	NA	--
2-Nitrophenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
3,3'-Dichlorobenzidine	NA	--	NA	NA	--	--	--	0.45	IRIS	0.34	1.2	Cal/EPA
3,3'-Dichlorobenzidine	NA	--	NA	NA	--	--	--	1.2	OEHHA	0.34	1.2	OEHHA
3,4-Methylphenol	0.005	HEAST	0.6	0.171429	Cal/EPA	Decreased body weights and neurotoxicity	1000/1	NA	--	NA	NA	--
3-Nitroaniline	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4,6-Dinitro-2-methylphenol	8.00E-05	X	NA	NA	--	--	--	NA	--	NA	NA	--
4-Bromophenylphenyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Chloro-3-methylphenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Chloroaniline	0.004	IRIS	NA	NA	--	Nonneoplastic lesions of splenic capsule	3000/1	0.2	PPRTV	NA	NA	--
4-Chlorophenylphenyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Methylphenol	0.005	HEAST	0.6	0.17	Cal/EPA	--	--	NA	--	NA	NA	--
4-Nitroaniline	0.004	PPRTV	0.006	0.002	PPRTV	--	--	0.02	PPRTV	NA	NA	--
4-Nitrophenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Acenaphthene	0.06	IRIS	NA	NA	--	Hepatotoxicity	3000/1	NA	--	NA	NA	--
Acenaphthylene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Acetophenone	0.1	IRIS	NA	NA	--	General toxicity	3000/1	NA	--	NA	NA	--
Anthracene	0.3	IRIS	NA	NA	--	No observed effects	3000/1	NA	--	NA	NA	--
Atrazine	0.035	IRIS	NA	NA	--	Decreased body weight gain	100/1	0.23	Cal/EPA	NA	NA	--
Atrazine	NA	--	NA	NA	--	--	100/1	0.23	OEHHA	NA	NA	--
Benzaldehyde	0.1	IRIS	NA	NA	--	Forestomach lesions, kidney toxicity	1000/1	NA	--	NA	NA	--
Benzo(a)anthracene	NA	--	NA	NA	--	--	--	0.73	ECAO	0.11	0.39	Cal/EPA
Benzo(a)anthracene	NA	--	NA	NA	--	--	--	1.2	OEHHA	0.11	0.39	OEHHA
Benzo(a)pyrene	NA	--	NA	NA	--	--	--	7.3	IRIS	1.1	3.85	Cal/EPA
Benzo(a)pyrene	NA	--	NA	NA	--	--	--	12	OEHHA	1.1	3.85	OEHHA

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Benzo(b)fluoranthene	NA	--	NA	NA	--	--	--	0.73	ECAO	0.11	0.39	Cal/EPA
Benzo(b)fluoranthene	NA	--	NA	NA	--	--	--	1.2	OEHHA	0.11	0.39	OEHHA
Benzo(g,h,i)perylene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Benzo(k)fluoranthene	NA	--	NA	NA	--	--	--	0.073	NCEA	0.11	0.39	Cal/EPA
Benzo(k)fluoranthene	NA	--	NA	NA	--	--	--	1.2	OEHHA	0.11	0.39	OEHHA
Benzyl butyl phthalate	0.2	IRIS	NA	NA	--	Significantly increased liver-to-body weight and liver-to-brain weight ratios	1000/1	0.0019	PPRTV	NA	NA	--
Biphenyl (diphenyl)	0.05	IRIS	NA	NA	--	Kidney damage	100/10	NA	--	NA	NA	--
bis(2-Chloroethoxy)methane	0.003	PPRTV	NA	NA	--	--	--	NA	--	NA	NA	--
bis(2-Chloroethyl)ether	NA	--	NA	NA	--	--	--	1.1	IRIS	0.33	1.2	IRIS
bis(2-Chloroethyl)ether	NA	--	NA	NA	--	--	--	2.5	OEHHA	0.71	2.5	OEHHA
bis(2-Ethylhexyl)phthalate	0.02	IRIS	--	--	--	Increased relative liver weight	1000/1	0.014	IRIS	0.0024	0.0084	Cal/EPA
bis(2-Ethylhexyl)phthalate	NA	--	NA	NA	--	--	1000/1	0.003	OEHHA	0.0024	0.0084	OEHHA
Caprolactam	0.5	IRIS	NA	NA	--	Reduced offspring body weight	100/1	NA	--	NA	NA	--
Carbazole	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Chrysene	NA	--	NA	NA	--	--	--	0.0073	ECAO	0.011	0.039	Cal/EPA
Chrysene	NA	--	NA	NA	--	--	--	0.12	OEHHA	0.011	0.039	OEHHA
Dibenz(a,h)anthracene	NA	--	NA	NA	--	--	--	4.1	OEHHA	1.2	4.2	OEHHA
Dibenzofuran	0.002	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Diethylphthalate	0.8	IRIS	NA	NA	--	Decreased growth rate, food consumption and altered organ weights	1000/1	NA	--	NA	NA	--
Dimethylphthalate	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Di-n-butyl phthalate	0.1	IRIS	NA	NA	--	Increased mortality	1000/1	NA	--	NA	NA	--
Di-n-octyl phthalate	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Fluoranthene	0.04	IRIS	NA	NA	--	Kidney, Liver, Circulatory	3000/1	NA	--	NA	NA	--
Fluorene	0.04	IRIS	NA	NA	--	Kidney, Liver, Circulatory	3000/1	NA	--	NA	NA	--
Hexachlorobenzene	0.0008	IRIS	NA	NA	--	Liver effects	100/1	0.078	IRIS	0.46	1.6	IRIS
Hexachlorobenzene	--	--	NA	NA	--	--	100/1	1.8	OEHHA	0.51	1.8	OEHHA
Hexachlorobutadiene	0.001	PPRTV	NA	0.0003	Route Extrapolation	--	--	0.078	IRIS	0.022	0.077	IRIS
Hexachlorocyclopentadiene	0.006	IRIS	0.0002	0.000057	IRIS	Chronic irritation	1000/1	NA	--	NA	NA	--
Hexachloroethane	0.001	IRIS	NA	NA	--	Atrophy and degeneration of the renal tubules	1000/1	0.014	IRIS	0.004	0.014	IRIS
Hexachloroethane	NA	--	NA	NA	--	--	1000/1	0.039	OEHHA	0.011	0.04	OEHHA
Indeno(1,2,3-c,d)pyrene	NA	--	NA	NA	--	--	--	0.73	NCEA	0.011	0.04	Cal/EPA
Indeno(1,2,3-c,d)pyrene	NA	--	NA	NA	--	--	--	1.2	OEHHA	0.011	0.39	OEHHA

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Isophorone	0.2	IRIS	2	0.57	Cal/EPA	No observed effects	1000/1	0.00095	IRIS	NA	NA	--
p-Cymene (p-Isopropyltoluene)	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Naphthalene	0.02	IRIS	0.003	0.00086	IRIS	Decreased body weight	3000/1	NA	--	0.034	0.12	Cal/EPA
Naphthalene	NA	--	9	2.6	OEHHA	--	3000/1	0.12	OEHHA	0.034	0.12	OEHHA
Nitrobenzene	0.002	IRIS	0.009	0.0026	IRIS	Hematologic, adrenal, renal and hepatic lesions	10000/1	NA	--	0.04	0.14	IRIS
N-Nitrosodi-n-propylamine	NA	--	NA	NA	--	--	--	7	IRIS	0.002	7	OEHHA
N-Nitrosodiphenylamine	0.02	PPRTV	NA	0.02	PPRTV	--	--	0.0049	IRIS	0.0026	0.009	Cal/EPA
N-Nitrosodiphenylamine	NA	--	NA	NA	--	--	--	0.009	OEHHA	0.0026	0.009	OEHHA
Pentachlorophenol	0.03	IRIS	--	--	--	Liver and kidney pathology	100/1	0.12	IRIS	0.0051	0.018	Cal/EPA
Pentachlorophenol	0.003	OEHHA*	NA	NA	--	--	--	0.018	OEHHA	0.0051	0.018	OEHHA
Phenanthrene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Phenol	NA	--	0.2	0.057	OEHHA	--	300/1	NA	--	NA	NA	--
n-Propylbenzene	0.04	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Pyrene	0.03	IRIS	NA	NA	--	tubular pathology,	3000/1	NA	--	NA	NA	--
1,1,1-Trichloroethane	2	IRIS	5	1.4	IRIS	--	--	NA	--	NA	NA	--
1,1,2,2-Tetrachloroethane	0.004	PPRTV	NA	0.06	Route Extrapolation	--	--	0.2	IRIS	0.058	0.2	IRIS
1,1,2,2-Tetrachloroethane	NA	--	NA	NA	--	--	--	0.27	OEHHA	0.058	0.2	OEHHA
1,1,2-Trichloroethane	0.004	IRIS	NA	NA	--	Clinical serum chemistry	1000/1	0.057	IRIS	0.016	0.056	IRIS
1,1,2-Trichloroethane	NA	--	NA	NA	--	--	1000/1	0.072	OEHHA	0.016	0.057	OEHHA
1,1-Dichloroethane	0.2	PPRTV	NA	NA	--	--	--	0.0057	OEHHA	0.0016	0.0057	OEHHA
1,1-Dichloroethene	0.05	IRIS	0.2	0.057	IRIS	--	--	NA	--	NA	0.091	IRIS
1,1-Dichloroethene	NA	--	0.07	0.02	OEHHA	--	--	NA	--	NA	NA	--
1,2,3-Trichlorobenzene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
1,2,4-Trichlorobenzene	NA	--	NA	NA	--	--	--	0.0036	OEHHA	NA	NA	--
1,2,4-Trimethylbenzene	0.007	PPRTV	NA	NA	--	NA	--	NA	--	NA	NA	--
1,2-Dibromo-3-chloropropane	0.0002	PPRTV	0.0002	0.000057	IRIS	--	--	0.8	PPRTV	0.006	0.021	PPRTV
1,2-Dibromo-3-chloropropane	NA	--	NA	NA	--	--	--	7	OEHHA	2	7	OEHHA
1,2-Dibromoethane	0.009	IRIS	0.009	0.0026	IRIS	Testicular atrophy, liver peliosis, and adrenal cortical degeneration	3000/1	2	IRIS	0.6	2	IRIS
1,2-Dibromoethane	NA	--	NA	NA	--	--	--	3.6	OEHHA	0.071	0.25	OEHHA
1,2-Dichlorobenzene	0.09	IRIS	0.2	0.057	HEAST	No adverse effects observed	1000/1	NA	--	NA	NA	--
1,2-Dichloroethane	NA	--	NA	NA	--	--	--	0.047	OEHHA	0.021	0.074	OEHHA
1,2-Dichloropropane	0.09	ATSDR	0.004	0.0011	IRIS	--	--	0.036	OEHHA	0.01	0.035	OEHHA
1,3-Butadiene	NA	--	0.002	0.00057	IRIS	--	--	3.4	OEHHA	0.03	0.11	OEHHA
1,3-Dichlorobenzene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
1,3,5-Trimethylbenzene	0.01	X	NA	NA	--	NA	--	NA	--	NA	NA	--
1,4-Dichlorobenzene	0.07	ATSDR	0.8	0.23	IRIS	--	--	0.0054	OEHHA	0.011	0.04	OEHHA
1,4-Dioxane (p-dioxane)	0.1	ATSDR	3.6	1.03	ATSDR	--	--	0.011	IRIS	0.0077	0.027	Cal/EPA

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1,4-Dioxane (p-dioxane)	NA	--	3	0.86	OEHHA	--	--	0.027	OEHHA	0.0077	0.027	OEHHA
2-Hexanone	0.005	IRIS	0.03	0.009	IRIS	--	--	NA	--	NA	NA	--
Acetone	0.9	IRIS	31	8.86	ATSDR	Nephropathy	1000/1	NA	--	NA	NA	--
Benzene	0.004	IRIS	0.03	0.0086	IRIS	Immune system (decreased lymphocyte count)	300/1	0.055	IRIS	0.0078	0.027	IRIS
Benzene	NA	--	0.06	0.017	OEHHA	--	300/1	0.1	OEHHA	0.029	0.1	OEHHA
Bromodichloromethane	0.02	IRIS	NA	NA	--	Renal cytomegaly	1000/1	0.062	IRIS	0.037	0.13	Cal/EPA
Bromodichloromethane	NA	--	NA	NA	--	--	1000/1	0.13	OEHHA	0.037	0.1	OEHHA
Bromoform	0.02	IRIS	NA	NA	--	Hepatic lesions	1000/1	0.0079	IRIS	0.0011	0.0039	IRIS
Bromoform	NA	--	NA	NA	--	--	1000/1	0.011	OEHHA	NA	NA	--
Bromomethane	0.0014	IRIS	0.005	0.0014	IRIS	Epithelial hyperplasia of the forestomach	1000/1	NA	--	NA	NA	--
Carbon disulfide	NA	--	0.8	0.23	OEHHA	--	100/1	NA	--	NA	NA	--
Carbon tetrachloride	0.004	IRIS	0.1	0.03	IRIS	Liver lesions	1000/1	0.07	IRIS	0.006	0.021	IRIS
Carbon tetrachloride	NA	--	0.04	0.011	OEHHA	--	1000/1	0.15	OEHHA	0.042	0.15	OEHHA
Chlorobenzene	0.02	IRIS	0.05	0.014	PPRTV	Histopathologic changes in liver	1000/1	NA	--	NA	NA	--
Chlorobenzene	NA	--	1	0.29	OEHHA	--	1000/1	NA	--	NA	NA	--
Chloroethane	NA	--	10	2.86	IRIS	--	--	NA	--	NA	0.0029	Route Extrapolation
Chloroform	0.01	IRIS	0.098	0.028	ATSDR	Moderate/marked fatty cyst formation in the liver and elevated SGPT	100/1	0.031	OEHHA	0.0053	0.019	OEHHA
Chloromethane	NA	--	0.09	0.026	IRIS	Brain (cerebellar lesions)	1000/1	NA	--	NA	NA	--
cis-1,2-Dichloroethene	0.01	PPRTV	NA	NA	--	Decreased hematocrit and hemoglobin (Blood)	--	NA	--	NA	NA	--
cis-1,3-Dichloropropene	0.03	IRIS	0.02	0.0057	IRIS	Chronic irritation	100/1	0.1	IRIS	0.004	0.014	IRIS
cis-1,3-Dichloropropene	NA	--	NA	NA	--	--	100/1	0.091	OEHHA	0.016	0.056	OEHHA
Cyclohexane	NA	--	6	1.7	IRIS	--	--	NA	--	NA	NA	--
Dibromochloromethane	0.02	IRIS	NA	NA	--	Hepatic lesions	1000/1	0.084	IRIS	0.027	0.095	CalEPA
Dibromochloromethane	NA	--	NA	NA	--	--	1000/1	0.094	OEHHA	0.027	0.095	OEHHA
Ethyl tertiary butyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Ethylbenzene	NA	--	2	0.57	OEHHA	--	1000/1	0.011	OEHHA	0.0025	0.00875	OEHHA
Freon 11	0.3	IRIS	0.7	0.20	HEAST	Survival and histopathology	1000/1	NA	--	NA	NA	--
Freon 113	30	IRIS	30	8.57	HEAST	Psychomotor impairment	10/1	NA	--	NA	NA	--
Freon 12	0.2	IRIS	0.2	0.057	HEAST	Reduced body weight	100/1	NA	--	NA	NA	--
Isopropylbenzene (cumene)	0.1	IRIS	0.4	0.11	IRIS	Increased kidney weights in female rats and adrenal weights in male and female rats	1000/1	NA	--	NA	NA	--
Isopropyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--

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Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Oral RfD (mg/kg-day)	References	REL or Reference Conc (mg/m^3)	Inhalation RFD (mg/kg-day)	References	Primary Target Organ/Effect	Uncertainty/ Modifying Factors	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	References	Inhalation Unit Risk (mg/m^3)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$	References
Methyl acetate	1	HEAST	NA	NA	--	--	--	NA	--	NA	NA	--
Methyl ethyl ketone	0.6	IRIS	5	1.4	IRIS	Decreased pup body weight	1000/1	NA	--	NA	NA	--
Methyl isobutyl ketone	0.08	HEAST	3	0.86	IRIS	--	--	NA	--	NA	NA	--
Methyl tert-butyl ether	NA	--	8	2.3	OEHHA	--	--	0.0018	OEHHA	0.00026	0.00091	OEHHA
Methylcyclohexane	NA	--	NA	0.86	HEAST	--	--	NA	--	NA	NA	--
Methylene chloride	0.06	IRIS	1	0.29	ATSDR	Liver toxicity	100/1	0.0075	IRIS	0.00047	0.0016	IRIS
Methylene chloride	NA	--	0.4	0.11	OEHHA	--	100/1	0.014	OEHHA	0.001	0.0035	OEHHA
n-Butylbenzene	0.04	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Styrene	0.2	IRIS	1	0.29	IRIS	Red blood cell and liver effects	1000/1	NA	--	NA	NA	--
Styrene	NA	--	0.9	0.26	OEHHA	--	1000/1	NA	--	NA	NA	--
sec-Butylbenzene	0.04	NCEA	NA	0.04	Route Extrapolation	--	--	NA	--	NA	NA	--
tert-Butyl alcohol	0.1	IRIS	NA	0.0026	NCEA	--	--	NA	--	NA	NA	--
tert-Butylbenzene	0.04	NCEA		NA	--	--	--	NA	--	NA	NA	--
Tetrachloroethene	0.01	IRIS	0.27	0.08	ATSDR	Hepatotoxicity in mice, weight gain in rats	1000/1	0.54	OEHHA	0.0059	0.021	OEHHA
Tetrachloroethene	NA		0.035	0.01	OEHHA	--	--	0.54	OEHHA	0.0059	0.021	OEHHA
Toluene	0.08	IRIS	5	1.43	IRIS	Kidney	3000/1	NA	--	NA	NA	--
Toluene	NA	--	0.3	0.086	OEHHA	--	--	NA	--	NA	NA	--
trans-1,2-Dichloroethene	0.02	IRIS	0.06	0.02	PPRTV	Increased serum alkaline phosphatase in male mice	1000/1	NA	--	NA	NA	--
trans-1,3-Dichloropropene	0.03	IRIS	0.02	0.0057	IRIS	Chronic irritation	100/1	0.1	IRIS	0.004	0.014	IRIS
trans-1,3-Dichloropropene	NA	--	NA	NA	--	--	--	0.091	OEHHA	0.016	0.056	OEHHA
Trichloroethene	0.0003	NCEA	NA	0.01	NCEA	NA	--	NA	--	NA	NA	--
Trichloroethene	NA	--	600	0.17	OEHHA	--	--	0.0059	OEHHA	0.002	0.007	OEHHA
Vinyl chloride	0.003	IRIS	0.1	0.0286	IRIS	Liver	30/1	0.72	IRIS	0.0044	0.0154	IRIS
Vinyl chloride	NA	--	NA	NA	--	--	30/1	0.27	OEHHA	0.078	0.27	OEHHA
o-Xylene	0.2	IRIS	0.7	0.2	OEHHA	Decreased body weight, increased mortality	1000/1	NA	--	NA	NA	--
m,p-Xylenes	0.2	IRIS	0.7	0.2	OEHHA	Decreased body weight, increased mortality	1000/1	NA	--	NA	NA	--
Xylenes, total	NA	--	0.7	0.2	OEHHA	--	1000/1	NA	--	NA	NA	--
1,2,3,4,6,7,8-HpCDD	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,6,7,8-HpCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	380000	1300	OEHHA
1,2,3,4,6,7,8-HpCDF	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,6,7,8-HpCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	380000	1300	OEHHA
1,2,3,4,7,8,9-HpCDF	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,7,8,9-HpCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	380000	1300	OEHHA
1,2,3,4,7,8-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,4,7,8-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
1,2,3,4,7,8-HxCDF	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,4,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA

Table 11
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Oral RfD (mg/kg-day)	References	REL or Reference Conc (mg/m^3)	Inhalation RFD (mg/kg-day)	References	Primary Target Organ/Effect	Uncertainty/ Modifying Factors	Oral Cancer Slope Factor (mg/kg-day)$^{-1}$	References	Inhalation Unit Risk (mg/m^3)$^{-1}$	Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$	References
1,2,3,6,7,8-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,6,7,8-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
1,2,3,6,7,8-HxCDF	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,6,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
1,2,3,7,8,9-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,7,8,9-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
1,2,3,7,8,9-HxCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,7,8,9-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
1,2,3,7,8-PeCDD	NA	--	NA	--	--	--	--	150000	calc using TEF	NA	150000	calc using TEF
1,2,3,7,8-PeCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	6500	OEHHA	37600000	130000	OEHHA
1,2,3,7,8-PeCDF	NA	--	NA	--	--	--	--	7500	calc using TEF	NA	7500	calc using TEF
1,2,3,7,8-PeCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	6500	OEHHA	1857140	6500	OEHHA
2,3,4,6,7,8-HxCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
2,3,4,6,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
2,3,4,7,8-PeCDF	NA	--	NA	--	--	--	--	75000	calc using TEF	NA	75000	calc using TEF
2,3,4,7,8-PeCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	65000	OEHHA	18571300	65000	OEHHA
2,3,7,8-TCDD	NA	--	NA	--	--	--	--	150000	HEAST	NA	150000	HEAST
2,3,7,8-TCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	130000	OEHHA	37600000	130000	OEHHA
2,3,7,8-TCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
2,3,7,8-TCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3760000	13000	OEHHA
OCDD	NA	--	NA	--	--	--	--	15	calc using TEF	NA	15	calc using TEF
OCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13	OEHHA	3800	13	OEHHA
OCDF	NA	--	NA	--	--	--	--	15	calc using TEF	NA	15	calc using TEF
OCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13	OEHHA	3800	13	OEHHA

References

HEAST: Health Effects Assessment Summary Tables (1997)

IRIS: Integrated Risk Information System (EPA 2010)

NCEA: National Center for Environmental Assessment (as cited on the RSL Table, 2010)

OEHHA: California Office of Environmental Health Hazard Assessment. Toxicity Criteria Database (2010)

OEHHA*: California Office of Environmental Health Hazard Assessment. Child Reference Dose (2007)

PPRTV : Provisional Peer Reviewed Toxicity Value (as cited on the RSL Table, 2010)

Shaded values are State of California toxicity values

Table 12
Summary of Cancer Risks and Noncancer Hazards - Soil
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

	Former AMCO Chemical Facility			Parking Lot			Large Vacant Lot		
Exposure Scenario/ Receptor	**Cancer**	**Noncancer**	**Risk Drivers**	**Cancer**	**Noncancer**	**Risk Drivers**	**Cancer**	**Noncancer**	**Risk Drivers**
Worker									
Industrial Worker									
Shallow Soil	1E-04	1	Vinyl chloride, xylenes, naphthalene, 2-methylnaphthalene, manganese, aluminum, cadmium, aldrin and dieldrin	5E-05	1	Lead, arsenic[1], benzo(a)pyrene, antimony and cadmium	6E-05	0.7	Lead, arsenic[1], DDT, benzo(a)pyrene, and cadmium
Deep Soil	1E-04	1		1E-04	1		4E-05	0.5	
Future Construction Worker									
Shallow Soil	1E-05	23		9E-06	30		1E-05	12	
Deep Soil	1E-05	20		2E-05	25		7E-06	10	
Hypothetical Resident									
Future Adult Resident (24 years)									
Shallow Soil	1E-04	1		5E-05	1		6E-05	0.8	
Deep Soil	1E-04	2		1E-04	1		4E-05	0.6	
Future Child Resident (6 years)									
Shallow Soil	2E-04	10		1E-04	26		1E-04	10	
Deep Soil	2E-04	11		2E-04	25		9E-05	7	
Sum of Adult plus Child (30 years)									
Shallow Soil	3E-04			2E-04			2E-04		
Deep Soil	3E-04			4E-04			1E-04		

Notes:

[1] Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to or less than arsenic levels found in the background data set; therefore, the risk contributions from arsenic may not be site-related.

Table 12
Summary of Cancer Risks and Noncancer Hazards - Soil
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

	Small Vacant Lot			Background		
Exposure Scenario/ Receptor	**Cancer**	**Noncancer**	**Risk Drivers**	**Cancer**	**Noncancer**	**Risk Drivers**
Worker						
Industrial Worker						
Shallow Soil	4E-05	0.4	Arsenic[1], dieldrin, DDT, aluminum, and cadmium	1E-05	0.8	Arsenic and thallium
Future Construction Worker						
Shallow Soil	7E-06	7		1E-06	3	
Hypothetical Resident						
Future Adult Resident (24 years)						
Shallow Soil	5E-05	0.4		1E-05	1	
Future Child Resident (6 years)						
Shallow Soil	1E-04	12		3E-05	11	
Sum of Adult plus Child (30 years)						
Shallow Soil	1E-04			4E-05		

Notes:

[1] Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to or less than arsenic levels found in the background data set; therefore, the risk contributions from arsenic may not be site-related.

Table 13

Summary of Cancer Risks and Noncancer Hazards - Groundwater

Remedial Investigation Report

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer	Noncancer	Risk Drivers
Trench Worker	1E-04	34	Vinyl chloride, arsenic, benzene, cis-1, 2-dichloroethene, benzo(a)pyrene, and Aroclor-1260
Hypothetical Resident			
Future Adult Resident (24 years)	5E-02	262	
Future Child Resident (6 years)	3E-02	628	
Sum of Adult plus Child (30 years)	7E-02		

Table 14

Risk and Hazards Summary for Vapor Intrusion Evaluation

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

	Crawlspace Air		Outdoor Air	
Location	**Cancer Risk**	**Noncancer HI**	**Cancer Risk**	**Noncancer HI**
Commercial/Industrial Scenario				
1414 3rd St	6E-05	0.6		
Residential Scenario				
1428 3rd St	3E-04	7	2E-04	4
1432 3rd St	6E-04	8	4E-05	0.8
1436 3rd St			1E-04	0.8
320 Center St	6E-05	0.7	6E-05	1
326 Center St	8E-05	0.5	3E-05	0.4
339 Center St			4E-05	0.7
356 Center St			5E-05	0.9
360 Center St			4E-05	1
366 Center St			2E-05	0.1
Prescott Park			3E-05	0.5
Combined Background			3E-05	0.5

TABLE 15
Irrigation Well Detected Analytical Results
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Screening Level	Agricultural Water Quality Limit	Units	9/2/2004	6/24/2005	10/12/2005
Volatile Organic Compounds						
Acetone	5,500	NE	µg/L	ND (4)	4 J	---
cis-1,2-Dichloroethene	6	NE	µg/L	0.6	ND (0.5)	---
Methyl tert-butyl ether	13	NE	µg/L	0.6	ND (0.5)	---
trans-1,2-Dichloroethene	10	NE	µg/L	0.2 J	ND (0.5)	---
Trichloroethene	5	NE	µg/L	0.3 J	ND (0.5)	---
Semivolatile Organic Compounds						
1,4-Dioxane (p-dioxane)	6.1	NE	µg/L	1.1	ND (1)	---
bis(2-Ethylhexyl)phthalate	4.8	NE	µg/L	1.8	---	---
Metals						
Aluminum	1,000	5,000	µg/L	320	---	---
Antimony	6	NE	µg/L	4.2	---	---
Arsenic	10	100	µg/L	2.3	---	---
Barium	1,000	NE	µg/L	170	---	---
Boron	7,300	700	µg/L	2,800	---	---
Cadmium	5	10	µg/L	2.2	---	---
Calcium	NA	NE	µg/L	190,000	---	---
Chromium	50	NE	µg/L	3.2	---	---
Cobalt	730	50	µg/L	2.2	---	---
Copper	1,300	200	µg/L	40	---	---
Iron	11,000	5,000	µg/L	1,400	---	---
Lead	15	5,000	µg/L	**79**	---	---
Magnesium	NA	NE	µg/L	34,000	---	---
Manganese	880	200	µg/L	390	---	---
Mercury	2	NE	µg/L	0.23	---	---
Molybdenum	180	10	µg/L	6.2	---	---
Nickel	100	200	µg/L	25	---	---
Potassium	NA	NE	µg/L	33,000	---	---
Sodium	NA	69,000	µg/L	150,000	---	---
Zinc	11,000	2,000	µg/L	520	---	---
Organochlorine Pesticides/PCBs						
4,4'-DDD	0.28	NE	µg/L	---	0.004 J	---
4,4'-DDT	0.2	NE	µg/L	---	0.003 J	---
Water Quality Indicators						
Hardness (as CaCO3)	NA	NE	µg/L	610,000	---	---

Notes:
Only Organophosphorus Pesticides were analyzed for the sample collected on 10/12/2005 and none of the results were detected above the reporting limit.
Screening levels are the lower of the Federal or California Primary MCL, or EPA Region 9 tap water PRG, if a Primary MCL is not available.
Agricultural Water Quality Limit - suitability of water for irrigation of plants/crops (Ayers, R.S., and D.W. Westcot, 1985)
Results greater than the Screening Level ae bolded.

--- not analyzed
NA not applicable
NE not established
µg/L micrograms per liter
ND not detected above the reporting limit
J estimated value

TABLE 16

Minimum Analyte Reporting Limits Above Applicable Groundwater Screening Level

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

	Minimum RL (μg/L)	Screening Levels (μg/L)	Number that Exceeded Screening Level (%)	Total Number of Samples
1,1,1,2-Tetrachloroethane	0.5	0.43	118 (100)	118
1,2,3-Trichloropropane	0.5	0.0056	118 (100)	118
1,4-Dioxane (p-dioxane)	1000	6.1	64 (80)	80
Naphthalene	0.2	0.093	81 (69)	118
bis(2-Chloroethyl)ether	0.08	0.01	111 (100)	111
Dibenz(a,h)anthracene	0.01	0.0092	111 (100)	111
Naphthalene	0.1	0.093	88 (81)	109
N-Nitrosodi-n-propylamine	0.01	0.0096	106 (96)	110
Aldrin	0.01	0.004	80 (80)	100
Dieldrin	0.02	0.0042	62 (63)	98

TABLE 17
Minimum Analyte Reporting Limits Above Applicable Ambient/Crawlspace Air Screening Level
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

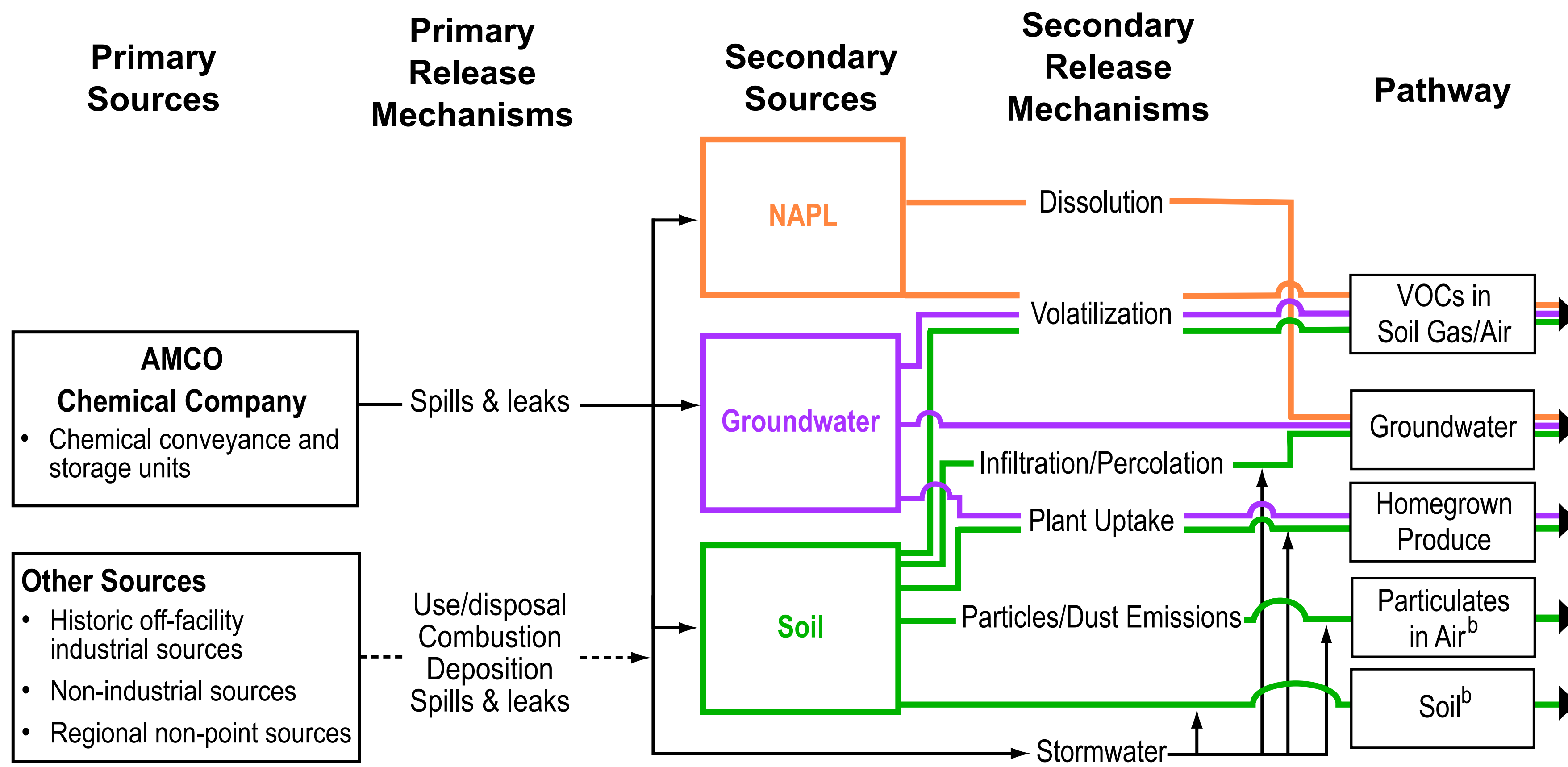
	Minimum RL ($\mu g/m^3$)	Screening Levels ($\mu g/m^3$)	Number that Exceeded Screening Level (%)	Total Number of Samples
AMBIENT AIR				
1,1,1,2-Tetrachloroethane	0.19	0.43	21 (99)	22
1,2-Dibromoethane	0.21	0.033	22 (100)	22
1,2-Dichloroethane	0.11	0.0034	19 (86)	22
Benzene	0.59	0.074	1 (4)	22
Chloroform	0.16	0.25	4 (18)	22
Hexachlorobutadiene	1.5	0.083	22 (100)	22
Naphthalene	3.6	0.086	6 (43)	14
Trichloroethene	0.028	0.056	11 (50)	22
CRAWLSPACE AIR				
1,1,1,2-Tetrachloroethane	0.19	0.43	21 (99)	22
1,2-Dibromoethane	0.21	0.033	22 (100)	22
1,2-Dichloroethane	0.11	0.0034	19 (86)	22
Chloroform	0.16	0.25	4 (18)	22
Hexachlorobutadiene	1.5	0.083	22 (100)	22
Naphthalene	3.6	0.086	6 (43)	14
Trichloroethene	0.028	0.056	11 (50)	22

Table 18
Summary of Surrogate Toxicity Values
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Compound	Surrogate	Oral RfD (mg/kg-day)	Reference	Inhalation RfD (mg/kg-day)	Reference	Oral CSF $(mg/kg\text{-}day)^{-1}$	Reference	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Reference
alpha-Chlordane gamma-Chlordane	Chlordane	0.0005	IRIS	0.0002	IRIS	1.2	OEHHA	1.2	OEHHA
Endosulfan I Endosulfan II Endosulfan sulfate	Endosulfan	0.006	IRIS	0.006	Route Extrapolation	NA	--	NA	--
Endrin aldehyde Endrin ketone	Endrin	0.0003	IRIS	0.0003	Route Extrapolation	NA	--	NA	--
Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1260	Aroclor-1254	0.00002	IRIS	0.00002	Route Extrapolation	2.0	IRIS	2.0	IRIS
o-Xylene m,p-Xylenes	Xylenes	0.2	IRIS	0.03	IRIS	NA	--	NA	--

Notes:
IRIS - Integrated Risk Information System (http://www.epa.gov/iris/)
RfD - Reference Dose
CSF - Cancer Slope Factor
NA - Toxicity value not available
OEHHA - Office of Environmental Health and Hazard Assessment, California State

Figures



Exposure Scenarios	Commercial/ Industrial Worker	Construction Worker	Trench Worker[c]	Future Onsite Resident	Offsite Resident
Inhalation (outdoor air)	●	●	●	●	●
Inhalation (indoor vapor intrusion)	●	IP	IP	●	●
Dermal Contact	IP	○	●	●[a]	●[a]
Ingestion	IP	○	○	●[a]	●[a]
Ingestion	IP	IP	IP	●	●
Inhalation (outdoor air)	●	●	●	●	●
Ingestion	●	●	●	●	●
Dermal Contact	●	●	●	●	●

LEGEND:

● = Potentially complete pathway

○ = Potentially complete pathway but not considered a significant source of risk

IP = Incomplete pathway

NAPL = Non-aqueous Phase Liquid

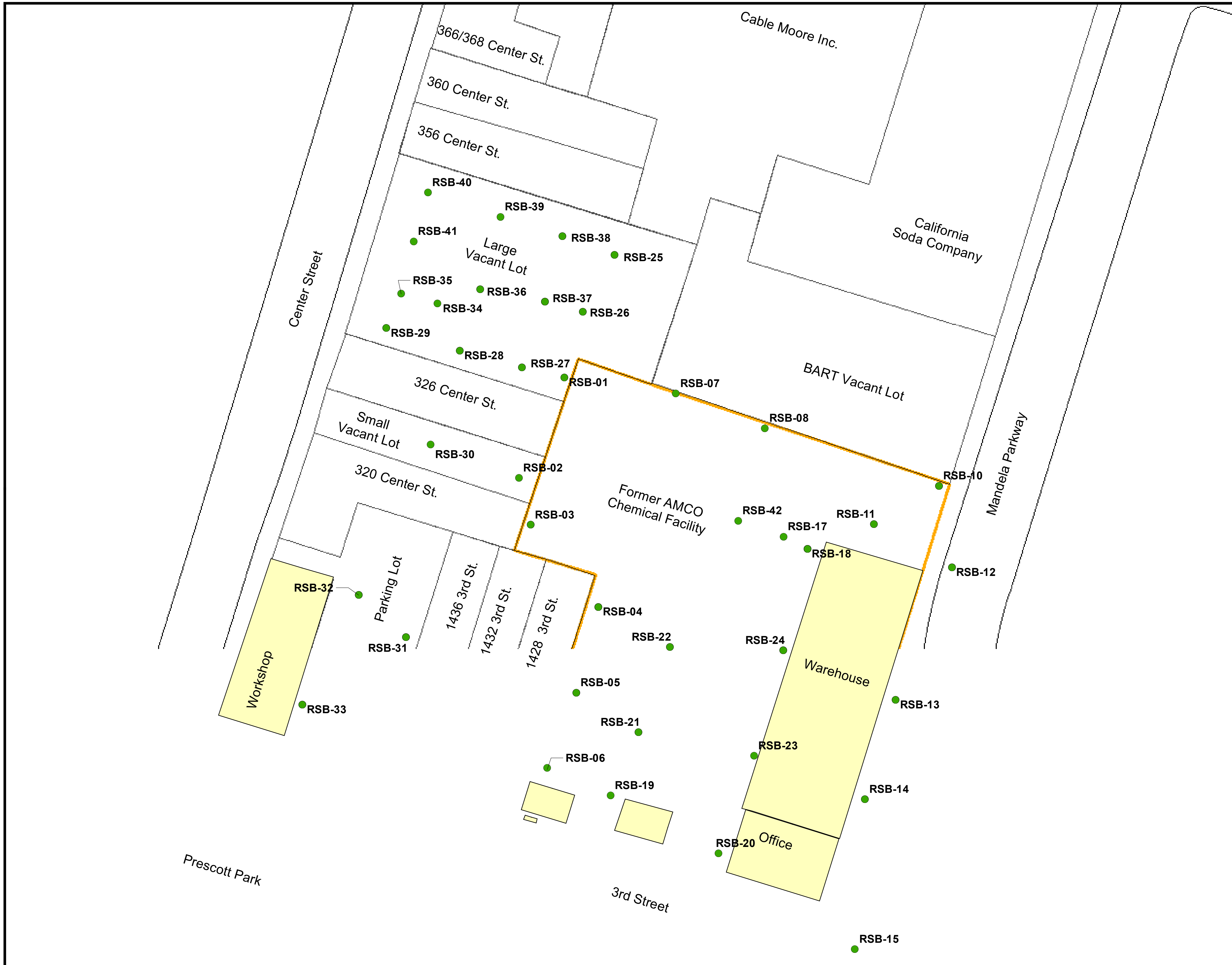
NOTES:

a Groundwater is designated for Municipal and Domestic Supply Beneficial Use by default; however, there are no domestic water wells within 1 mile of the site, and there are no municipal water wells within 4 miles of the site

b Assuming no pavement

c Groundwater exposure for a Landscape Worker is accounted for by this pathway

FIGURE 1
CONCEPTUAL SITE MODEL DIAGRAM
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA



LEGEND

- Soil Sampling Location
- Former AMCO Chemical Facility Boundary
- Former Extraction Trench
- Buildings

FIGURE 2
SOIL SAMPLING LOCATION MAP

HUMAN HEALTH RISK ASESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL

ES080610043239BAO_Fig 2 Soil Sampling Location Map.ai 8/6/10

Notes:
1. Data from 2005qtr2 was not used in the risk assessment because of insufficient quality.
2. Data from deep wells were not used in risk assessment calculations as the exposure pathway is incomplete.

FIGURE 3
GRAB AND MONITORING WELL SAMPLE LOCATIONS FOR SHALLOW WELLS USED IN THE RISK ASSESSMENT

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL

ES080610043239BAO_Fig 3 Grab And Monitoring Well Samp Loc Shallow Gw.ai 8/6/10

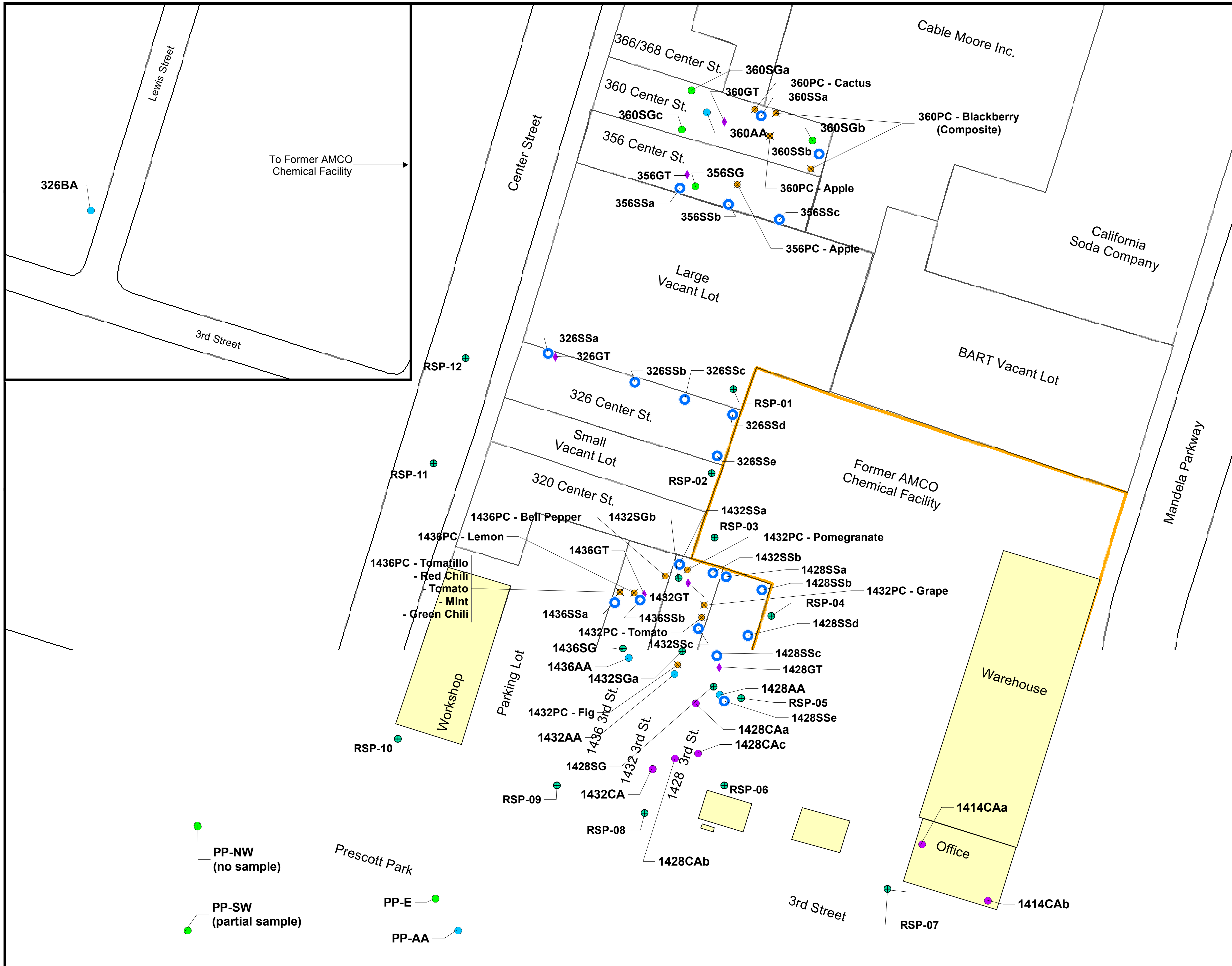
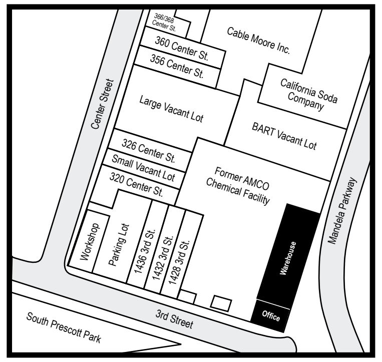


FIGURE 4
RESIDENTIAL AMBIENT AIR, CRAWLSPACE AIR, PRODUCE, AND SOIL GAS SAMPLE LOCATIONS

HUMAN HEALTH RISK ASESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL

ES080610043239BAO_Fig 4 Residential ambient air Crawlspace air Produce and Soilgas sample locations.ai 8/6/10



RSG-17	SL	SEP 2004
Concrete Depth (ft bgs)	- -	3.0
Sample Depth (ft bgs)	- -	5.6 - 6.0
1,1-Dichloroethane	15.0	**21000**
Benzene	3.10	**2600 J**
Chloromethane	14.0	**440**
Ethylbenzene	9.70	**390 J**
Tetrachloroethene	4.10	**40 J**
trans-1,2-Dichloroethene	630	**1000**
Trichloroethene	12.0	**240 J**
Vinyl chloride	1.60	**15000**

RSG-18	SL	SEP 2004
Concrete Depth (ft bgs)	- -	2.0
Sample Depth (ft bgs)	- -	4.6 - 5.0
1,1-Dichloroethane	15.0	**55000 J**
1,2-Dichloroethane	0.94	**44 J**
Benzene	3.10	**620**
Ethylbenzene	9.70	**40 J**
Trichloroethene	12.0	**150**
Vinyl chloride	1.60	**7300**

RSG-11	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.0
Sample Depth (ft bgs)	- -	2.6 - 3.0
1,1-Dichloroethane	15.0	**45 J**
Chloromethane	14.0	**470**
Vinyl chloride	1.60	**250**

INDOOR AIR CMI-IA01-E1	RSL	Jun 2009
No exceedances		

INDOOR AIR CMI-IA02-E1	Industrial RSL	Jun 2009
Tetrachloroethene	2.1	2.2

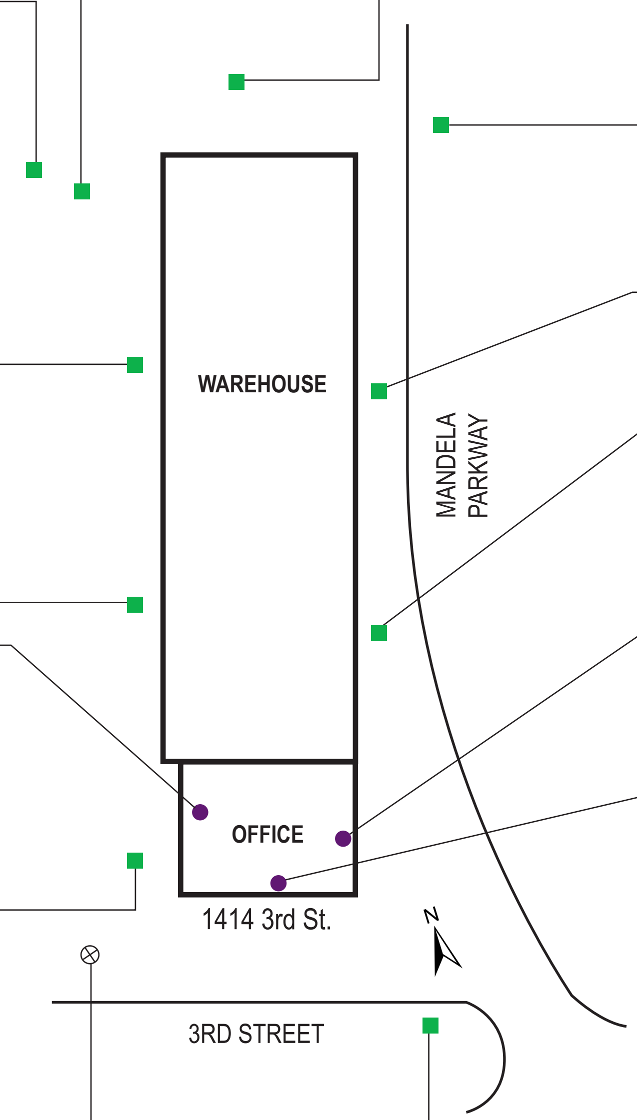
RSG-24	SL	SEP 2004
Concrete Depth (ft bgs)		0.8
Sample Depth (ft bgs)		3.5 - 3.9
1,1-Dichloroethane	15.0	**1100000**
1,1-Dichloroethene	2100	**53000**
1,2-Dichloroethane	0.94	**4200**
Benzene	3.10	**29000**
Chlorobenzene	520	**1300 J**
Ethylbenzene	9.70	**15000 J**
Tetrachloroethene	4.10	**180 J**
Toluene	52000	**440000**
trans-1,2-Dichloroethene	630	**73000**
Trichloroethene	12.0	**5700**
Vinyl chloride	1.60	**1500000**
Xylenes, total	1000	**43700 J**

RSG-23	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.75
Sample Depth (ft bgs)	- -	3.8 - 4.2
1,1,2-Trichloroethane	1.50	**1500**
1,1-Dichloroethane	15.0	**54000**
1,1-Dichloroethene	2100	**3000**
1,2,4-Trimethylbenzene	73.0	**110**
1,2-Dichloroethane	0.94	**350**
1,3,5-Trimethylbenzene	63.0	**160**
Benzene	3.10	**6500**
Chlorobenzene	520	**760**
Ethylbenzene	9.70	**5900**
Methylene chloride	52.0	**1200**
Tetrachloroethene	4.10	**190**
Toluene	52000	**600000 J**
trans-1,2-Dichloroethene	630	**11000**
Trichloroethene	12.0	**4000**
Vinyl chloride	1.60	**430000**
Xylenes, total	1000	**15300**

RSG-12	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.25
Sample Depth (ft bgs)	- -	2.6 - 3.0
1,1-Dichloroethane	15.0	**37 J**
Vinyl chloride	1.60	**740**

RSG-13	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.0
Sample Depth (ft bgs)	- -	2.6 - 3.0
1,1-Dichloroethane	15.0	**74 J**

RSG-14	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.0
Sample Depth (ft bgs)	- -	2.6 - 3.0
1,1-Dichloroethane	15.0	**300**
Chloroform	1.10	**40 J**
Trichloroethene	12.0	**1900**
Vinyl chloride	1.60	**59**



CRAWL SPACE AIR - 1414CAa	SL	NOV 2006	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008
1,1-Dichloroethane	7.70	**28**	**24**	2.6	**19**	**33**	**27**	**10**
1,2-Dibromoethane	0.02	0.82 U	0.26 U	0.25 U	0.24 U	1.4 U	0.88 U	**0.11 J**
1,2-Dichloroethane	0.47	0.43 U	0.064 J	0.047 J	**1**	0.077 J	**0.66**	0.2
Carbon tetrachloride	0.82	0.47 J	0.66	0.42	0.72	**17**	0.5	0.5
Chloroform	0.53	**0.66 J**	0.37	0.15 J	**1.1**	**3**	**0.75 J**	0.53
Chloromethane	6.80	**22**	0.81	0.97	4.6	0.75 J	0.72 J	0.68
Naphthalene	0.36	**0.41 J**	**0.98 J**	4.3 U	0.6 UJ	**0.21 UJ**	15 U	**0.75 UJ**
Tetrachloroethene	2.10	**19**	**8.8**	**5.3**	**3.5**	**11**	**12**	**9.3**
Trichloroethene	6.10	**26**	**8.7**	3.7	4.9	**15**	**17**	**9.5**

CRAWL SPACE AIR - 1414CAc	SL	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008	JUN 2009
1,2-Dichloroethane	0.47	0.13 U	0.062 J	0.033 J	**1.5**	0.14	0.16 U
Chloroform	0.53	0.13 J	0.21	0.2	**0.64**	0.21	0.94 U
Tetrachloroethene	2.1	1.3	**2.9**	**3.1**	**3.2**	1.2	**2.7**

CRAWL SPACE AIR - 1414CAb	SL	NOV 2006	SEP 2007	JUN 2009
1,1-Dichloroethane	7.7	1.1	2	**24**
1,2-Dichloroethane	0.47	0.13 U	**0.85**	0.13 J
Carbon tetrachloride	0.82	0.38	0.6	**0.84**
Naphthalene	0.36	**0.53 J**	3.6 U	4.9 UJ
Tetrachloroethene	2.1	**3**	1.3	**14**
Trichloroethene	6.1	3.1	6.1	**28**
Vinyl chloride	2.8	**7.6**	0.29	0.048 U

RSG-20	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.5
Sample Depth (ft bgs)	- -	3.1 - 3.5
1,1-Dichloroethane	15.0	**370**
Benzene	3.10	**110**
Ethylbenzene	9.70	**27 J**
Trichloroethene	12.0	**88**
Vinyl chloride	1.60	**4400**

RSG-15	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.25
Sample Depth (ft bgs)	- -	2.6 - 3.0
Benzene	3.10	**1100**
Chloromethane	14.0	**160**
Ethylbenzene	9.70	**21 J**
Trichloroethene	12.0	**49 J**
Vinyl chloride	1.60	**63**

RSP-07	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.7	0.7	0.7	0.7	0.7	0.7
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	4.1[c]	4.7[b]	4.7	4.7	
1,1-Dichloroethane	15	**3400**	**1100**	**1500**	**270**	**3100 J**	**2000**
1,2,4-Trimethylbenzene	73	**24000**	**290**	74 UJ	69 U	120 U	160 U
1,3,5-Trimethylbenzene	63	**15000**	**170**	74 U	69 U	120 U	160 U
1,4-Dichlorobenzene	2.2	**180**	82 U	91 U	85 U	140 U	200 U
4-Ethyltoluene	1000	**34000**	76	NA	NA	NA	NA
Benzene	3.1	92 U	44 UJ	48 U	**12 J**	75 U	100 U
Chloroform	1.1	140 U	NA	**36 J**	69 U	**160 J**	**39 J**
Ethylbenzene	9.7	**5200**	**150**	66 U	2.4 J	100 U	140 U
Methylene chloride	52	100 U	48 U	**150 J**	98 U	81 UJ	32 J
Tetrachloroethene	4.1	**7700**	**5200**	**3400**	**910**	**7100 J**	**10000**
trans-1,2-Dichloroethene	630	**1100**	490	580	100	**1400 J**	**820**
Trichloroethene	12	**13000**	**4600**	**5000**	**850**	**15000 J**	**11000**
Vinyl chloride	1.6	**85**	**40**	38 U	3.6 U	**44 J**	84 U
Xylenes, total	1000	**21900**	150	66 U	NA	NA	NA

● CRAWL SPACE AIR SAMPLING LOCATION
■ SOIL GAS SAMPLING LOCATION
⊗ PERMANENT SOIL GAS PROBE LOCATION

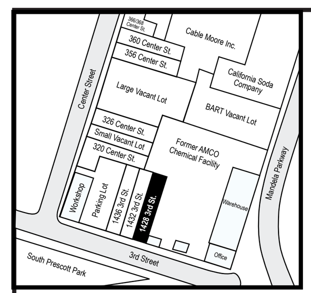
All results and screening levels in μg/m³
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

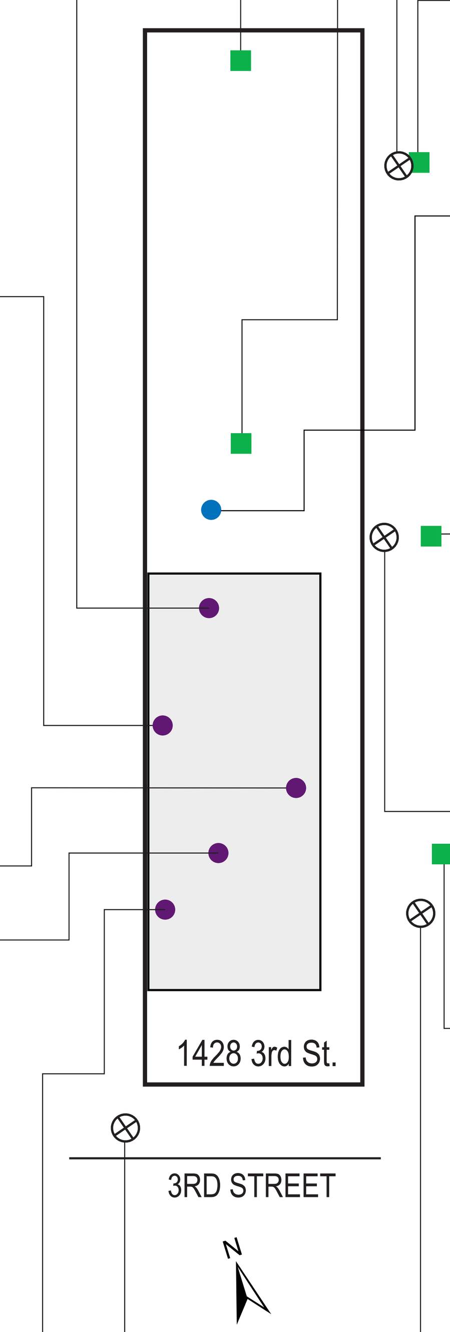
Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. November 2006 water levels based on September 2006 groundwater sampling event.
6. Property lines based on Alameda County parcel maps.
7. Building locations identified from orthocorrected aerial photograph.
8. RSP-07 is located in the backfill of the extraction trench.

FIGURE 5
1414 3rd STREET CRAWLSPACE AIR SAMPLING RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL

ES080610043239BAO_Fig 5_1414_sample_locs_allData_2009.ai 8/6/10





Soil Gas - 1428-SG02	SL	JUN 2009
Chloroform	1.1	**48**
Tetrachloroethene	4.1	**5**

Soil Gas - 1428SG	SL	SEP 2004	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA_a	5.8_b	5.6	5.6	5.6
1,1-Dichloroethane	15	**17**	4.9	**47**	**44**	7.4
Chloroform	1.1	**22**	**9**	**6.8**	**12**	**23**
Tetrachloroethene	4.1	**100**	**42**	**130**	**210**	**22**
Trichloroethene	12	**230**	**98**	**340**	**480**	**36**

RSP-04	SL	OCT 2004	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	1.4	1.4	1.4	1.4	1.4
Sample Depth (ft bgs)	- -	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5
Depth to Water (ft bgs)	- -	NA^a	6.4^b	6.5	6.5	
1,1-Dichloroethane	15	**70**	**59**	**76 J**	**66**	0.053 J
Benzene	3.1	**43**	**22 J**	**26 J**	**19**	0.34
Ethylbenzene	9.7	**12**	0.66	0.86 J	0.95	0.21
Vinyl chloride	1.6	**43**	**20**	**24 J**	**20**	0.048 U

Crawl Space Air - 1428CAa	SL	SEP 2004	MAY 2005	NOV 2006
1,2,4-Trimethylbenzene	7.3	**14**	0.077 J	0.5
1,4-Dichlorobenzene	0.22	**0.25 J**	0.19 UJ	**0.31**
Benzene	0.31	**1.1 J**	0.19 J	**0.49**
Carbon tetrachloride	0.16	**0.43**	**0.49 J**	**0.46**
Chloroform	0.11	**0.35**	**0.19**	**0.23**
Ethylbenzene	0.97	**1.9**	0.11 J	0.41
Naphthalene	0.072	NA	NA	**0.58 J**
Tetrachloroethene	0.41	0.34	0.29	**0.58**
Vinyl chloride	0.16	0.048 U	0.04 U	**1.5**

RSG-04	SL	SEP 2004
Concrete Depth (ft bgs)	- -	2.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
All VOCs - No Exceedences		

Crawl Space Air - 1428CAe	SL	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008	JUN 2009
1,2-Dibromoethane	0.0041	0.23 U	0.22 U	**0.034 J**	0.26 U	0.28 U	0.23 U	1.3 U
1,2-Dichloroethane	0.094	0.012 J	0.024 J	0.06 J	0.01 J	**2**	**0.13**	0.14 U
1,4-Dichlorobenzene	0.22	0.18 UJ	0.082 UJ	**0.4**	0.14 UJ	1.6 UJ	**0.54**	**0.36 J**
Benzene	0.31	0.18 J	**0.39**	0.3 J	0.28	**0.64**	**0.33**	**2.4**
Carbon tetrachloride	0.16	**0.57**	**0.42**	**0.5**	**0.4**	**0.46**	**0.49**	**0.4**
Chloroform	0.11	0.36	**1.1**	**1.7**	**0.56**	**0.9**	**0.41**	**0.38 J**
Ethylbenzene	0.97	0.69	**1.2**	0.57	0.32	0.16	0.17	**1.4**
Naphthalene	0.072	4 U	3.7 U	0.38 UJ	0.35 UJ	4.7 U	4 UJ	**3 J**
Tetrachloroethene	0.41	0.27	**0.72**	0.37	0.4	0.32	0.23	**1.7**
Trichloroethene	1.2	0.11	0.22	0.56	0.16	**3.1**	0.47	0.056 J

Ambient Air - 1428AA	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008	JUN 2009
1,1,2,2-Tetrachloroethane	0.042	0.23 U	**0.15 J**	0.22 U	0.18 U	0.19 U	**0.18 J**	0.22 U	0.23 U	0.2 U	**42**
1,2,4-Trimethylbenzene	7.3	**23**	0.19	0.9	0.13	0.4	0.3 J	0.16 J	2.1	1.3	0.23 U
1,2-Dichloroethane	0.094	0.13 U	0.12 U	0.13 U	0.052 J	0.052 J	0.044 J	0.033 J	**0.27**	0.086 J	**0.4 J**
1,3,5-Trimethylbenzene	6.3	**8**	0.082 J	0.24	0.047 J	0.11 J	0.11 J	0.046 UJ	0.74	0.67	0.21
1,4-Dichlorobenzene	0.22	**3.5 J**	0.19 UJ	0.19 U	0.16 UJ	0.07 UJ	0.17 J	0.031 UJ	**0.51**	0.086 UJ	0.84 U
Benzene	0.31	**5.6 J**	**0.44**	**0.85**	**0.33**	**0.48**	**0.41 J**	**0.37**	**1.8**	**1.6**	1 U
Carbon tetrachloride	0.16	**0.47**	**0.54 J**	**0.46**	**0.7**	**0.43**	**0.58 J**	**0.45**	**0.48**	**0.54**	**0.31**
Chloroform	0.11	0.16 U	0.11 J	**0.14 J**	**0.13**	0.087 J	**0.18 J**	**0.12 J**	**0.38**	**0.16**	**0.62**
Chloromethane	1.4	**1.5**	1.2	0.99	1.3	1.4	1.4 J	1	1.2	0.87	0.83 U
Ethylbenzene	0.97	**12**	0.21	0.72	0.16	0.35	0.39 J	0.22	**1.7**	**1.3**	0.26
Methylene chloride	5.2	1.2 U	**21**	1.1 U	0.93 UJ	0.47 UJ	0.61 UJ	0.31 UJ	3.8	0.44 UJ	0.34 J
Naphthalene	0.072	NA	**0.12**	4.2 U	3.5 U	3.6 U	3.5 UJ	4.1 U	**0.63 J**	**16 J**	**0.76 J**
Tetrachloroethene	0.41	**2.2**	0.14 J	0.32	0.078 J	0.14 J	0.14 J	0.1 J	0.26	0.18 J	0.074 J

RSG-05	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.9
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**150**
Ethylbenzene	9.70	**29 J**
Tetrachloroethene	4.10	**1000**
Trichloroethene	12.0	**2500**

Crawl Space Air - 1428CAc	SL	MAY 2005	NOV 2006
1,4-Dichlorobenzene	0.22	**0.4 J**	**0.38**
Benzene	0.31	**0.55**	**0.51**
Carbon tetrachloride	0.16	**0.63 J**	**0.44**
Chloroform	0.11	**0.25**	**0.21**
Methylene chloride	5.2	**8.2**	2.5
Tetrachloroethene	0.41	0.28	**4.8**
Vinyl chloride	0.16	0.04 U	**10**

Crawl Space Air - 1428CAb	SL	SEP 2004
1,2,4-Trimethylbenzene	7.3	**13**
Benzene	0.31	**1.2 J**
Carbon tetrachloride	0.16	**0.45**
Chloroform	0.11	**0.47**
Ethylbenzene	0.97	**1.8**

RSP-05	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.9	0.9	0.9	0.9	0.9	0.9
Sample Depth (ft bgs)	- -	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0
Depth to Water (ft bgs)	- -	NA^a	5.5^c	6.0^b	6.3	6.3	
1,1-Dichloroethane	15	**130**	**25**	**100**	**75**	**76**	**32**
Benzene	3.1	17 U	10 UJ	11 UJ	**6.3 J**	15 U	1.3 J
Chloroform	1.1	27 U	**9.5 J**	**29 J**	**23 J**	**32**	**20 J**
Tetrachloroethene	4.1	**10000**	**4900**	**8400**	**7600**	**7000**	**6200**
Trichloroethene	12	**9500**	**4800**	**9500**	**7300**	**6400**	**5700**

RSG-06	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**530**
Benzene	3.10	**38 J**
Trichloroethene	12.0	**1300**

Crawl Space Air - 1428CAd	SL	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008	JUN 2009
1,1,2,2-Tetrachloroethane	0.042	0.2 U	0.2 U	0.076 UJ	**0.074 J**	0.22 U	0.21 U	11 U
1,2,4-Trimethylbenzene	7.3	0.59	1.4	0.1 J	0.14 J	0.14 J	0.14 J	**57**
1,2-Dichloroethane	0.094	0.02 J	0.019 J	0.05 J	0.016 J	**2.9**	**0.23**	6.5 U
1,2-Dichloropropane	0.24	0.067 U	0.067 U	0.073 U	0.078 U	**0.3**	0.1	37 U
1,3,5-Trimethylbenzene	6.3	0.092 J	0.2	0.16 U	0.024 J	0.062 J	0.043 UJ	**15 J**
1,4-Dichlorobenzene	0.22	0.25 U	0.093 UJ	**0.4**	0.17 UJ	**2**	**0.32**	48 U
Benzene	0.31	0.14 J	**0.48**	**0.35**	**0.33**	**0.73**	**0.46**	13 U
Carbon tetrachloride	0.16	**0.62**	**0.41**	**0.5**	**0.42**	**0.46**	**0.47**	10 U
Chloroform	0.11	**1.4**	**6.6**	**2.5**	**1.1**	**0.99**	**0.48**	39 U
Ethylbenzene	0.97	0.32	**1.5**	0.7	0.38	0.29	0.49	**4 J**
Naphthalene	0.072	3.8 U	3.8 U	0.11 UJ	4.4 U	4.1 U	**0.64 J**	210 U
Tetrachloroethene	0.41	**0.48**	**0.82**	0.25	0.26	0.31	**0.57**	**1.4 J**
Trichloroethene	1.2	0.073	0.23	0.69	0.13	**4.2**	0.67	**2.9 J**

RSP-06	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	1.0	1.0	1.0	1.0	1.0	1.0
Sample Depth (ft bgs)	- -	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0
Depth to Water (ft bgs)	- -	NA^a	5.4^c	5.9^b	6.2	6.2	
1,1-Dichloroethane	15	**56**	**34**	**110**	**78 J**	**58**	**63**
1,2-Dibromoethane	0.041	10 U	**0.043 J**	21 U	10 UJ	11 U	9 U
Chloroform	1.1	**40**	**15**	**17**	**240 J**	**96**	**66**
Tetrachloroethene	4.1	**36**	**18**	**30**	**36 J**	**24**	**23**
Trichloroethene	12	**320**	**120**	**220**	**310 J**	**170**	**160**

RSP-08	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.3	0.3	0.3	0.3	0.3	0.3
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA^a	4.2^c	4.8^b	5.0	4.8	
Chloroform	1.1	**12**	**6.1**	**8.8**	**8**	**56**	**34**
Naphthalene	0.72	NA	3.8 U	**0.86 J**	**22**	3.5 U	4.7 UJ

1428 3rd Street - Downstairs Indoor Air

Living room area along southeast wall		
1428-IA01-E1, 1428-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.36
1,4-Dichlorobenzene	0.22	0.3 J
Benzene	0.31	1.1
Carbon tetrachloride	0.16	0.41
Chloroform	0.11	2.7
Tetrachloroethene	0.41	3.6

Master bedroom - center		
1428-IA03-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.14
1,4-Dichlorobenzene	0.22	0.25 J
Benzene	0.31	0.65
Carbon tetrachloride	0.16	0.52
Chloroform	0.11	1.2
Ethylbenzene	0.97	3.2
Naphthalene	0.072	0.73 J
Tetrachloroethene	0.41	58

Back bedroom along northeast wall		
1428-IA04-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.37
1,4-Dichlorobenzene	0.22	0.34 J
Benzene	0.31	0.72
Carbon tetrachloride	0.16	0.42
Chloroform	0.11	2.4
Ethylbenzene	0.97	1
Naphthalene	0.072	0.79 J
Tetrachloroethene	0.41	2.8

Kitchen on west wall, adjacent to back bedroom		
1428-IA05-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.38
Benzene	0.31	0.78
Carbon tetrachloride	0.16	0.42
Chloroform	0.11	2.7
Naphthalene	0.072	0.88 J
Tetrachloroethene	0.41	3.1

1430 3rd Street - Outdoor Air

Back deck, northeast corner		
1430-OA01-E1	RSL	Jun-09
Benzene	0.31	0.34
Carbon tetrachloride	0.16	0.42

1430 3rd Street - Upstairs Indoor Air

Center living room area		
1430-IA01-E1	RSL	Jun-09
Benzene	0.31	0.62
Carbon tetrachloride	0.16	0.45
Chloroform	0.11	1.5

Master bedroom, south side of residence		
1430-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.43
1,4-Dichlorobenzene	0.22	0.32 J
Benzene	0.31	0.99
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	0.88
Naphthalene	0.072	1.4 J
Tetrachloroethene	0.41	0.64

Middle bedroom, west side of residence		
1430-IA03-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.11 J
Benzene	0.31	0.61
Carbon tetrachloride	0.16	0.56
Chloroform	0.11	1
Naphthalene	0.072	0.73 J
Tetrachloroethene	0.41	0.6

Back bedroom, west side of residence		
1430-IA04-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.1 J
Benzene	0.31	1.2
Carbon tetrachloride	0.16	0.41
Chloroform	0.11	2.9
Naphthalene	0.072	1.1 J

AMBIENT AIR SAMPLING LOCATION
CRAWL SPACE AIR SAMPLING LOCATION
SOIL GAS SAMPLING LOCATION
PERMANENT SOIL GAS PROBE LOCATION

All results and screening levels in $\mu g/m^3$
Bold - detected above screening levels
[a] - Well construction not completed by October 2004; consequently, no water level information available
[b] - Based on nearest available water on March 2006
[c] - Based on nearest available water on November 2006
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 6
1428 3rd STREET
SOIL GAS/CRAWLSPACE/AMBIENT/INDOOR AIR SAMPLING LOCATIONS AND RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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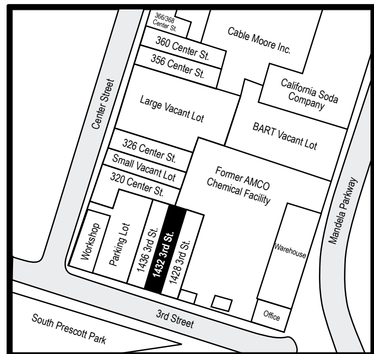


RSP-03	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.5	0.5	0.5	0.5	0.5	0.5
Sample Depth (ft bgs)	- -	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5
Depth to Water (ft bgs)	- -	NA[a]	5.6[c]	6.4[b]	6.6	6.5	
Chloroform	1.1	**34**	**2.2 J**	**5.2**	**3.9 J**	**3.4**	**3**

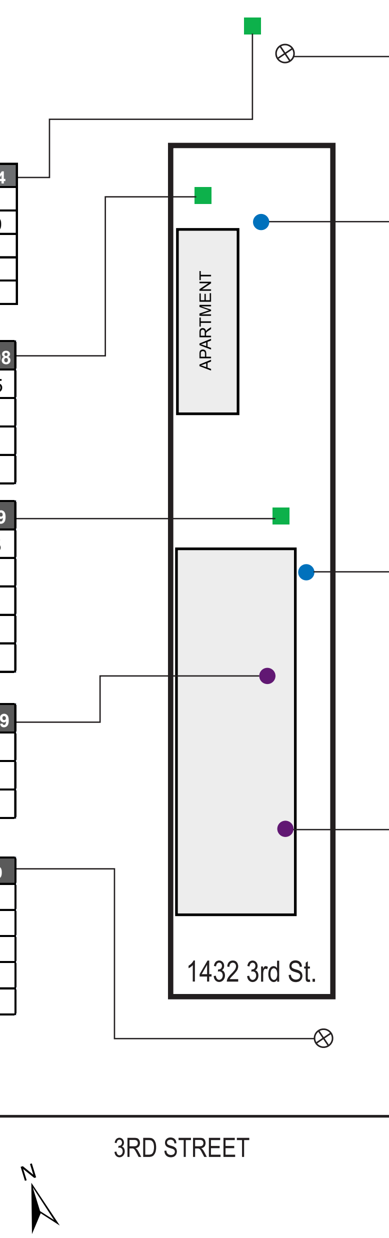
RSG-03A	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.0
Sample Depth (ft bgs)	- -	2.6 - 3.0
Depth to Water (ft bgs)	- -	NA
Ethylbenzene	9.70	**24 J**
Trichloroethene	12.0	**79**

Soil Gas - 1432SGb	SL	SEP 2004	NOV 2006	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA	5.3	5.6	5.7
Chloroform	1.10	**6.3**	**1.6**	**5.9**	0.85 J
Tetrachloroethene	4.10	4.6 U	**11**	2.4	0.81

Soil Gas - 1432SGa	SL	SEP 2004	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA	5.5	5.7	5.8	
Chloroform	1.10	**6.3**	**1.4**	0.26 J	**12**	**280**
Naphthalene	0.72	NA	3.4 U	**1.6 J**	4.1 U	4.3 U
Tetrachloroethene	4.10	4.6 U	2.9	0.22	4	**5.1**

Crawl Space Air - 1432-CA02	SL	JUN 2009
1,4-Dichlorobenzene	0.22	**0.29 J**
Benzene	0.31	**0.35**
Carbon tetrachloride	0.16	**0.43**

RSP-08	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.3	0.3	0.3	0.3	0.3	0.3
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	4.2[c]	4.8[b]	5.0	4.8	
Chloroform	1.1	**12**	**6.1**	**8.8**	**8**	**56**	**34**
Naphthalene	0.72	NA	3.8 U	**0.86 J**	**22**	3.5 U	4.7 UJ



Ambient Air - 1432-OA02-E1	RSL	Jun-09
Carbon tetrachloride	0.16	0.42

Ambient Air - 1432AA	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008
1,4-Dichlorobenzene	0.22	0.19 UJ	**0.25 J**	0.22 U	0.17 UJ	0.042 UJ	0.13 UJ	0.048 UJ	0.23 UJ	0.057 UJ
Benzene	0.31	**0.74 J**	**0.55**	**0.81**	0.24	0.47	0.25	**0.37**	**1.6**	**0.84**
Carbon tetrachloride	0.16	**0.53**	**0.6**	**0.45**	**0.56**	**0.43**	**0.55**	**0.46**	**0.45**	**0.52**
Chloroform	0.11	**0.3**	**0.18**	**0.15 J**	0.11 J	0.088 J	**0.12 J**	**0.12 J**	**0.36**	**0.18**
Ethylbenzene	0.97	0.4	0.24	0.6	0.11 J	0.25	0.13	0.19	**1.5**	0.48
Naphthalene	0.072	NA	**0.27**	**0.46 J**	3.8 U	3.9 U	4 U	3.7 U	**0.74 J**	**0.71 J**

Crawl Space Air - 1432CA	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008	JUN 2009
1,2,4-Trimethylbenzene	7.30	**31**	0.066 J	0.092 J	0.5	0.95	0.41 J	0.2 J	1.4	0.22	0.8 J
1,2-Dichloroethane	0.094	0.13 U	0.044 J	0.14 U	0.056 J	0.047 J	0.038 J	0.03 J	**0.91**	**0.13**	0.06 J
1,3,5-Trimethylbenzene	6.30	**11**	0.047 J	0.16 U	0.1 J	0.17	0.12 J	0.064 J	0.54	0.078 J	0.22 J
1,4-Dichlorobenzene	0.22	**4.8**	**0.32 J**	0.2 U	0.18 UJ	0.073 UJ	0.14 UJ	0.13 UJ	1.4	0.17 UJ	1.1 U
Benzene	0.31	**16 J**	0.23 J	0.19 J	0.25	**0.69**	**0.32**	**0.36**	**1.5**	**1.9**	**0.52**
Carbon tetrachloride	0.16	**0.54**	**0.58**	**0.48**	**0.55**	**0.43**	**0.56**	**0.45**	**0.48**	**0.54**	**0.47**
Chloroform	0.11	**0.44**	**0.19**	**0.33**	**0.27**	**0.35**	**0.21**	**0.18**	**0.65**	**0.25**	0.91 U
Ethylbenzene	0.97	**20**	0.046 J	0.083 J	0.29	0.94	0.47	0.29	**1.6**	0.42	0.28
Naphthalene	0.072	NA	NA	4.4 U	3.9 U	0.42 UJ	0.5 UJ	3.8 U	**0.92 J**	**0.71 J**	4.9 U
Tetrachloroethene	0.41	**3.2**	0.17 J	0.37	0.2 UJ	**0.43**	0.25	0.15 J	0.27	0.33	0.06 J
Trichloroethene	1.20	0.36	0.036 UJ	0.14	0.033	0.058	0.22	0.069	**1.5**	0.25	0.033 J
Vinyl chloride	0.16	0.13	0.064	**2.8**	0.038 U	0.032 J	0.038 U	0.037 U	0.042 U	0.041 U	0.074

1432 3rd Street - Downstairs Indoor Air

First floor, living room area		
1432-IA01-E1, 1432-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.12 J
1,4-Dichlorobenzene	0.22	2.8
Benzene	0.31	0.32
Carbon tetrachloride	0.16	0.52
Chloroform	0.11	2.8
Naphthalene	0.072	110

First floor, backyard house, living area		
1432-IA03-E1	RSL	Jun-09
Carbon tetrachloride	0.16	0.45
Chloroform	0.11	0.29 J
Naphthalene	0.072	0.79 J

1434 3rd Street - Upstairs Indoor Air

2nd floor, living room area - center residence		
1434-IA01-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.11 J
Carbon tetrachloride	0.16	0.49
Chloroform	0.11	0.21 J
Naphthalene	0.072	1.6 J

AMBIENT AIR SAMPLING LOCATION
CRAWL SPACE AIR SAMPLING LOCATION
SOIL GAS SAMPLING LOCATION
⊗ PERMANENT SOIL GAS PROBE LOCATION

All results and screening levels in μg/m^3
Bold - detected above screening levels
a - Well construction not completed by October 2004; consequently, no water level information available
b - Based on nearest available water on March 2006
c - Based on nearest available water on November 2006
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
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3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 7
1432 3rd STREET
SOIL GAS/CRAWLSPACE/AMBIENT INDOOR AIR SAMPLING LOCATIONS AND RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
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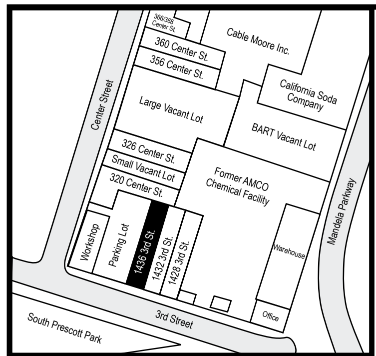

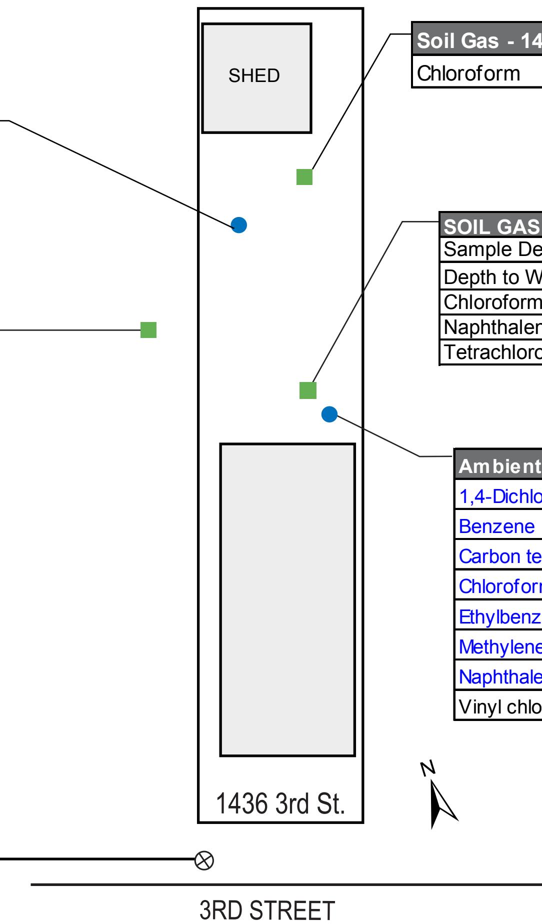

Outdoor Air - 1436-OA01	SL	JUN 2009
Benzene	0.31	**0.66**
Carbon tetrachloride	0.16	**0.46 J**

Soil Gas - 1436-SG01	SL	JUN 2009
Chloroform	1.1	**7.6**

RSG-31	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.5
Sample Depth (ft bgs)	- -	3.4 - 3.8
Depth to Water (ft bgs)	- -	NA
All VOCs - No Exceedences		

SOIL GAS - 1436SG	SL	SEP 2004	NOV 2006	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA	5.7	5.7	5.8
Chloroform	1.10	3.3 U	**1.6**	**2.5**	**2.9**
Naphthalene	0.72	NA	4.4 U	**1.3 J**	4.4 U
Tetrachloroethene	4.10	**5.2**	1.4	0.4	0.88

Ambient Air - 1436AA	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008
1,4-Dichlorobenzene	0.22	0.19 U	0.14 J	**0.23**	0.19 U	0.27 UJ
Benzene	0.31	**0.79 J**	**0.48**	**1.2**	0.24 J	**1.8**
Carbon tetrachloride	0.16	**0.48**	**0.63**	**0.48**	**0.55**	**0.49**
Chloroform	0.11	**0.16**	0.11 J	**0.14**	0.09 J	**0.39**
Ethylbenzene	0.97	0.57	0.22	**1.7**	0.13 J	**2.2**
Methylene chloride	5.2	1.1 U	**11**	4.5 J	1.1 UJ	3.8
Naphthalene	0.072	NA	0.069	3.6 U	4.1 U	**0.62 J**
Vinyl chloride	0.16	0.04 U	0.04 U	**0.7 J**	0.04 U	0.039 U

RSP-09	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.3	0.3	0.3	0.3	0.3	0.3
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	4.0[c]	4.9[b]	4.9	4.9	
Naphthalene	0.72	NA	3.8 U	3.6 UJ	3.6 UJ	4.2 U	**2.6 J**
Tetrachloroethene	4.1	**15**	**9.1**	**11**	**13 J**	**11**	**11**

1436 3rd Street - Downstairs Indoor Air

Master bedroom - along southeast wall

1436-IA01	RSL	JUN 2009
1,2-Dichloroethane	0.094	1.1
1,4-Dichlorobenzene	0.22	0.67 J
1,4-Dioxane (p-dioxane)	0.32	0.36 J
Benzene	0.31	0.5
Carbon tetrachloride	0.16	0.45
Chloroform	0.11	1.6
Ethylbenzene	0.97	1
Naphthalene	0.072	1 J
Tetrachloroethene	0.41	0.95

Duplicate of 1436-IA01

1436-IA02	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.35
1,4-Dichlorobenzene	0.22	0.54 J
Benzene	0.31	0.54
Carbon tetrachloride	0.16	0.5
Chloroform	0.11	1.7

Living room/kitchen area

1436-IA03	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.38
1,4-Dichlorobenzene	0.22	0.75 J
1,4-Dioxane (p-dioxane)	0.32	0.47 J
Benzene	0.31	0.49
Carbon tetrachloride	0.16	0.5
Chloroform	0.11	1.7
Naphthalene	0.072	1.2 J

Back bedroom southeast wall

1436-IA04	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.34
1,4-Dichlorobenzene	0.22	0.58 J
Benzene	0.31	0.47
Carbon tetrachloride	0.16	0.48
Chloroform	0.11	1.8
Naphthalene	0.072	0.76 J
Tetrachloroethene	0.41	0.48

1436 3rd Street - Backhouse Unit Indoor Air

Main bedroom - north wall

1436-IA05	RSL	JUN 2009
1,4-Dichlorobenzene	0.22	2.2
Benzene	0.31	0.84
Carbon tetrachloride	0.16	0.45
Chloroform	0.11	3
Naphthalene	0.072	0.63 J

1438 3rd Street - Upstairs Indoor Air

Back bedroom, north side of residence

1438-IA01	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.15
Benzene	0.31	0.36
Carbon tetrachloride	0.16	0.37

Middle bedroom - west side of residence

1438-IA02	RSL	JUN 2009
1,1,2,2-Tetrachloroethane	0.042	0.18 J
1,2-Dichloroethane	0.094	0.2
Benzene	0.31	0.4
Carbon tetrachloride	0.16	0.41
Chloroform	0.11	0.48 J

Center of master bedroom

1438-IA03	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.25
Benzene	0.31	0.48
Carbon tetrachloride	0.16	0.37
Chloroform	0.11	0.43 J

Back bedroom along the northeast wall

1438-IA04	RSL	JUN 2009
1,2-Dichloroethane	0.094	0.23
Benzene	0.31	0.4
Carbon tetrachloride	0.16	0.39
Chloroform	0.11	0.41 J

AMBIENT AIR SAMPLING LOCATION
SOIL GAS SAMPLING LOCATION
PERMANENT SOIL GAS PROBE LOCATION

All results and screening levels in μg/m^3
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
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4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 8
1436 3rd STREET
SOIL GAS/AMBIENT/INDOOR AIR SAMPLING LOCATIONS AND RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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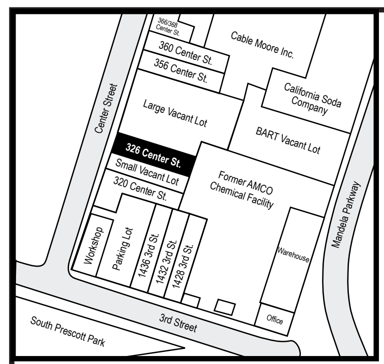


RSP-01	SL	OCT 2004	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.9	0.9	0.9	0.9	0.9
Sample Depth (ft bgs)	- -	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0
Depth to Water (ft bgs)	- -	NA[a]	5.9[b]	6.2	6.1	
1,1-Dichloroethane	15	280 U	**200**	**230**	**120**	**190**
Benzene	3.1	**490**	**210**	**320**	**36 J**	**41 J**
Chloroform	1.1	340 U	190 U	100 U	77 U	**28 J**
Tetrachloroethene	4.1	**11000**	**12000**	**15000**	**8200**	**16000**
trans-1,2-Dichloroethene	630	**9600**	**6800**	**8700**	**2500**	**4900**
Trichloroethene	12	**23000**	**17000**	**21000**	**9600**	**17000**
Vinyl chloride	1.6	**3300**	**2800**	**5100**	**160**	**640**

SOIL GAS - 326SG	SL	SEP 2004	MAY 2005	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA	3.5	5.7	5.5
Chloroform	1.10	**32**	**1.8 J**	**2.2**	**4.8**
Naphthalene	0.72	NA	5 U	**0.9 J**	4.1 U
Tetrachloroethene	4.10	**680**	**46**	**12**	**66**
Trichloroethene	12.0	**52**	0.15 U	0.039 J	0.38

RSG-28	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.8
Sample Depth (ft bgs)	- -	3.4 - 3.8
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**110**

RSG-27	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.8
Sample Depth (ft bgs)	- -	3.4 - 3.8
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**9600**
Benzene	3.10	**32 J**
Tetrachloroethene	4.10	**190**
Trichloroethene	12.0	**410**
Vinyl chloride	1.60	**310**

RSG-29	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
Benzene	3.10	150
Bromomethane	52.0	140 J
Ethylbenzene	9.70	26 J
Vinyl chloride	1.60	110

RSG-01	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.8
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**53 J**
Benzene	3.10	**150**
Tetrachloroethene	4.10	**80 J**
trans-1,2-Dichloroethene	630	**3300**
Trichloroethene	12.0	**160**
Vinyl chloride	1.60	**13000**

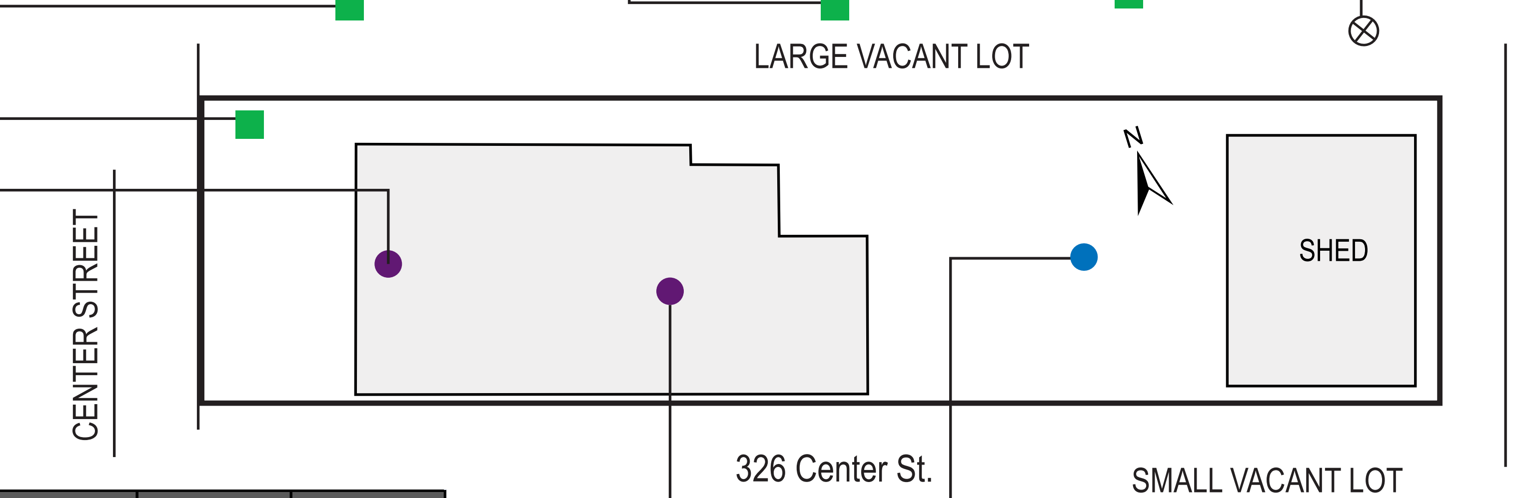
326 Center Street - Upstairs Indoor Air		
Center living room		
326-IA01-E1	**RSL**	**Jun-09**
1,2-Dichloroethane	0.094	0.14 J
1,4-Dichlorobenzene	0.22	0.26 J
Benzene	0.31	0.34
Carbon tetrachloride	0.16	0.52 J
Chloroform	0.11	0.97

Front bedroom, south side of residence		
326-IA02-E1	**RSL**	**Jun-09**
1,2-Dichloroethane	0.094	0.16 J
Benzene	0.31	0.42 J
Carbon tetrachloride	0.16	0.43 J
Chloroform	0.11	0.8 J

Front bedroom, north side of residence		
326-IA03-E1	**RSL**	**Jun-09**
1,2-Dichloroethane	0.094	0.14
1,4-Dichlorobenzene	0.22	0.57 J
Benzene	0.31	0.37
Carbon tetrachloride	0.16	0.57 J
Chloroform	0.11	1

Dining room, adjacent to kitchen		
326-IA04-E1	**RSL**	**Jun-09**
1,1,2,2-Tetrachloroethane	0.042	0.058 J
1,2-Dichloroethane	0.094	0.12 J
Benzene	0.31	0.35
Carbon tetrachloride	0.16	0.51 J
Chloroform	0.11	1.3

Crawl Space Air - 326-CA01	SL	JUN 2009
1,4-Dichlorobenzene	0.22	**0.27 J**
Benzene	0.31	**0.34**
Carbon tetrachloride	0.16	**0.51 J**



RSP-12	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.4	0.4	0.4	0.4	0.4	0.4
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	3.4[c]	4.3[b]	4.5	4.4	
Tetrachloroethene	4.1	**110**	**130**	**96**	**96**	**78**	**130**

RSG-02	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
Ethylbenzene	9.70	**22 J**

CRAWL SPACE AIR - 326CA	SL	SEP 2004	MAY 2005	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008
1,1,2,2-Tetrachloroethane	0.042	0.23 U	0.21 UJ	0.18 U	0.2 U	**0.58**	0.2 U	0.22 U	0.23 U
1,2-Dichloroethane	0.094	0.13 U	0.049 J	**0.12**	0.05 J	0.059 J	0.03 J	**1.9**	**0.34**
1,4-Dichlorobenzene	0.22	**6**	0.088 J	0.16 UJ	0.082 UJ	**0.32**	0.19 UJ	**1.3**	**0.86**
Benzene	0.31	**0.65 J**	**0.51**	0.28	**0.83**	**0.43**	**0.62**	**1.7**	**1**
Carbon tetrachloride	0.16	**0.48**	**0.55**	**0.55**	**0.42**	**0.52**	**0.44**	**0.45**	**0.49**
Chloroform	0.11	0.16 U	0.099 J	0.091 J	0.094 J	0.11 J	**0.15**	**0.53**	**0.35**
Ethylbenzene	0.97	0.31	0.11 J	0.72	**1.5**	0.88	0.53	**1.3**	0.81
Hexachlorobutadiene	0.11	1.8 UJ	**0.68 J**	1.4 U	1.6 U	1.8 U	1.6 U	1.7 UJ	1.8 UJ
Methylene chloride	5.20	1.2 U	1.1 UJ	0.93 UJ	0.87 UJ	0.79 UJ	1 U	**5.4**	0.72 J
Tetrachloroethene	0.41	0.23 U	0.2 J	0.19	**0.73**	**0.55**	0.28	0.25	**0.56**
Trichloroethene	1.20	0.027 U	0.042 UJ	0.54	0.07	0.38	0.17	**2.5**	0.79

RSP-02	SL	OCT 2004	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	1.0	1.0	1.0	1.0	1.0
Sample Depth (ft bgs)	- -	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5
Depth to Water (ft bgs)	- -	NA[a]	5.8[b]	6.0	5.9	
Chloroform	1.1	3.3 U	**3.2**	**1.6 J**	**1.5**	**1.6**
Tetrachloroethene	4.1	**210**	**180**	**140 J**	**160**	**150**

AMBIENT AIR - 326AA	SL	SEP 2004	MAY 2005	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008
1,4-Dichlorobenzene	0.22	**0.85**	0.077 J	0.17 UJ	0.033 UJ	0.031 UJ	0.04 UJ	0.046 UJ	0.053 UJ
Benzene	0.31	**0.66 J**	**0.42**	0.25	**0.45**	0.25 J	**0.4**	**1.8**	**0.61**
Carbon tetrachloride	0.16	**0.46**	**0.53**	**0.56**	**0.43**	**0.45**	**0.45**	**0.48**	**0.52**
Chloroform	0.11	0.17 U	0.1 J	0.08 J	0.07 J	0.1 J	**0.12 J**	**0.33**	0.095 J
Ethylbenzene	0.97	0.36	0.22	0.12	0.23	0.11 J	0.23	**1.2**	**1.5**

RSG-30	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
Ethylbenzene	9.70	**22 J**

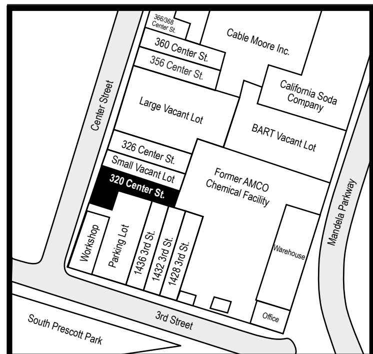
- AMBIENT AIR SAMPLING LOCATION
- CRAWL SPACE AIR SAMPLING LOCATION
- SOIL GAS SAMPLING LOCATION
- PERMANENT SOIL GAS PROBE LOCATION

All results and screening levels in μg/m³
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 9
326 CENTER STREET
SOIL GAS/CRAWLSPACE/AMBIENT/INDOOR AIR SAMPLING LOCATIONS AND RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL



RSP-03	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.5	0.5	0.5	0.5	0.5	0.5
Sample Depth (ft bgs)	- -	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5
Depth to Water (ft bgs)	- -	NA[a]	5.6[c]	6.4[b]	6.6	6.5	
Chloroform	1.1	**34**	**2.2 J**	**5.2**	**3.9 J**	**3.4**	**3**

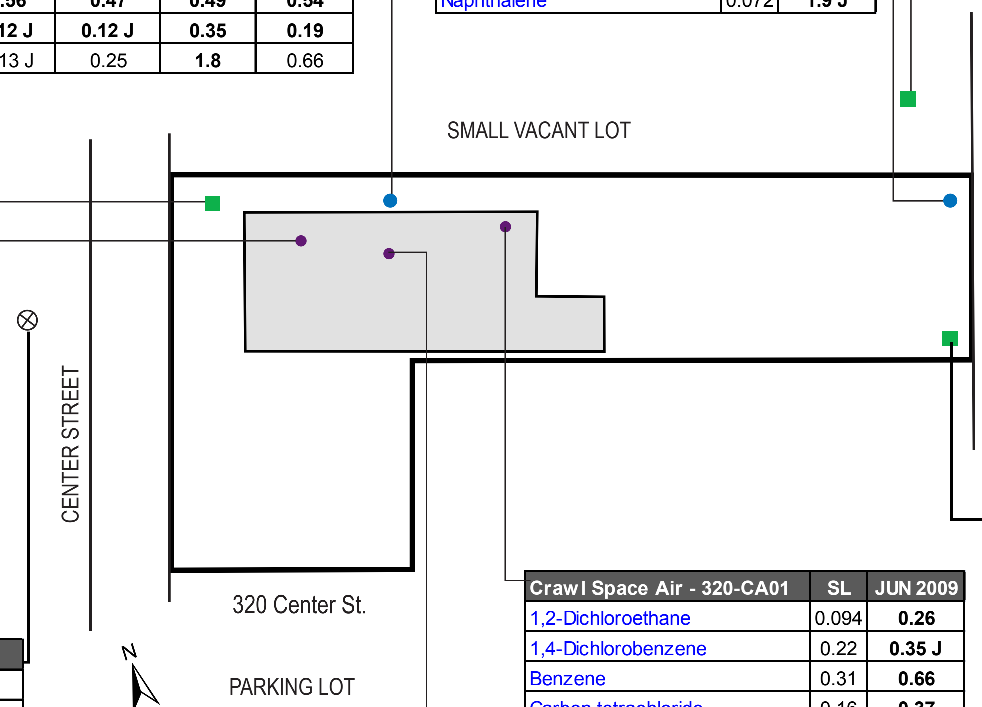
RSG-02	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
Ethylbenzene	9.70	**22 J**

Ambient Air - 320AA	SL	AUG 2008	SEP 2008	OCT 2008	DEC 2008
Benzene	0.31	0.26 J	**0.45**	**1.8**	**0.88**
Carbon tetrachloride	0.16	**0.56**	**0.47**	**0.49**	**0.54**
Chloroform	0.11	**0.12 J**	**0.12 J**	**0.35**	**0.19**
Ethylbenzene	0.97	0.13 J	0.25	**1.8**	0.66

Ambient Air -OA01	SL	JUN 2009
Carbon tetrachloride	0.16	**0.48 J**
Naphthalene	0.072	**1.9 J**

Soil Gas - 320SG	SL	OCT 2008
Sample Depth (ft bgs)	- -	2.0 - 2.5
Depth to Water (ft bgs)	- -	5.8
Tetrachloroethene	4.10	**5.5**
Vinyl chloride	1.60	**4.4**

Crawl Space Air - 320-CA02	SL	JUN 2009
1,2-Dichloroethane	0.094	**0.31**
1,4-Dichlorobenzene	0.22	**0.34 J**
Benzene	0.31	**0.54**
Carbon tetrachloride	0.16	**0.37**



RSG-03A	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.0
Sample Depth (ft bgs)	- -	2.6 - 3.0
Depth to Water (ft bgs)	- -	NA
Ethylbenzene	9.70	**24 J**
Trichloroethene	12.0	**79**

Soil Gas - 320-SG01-E1	RSL*	Jun-09
No exceedances		

Crawl Space Air - 320-CA01	SL	JUN 2009
1,2-Dichloroethane	0.094	**0.26**
1,4-Dichlorobenzene	0.22	**0.35 J**
Benzene	0.31	**0.66**
Carbon tetrachloride	0.16	**0.37**

RSP-11	SL	OCT 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Concrete Depth (ft bgs)	- -	0.4	0.4	0.4	0.4	0.4	0.4
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	3.4[c]	4.4[b]	4.4	4.4	
Benzene	3.1	2.2 U	2.7 UJ	0.22 UJ	**10 J**	0.22 U	0.18 J
Chloromethane	14	5.8 U	6.9 U	0.29 U	**1600**	0.29 U	0.39 U
Tetrachloroethene	4.1	**150**	**120**	**110**	**150**	**120**	**160**

Crawl Space Air - 320CA	SL	AUG 2008	SEP 2008	OCT 2008	DEC 2008
1,2-Dichloroethane	0.094	0.046 J	0.037 J	**1.2**	0.065 J
1,4-Dichlorobenzene	0.22	0.12 UJ	0.1 UJ	**1.4**	0.058 UJ
Benzene	0.31	0.3	**0.44**	**2**	**0.94**
Carbon tetrachloride	0.16	**0.6**	**0.44**	**0.48**	**0.52**
Chloroform	0.11	**0.14**	**0.15**	**0.56**	**0.16**
Ethylbenzene	0.97	0.58	0.36	**1.8**	0.53
Tetrachloroethene	0.41	**0.71**	0.14 J	0.27	0.14 J
Trichloroethene	1.20	0.13	0.054	**1.8**	0.051

320 Center Street - Indoor Air

Front storage room		
320-IA01-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	2
1,4-Dichlorobenzene	0.22	5.4
Benzene	0.31	1.3
Carbon tetrachloride	0.16	0.56
Chloroform	0.11	4.5
Naphthalene	0.072	0.96 J

Front bedroom		
320-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	2
1,4-Dichlorobenzene	0.22	5.5
Benzene	0.31	1.5
Carbon tetrachloride	0.16	0.41
Chloroform	0.11	6.4
Naphthalene	0.072	0.87 J

Middle bedroom		
320-IA03-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	1.6
1,4-Dichlorobenzene	0.22	7.6
Benzene	0.31	1.6
Carbon tetrachloride	0.16	0.44
Chloroform	0.11	5.4
Naphthalene	0.072	0.88 J

Living room area		
320-IA04-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	1.9
1,4-Dichlorobenzene	0.22	5.9
Benzene	0.31	1.6
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	4.3
Naphthalene	0.072	0.82 J

Back bedroom		
320-IA05-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	1.6
1,4-Dichlorobenzene	0.22	7.3
Benzene	0.31	1.5
Carbon tetrachloride	0.16	0.43
Chloroform	0.11	5.8

- AMBIENT AIR SAMPLING LOCATION
- CRAWL SPACE AIR SAMPLING LOCATION
- SOIL GAS SAMPLING LOCATION
- MONITORING WELL LOCATION

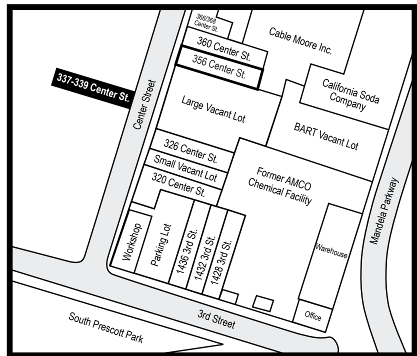
All results and screening levels in µg/m^3
Bold - detected above screening levels
a - Well construction not completed by October 2004; consequently, no water level information available
b - Based on nearest available water on March 2006
c - Based on nearest available water on November 2006
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

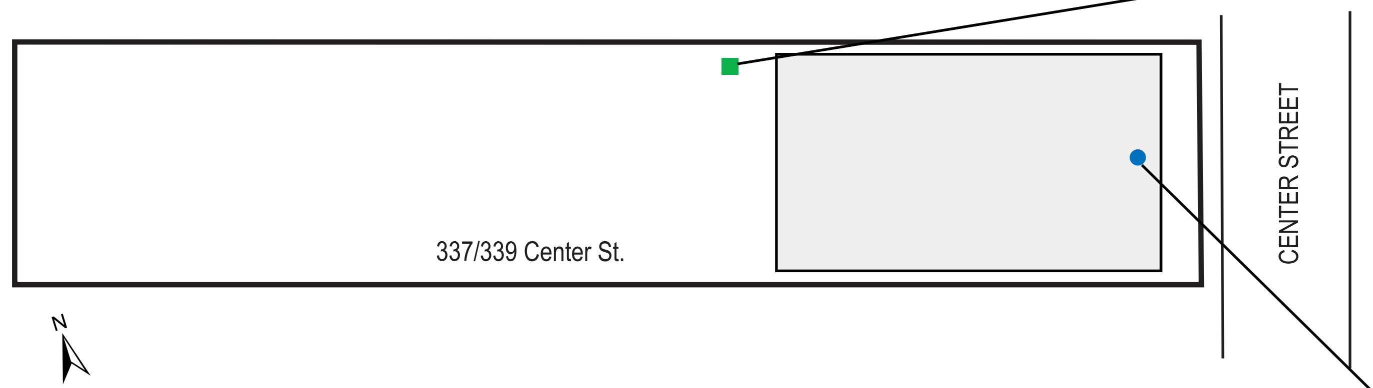
Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 10
320 CENTER STREET
SOIL GAS/CRAWLSPACE/ AMBIENT/INDOOR AIR SAMPLING LOCATIONS AND RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL





339-SG01	SL	JUN 2009
Chloroform	1.1	**4.7**

339-OA01	SL	JUN 2009
1,1,2,2-Tetrachloroethane	0.042	**0.18 J**
1,4-Dichlorobenzene	0.22	**0.24 J**
Benzene	0.31	**0.38**
Carbon tetrachloride	0.16	**0.4**
Naphthalene	0.072	**1.1 J**

337 Center Street - Downstairs Indoor Air

1st floor, storage room, below 339 Center St, south side of residence

337-IA01-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.76
1,2-Dichloropropane	0.24	0.53 J
1,4-Dichlorobenzene	0.22	1
Benzene	0.31	0.82
Carbon tetrachloride	0.16	0.56 J
Chloroform	0.11	1.3
Ethylbenzene	0.97	1.9
Naphthalene	0.072	2.6 J
Tetrachloroethene	0.41	0.68

1st floor, center of living area

337-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.52
1,2-Dichloropropane	0.24	0.81 J
1,4-Dichlorobenzene	0.22	1.5
Benzene	0.31	0.87
Carbon tetrachloride	0.16	0.43
Chloroform	0.11	1.5
Naphthalene	0.072	5.2 J
Tetrachloroethene	0.41	0.83

339 Center Street - Upstairs Indoor Air

2nd floor, west wall of child's bedroom

339-IA01-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.1 J
1,4-Dichlorobenzene	0.22	0.26 J
Benzene	0.31	0.6
Carbon tetrachloride	0.16	0.4
Chloroform	0.11	0.83 J
Naphthalene	0.072	7 J

2nd floor, living room area, northeast corner

339-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.095 J
Benzene	0.31	0.42 B
Carbon tetrachloride	0.16	0.39
Chloroform	0.11	0.46 J
Naphthalene	0.072	1.6 J

■ SOIL GAS SAMPLING LOCATION

● OUTDOOR AIR SAMPLING LOCATION

All results and screening levels in µg/m^3

J - estimated

Maximum value between field duplicate (FD) & primary sample is shown

RSL - Regional Screening Level

SL - Screening Level

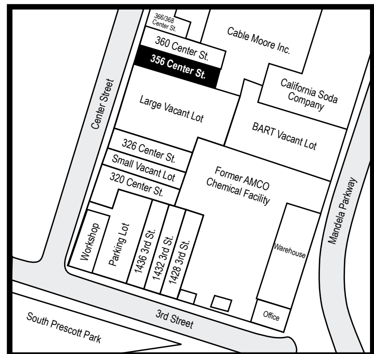
Chemicals shown in blue were also detected in the background sample.

Notes:

1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels.
3. Sampling locations indicated are approximate.

FIGURE 11
337 AND 339 CENTER STREET
SOIL GAS/INDOOR/OUTDOOR AIR
SAMPLING LOCATIONS AND RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL



356-SG01-E1	RSL*	JUN 2009
No exceedances		

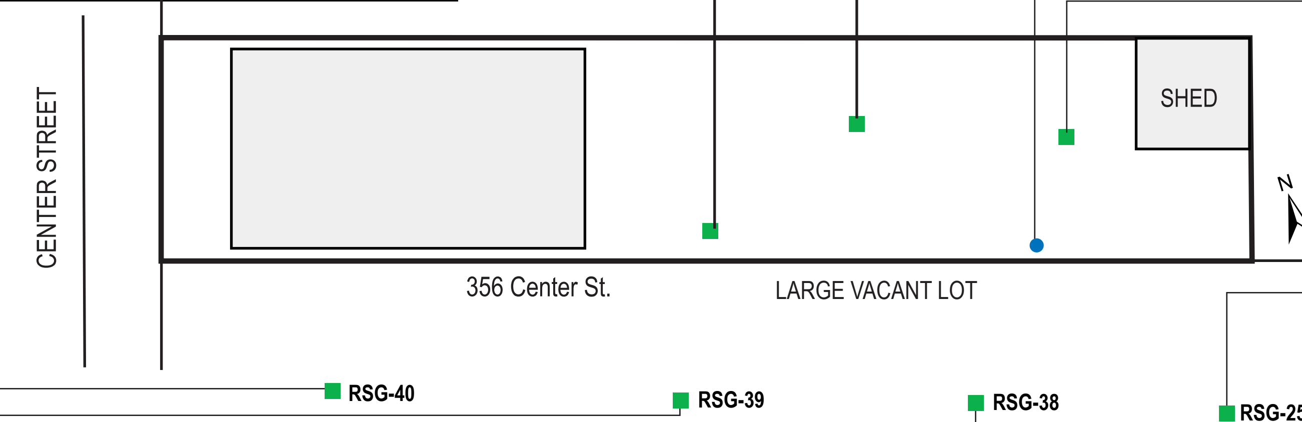
SOIL GAS - 356SG	SL	SEP 2004	MAY 2005	NOV 2006
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA[3]	3.5	5.0[7]
Chloroform	1.10	3.3 U	12 U	**1.2**

356-OA01	SL	JUN 2009
1,4-Dichlorobenzene	0.22	**0.62 J**
1,4-Dioxane (p-dioxane)	0.32	**0.89**
Benzene	0.31	**0.41**
Carbon tetrachloride	0.16	**0.5 J**
Naphthalene	0.072	**1.9 J**

SOIL GAS - 356SGB	SL	SEP 2007
Sample Depth (ft bgs)	- -	2.0 - 2.5
Depth to Water (ft bgs)	- -	5.7
Naphthalene	0.72	**0.75 J**

RSG-40	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.5
Sample Depth (ft bgs)	- -	3.1 - 3.5
Depth to Water (ft bgs)	- -	NA
Benzene	3.10	**38 J**
Ethylbenzene	9.70	**20 J**

RSG-39	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
Benzene	3.10	**41 J**
Trichloroethene	12.0	**25 J**
Vinyl chloride	1.60	**1100**



RSG-25	SL	SEP 2004
Concrete Depth (ft bgs)	- -	0.8
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**65 J**
Benzene	3.10	**45 J**
Vinyl chloride	1.60	**360**

RSG-38	SL	SEP 2004
Concrete Depth (ft bgs)	- -	1.0
Sample Depth (ft bgs)	- -	3.6 - 4.0
Depth to Water (ft bgs)	- -	NA
1,1-Dichloroethane	15.0	**220**
Benzene	3.10	**91**
Ethylbenzene	9.70	**130**
Trichloroethene	12.0	**51**
Vinyl chloride	1.60	**340**

356 Center Street - Indoor Air

1st floor, entertainment room

356-IA04-E1	RSL	Jun 2009
1,2,4-Trimethylbenzene	7.3	35
1,2-Dichloroethane	0.094	0.32
1,3,5-Trimethylbenzene	6.3	9.8
Benzene	0.31	10
Carbon tetrachloride	0.16	0.53 J
Chloroform	0.11	0.9 J
Ethylbenzene	0.97	21
Naphthalene	0.072	2.6 J

2nd floor, front bedroom

356-IA01-E1	RSL	Jun 2009
1,2,4-Trimethylbenzene	7.3	29
1,2-Dichloroethane	0.094	1.3
1,3,5-Trimethylbenzene	6.3	8.4
Benzene	0.31	8.6
Carbon tetrachloride	0.16	0.52 J
Chloroform	0.11	3.1
Ethylbenzene	0.97	17
Naphthalene	0.072	2.9 J

2nd floor, back bedroom

356-IA03-E1	RSL	Jun 2009
1,2,4-Trimethylbenzene	7.3	26
1,2-Dichloroethane	0.094	1.4
1,3,5-Trimethylbenzene	6.3	7.3
Benzene	0.31	7.4
Carbon tetrachloride	0.16	0.53 J
Chloroform	0.11	1.8
Ethylbenzene	0.97	15
Naphthalene	0.072	2.7 J

1st floor, play room area

356-IA05-E1	RSL	Jun 2009
1,2,4-Trimethylbenzene	7.3	26
1,2-Dichloroethane	0.094	0.39
1,3,5-Trimethylbenzene	6.3	7.5
Benzene	0.31	7.8
Carbon tetrachloride	0.16	0.51 J
Chloroform	0.11	0.92 J
Ethylbenzene	0.97	15
Naphthalene	0.072	2.5 J

2nd floor, living room

356-IA02-E1	RSL	Jun 2009
1,2,4-Trimethylbenzene	7.3	27
1,2-Dichloroethane	0.094	1.3
1,3,5-Trimethylbenzene	6.3	7.7
Benzene	0.31	7.8
Carbon tetrachloride	0.16	0.55 J
Chloroform	0.11	2.5
Ethylbenzene	0.97	15
Naphthalene	0.072	3 J

Backyard shed

356-IA06-E1	RSL	Jun 2009
1,2-Dichloroethane	0.094	1.3
Benzene	0.31	0.91
Carbon tetrachloride	0.16	0.45 J

● AMBIENT AIR SAMPLING LOCATION

■ SOIL GAS SAMPLING LOCATION

All results and screening levels in μg/m³

Bold - detected above screening levels

J - estimated

U - not detected at listed reporting limit

UJ - not detected at estimated reporting limit

NA - not analyzed

Maximum value between field duplicate (FD) & primary sample is shown

SL - Screening Level

RSL - Regional Screening Level

Chemicals shown in blue were also detected in the background sample.

Notes:

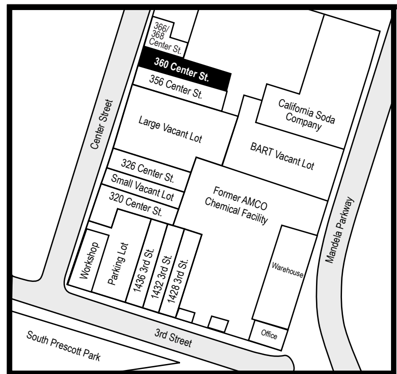
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Water levels for 356 and 360 Center Street extrapolated from nearest shallow well, RMW-06-15. Estimated error up to ± 1 foot.
6. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
7. November 2006 water levels based on September 2006 groundwater sampling event.
8. Property lines based on Alameda County parcel maps
9. Building locations identified from orthocorrected aerial photograph.
10. Sampling locations indicated are approximate.

FIGURE 12
356 CENTER STREET
SOIL GAS/INDOOR/OUTDOOR AIR SAMPLING LOCATIONS AND RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL

ES080610043239BAO_Fig 12 356_CenterSt_sample_locs_allData_2009.ai 8/6/10



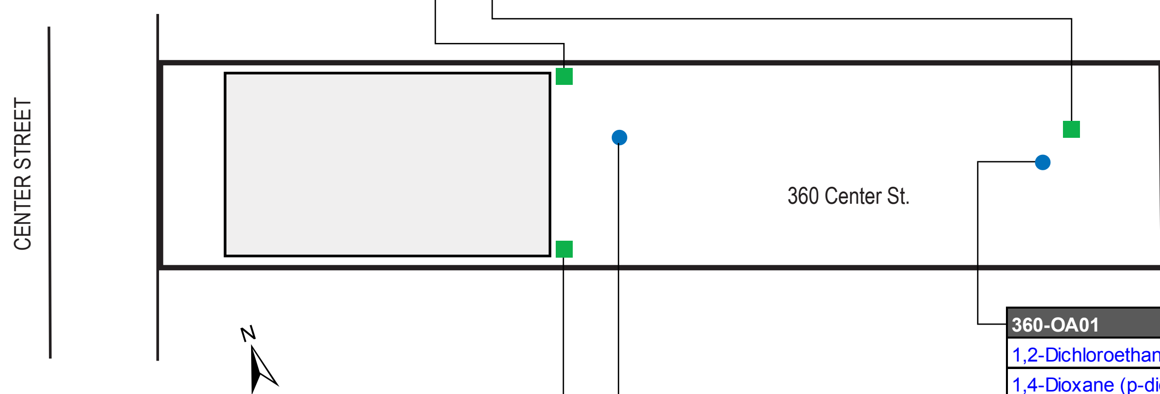
Soil Gas - 360SGa	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008
Sample Interval (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to water (ft bgs)	- -	NA[a]	3.5	5.0[d]	5.5	5.3
Benzene	3.1	**3.6**	1.6 J	1.9 J	0.36	0.76
Chloroform	1.1	3.3 U	1.1 J	**2**	0.65 U	**1.5**
Naphthalene	0.72	NA	5.2 U	8.8 U	**0.81 J**	4.6 U

Soil Gas - 360SGb	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA[a]	3.5	5.0[d]	5.5	5.3	
Chloroform	1.1	3.3 U	**1.2 J**	**3.9**	**1.5**	0.28 J	**6.9**
Naphthalene	0.72	NA	5.4 U	3.6 U	**1.2 J**	4 U	**0.97 J**
Tetrachloroethene	4.1	4.6 U	5.6 U	1.7	0.84	0.23	**4.7**
Vinyl chloride	1.6	0.035 U	0.042 U	0.035 U	0.018 J	**2**	0.049 U

360-OA01	SL	JUN 2009
1,2-Dichloroethane	0.094	**0.15**
1,4-Dioxane (p-dioxane)	0.32	**0.36 J**
Benzene	0.31	**0.36**
Carbon tetrachloride	0.16	**0.41**

Ambient Air - 360AA	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008
1,4-Dichlorobenzene	0.22	**0.28 J**	0.2 J	0.16 J	0.2 UJ	0.26 UJ
Benzene	0.31	0.59 UJ	**1.2**	**1.2**	0.28	**2**
Carbon tetrachloride	0.16	**0.53**	**0.83**	**0.46**	**0.55**	**0.48**
Chloroform	0.11	0.18 U	0.093 J	**0.16 J**	0.078 J	**0.37**
Ethylbenzene	0.97	0.25	0.27	**3.5**	0.089 J	**2.3**

Soil Gas - 360SGc	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Depth to Water (ft bgs)	- -	NA[a]	3.5	5.0[b]	5.5	5.3
Chloroform	1.1	3.3 U	**1.4 J**	0.64 U	0.56 J	**9.4**
Naphthalene	0.72	NA	4.9 U	3.4 U	**1.3 J**	4.1 U



360 Center Street - Downstairs Indoor Air

1st floor - bedroom		
360-IA01-E1	RSL	Jun-09
Benzene	0.31	0.56
Carbon tetrachloride	0.16	0.39
Chloroform	0.11	0.57 J

1st floor - back bedroom		
360-IA02-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.11 J
Benzene	0.31	0.52
Carbon tetrachloride	0.16	0.39
Chloroform	0.11	1.1

1st floor - left corner of front bedroom		
360-IA03-E1	RSL	Jun-09
Benzene	0.31	0.5
Carbon tetrachloride	0.16	0.4

1st floor - living room area		
360-IA04-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.21
Benzene	0.31	0.66
Carbon tetrachloride	0.16	0.54
Chloroform	0.11	0.68 J

1st floor, back shed area		
360-IA05-E1	RSL	Jun-09
Benzene	0.31	0.38
Carbon tetrachloride	0.16	0.35
Chloroform	0.11	0.37 J

360 Center Street - Upstairs Indoor Air

2nd floor, center bedroom		
360-IA06-E1	RSL	Jun-09
1,2-Dichloroethane	0.094	0.48
Benzene	0.31	2.4
Carbon tetrachloride	0.16	0.38 J
Naphthalene	0.072	2.2 J

2nd floor, kitchen area		
360-IA07-E1	RSL	Jun-09
Benzene	0.31	0.56
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	0.65 J

2nd floor, back bedroom (northeast)		
360-IA08-E1	RSL	Jun-09
Benzene	0.31	0.52
Carbon tetrachloride	0.16	0.4
Chloroform	0.11	0.34 J

2nd floor, laundry room area		
360-IA09-E1	RSL	Jun-09
1,4-Dichlorobenzene	0.22	0.24 J
Benzene	0.31	0.51
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	1.4
Naphthalene	0.072	0.74 J

AMBIENT AIR SAMPLING LOCATION

SOIL GAS SAMPLING LOCATION

All results and screening levels in µg/m³

Bold - detected above screening levels

[a] - Well construction not completed by October 2004; consequently, no water level information available

[b] - Based on nearest available water on March 2006

[c] - Based on nearest available water on November 2006

J - estimated

U - not detected at listed reporting limit

UJ - not detected at estimated reporting limit

NA - not analyzed

Maximum value between field duplicate (FD) & primary sample is shown

SL - Screening Level

Chemicals shown in blue were also detected in the background sample.

Notes:

1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Water levels for 356 and 360 Center Street extrapolated from nearest shallow well, RMW-06-15. Estimated error up to ± 1 foot.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 13
360 CENTER STREET
SOILGAS/INDOOR/OUTDOOR AIR
SAMPLING LOCATIONS AND RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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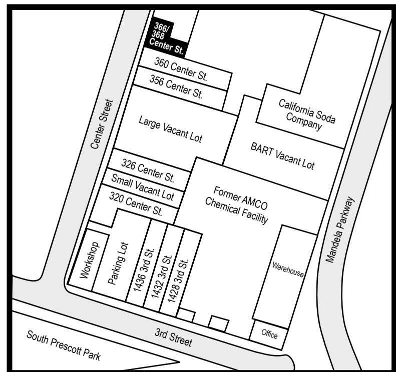
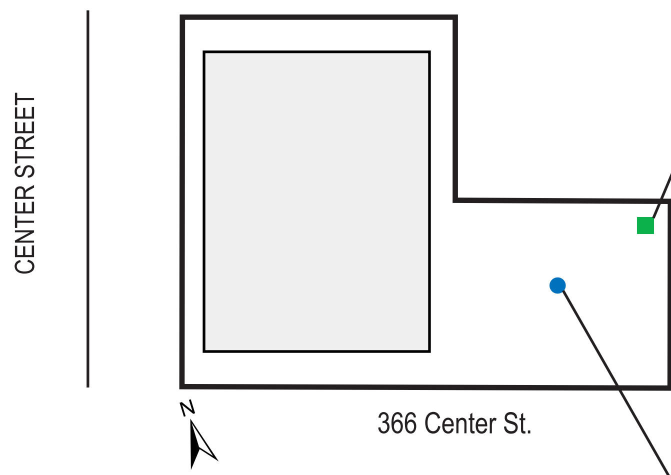


366 Center Street - Indoor Air		
Front bedroom		
366-IA01-E1	**RSL**	**Jun-09**
1,4-Dichlorobenzene	0.22	0.31 J
1,4-Dioxane (p-dioxane)	0.32	0.46 J
Benzene	0.31	1.2
Carbon tetrachloride	0.16	0.53
Chloroform	0.11	0.46 J
Ethylbenzene	0.97	1.7

Center living room area		
366-IA02-E1	**RSL**	**Jun-09**
Benzene	0.31	0.86
Carbon tetrachloride	0.16	0.46
Chloroform	0.11	0.54 J
Ethylbenzene	0.97	1.4
Naphthalene	0.072	0.9 J

Middle bedroom, south side of residence		
366-IA03-E1	**RSL**	**Jun-09**
1,2-Dichloroethane	0.094	0.2
Benzene	0.31	0.58
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	0.52 J
Tetrachloroethene	0.41	1.2

Back bedroom, south side of residence		
366-IA04-E1	**RSL**	**Jun-09**
1,2-Dichloroethane	0.094	0.11 J
1,4-Dichlorobenzene	0.22	0.88 J
Benzene	0.31	0.79
Carbon tetrachloride	0.16	0.38
Chloroform	0.11	0.71 J
Ethylbenzene	0.97	1.8



366-SG01	SL	JUN 2009
Chloroform	1.1	**5**

366-OA01	SL	JUN 2009
1,2-Dichloroethane	0.094	**0.11 J**
Benzene	0.31	**0.42**
Carbon tetrachloride	0.16	**0.48**

- ● OUTDOOR AIR SAMPLING LOCATION
- ■ SOIL GAS SAMPLING LOCATION

All results and screening levels in μg/m³
J - estimated
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level
Chemicals shown in blue were also detected in the background sample.

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels.
3. Sampling locations indicated are approximate.

FIGURE 14
366 CENTER STREET
SOIL GAS/INDOOR/OUTDOOR AIR
SAMPLING LOCATIONS AND RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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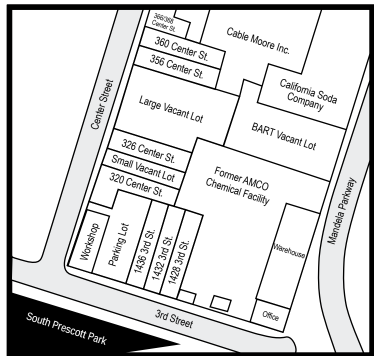


Soil Gas - PP-NW	SL	SEP 2004	NOV 2006	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA	6.2	6.2	6.6
Chloroform	1.10	10 U	0.49 U	**5.4**	0.71 U
Tetrachloroethene	4.10	**27**	0.14 U	2.5	0.078 J
Vinyl chloride	1.60	0.11 U	0.026 U	0.02 J	**2.7**

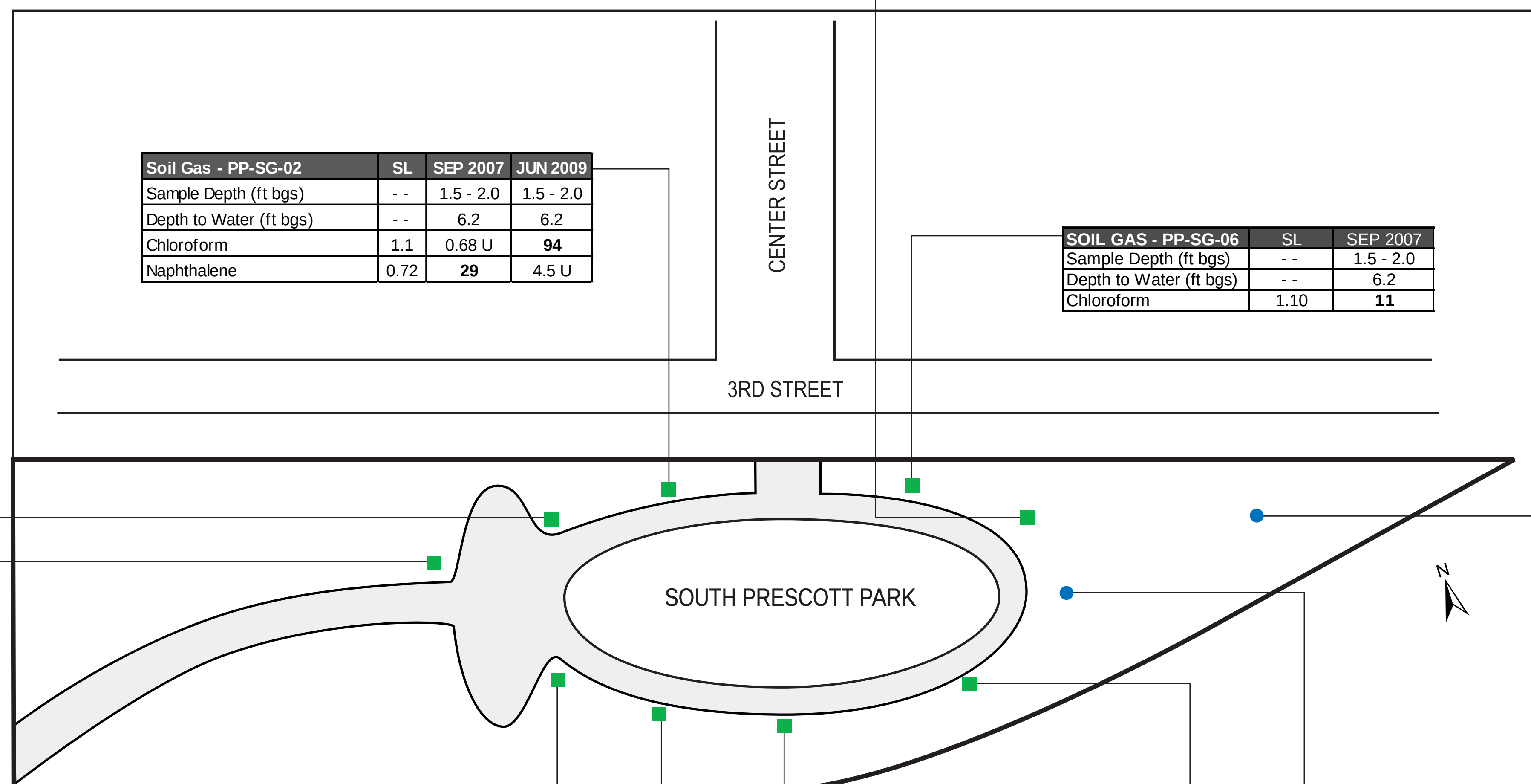
SOIL GAS - PP-E	SL	SEP 2004	MAY 2005	NOV 2006	SEP 2007	OCT 2008	JUN 2009
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA[a]	5.3	6.2	6.2	6.6	6.2
1,3-Butadiene	0.81	1.5 U	1.7	NA	NA	NA	NA
Chloroform	1.1	**99**	**23**	**61**	**590**	1 U	14
Naphthalene	0.72	NA	3.5 U	9.2 U	**1.4 J**	5.6 U	4.3 U
Tetrachloroethene	4.1	**16**	**12**	**7.6**	**60**	0.14 J	41

Soil Gas - PP-SG-02	SL	SEP 2007	JUN 2009
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	6.2	6.2
Chloroform	1.1	0.68 U	**94**
Naphthalene	0.72	**29**	4.5 U

SOIL GAS - PP-SG-06	SL	SEP 2007
Sample Depth (ft bgs)	- -	1.5 - 2.0
Depth to Water (ft bgs)	- -	6.2
Chloroform	1.10	**11**

PP-BGA02	SL	JUN 2009
1,2-Dichloroethane	0.094	**0.29**
Benzene	0.31	**0.41**
Carbon tetrachloride	0.16	**0.53**

PP-BGA03	SL	JUN 2009
Carbon tetrachloride	0.16	**0.43**



SOIL GAS - PP-SG-01	SL	SEP 2007
Sample Depth (ft bgs)	- -	1.5 - 2.0
Depth to Water (ft bgs)	- -	6.2
Chloroform	1.10	**2.9**
Naphthalene	0.72	**2.4 J**
Tetrachloroethene	4.10	**12**

SOIL GAS - PP-SW	SL	SEP 2004	MAY 2005	SEP 2007	OCT 2008
Sample Depth (ft bgs)	- -	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Depth to Water (ft bgs)	- -	NA	5.3	6.2	6.6
Benzene	3.10	2.3 U	**14**	1.9	**3.6**
Chloroform	1.10	**22**	7.3 U	**21**	**12**

SOIL GAS - PP-SG-05	SL	SEP 2007
Naphthalene	0.56	**0.7 J**

AMBIENT AIR - PP-AA	SL	MAY 2005	NOV 2006	SEP 2007	OCT 2008
Benzene	0.31	**0.46**	**0.86**	**0.4**	**1.3**
Carbon tetrachloride	0.16	**0.55 J**	**0.48**	**0.64**	**0.46**
Chloroform	0.11	0.093 J	**0.51**	**0.25**	**0.2**
Tetrachloroethene	0.41	0.14 J	**0.42**	0.065 J	0.02 J

SOIL GAS - PP-SG-03	SL	SEP-07
Sample Depth (ft bgs)	- -	1.5 - 2.0
Depth to Water (ft bgs)	- -	6.2
All VOCs - No Exceedences		

SOIL GAS - PP-SG-04	SL	SEP 2007
Sample Depth (ft bgs)	- -	1.5 - 2.0
Depth to Water (ft bgs)	- -	6.2
Naphthalene	0.72	**1.5 J**

AMBIENT AIR SAMPLING LOCATION

SOIL GAS SAMPLING LOCATION

All results and screening levels in µg/m^3

Bold - detected above screening levels

J - estimated

U - not detected at listed reporting limit

UJ - not detected at estimated reporting limit

NA - not analyzed

Maximum value between field duplicate (FD) & primary sample is shown

SL - Screening Level

Chemicals shown in blue were also detected in the background sample.

Notes:

1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. No depth to water is available for September 2004. First groundwater sampling event occurred in March 2005.
4. All water levels approximate based on nearest available surveyed ground surface elevation and interpolation of water levels from nearest available wells.
5. Due to wet soil conditions, soil gas samples could not be collected at most location during the May 2005 sampling event.
6. November 2006 water levels based on September 2006 groundwater sampling event.
7. Property lines based on Alameda County parcel maps
8. Building locations identified from orthocorrected aerial photograph.

FIGURE 15
PRESCOTT PARK
SOIL GAS/AMBIENT AIR SAMPLING LOCATIONS AND RESULTS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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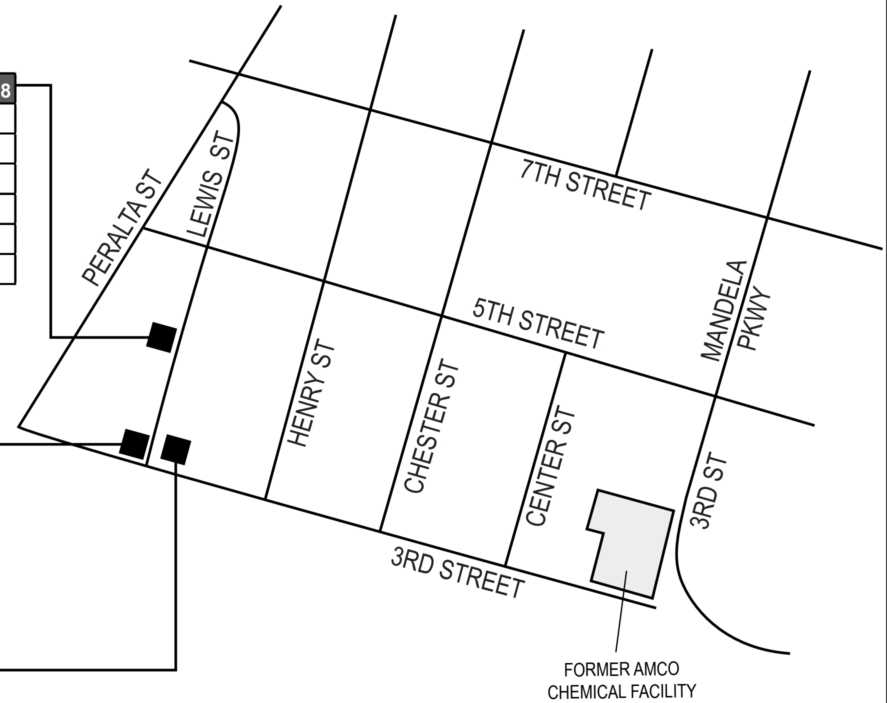
Background (329 Lewis St)	SL	SEP 2004	SEP 2007	MAY 2008	AUG 2008	SEP 2008	OCT 2008	DEC 2008
Benzene	0.31	**1.3 J**	0.3	**0.62**	0.29	**0.33**	**1.5**	**0.83**
Carbon tetrachloride	0.16	**0.45**	**0.55**	**0.44**	**0.62**	**0.45**	**0.49**	**0.58**
Chloroform	0.11	**0.19**	0.1 J	0.073 J	**0.13**	0.11 J	**0.32**	**0.15**
Ethylbenzene	0.97	0.9	0.24	0.26	0.18	0.17	**1.5**	0.37
Naphthalene	0.072	NA	3.8 U	3.8 U	3.3 U	0.13 UJ	0.65 UJ	**0.7 J**
Tetrachloroethene	0.41	0.27	0.2 UJ	0.11 J	**0.76**	0.073 J	0.24	0.14 J



Background (323 Lewis St)	SL	JUN 2009
Carbon tetrachloride	0.16	**0.51**

Background (323 Lewis St)	SL	JUN 2009
Carbon tetrachloride	0.16	0.47

Background (322 Lewis St)	SL	MAY 2005	NOV 2006
Benzene	0.31	**0.52**	**0.97**
Carbon tetrachloride	0.16	**0.58**	**0.48**
Chloroform	0.11	**0.13 J**	0.1 J
Naphthalene	0.072	**0.09**	4.9 U
Tetrachloroethene	0.41	0.4	**0.42**

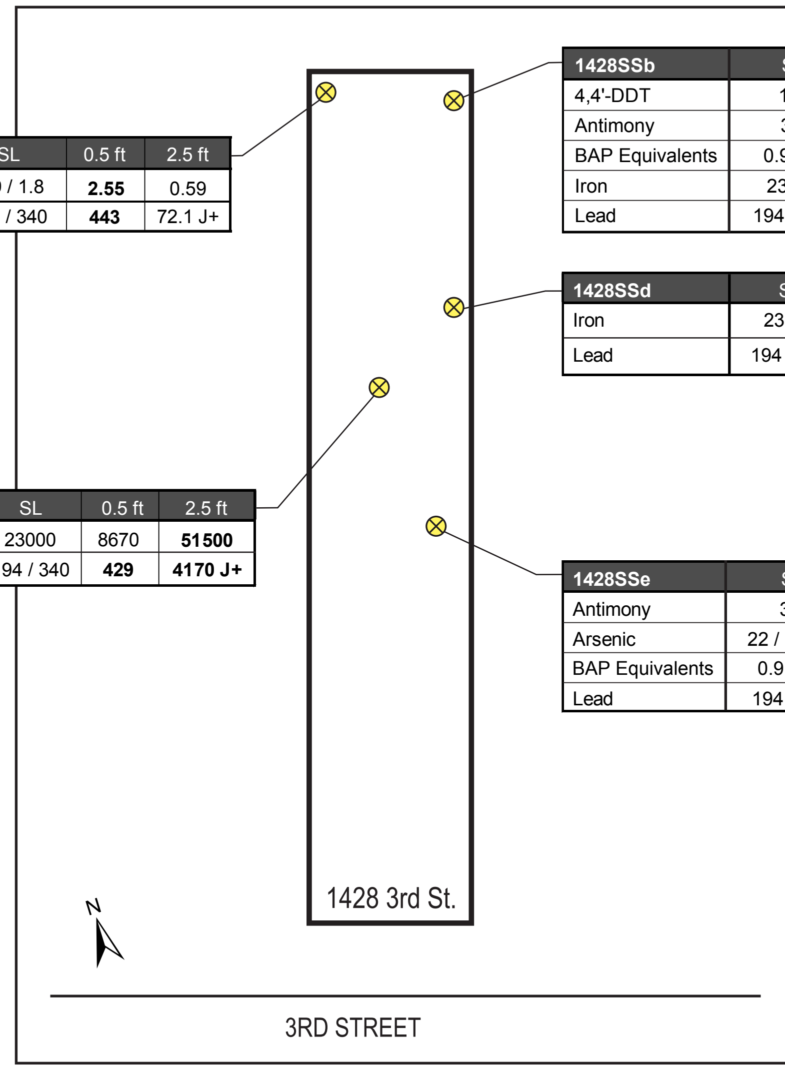
All results and screening levels in µg/m^3
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.

FIGURE 16
322, 323, AND 329 LEWIS STREET BACKGROUND SAMPLING RESULTS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

CH2MHILL



1428SSa	SL	0.5 ft	2.5 ft
BAP Equivalents	0.9 / 1.8	**2.55**	0.59
Lead	194 / 340	**443**	72.1 J+

1428SSb	SL	0.5 ft	2.5 ft
4,4'-DDT	1.7	**1.8 J**	0.45 J
Antimony	31	**37.7**	6 J
BAP Equivalents	0.9 / 1.8	**12.1**	0.236
Iron	23000	**26100**	10500
Lead	194 / 340	**2320**	**224**

1428SSc	SL	0.5 ft	2.5 ft
Iron	23000	8670	**51500**
Lead	194 / 340	**429**	**4170 J+**

1428SSd	SL	0.5 ft	2.5 ft
Iron	23000	**44100**	15000
Lead	194 / 340	**2920**	**318 J+**

1428SSe	SL	0.5 ft	2.5 ft
Antimony	31	**77.4**	18.4
Arsenic	22 / 0.062	**35.1**	10.8
BAP Equivalents	0.9 / 1.8	**8.24**	**2.26**
Lead	194 / 340	**2660 J+**	**1050 J+**

⊗ SOIL SAMPLING LOCATION

All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 17
1428 3rd STREET
SOIL/PRODUCE
SAMPLING LOCATIONS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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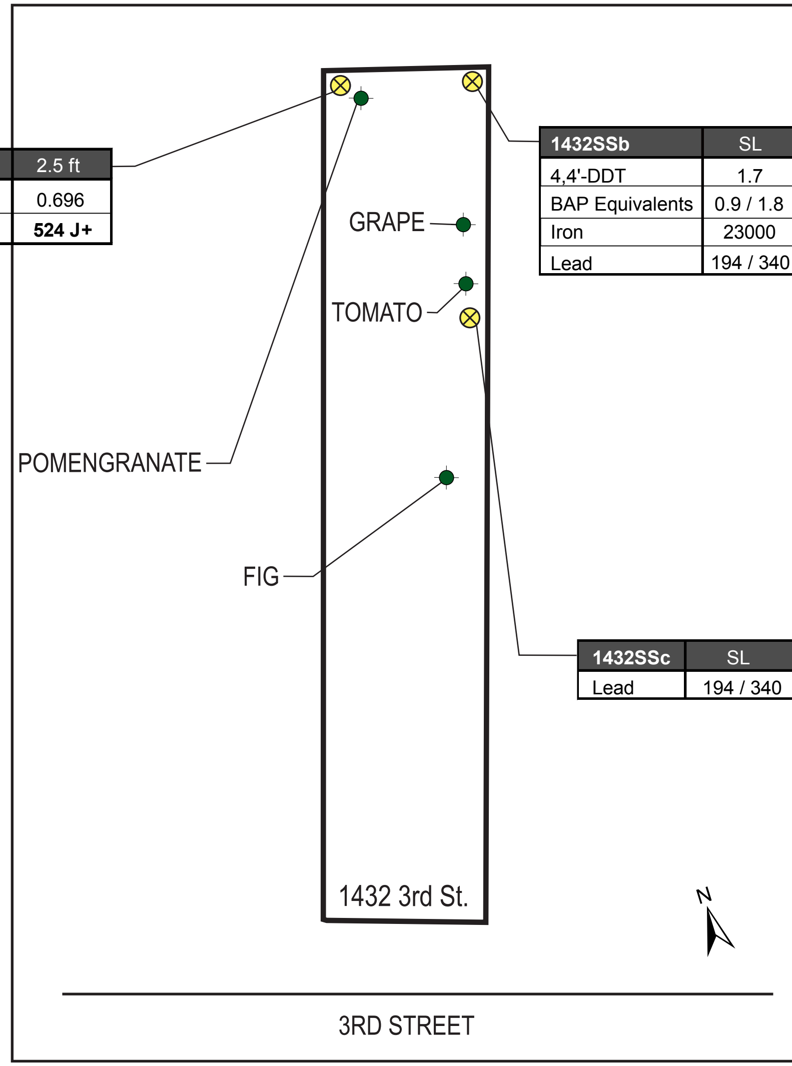

1432SSa	SL	0.5 ft	2.5 ft
BAP Equivalents	0.9 / 1.8	**2.67**	0.696
Lead	194 / 340	**1060**	**524 J+**

1432SSb	SL	0.5 ft	2.5 ft
4,4'-DDT	1.7	**3.1 J**	0.51 J
BAP Equivalents	0.9 / 1.8	**3.75**	**1**
Iron	23000	**28200**	22900
Lead	194 / 340	**1830**	**1500 J+**

1432SSc	SL	0.5 ft	2.5 ft
Lead	194 / 340	**2280 J**	**983**

PRODUCE SAMPLING LOCATION
SOIL SAMPLING LOCATION

All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 18
1432 3rd STREET SOIL/PRODUCE SAMPLING LOCATIONS

HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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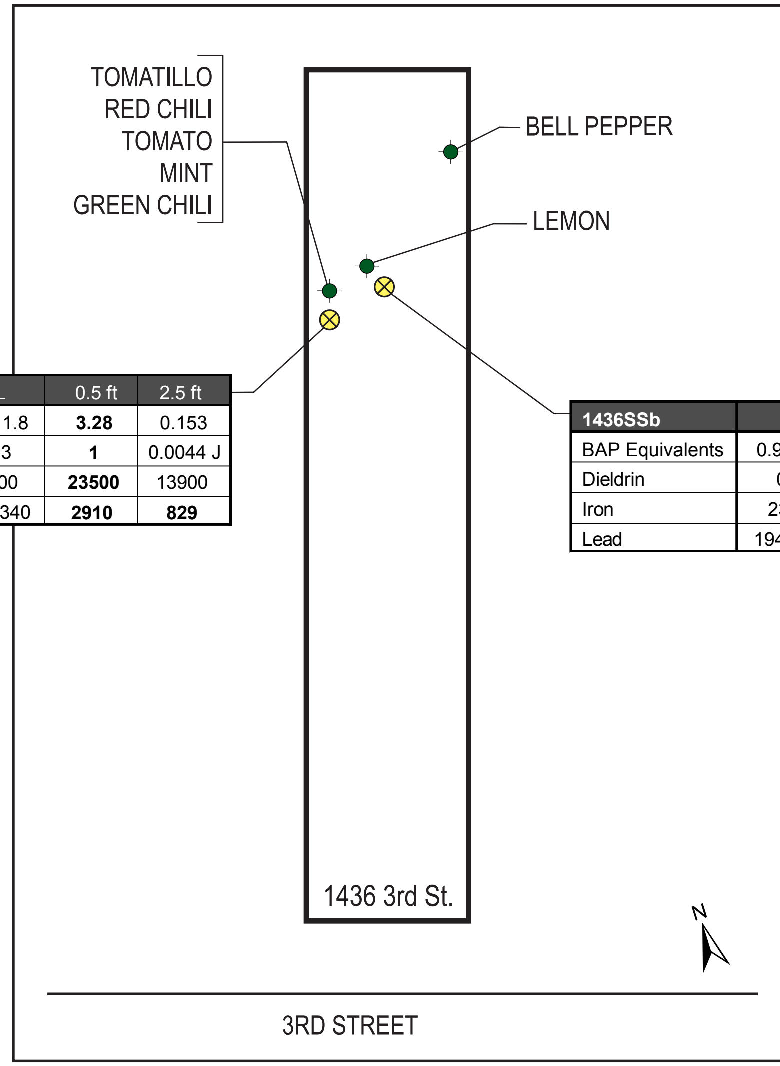

1436SSa	SL	0.5 ft	2.5 ft
BAP Equivalents	0.9 / 1.8	**3.28**	0.153
Dieldrin	0.03	**1**	0.0044 J
Iron	23000	**23500**	13900
Lead	194 / 340	**2910**	**829**

1436SSb	SL	0.5 ft	2.5 ft
BAP Equivalents	0.9 / 1.8	**1.85**	0.136
Dieldrin	0.03	**0.036**	0.0002 J
Iron	23000	**27700**	9290
Lead	194 / 340	**3630**	**216 J+**

PRODUCE SAMPLING LOCATION
SOIL SAMPLING LOCATION

All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 19
1436 3rd STREET
SOIL/PRODUCE
SAMPLING LOCATIONS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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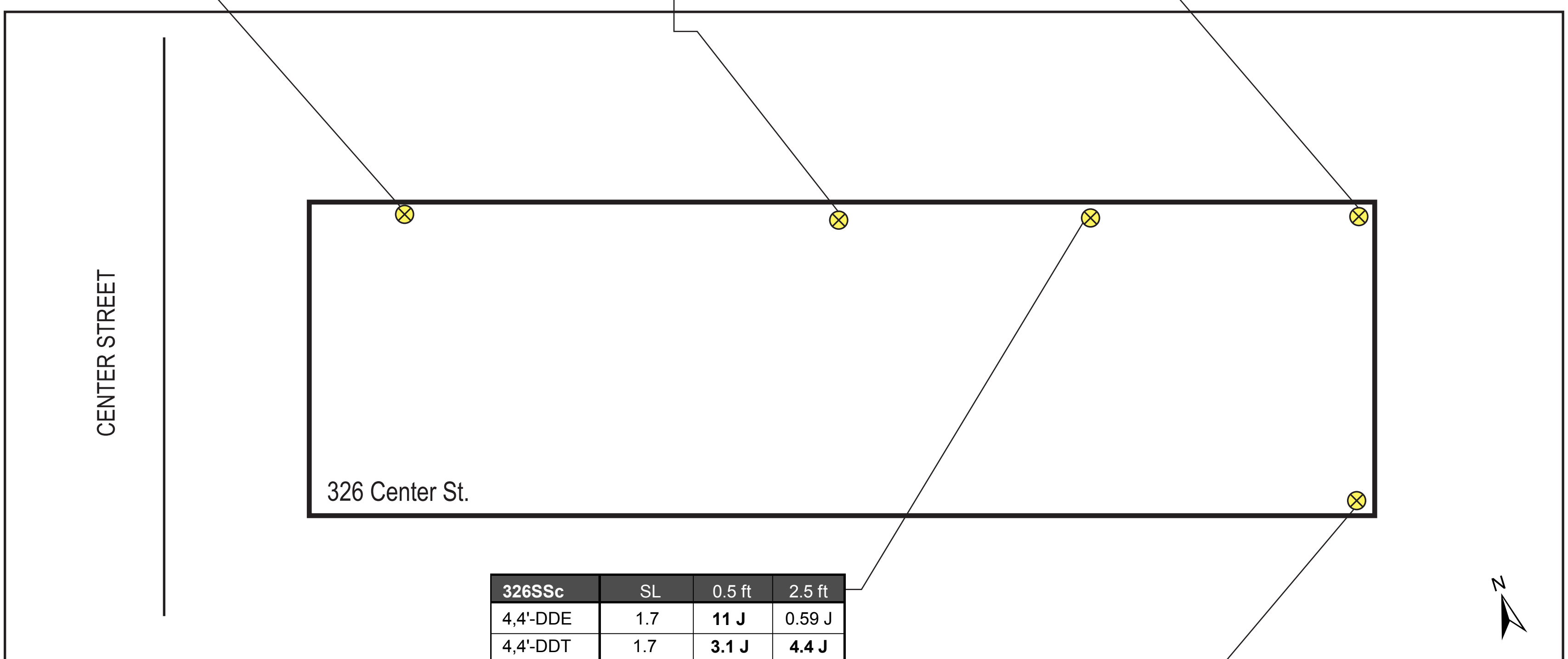
326SSa	SL	0.5 ft	2.5 ft
Lead	194 / 340	**274**	35.9

326SSb	SL	0.5 ft	2.5 ft
Lead	194 / 340	**261 J+**	179

326SSd	SL	0.5 ft	2.5 ft
4,4'-DDT	1.7	**2.2**	**3**
Arsenic	22 / 0.062	**451**	**125**
Iron	23000	**25400**	5530
Lead	194 / 340	**28600**	**631 J+**



326SSc	SL	0.5 ft	2.5 ft
4,4'-DDE	1.7	**11 J**	0.59 J
4,4'-DDT	1.7	**3.1 J**	**4.4 J**
Dieldrin	0.03	**0.16 J**	0.013
Lead	194 / 340	**389 J+**	**284**

326SSe	SL	0.5 ft	2.5 ft
Lead	194 / 340	**1270 J+**	**53000 J**

⊗ SOIL SAMPLING LOCATION
All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 20
326 CENTER STREET
SOIL/PRODUCE
SAMPLING LOCATIONS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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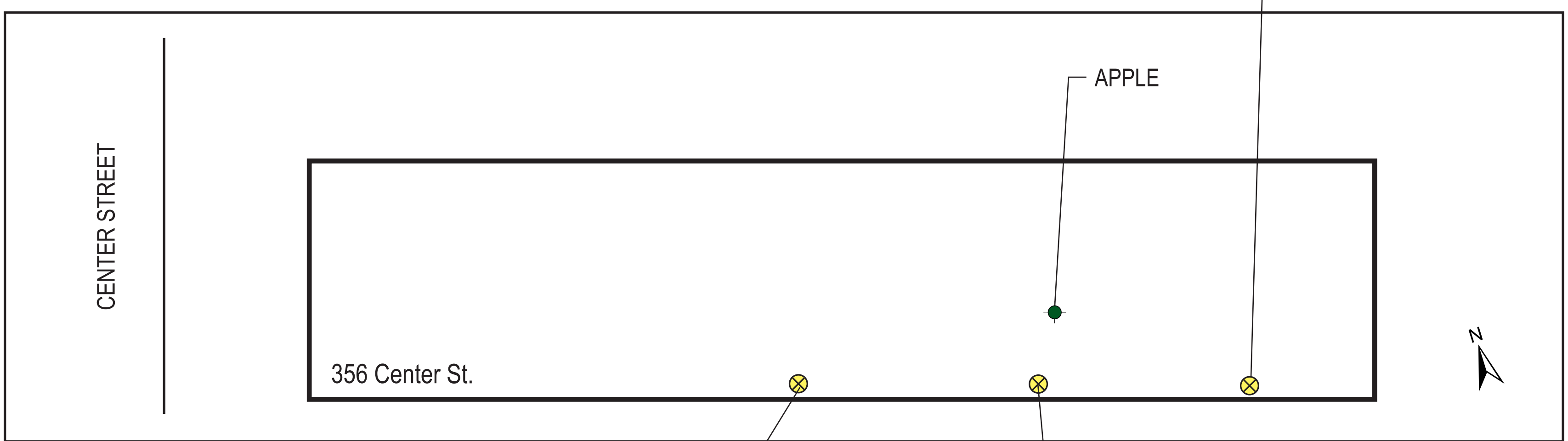

356SSc	SL	0.5 ft	2.5 ft
Lead	194 / 340	**354 J+**	26.2 J+

356SSa	SL	0.5 ft	2.5 ft
Lead	194 / 340	**822 J+**	**223**

356SSb	SL	0.5 ft	2.5 ft
Lead	194 / 340	**563 J+**	**432**

PRODUCE SAMPLING LOCATION
SOIL SAMPLING LOCATION
All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 21
356 CENTER STREET
SOIL/PRODUCE
SAMPLING LOCATIONS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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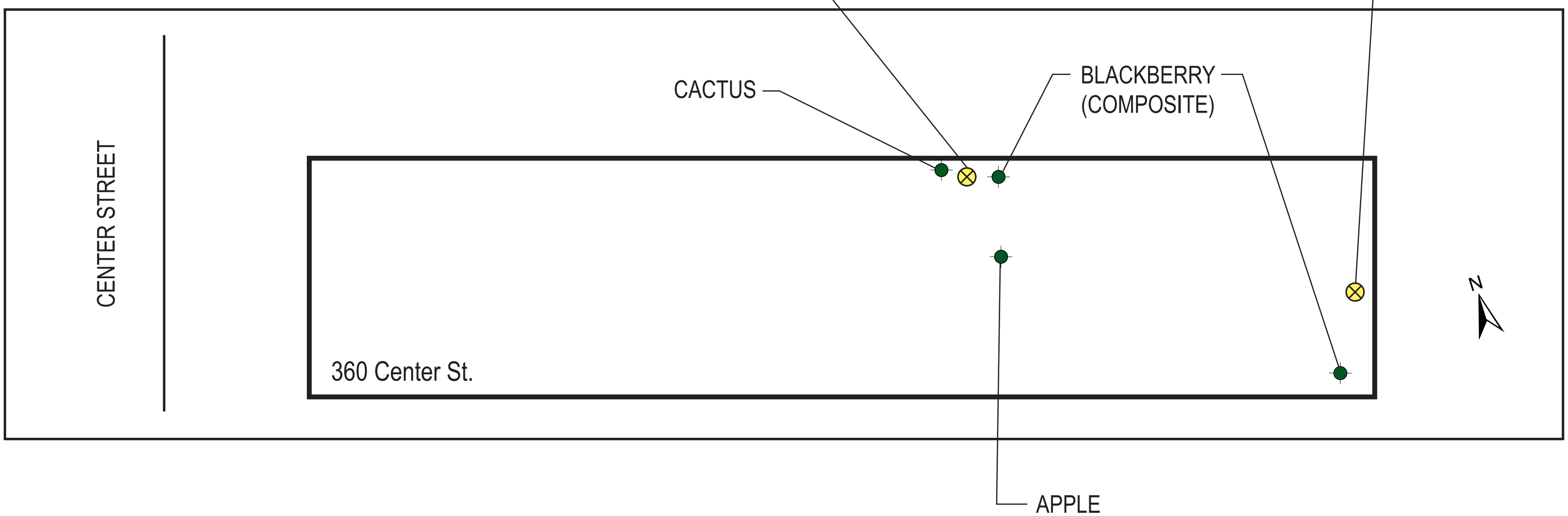
360SSa	SL	0.5 ft	2.5 ft
Aroclor-1254	0.22	**11**	**2.4 J**
Heptachlor epoxide	0.053	**0.31 J**	0.0099J
Lead	194 / 340	**2230 J+**	193

360SSb	SL	0.5 ft	2.5 ft
Lead	194 / 340	**600**	**478 J**



PRODUCE SAMPLING LOCATION

SOIL SAMPLING LOCATION

All results and screening levels in mg/kg
ft - feet below ground surface
Bold - detected above screening levels
J - estimated
U - not detected at listed reporting limit
UJ - not detected at estimated reporting limit
NA - not analyzed
Maximum value between field duplicate (FD) & primary sample is shown
SL - Screening Level

Notes:
1. Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
2. Concentrations are only shown for locations that had result(s) exceeding the screening levels during at least one sampling event.
3. For arsenic, 22 mg/kg was used for screening because the cancer endpoint of 0.062 mg/kg is below background levels.
4. Lead screening level in soil was evaluated using Department Toxic Substance Control's Lead Risk Assessment Spreadsheet Version 7 (Lead Spread 7, Cal/EPA 1999). Lead screening level of 194 mg/kg includes homegrown produce pathway.

FIGURE 22
360 CENTER STREET SOIL/PRODUCE SAMPLING LOCATIONS
HUMAN HEALTH RISK ASSESSMENT
AMCO CHEMICAL SUPERFUND SITE
OAKLAND, CALIFORNIA

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Attachment 1
Detailed Risk and Hazard Results for Exposure to Soil

Attachment 1 - Table of Contents - Soil Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 1-1	AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Table 1-2	Soil Exposure Assumptions
Table 1-3	Cancer and Noncancer Toxicity Values for COPCs
Table 1-4	Volatilization Factors and Absorption Factors
Table 1-5	Exposure Point Concentrations - Shallow Soil - Former AMCO Chemical Facility
Table 1-6	Exposure Point Concentrations - Deep Soil - Former AMCO Chemical Facility
Table 1-7	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Table 1-8	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Table 1-9	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Table 1-10	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Table 1-11	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Former AMCO Chemical Facility**
Table 1-12	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Former AMCO Chemical Facility**
Table 1-13	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Table 1-14	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Table 1-15	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Table 1-16	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Table 1-17	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Former AMCO Chemical Facility**
Table 1-18	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Former AMCO Chemical Facility**
Table 1-19	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Table 1-20	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Table 1-21	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Table 1-22	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Table 1-23	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Former AMCO Chemical Facility**
Table 1-24	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Former AMCO Chemical Facility**
Table 1-25	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Table 1-26	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Table 1-27	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility

Attachment 1 - Table of Contents - Soil Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 1-28	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Table 1-29	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Former AMCO Chemical Facility**
Table 1-30	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Former AMCO Chemical Facility**
Table 1-31	Exposure Point Concentrations for Site Risks - Shallow Soil - Parking Lot
Table 1-32	Exposure Point Concentrations for Site Risks - Deep Soil - Parking Lot
Table 1-33	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Table 1-34	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Table 1-35	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Table 1-36	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Table 1-37	**Cancer Risk Results Detailed Summary of Risk Drivers - Shallow Soil - Future Adult/Child Resident - Parking Lot**
Table 1-38	**Noncancer Risk Results Detailed Summary of Risk Drivers - Shallow Soil - Future Adult/Child Resident - Parking Lot**
Table 1-39	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Table 1-40	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Table 1-41	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Table 1-42	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Table 1-43	**Cancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Parking Lot**
Table 1-44	**Noncancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Parking Lot**
Table 1-45	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Table 1-46	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Table 1-47	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Table 1-48	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Table 1-49	**Cancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Adult/Child Resident - Parking Lot**
Table 1-50	**Noncancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Adult/Child Resident - Parking Lot**
Table 1-51	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Table 1-52	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Table 1-53	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot

Attachment 1 - Table of Contents - Soil Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 1-54	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Table 1-55	**Cancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Industrial/Construction Worker - Parking Lot**
Table 1-56	**Noncancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Industrial/Construction Worker - Parking Lot**
Table 1-57	Exposure Point Concentrations - Shallow Soil - Large Vacant Lot
Table 1-58	Exposure Point Concentrations - Deep Soil - Large Vacant Lot
Table 1-59	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Large Vacant Lot
Table 1-60	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Large Vacant Lot
Table 1-61	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Large Vacant Lot
Table 1-62	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Large Vacant Lot
Table 1-63	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Large Vacant Lot**
Table 1-64	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Large Vacant Lot**
Table 1-65	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Table 1-66	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Table 1-67	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Table 1-68	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Table 1-69	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Large Vacant Lot**
Table 1-70	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Large Vacant Lot**
Table 1-71	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Large Vacant Lot
Table 1-72	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Large Vacant Lot
Table 1-73	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident - Large Vacant Lot
Table 1-74	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident - Large Vacant Lot
Table 1-75	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Large Vacant Lot**
Table 1-76	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Large Vacant Lot**
Table 1-77	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Table 1-78	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot

Attachment 1 - Table of Contents - Soil Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 1-79	Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Table 1-80	Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Table 1-81	**Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Large Vacant Lot**
Table 1-82	**Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Large Vacant Lot**
Table 1-83	Exposure Point Concentrations - Shallow Soil - Small Vacant Lot
Table 1-84	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Small Vacant Lot
Table 1-85	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Small Vacant Lot
Table 1-86	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Small Vacant Lot
Table 1-87	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Small Vacant Lot
Table 1-88	**Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Shallow Soil - Small Vacant Lot**
Table 1-89	**Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Shallow Soil - Small Vacant Lot**
Table 1-90	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Small Vacant Lot
Table 1-91	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Small Vacant Lot
Table 1-92	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Small Vacant Lot
Table 1-93	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Small Vacant Lot
Table 1-94	**Cancer Risk Results Detailed Summary for Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Small Vacant Lot**
Table 1-95	**Noncancer Risk Results Detailed Summary for Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Small Vacant Lot**
Table 1-96	Soil Exposure Point Concentrations for City of Oakland Background
Table 1-97	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Background
Table 1-98	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Background
Table 1-99	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Background
Table 1-100	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Shallow Soil Exposure Scenario - Future Child Resident Receptor - Background
Table 1-101	**Cancer Risk Results Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Background**
Table 1-102	**Noncancer Risk Results Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Background**
Table 1-103	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker Receptor - Background
Table 1-104	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker Receptor - Background

Attachment 1 - Table of Contents - Soil Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 1-105	Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Background
Table 1-106	Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Background
Table 1-107	**Cancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Background**
Table 1-108	**Noncancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Background**
Table 1-109	**Summary of Cancer Risks and Noncancer Hazards - Soil**
Table 1-110	**Summary of Cancer Risks and Noncancer Hazards - Groundwater**
Table 1-111	**Summary of Target Organ / Endpoint for Health Hazards**
Table 1-112	Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow and Deep Soil - Former AMCO Chemical Facility
Table 1-113	Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Former AMCO Chemical Facility
Table 1-114	Noncancer Health Hazard - Risk Drivers for Industrial Worker - Shallow and Deep Soil - Former AMCO Chemical Facility
Table 1-115	Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow and Deep Soil - Former AMCO Chemical Facility
Table 1-116	Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow and Deep Soil - Parking Lot
Table 1-117	Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Parking Lot
Table 1-118	Noncancer Health Hazard - Risk Drivers for Industrial Worker - Shallow and Deep Soil - Parking Lot
Table 1-119	Noncancer Health Hazard - Risk Drivers for Future Construction Worker - Shallow and Deep Soil - Parking Lot
Table 1-120	Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Large Vacant Lot
Table 1-121	Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow and Deep Soil - Large Vacant Lot
Table 1-122	Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow Soil - Small Vacant Lot
Table 1-123	Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow Soil - Small Vacant Lot
Table 1-124	Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow Soil - Background
Table 1-125	Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow Soil - Background
Table 1-126	Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow Soil - Background

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Former AMCO Chemical Facility - Shallow																	
Metals																	
Aluminum	21	21	100	mg/kg	5400	20700	NA	NA	RSB-22	2	3	11000	4160	12600	95% Student's-t UCL	12600	95% Student's-t UCL
Antimony	14	21	67	mg/kg	0.3	49	12	12	RSB-04	2.5	3.5	6.41	10.5	13.6	95% Chebyshev (MVUE) UCL	13.6	95% Chebyshev (MVUE) UCL
Arsenic	21	21	100	mg/kg	1.8	15	NA	NA	RSB-24	1.8	3	6.12	3.86	7.71	95% Approximate Gamma UCL	7.71	95% Approximate Gamma UCL
Barium	21	21	100	mg/kg	68	1460	NA	NA	RSB-20	1.5	2.5	360	355	513	95% Approximate Gamma UCL	513	95% Approximate Gamma UCL
Beryllium	21	21	100	mg/kg	0.19	1.7	NA	NA	RSB-22	2	3	0.485	0.348	0.614	95% Approximate Gamma UCL	0.614	95% Approximate Gamma UCL
Cadmium	16	21	76	mg/kg	0.17	6.4	1	1	RSB-07	3.5	4.5	1.05	1.36	1.58	95% H-UCL	1.58	95% H-UCL
Chromium	21	21	100	mg/kg	22.1	2650	NA	NA	RSB-24	1.8	3	174	568	1410	99% Chebyshev (Mean, Sd) UCL	1410	99% Chebyshev (Mean, Sd) UCL
Cobalt	21	21	100	mg/kg	3.8	16.5	NA	NA	RSB-24	1.8	3	7.6	2.88	8.75	95% Approximate Gamma UCL	8.75	95% Approximate Gamma UCL
Copper	21	21	100	mg/kg	8.8	672	NA	NA	RSB-18	3	4	109	147	229	95% Chebyshev (MVUE) UCL	229	95% Chebyshev (MVUE) UCL
Iron	21	21	100	mg/kg	8130	66200	NA	NA	RSB-24	1.8	3	21300	12900	26100	95% Approximate Gamma UCL	26100	95% Approximate Gamma UCL
Lead	21	21	100	mg/kg	8.2	1710	NA	NA	RSB-20	1.5	2.5	382	439	640	95% Approximate Gamma UCL	640	95% Approximate Gamma UCL
Manganese	21	21	100	mg/kg	79.7	2450	NA	NA	RSB-24	1.8	3	508	664	1140	95% Chebyshev (Mean, Sd) UCL	1140	95% Chebyshev (Mean, Sd) UCL
Nickel	21	21	100	mg/kg	15.3	126	NA	NA	RSB-24	1.8	3	33.6	23	42.2	95% Student's-t UCL	42.2	95% Student's-t UCL
Selenium	12	21	57	mg/kg	0.31	2.5	7	7	RSB-20	1.5	2.5	2.4	1.08	3.43	95% Chebyshev (Mean, Sd) UCL	2.5	Maximum Result
Silver	18	21	86	mg/kg	0.18	2.2	2	2	RSB-20	1.5	2.5	0.643	0.467	0.843	95% Approximate Gamma UCL	0.843	95% Approximate Gamma UCL
Thallium	12	21	57	mg/kg	0.25	5.7	5	5	RSB-24	1.8	3	1.99	1.23	3.16	95% Chebyshev (Mean, Sd) UCL	3.16	95% Chebyshev (Mean, Sd) UCL
Vanadium	21	21	100	mg/kg	19.6	68.6	NA	NA	RSB-20	1.5	2.5	36.3	13.5	41.6	95% Approximate Gamma UCL	41.6	95% Approximate Gamma UCL
Zinc	21	21	100	mg/kg	23.1	2510	NA	NA	RSB-07	3.5	4.5	392	533	591	95% Approximate Gamma UCL	591	95% Approximate Gamma UCL
Pesticides/PCBs																	
4,4'-DDD	20	21	95	ug/kg	1	20000	1.1	1.1	RSB-21	1	1.5	3550	5420	9160	95% Adjusted Gamma UCL	9160	95% Adjusted Gamma UCL
4,4'-DDE	20	21	95	ug/kg	1.6	10000	3.5	3.5	RSB-18	3	4	1490	2460	3560	95% Adjusted Gamma UCL	3560	95% Adjusted Gamma UCL
4,4'-DDT	10	21	48	ug/kg	1.5	560	3.6	360	RSB-14	1	2	52.9	126	325	99% Chebyshev (Mean, Sd) UCL	325	99% Chebyshev (Mean, Sd) UCL
Aldrin	12	21	57	ug/kg	0.83	2400	1.8	18	RSB-17	4	5	151	523	1290	99% Chebyshev (Mean, Sd) UCL	1290	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	4	21	19	ug/kg	2.4	26	1.8	180	RSB-20	1.5	2.5	7.88	19.7	50.6	99% Chebyshev (Mean, Sd) UCL	26	Maximum Result
alpha-Chlordane	11	21	52	ug/kg	0.4	170	0.54	18	RSB-21	1	1.5	15.9	37.4	40.4	95% Chebyshev (MVUE) UCL	40.4	95% Chebyshev (MVUE) UCL
beta-BHC	6	21	29	ug/kg	2.1	35	1.8	180	RSB-24	1.8	3	9.84	20.2	53.7	99% Chebyshev (Mean, Sd) UCL	35	Maximum Result
delta-BHC	1	21	5	ug/kg	4.1	4.1	1.8	180	RSB-03	1	2	7.76	19.4	49.9	99% Chebyshev (Mean, Sd) UCL	4.1	Maximum Result
Dieldrin	20	21	95	ug/kg	0.87	2400	3.5	3.5	RSB-18	3	4	541	839	1340	95% Adjusted Gamma UCL	1340	95% Adjusted Gamma UCL
Endosulfan sulfate	1	21	5	ug/kg	1.6	1.6	3.5	360	RSB-19	1	2	15.1	38.9	99.5	99% Chebyshev (Mean, Sd) UCL	1.6	Maximum Result
Endrin	3	21	14	ug/kg	1.2	4.6	3.5	360	RSB-23	1.3	2	14.8	39	99.4	99% Chebyshev (Mean, Sd) UCL	4.6	Maximum Result
Endrin aldehyde	1	21	5	ug/kg	1.1	1.1	3.5	360	RSB-04	2.5	3.5	15	38.9	99.5	99% Chebyshev (Mean, Sd) UCL	1.1	Maximum Result
Endrin ketone	4	21	19	ug/kg	1.1	12	3.5	360	RSB-24	1.8	3	14.7	38.9	99.1	99% Chebyshev (Mean, Sd) UCL	12	Maximum Result
gamma-Chlordane	12	21	57	ug/kg	0.83	190	1.8	40	RSB-21	1	1.5	18.6	41.6	109	99% Chebyshev (Mean, Sd) UCL	109	99% Chebyshev (Mean, Sd) UCL
Heptachlor	1	21	5	ug/kg	8.8	8.8	1.8	180	RSB-24	1.8	3	7.56	19.4	49.8	99% Chebyshev (Mean, Sd) UCL	8.8	Maximum Result
Methoxychlor	1	21	5	ug/kg	3.9	3.9	18	1800	RSB-08	4	5	75.9	195	498	99% Chebyshev (Mean, Sd) UCL	3.9	Maximum Result
Aroclor-1260	1	21	5	ug/kg	640	640	35	3600	RSB-22	2	3	176	403	1050	99% Chebyshev (Mean, Sd) UCL	640	Maximum Result
SVOCs/VOCs																	
1,2,4-Trichlorobenzene	6	21	29	ug/kg	2	2100	10	13	RSB-42	4	5	204	614	1540	99% Chebyshev (Mean, Sd) UCL	1540	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	10	21	48	ug/kg	12	110000	10	13	RSB-18	3	4	13000	27100	54700	95% Hall's Bootstrap UCL	54700	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	8	21	38	ug/kg	10	3800	10	13	RSB-42	4	5	233	825	2020	99% Chebyshev (Mean, Sd) UCL	2020	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	9	21	43	ug/kg	4	44000	10	13	RSB-42	4	5	3260	10200	25500	99% Chebyshev (Mean, Sd) UCL	25500	99% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	3	6	50	ug/kg	270	300	250	280	RSB-03	1	2	210	88.5	317	95% Approximate Gamma UCL	300	Maximum Result
2-Methylnaphthalene	12	21	57	ug/kg	130	380000	350	1400	RSB-17	4	5	74500	129000	114000	95% Hall's Bootstrap UCL	114000	95% Hall's Bootstrap UCL
2-Methylphenol	1	21	5	ug/kg	990	990	350	14000	RSB-24	1.8	3	2390	2800	8480	99% Chebyshev (Mean, Sd) UCL	990	Maximum Result
4-Chloro-3-methylphenol	2	21	10	ug/kg	2000	7200	350	13000	RSB-18	3	4	2450	2800	8540	99% Chebyshev (Mean, Sd) UCL	7200	Maximum Result
4-Methylphenol	2	21	10	ug/kg	1500	3600	350	13000	RSB-18	3	4	2250	2610	7910	99% Chebyshev (Mean, Sd) UCL	3600	Maximum Result
Acenaphthene	3	21	14	ug/kg	2500	10000	350	14000	RSB-20	1.5	2.5	2530	3060	9180	99% Chebyshev (Mean, Sd) UCL	9180	99% Chebyshev (Mean, Sd) UCL
Anthracene	3	21	14	ug/kg	77	1100	350	14000	RSB-24	1.8	3	2390	2810	8480	99% Chebyshev (Mean, Sd) UCL	1100	Maximum Result
Benzo(a)anthracene	3	21	14	ug/kg	150	550	350	14000	RSB-24	1.8	3	2380	2810	8480	99% Chebyshev (Mean, Sd) UCL	550	Maximum Result
Benzo(a)pyrene	2	21	10	ug/kg	130	500	350	14000	RSB-08	4	5	2400	2790	8470	99% Chebyshev (Mean, Sd) UCL	500	Maximum Result
Benzo(b)fluoranthene	2	21	10	ug/kg	110	420	350	14000	RSB-08	4	5	2400	2800	8470	99% Chebyshev (Mean, Sd) UCL	420	Maximum Result
Benzo(g,h,i)perylene	1	21	5	ug/kg	430	430	350	14000	RSB-08	4	5	2400	2790	8470	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Benzo(k)fluoranthene	2	21	10	ug/kg	130	430	350	14000	RSB-08	4	5	2400	2800	8470	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Benzyl butyl phthalate	1	21	5	ug/kg	7600	7600	350	14000	RSB-24	1.8	3	2710	3000	9230	99% Chebyshev (Mean, Sd) UCL	7600	Maximum Result
Biphenyl (diphenyl)	4	21	19	ug/kg	1600	4400	350	14000	RSB-20	1.5	2.5	2020	2430	7300	99% Chebyshev (Mean, Sd) UCL	4400	Maximum Result
bis(2-Ethylhexyl)phthalate	4	21	19	ug/kg	3300	13000	350	13000	RSB-20	1.5	2.5	2570	3350	9850	99% Chebyshev (Mean, Sd) UCL	9850	99% Chebyshev (Mean, Sd) UCL

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Caprolactam	1	21	5	ug/kg	95	95	350	14000	RSB-10	1	2	2390	2810	8480	99% Chebyshev (Mean, Sd) UCL	95	Maximum Result
Carbazole	1	21	5	ug/kg	1100	1100	350	14000	RSB-24	1.8	3	2400	2800	8480	99% Chebyshev (Mean, Sd) UCL	1100	Maximum Result
Chrysene	3	21	14	ug/kg	190	910	350	14000	RSB-24	1.8	3	2400	2790	8470	99% Chebyshev (Mean, Sd) UCL	910	Maximum Result
Dibenz(a,h)anthracene	1	21	5	ug/kg	120	120	350	14000	RSB-08	4	5	2390	2810	8480	99% Chebyshev (Mean, Sd) UCL	120	Maximum Result
Dibenzofuran	2	21	10	ug/kg	2000	4100	350	14000	RSB-20	1.5	2.5	2350	2700	8200	99% Chebyshev (Mean, Sd) UCL	4100	Maximum Result
Di-n-butyl phthalate	2	21	10	ug/kg	530	2900	350	14000	RSB-20	1.5	2.5	2220	2700	8070	99% Chebyshev (Mean, Sd) UCL	2900	Maximum Result
Fluoranthene	5	21	24	ug/kg	77	4200	380	14000	RSB-24	1.8	3	2490	2690	4220	95% Approximate Gamma UCL	4200	Maximum Result
Fluorene	4	21	19	ug/kg	2400	8900	350	13000	RSB-20	1.5	2.5	2310	2760	8310	99% Chebyshev (Mean, Sd) UCL	8310	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	1	21	5	ug/kg	440	440	350	14000	RSB-08	4	5	2400	2790	8470	99% Chebyshev (Mean, Sd) UCL	440	Maximum Result
Naphthalene	7	21	33	ug/kg	13000	80000	350	13000	RSB-20	1.5	2.5	10700	19400	52800	99% Chebyshev (Mean, Sd) UCL	52800	99% Chebyshev (Mean, Sd) UCL
Phenanthrene	7	21	33	ug/kg	190	16000	350	13000	RSB-20	1.5	2.5	3140	4130	12100	99% Chebyshev (Mean, Sd) UCL	12100	99% Chebyshev (Mean, Sd) UCL
Pyrene	6	21	29	ug/kg	95	4900	350	14000	RSB-20	1.5	2.5	2370	2590	3970	95% Approximate Gamma UCL	3970	95% Approximate Gamma UCL
1,1,1-Trichloroethane	2	21	10	ug/kg	7	81	10	14	RSB-24	1.8	3	9.48	16.4	25.1	95% Chebyshev (Mean, Sd) UCL	25.1	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	9	21	43	ug/kg	5	14000	10	13	RSB-18	3	4	1330	4050	10100	99% Chebyshev (Mean, Sd) UCL	10100	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	3	21	14	ug/kg	6	240	10	13	RSB-24	1.8	3	19	51.5	68	95% Chebyshev (Mean, Sd) UCL	68	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	1	21	5	ug/kg	220	220	10	14	RSB-24	1.8	3	16	46.7	60.5	95% Chebyshev (Mean, Sd) UCL	60.5	95% Chebyshev (Mean, Sd) UCL
Acetone	16	21	76	ug/kg	30	860	10	13	RSB-24	1.8	3	134	191	226	95% Approximate Gamma UCL	226	95% Approximate Gamma UCL
Benzene	7	21	33	ug/kg	25	3500	10	1300	RSB-24	1.8	3	265	768	1930	99% Chebyshev (Mean, Sd) UCL	1930	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	7	21	33	ug/kg	3	9	10	14	RSB-23	1.3	2	5.76	1.41	6.29	95% Student's-t UCL	6.29	95% Student's-t UCL
Chlorobenzene	7	21	33	ug/kg	44	19000	10	13	RSB-42	4	5	1100	4140	10100	99% Chebyshev (Mean, Sd) UCL	10100	99% Chebyshev (Mean, Sd) UCL
Chloroethane	4	21	19	ug/kg	7	75	10	13	RSB-21	1	1.5	9.6	15.1	24	95% Chebyshev (Mean, Sd) UCL	24	95% Chebyshev (Mean, Sd) UCL
Chloromethane	1	21	5	ug/kg	480	480	10	14	RSB-19	1	2	28.4	103	127	95% Chebyshev (Mean, Sd) UCL	127	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	10	21	48	ug/kg	3	240000	10	13	RSB-24	1.8	3	13900	52200	149000	95% Hall's Bootstrap UCL	149000	95% Hall's Bootstrap UCL
Cyclohexane	8	21	38	ug/kg	7	3300	10	1300	RSB-21	1	1.5	420	980	2550	99% Chebyshev (Mean, Sd) UCL	2550	99% Chebyshev (Mean, Sd) UCL
Ethylbenzene	9	21	43	ug/kg	3	89000	10	13	RSB-24	1.8	3	12600	24200	22400	95% Hall's Bootstrap UCL	22400	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	9	21	43	ug/kg	31	17000	10	13	RSB-21	1	1.5	3340	5510	5350	95% Hall's Bootstrap UCL	5350	95% Hall's Bootstrap UCL
Methyl ethyl ketone	6	21	29	ug/kg	14	570	10	36	RSB-24	1.8	3	44.7	124	314	99% Chebyshev (Mean, Sd) UCL	314	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	1	21	5	ug/kg	11000	11000	10	13	RSB-18	3	4	529	2400	5740	99% Chebyshev (Mean, Sd) UCL	5740	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	1	21	5	ug/kg	4	4	10	14	RSB-22	2	3	5.76	0.625	6	95% Student's-t UCL	4	Maximum Result
Methylcyclohexane	9	21	43	ug/kg	43	35000	10	13	RSB-21	1	1.5	5320	10300	10200	95% Hall's Bootstrap UCL	10200	95% Hall's Bootstrap UCL
Methylene chloride	6	21	29	ug/kg	4	14	10	13	RSB-18	3	4	7.24	3.04	8.38	95% Student's-t UCL	8.38	95% Student's-t UCL
Styrene	1	21	5	ug/kg	980	980	10	14	RSB-20	1.5	2.5	52.2	213	514	99% Chebyshev (Mean, Sd) UCL	514	99% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	9	21	43	ug/kg	4	110	10	13	RSB-24	1.8	3	19.5	31.4	87.6	99% Chebyshev (Mean, Sd) UCL	87.6	99% Chebyshev (Mean, Sd) UCL
Toluene	9	21	43	ug/kg	3	530000	10	13	RSB-24	1.8	3	70900	168000	116000	95% Hall's Bootstrap UCL	116000	95% Hall's Bootstrap UCL
trans-1,2-Dichloroethene	7	21	33	ug/kg	3	1200	10	13	RSB-24	1.8	3	74.5	260	638	99% Chebyshev (Mean, Sd) UCL	638	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	9	21	43	ug/kg	5	920	10	13	RSB-24	1.8	3	76	205	521	99% Chebyshev (Mean, Sd) UCL	521	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	5	21	24	ug/kg	51	2200	10	13	RSB-22	2	3	177	509	1280	99% Chebyshev (Mean, Sd) UCL	1280	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	8	21	38	ug/kg	50	640000	10	13	RSB-24	1.8	3	77600	167000	157000	95% Hall's Bootstrap UCL	157000	95% Hall's Bootstrap UCL
Dioxins/Furans																	
1,2,3,4,6,7,8-HpCDD	4	4	100	ng/kg	0.706	1100	NA	NA	RSB-18	3	4	409	479	972	95% Student's-t UCL	972	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	3	4	75	ng/kg	42.1	178	0.379	0.379	RSB-18	3	4	70.1	76.2	160	95% Student's-t UCL	160	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	2	4	50	ng/kg	4.25	8.51	0.417	2.49	RSB-18	3	4	3.55	3.72	7.93	95% Student's-t UCL	7.93	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	3	4	75	ng/kg	1.75	16.4	0.383	0.383	RSB-18	3	4	5.03	7.62	51.7	95% Approximate Gamma UCL	16.4	Maximum Result
1,2,3,4,7,8-HxCDF	1	4	25	ng/kg	2.46	2.46	0.319	2.28	RSB-12	1	2	1.09	0.998	2.26	95% Student's-t UCL	2.26	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	3	4	75	ng/kg	6.63	73.5	0.371	0.371	RSB-18	3	4	22.8	34.1	270	95% Approximate Gamma UCL	73.5	Maximum Result
1,2,3,6,7,8-HxCDF	3	4	75	ng/kg	2.18	16.8	0.511	0.511	RSB-18	3	4	6.34	7.39	15	95% Student's-t UCL	15	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	3	4	75	ng/kg	2.59	41.4	0.318	0.318	RSB-18	3	4	11.9	19.7	143	95% Approximate Gamma UCL	41.4	Maximum Result
1,2,3,7,8,9-HxCDF	2	4	50	ng/kg	1.17	8.75	0.496	1.1	RSB-18	3	4	2.68	4.07	25.3	95% Approximate Gamma UCL	8.75	Maximum Result
1,2,3,7,8-PeCDD	2	4	50	ng/kg	1.03	15.3	0.625	1.38	RSB-18	3	4	4.33	7.32	47	95% Approximate Gamma UCL	15.3	Maximum Result
2,3,4,6,7,8-HxCDF	3	4	75	ng/kg	1.57	16.9	0.282	0.282	RSB-18	3	4	6.15	7.59	15.1	95% Student's-t UCL	15.1	95% Student's-t UCL
2,3,4,7,8-PeCDF	3	4	75	ng/kg	5.55	42.4	0.349	0.349	RSB-18	3	4	13.9	19.2	36.6	95% Student's-t UCL	36.6	95% Student's-t UCL
2,3,7,8-TCDF	1	4	25	ng/kg	5.36	5.36	0.316	2.22	RSB-18	3	4	1.77	2.42	4.63	95% Student's-t UCL	4.63	95% Student's-t UCL
OCDD	3	4	75	ng/kg	2130	8420	3.47	3.47	RSB-18	3	4	3900	3650	8200	95% Student's-t UCL	8200	95% Student's-t UCL
OCDF	3	4	75	ng/kg	31.1	354	0.519	0.519	RSB-18	3	4	136	161	325	95% Student's-t UCL	325	95% Student's-t UCL
Former AMCO Chemical Facility - Deep																	
Metals																	
Aluminum	32	32	100	mg/kg	5400	20700	NA	NA	RSB-22	2	3	11200	4260	12500	95% Student's-t UCL	12500	95% Student's-t UCL

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AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Antimony	22	32	69	mg/kg	0.27	49	12	12	RSB-04	2.5	3.5	5.45	8.63	20.6	99% Chebyshev (Mean, Sd) UCL	20.6	99% Chebyshev (Mean, Sd) UCL
Arsenic	32	32	100	mg/kg	1.3	21	NA	NA	RSB-10	4	5	6.47	5.07	8.1	95% Approximate Gamma UCL	8.1	95% Approximate Gamma UCL
Barium	32	32	100	mg/kg	46.8	1460	NA	NA	RSB-20	1.5	2.5	355	372	555	95% H-UCL	555	95% H-UCL
Beryllium	32	32	100	mg/kg	0.17	1.7	NA	NA	RSB-22	2	3	0.498	0.348	0.604	95% Approximate Gamma UCL	0.604	95% Approximate Gamma UCL
Cadmium	22	32	69	mg/kg	0.15	6.4	1	1	RSB-07	3.5	4.5	0.87	1.13	1.74	95% Chebyshev (Mean, Sd) UCL	1.74	95% Chebyshev (Mean, Sd) UCL
Chromium	32	32	100	mg/kg	22.1	2650	NA	NA	RSB-24	1.8	3	138	463	495	95% Chebyshev (Mean, Sd) UCL	495	95% Chebyshev (Mean, Sd) UCL
Cobalt	32	32	100	mg/kg	3.8	16.5	NA	NA	RSB-24	1.8	3	7.12	2.55	7.9	95% Approximate Gamma UCL	7.9	95% Approximate Gamma UCL
Copper	32	32	100	mg/kg	7.6	672	NA	NA	RSB-18	3	4	102	130	145	95% Approximate Gamma UCL	145	95% Approximate Gamma UCL
Iron	32	32	100	mg/kg	8130	66200	NA	NA	RSB-24	1.8	3	20100	11600	23400	95% Approximate Gamma UCL	23400	95% Approximate Gamma UCL
Lead	32	32	100	mg/kg	3	1710	NA	NA	RSB-20	1.5	2.5	378	480	605	95% Approximate Gamma UCL	605	95% Approximate Gamma UCL
Manganese	32	32	100	mg/kg	79.7	2450	NA	NA	RSB-24	1.8	3	418	551	843	95% Chebyshev (Mean, Sd) UCL	843	95% Chebyshev (Mean, Sd) UCL
Nickel	32	32	100	mg/kg	15.3	126	NA	NA	RSB-24	1.8	3	31.2	19.4	37	95% Student's-t UCL	37	95% Student's-t UCL
Selenium	18	32	56	mg/kg	0.31	3.9	7	7	RSB-10	4	5	2.43	1.13	3.3	95% Chebyshev (Mean, Sd) UCL	3.3	95% Chebyshev (Mean, Sd) UCL
Silver	28	32	88	mg/kg	0.1	2.2	2	2	RSB-20	1.5	2.5	0.613	0.461	0.775	95% Approximate Gamma UCL	0.775	95% Approximate Gamma UCL
Thallium	15	32	47	mg/kg	0.25	5.7	5	5.4	RSB-24	1.8	3	2.08	1.04	2.88	95% Chebyshev (Mean, Sd) UCL	2.88	95% Chebyshev (Mean, Sd) UCL
Vanadium	32	32	100	mg/kg	19.6	68.6	NA	NA	RSB-20	1.5	2.5	36.4	13	40.5	95% Approximate Gamma UCL	40.5	95% Approximate Gamma UCL
Zinc	32	32	100	mg/kg	17.1	2510	NA	NA	RSB-07	3.5	4.5	310	452	441	95% Approximate Gamma UCL	441	95% Approximate Gamma UCL
Pesticides/PCBs																	
4,4'-DDD	28	31	90	ug/kg	0.97	34000	1.1	4	RSB-23	4.75	6	4480	7640	8400	95% Hall's Bootstrap UCL	8400	95% Hall's Bootstrap UCL
4,4'-DDE	27	31	87	ug/kg	1.6	10000	3.5	5.5	RSB-18	3	4	1460	2340	5640	99% Chebyshev (Mean, Sd) UCL	5640	99% Chebyshev (Mean, Sd) UCL
4,4'-DDT	14	31	45	ug/kg	1.5	560	3.6	390	RSB-14	1	2	51.4	110	247	99% Chebyshev (Mean, Sd) UCL	247	99% Chebyshev (Mean, Sd) UCL
Aldrin	14	31	45	ug/kg	0.83	2400	1.8	200	RSB-17	4	5	129	445	924	99% Chebyshev (Mean, Sd) UCL	924	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	5	31	16	ug/kg	2.4	26	1.2	200	RSB-20	1.5	2.5	9.43	23.4	51.3	99% Chebyshev (Mean, Sd) UCL	26	Maximum Result
alpha-Chlordane	15	31	48	ug/kg	0.4	170	0.54	18	RSB-21	1	1.5	13.8	31.7	70.4	99% Chebyshev (Mean, Sd) UCL	70.4	99% Chebyshev (Mean, Sd) UCL
beta-BHC	7	31	23	ug/kg	2.1	35	1.8	200	RSB-24	1.8	3	11.2	23.6	53.4	99% Chebyshev (Mean, Sd) UCL	35	Maximum Result
delta-BHC	1	31	3	ug/kg	4.1	4.1	1.8	200	RSB-03	1	2	9.36	23.3	50.9	99% Chebyshev (Mean, Sd) UCL	4.1	Maximum Result
Dieldrin	25	31	81	ug/kg	0.87	2400	3.5	5.5	RSB-18	3	4	564	850	2080	99% Chebyshev (Mean, Sd) UCL	2080	99% Chebyshev (Mean, Sd) UCL
Endosulfan sulfate	1	31	3	ug/kg	1.6	1.6	3.5	390	RSB-19	1	2	18.2	46	100	99% Chebyshev (Mean, Sd) UCL	1.6	Maximum Result
Endrin	4	31	13	ug/kg	1.2	4.6	3.5	390	RSB-23	1.3	2	18	46	100	99% Chebyshev (Mean, Sd) UCL	4.6	Maximum Result
Endrin aldehyde	1	31	3	ug/kg	1.1	1.1	3.5	390	RSB-04	2.5	3.5	18.2	46	100	99% Chebyshev (Mean, Sd) UCL	1.1	Maximum Result
Endrin ketone	5	31	16	ug/kg	1.1	12	3.5	390	RSB-24	1.8	3	18.1	45.9	100	99% Chebyshev (Mean, Sd) UCL	12	Maximum Result
gamma-BHC	2	31	6	ug/kg	0.65	2.5	1.8	200	RSB-13	4	5	9.28	23.3	50.9	99% Chebyshev (Mean, Sd) UCL	2.5	Maximum Result
gamma-Chlordane	15	31	48	ug/kg	0.83	190	1.8	200	RSB-21	1	1.5	18.8	38.4	87.5	99% Chebyshev (Mean, Sd) UCL	87.5	99% Chebyshev (Mean, Sd) UCL
Heptachlor	3	31	10	ug/kg	2.5	8.8	1.8	200	RSB-24	1.8	3	9.49	23.2	51	99% Chebyshev (Mean, Sd) UCL	8.8	Maximum Result
Methoxychlor	1	31	3	ug/kg	3.9	3.9	18	2000	RSB-08	4	5	92.4	233	509	99% Chebyshev (Mean, Sd) UCL	3.9	Maximum Result
Aroclor-1260	2	31	6	ug/kg	640	980	35	3900	RSB-22	5	6	228	487	1100	99% Chebyshev (Mean, Sd) UCL	980	Maximum Result
SVOCs/VOCs																	
1,2,4-Trichlorobenzene	7	31	23	ug/kg	2	2100	10	17	RSB-42	4	5	142	510	1050	99% Chebyshev (Mean, Sd) UCL	1050	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	13	31	42	ug/kg	12	110000	10	17	RSB-18	3	4	10900	23600	40200	95% Hall's Bootstrap UCL	40200	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	11	31	35	ug/kg	6	3800	10	17	RSB-42	4	5	162	682	1380	99% Chebyshev (Mean, Sd) UCL	1380	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	12	31	39	ug/kg	4	44000	10	17	RSB-42	4	5	2380	8490	17600	99% Chebyshev (Mean, Sd) UCL	17600	99% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	5	10	50	ug/kg	270	1500	250	390	RSB-12	4	5	340	415	912	95% Chebyshev (Mean, Sd) UCL	912	95% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	18	32	56	ug/kg	130	550000	350	1400	RSB-22	5	6	102000	171000	402000	99% Chebyshev (Mean, Sd) UCL	402000	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	1	32	3	ug/kg	990	990	350	23000	RSB-24	1.8	3	2570	3210	8220	99% Chebyshev (Mean, Sd) UCL	990	Maximum Result
4-Chloro-3-methylphenol	2	32	6	ug/kg	2000	7200	350	23000	RSB-18	3	4	2610	3210	8250	99% Chebyshev (Mean, Sd) UCL	7200	Maximum Result
4-Methylphenol	3	32	9	ug/kg	1500	3600	350	23000	RSB-18	3	4	2360	3000	7630	99% Chebyshev (Mean, Sd) UCL	3600	Maximum Result
Acenaphthene	6	32	19	ug/kg	2500	10000	350	23000	RSB-20	1.5	2.5	2540	3290	8320	99% Chebyshev (Mean, Sd) UCL	8320	99% Chebyshev (Mean, Sd) UCL
Acetophenone	1	32	3	ug/kg	14000	14000	350	14000	RSB-21	4	5	2650	3450	8730	99% Chebyshev (Mean, Sd) UCL	8730	99% Chebyshev (Mean, Sd) UCL
Anthracene	3	32	9	ug/kg	77	1100	350	23000	RSB-24	1.8	3	2570	3210	8220	99% Chebyshev (Mean, Sd) UCL	1100	Maximum Result
Benzo(a)anthracene	3	32	9	ug/kg	150	550	350	23000	RSB-24	1.8	3	2560	3210	8210	99% Chebyshev (Mean, Sd) UCL	550	Maximum Result
Benzo(a)pyrene	2	32	6	ug/kg	130	500	350	23000	RSB-08	4	5	2580	3200	8210	99% Chebyshev (Mean, Sd) UCL	500	Maximum Result
Benzo(b)fluoranthene	2	32	6	ug/kg	110	420	350	23000	RSB-08	4	5	2580	3210	8220	99% Chebyshev (Mean, Sd) UCL	420	Maximum Result
Benzo(g,h,i)perylene	1	32	3	ug/kg	430	430	350	23000	RSB-08	4	5	2580	3200	8210	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Benzo(k)fluoranthene	2	32	6	ug/kg	130	430	350	23000	RSB-08	4	5	2580	3210	8210	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Benzyl butyl phthalate	1	32	3	ug/kg	7600	7600	350	23000	RSB-24	1.8	3	2780	3320	8610	99% Chebyshev (Mean, Sd) UCL	7600	Maximum Result
Biphenyl (diphenyl)	7	32	22	ug/kg	1600	7100	350	23000	RSB-18	6	7	2230	2960	7430	99% Chebyshev (Mean, Sd) UCL	7100	Maximum Result
bis(2-Ethylhexyl)phthalate	6	32	19	ug/kg	2800	13000	350	23000	RSB-20	1.5	2.5	2630	3540	8860	99% Chebyshev (Mean, Sd) UCL	8860	99% Chebyshev (Mean, Sd) UCL
Caprolactam	1	32	3	ug/kg	95	95	350	23000	RSB-10	1	2	2570	3210	8220	99% Chebyshev (Mean, Sd) UCL	95	Maximum Result
Carbazole	1	32	3	ug/kg	1100	1100	350	23000	RSB-24	1.8	3	2570	3210	8220	99% Chebyshev (Mean, Sd) UCL	1100	Maximum Result

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Chrysene	5	32	16	ug/kg	120	3500	350	23000	RSB-18	6	7	2460	3110	7930	99% Chebyshev (Mean, Sd) UCL	3500	Maximum Result
Dibenz(a,h)anthracene	1	32	3	ug/kg	120	120	350	23000	RSB-08	4	5	2570	3210	8220	99% Chebyshev (Mean, Sd) UCL	120	Maximum Result
Dibenzofuran	3	32	9	ug/kg	2000	4100	350	23000	RSB-20	1.5	2.5	2420	3050	7780	99% Chebyshev (Mean, Sd) UCL	4100	Maximum Result
Di-n-butyl phthalate	2	32	6	ug/kg	530	2900	350	23000	RSB-20	1.5	2.5	2460	3160	8010	99% Chebyshev (Mean, Sd) UCL	2900	Maximum Result
Fluoranthene	10	32	31	ug/kg	77	5900	380	14000	RSB-21	4	5	2360	2670	7050	99% Chebyshev (Mean, Sd) UCL	5900	Maximum Result
Fluorene	7	32	22	ug/kg	2400	9700	350	23000	RSB-18	6	7	2420	3230	8100	99% Chebyshev (Mean, Sd) UCL	8100	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	1	32	3	ug/kg	440	440	350	23000	RSB-08	4	5	2580	3200	8210	99% Chebyshev (Mean, Sd) UCL	440	Maximum Result
Naphthalene	11	32	34	ug/kg	13000	80000	350	13000	RSB-20	1.5	2.5	13000	21600	51000	99% Chebyshev (Mean, Sd) UCL	51000	99% Chebyshev (Mean, Sd) UCL
Pentachlorophenol	1	32	3	ug/kg	6700	6700	870	58000	RSB-23	4.75	6	6170	7900	20100	99% Chebyshev (Mean, Sd) UCL	6700	Maximum Result
Phenanthrene	13	32	41	ug/kg	88	33000	350	13000	RSB-18	6	7	3670	6500	15100	99% Chebyshev (Mean, Sd) UCL	15100	99% Chebyshev (Mean, Sd) UCL
Pyrene	10	32	31	ug/kg	95	9600	350	14000	RSB-18	6	7	2360	2810	7300	99% Chebyshev (Mean, Sd) UCL	7300	99% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	3	31	10	ug/kg	7	81	10	17	RSB-24	1.8	3	10.3	16.3	23.1	95% Chebyshev (Mean, Sd) UCL	23.1	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	12	31	39	ug/kg	5	14000	10	17	RSB-18	3	4	1150	3440	7300	99% Chebyshev (Mean, Sd) UCL	7300	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	5	31	16	ug/kg	6	240	10	17	RSB-24	1.8	3	17.9	44.3	52.6	95% Chebyshev (Mean, Sd) UCL	52.6	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	2	31	6	ug/kg	13	220	10	17	RSB-24	1.8	3	13.2	38.4	43.3	95% Chebyshev (Mean, Sd) UCL	43.3	95% Chebyshev (Mean, Sd) UCL
Acetone	22	31	71	ug/kg	30	860	10	130	RSB-24	1.8	3	138	183	209	95% Approximate Gamma UCL	209	95% Approximate Gamma UCL
Benzene	10	31	32	ug/kg	25	3500	10	1300	RSB-24	1.8	3	244	660	1420	99% Chebyshev (Mean, Sd) UCL	1420	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	10	31	32	ug/kg	3	14	10	16	RSB-12	4	5	5.98	2.07	6.61	95% Student's-t UCL	6.61	95% Student's-t UCL
Chlorobenzene	10	31	32	ug/kg	44	19000	10	17	RSB-42	4	5	788	3420	6890	99% Chebyshev (Mean, Sd) UCL	6890	99% Chebyshev (Mean, Sd) UCL
Chloroethane	7	31	23	ug/kg	7	75	10	16	RSB-21	1	1.5	9.06	12.5	18.8	95% Chebyshev (Mean, Sd) UCL	18.8	95% Chebyshev (Mean, Sd) UCL
Chloromethane	1	31	3	ug/kg	480	480	10	17	RSB-19	1	2	21.4	85.1	88	95% Chebyshev (Mean, Sd) UCL	88	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	13	31	42	ug/kg	3	240000	10	17	RSB-24	1.8	3	16200	53800	134000	95% Hall's Bootstrap UCL	134000	95% Hall's Bootstrap UCL
Cyclohexane	11	31	35	ug/kg	7	3300	10	1300	RSB-21	1	1.5	481	1060	2380	99% Chebyshev (Mean, Sd) UCL	2380	99% Chebyshev (Mean, Sd) UCL
Ethylbenzene	12	31	39	ug/kg	3	110000	10	17	RSB-22	5	6	14100	28100	25200	95% Hall's Bootstrap UCL	25200	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	12	31	39	ug/kg	31	20000	10	17	RSB-23	4.75	6	3600	6180	14700	99% Chebyshev (Mean, Sd) UCL	14700	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	10	31	32	ug/kg	14	570	10	36	RSB-24	1.8	3	55.6	126	281	99% Chebyshev (Mean, Sd) UCL	281	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	2	31	6	ug/kg	3900	11000	10	17	RSB-18	3	4	486	2070	4190	99% Chebyshev (Mean, Sd) UCL	4190	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	1	31	3	ug/kg	4	4	10	17	RSB-22	2	3	6.06	0.901	6.34	95% Student's-t UCL	4	Maximum Result
Methylcyclohexane	12	31	39	ug/kg	43	78000	10	17	RSB-22	5	6	7110	16500	16200	95% Hall's Bootstrap UCL	16200	95% Hall's Bootstrap UCL
Methylene chloride	10	31	32	ug/kg	4	15	10	16	RSB-23	4.75	6	7.66	3.27	8.66	95% Student's-t UCL	8.66	95% Student's-t UCL
Styrene	1	31	3	ug/kg	980	980	10	17	RSB-20	1.5	2.5	37.5	175	174	95% Chebyshev (Mean, Sd) UCL	174	95% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	12	31	39	ug/kg	4	1400	10	17	RSB-23	4.75	6	62.9	250	509	99% Chebyshev (Mean, Sd) UCL	509	99% Chebyshev (Mean, Sd) UCL
Toluene	13	31	42	ug/kg	3	1600000	10	16	RSB-23	4.75	6	2.08	320000	494000	95% Hall's Bootstrap UCL	494000	95% Hall's Bootstrap UCL
trans-1,2-Dichloroethene	10	31	32	ug/kg	3	1200	10	17	RSB-24	1.8	3	80.3	251	529	99% Chebyshev (Mean, Sd) UCL	529	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	12	31	39	ug/kg	4	7300	10	17	RSB-23	4.75	6	290	1310	2630	99% Chebyshev (Mean, Sd) UCL	2630	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	8	31	26	ug/kg	43	2200	10	17	RSB-22	2	3	138	423	895	99% Chebyshev (Mean, Sd) UCL	895	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	11	31	35	ug/kg	50	640000	10	17	RSB-24	1.8	3	83600	172000	140000	95% Hall's Bootstrap UCL	140000	95% Hall's Bootstrap UCL
Dioxins/Furans																	
1,2,3,4,6,7,8-HpCDD	4	4	100	ng/kg	0.706	1100	NA	NA	RSB-18	3	4	409	479	972	95% Student's-t UCL	972	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	3	4	75	ng/kg	42.1	178	0.379	0.379	RSB-18	3	4	70.1	76.2	160	95% Student's-t UCL	160	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	2	4	50	ng/kg	4.25	8.51	0.417	2.49	RSB-18	3	4	3.55	3.72	7.93	95% Student's-t UCL	7.93	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	3	4	75	ng/kg	1.75	16.4	0.383	0.383	RSB-18	3	4	5.03	7.62	51.7	95% Approximate Gamma UCL	16.4	Maximum Result
1,2,3,4,7,8-HxCDF	1	4	25	ng/kg	2.46	2.46	0.319	2.28	RSB-12	1	2	1.09	0.998	2.26	95% Student's-t UCL	2.26	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	3	4	75	ng/kg	6.63	73.5	0.371	0.371	RSB-18	3	4	22.8	34.1	270	95% Approximate Gamma UCL	73.5	Maximum Result
1,2,3,6,7,8-HxCDF	3	4	75	ng/kg	2.18	16.8	0.511	0.511	RSB-18	3	4	6.34	7.39	15	95% Student's-t UCL	15	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	3	4	75	ng/kg	2.59	41.4	0.318	0.318	RSB-18	3	4	11.9	19.7	143	95% Approximate Gamma UCL	41.4	Maximum Result
1,2,3,7,8,9-HxCDF	2	4	50	ng/kg	1.17	8.75	0.496	1.1	RSB-18	3	4	2.68	4.07	25.3	95% Approximate Gamma UCL	8.75	Maximum Result
1,2,3,7,8-PeCDD	2	4	50	ng/kg	1.03	15.3	0.625	1.38	RSB-18	3	4	4.33	7.32	47	95% Approximate Gamma UCL	15.3	Maximum Result
2,3,4,6,7,8-HxCDF	3	4	75	ng/kg	1.57	16.9	0.282	0.282	RSB-18	3	4	6.15	7.59	15.1	95% Student's-t UCL	15.1	95% Student's-t UCL
2,3,4,7,8-PeCDF	3	4	75	ng/kg	5.55	42.4	0.349	0.349	RSB-18	3	4	13.9	19.2	36.6	95% Student's-t UCL	36.6	95% Student's-t UCL
2,3,7,8-TCDF	1	4	25	ng/kg	5.36	5.36	0.316	2.22	RSB-18	3	4	1.77	2.42	4.63	95% Student's-t UCL	4.63	95% Student's-t UCL
OCDD	3	4	75	ng/kg	2130	8420	3.47	3.47	RSB-18	3	4	3900	3650	8200	95% Student's-t UCL	8200	95% Student's-t UCL
OCDF	3	4	75	ng/kg	31.1	354	0.519	0.519	RSB-18	3	4	136	161	325	95% Student's-t UCL	325	95% Student's-t UCL

Parking Lot - Shallow

Metals																	
Aluminum	3	3	100	mg/kg	7980	13500	NA	NA	RSB-33	1.5	2.5	NA	2760	NA		13500	Maximum Result
Antimony	3	3	100	mg/kg	3.4	216	NA	NA	RSB-33	1.5	2.5	NA	123	NA		216	Maximum Result

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Arsenic	3	3	100	mg/kg	6.4	20	NA	NA	RSB-33	1.5	2.5	NA	7.22	NA		20	Maximum Result
Barium	3	3	100	mg/kg	313	3800	NA	NA	RSB-33	1.5	2.5	NA	1980	NA		3800	Maximum Result
Beryllium	3	3	100	mg/kg	0.29	0.92	NA	NA	RSB-33	1.5	2.5	NA	0.353	NA		0.92	Maximum Result
Cadmium	3	3	100	mg/kg	0.81	11.1	NA	NA	RSB-32	2	3	NA	5.22	NA		11.1	Maximum Result
Chromium	3	3	100	mg/kg	51.3	102	NA	NA	RSB-32	2	3	NA	25.4	NA		102	Maximum Result
Cobalt	3	3	100	mg/kg	5.8	15.1	NA	NA	RSB-32	2	3	NA	4.7	NA		15.1	Maximum Result
Copper	3	3	100	mg/kg	108	418	NA	NA	RSB-33	1.5	2.5	NA	163	NA		418	Maximum Result
Iron	3	3	100	mg/kg	26600	74500	NA	NA	RSB-33	1.5	2.5	NA	26100	NA		74500	Maximum Result
Lead	3	3	100	mg/kg	1000	2170	NA	NA	RSB-31	1.8	3	NA	639	NA		2170	Maximum Result
Manganese	3	3	100	mg/kg	269	1110	NA	NA	RSB-33	1.5	2.5	NA	443	NA		1110	Maximum Result
Nickel	3	3	100	mg/kg	25.8	72.1	NA	NA	RSB-32	2	3	NA	24	NA		72.1	Maximum Result
Selenium	3	3	100	mg/kg	1.7	4.6	NA	NA	RSB-33	1.5	2.5	NA	1.55	NA		4.6	Maximum Result
Silver	3	3	100	mg/kg	0.7	1.1	NA	NA	RSB-33	1.5	2.5	NA	0.225	NA		1.1	Maximum Result
Thallium	3	3	100	mg/kg	1.1	4.9	NA	NA	RSB-33	1.5	2.5	NA	2.11	NA		4.9	Maximum Result
Vanadium	3	3	100	mg/kg	31.2	64.2	NA	NA	RSB-33	1.5	2.5	NA	17.9	NA		64.2	Maximum Result
Zinc	3	3	100	mg/kg	557	8030	NA	NA	RSB-33	1.5	2.5	NA	4270	NA		8030	Maximum Result
Pesticides/PCBs																	
4,4'-DDD	2	3	67	ug/kg	3.7	9.9	4.5	4.5	RSB-32	2	3	NA	4.06	NA		9.9	Maximum Result
4,4'-DDE	2	3	67	ug/kg	3.1	3.5	4.5	4.5	RSB-32	2	3	NA	0.638	NA		3.5	Maximum Result
4,4'-DDT	2	3	67	ug/kg	3	9.5	4.5	4.5	RSB-32	2	3	NA	3.99	NA		9.5	Maximum Result
Endrin	1	3	33	ug/kg	5.5	5.5	4	4.5	RSB-33	1.5	2.5	NA	1.95	NA		5.5	Maximum Result
Endrin ketone	2	3	67	ug/kg	2.4	14	4.5	4.5	RSB-33	1.5	2.5	NA	6.74	NA		14	Maximum Result
gamma-Chlordane	1	3	33	ug/kg	1.7	1.7	1.9	2.3	RSB-32	2	3	NA	0.388	NA		1.7	Maximum Result
Methoxychlor	1	3	33	ug/kg	9.9	9.9	20	23	RSB-33	1.5	2.5	NA	0.896	NA		9.9	Maximum Result
SVOCs/VOCs																	
1,4-Dioxane (p-dioxane)	3	3	100	ug/kg	280	340	NA	NA	RSB-31	1.8	3	NA	30.6	NA		340	Maximum Result
2-Methylnaphthalene	1	3	33	ug/kg	170	170	450	800	RSB-33	1.5	2.5	NA	120	NA		170	Maximum Result
Acenaphthylene	2	3	67	ug/kg	260	690	450	450	RSB-32	2	3	NA	259	NA		690	Maximum Result
Anthracene	2	3	67	ug/kg	240	860	450	450	RSB-32	2	3	NA	362	NA		860	Maximum Result
Benzo(a)anthracene	2	3	67	ug/kg	1000	1300	450	450	RSB-33	1.5	2.5	NA	555	NA		1300	Maximum Result
Benzo(a)pyrene	2	3	67	ug/kg	1000	2600	450	450	RSB-33	1.5	2.5	NA	1210	NA		2600	Maximum Result
Benzo(b)fluoranthene	1	3	33	ug/kg	1700	1700	450	720	RSB-33	1.5	2.5	NA	815	NA		1700	Maximum Result
Benzo(g,h,i)perylene	1	3	33	ug/kg	2300	2300	450	510	RSB-33	1.5	2.5	NA	1190	NA		2300	Maximum Result
Benzo(k)fluoranthene	1	3	33	ug/kg	1500	1500	450	850	RSB-33	1.5	2.5	NA	686	NA		1500	Maximum Result
Biphenyl (diphenyl)	1	3	33	ug/kg	160	160	380	450	RSB-32	2	3	NA	32.5	NA		160	Maximum Result
Chrysene	2	3	67	ug/kg	1300	1800	450	450	RSB-33	1.5	2.5	NA	805	NA		1800	Maximum Result
Fluoranthene	2	3	67	ug/kg	2700	3000	450	450	RSB-32	2	3	NA	1520	NA		3000	Maximum Result
Fluorene	1	3	33	ug/kg	500	500	380	450	RSB-32	2	3	NA	170	NA		500	Maximum Result
Indeno(1,2,3-c,d)pyrene	1	3	33	ug/kg	2300	2300	450	630	RSB-33	1.5	2.5	NA	1170	NA		2300	Maximum Result
Naphthalene	2	3	67	ug/kg	160	160	450	450	RSB-32	2	3	NA	37.5	NA		160	Maximum Result
Phenanthrene	2	3	67	ug/kg	1000	4400	450	450	RSB-32	2	3	NA	2220	NA		4400	Maximum Result
Pyrene	2	3	67	ug/kg	3600	4400	450	450	RSB-33	1.5	2.5	NA	2220	NA		4400	Maximum Result
Acetone	2	3	67	ug/kg	25	50	14	14	RSB-33	1.5	2.5	NA	21.6	NA		50	Maximum Result
cis-1,2-Dichloroethene	1	3	33	ug/kg	2	2	12	14	RSB-33	1.5	2.5	NA	2.65	NA		2	Maximum Result
Methyl ethyl ketone	1	3	33	ug/kg	21	21	12	14	RSB-33	1.5	2.5	NA	8.39	NA		21	Maximum Result
Methylene chloride	2	3	67	ug/kg	2	4	12	12	RSB-31	1.8	3	NA	2	NA		4	Maximum Result
Toluene	1	3	33	ug/kg	9	9	12	14	RSB-33	1.5	2.5	NA	1.53	NA		9	Maximum Result
Xylenes, total	1	3	33	ug/kg	5	5	12	14	RSB-33	1.5	2.5	NA	1	NA		5	Maximum Result
Dioxins/Furans																	
1,2,3,4,6,7,8-HpCDD	3	3	100	ng/kg	4.49	35.1	NA	NA	RSB-33	1.5	2.5	NA	15.9	NA		35.1	Maximum Result
1,2,3,4,6,7,8-HpCDF	3	3	100	ng/kg	2.89	30.8	NA	NA	RSB-33	1.5	2.5	NA	15.4	NA		30.8	Maximum Result
1,2,3,4,7,8,9-HpCDF	2	3	67	ng/kg	0.892	2.83	0.984	0.984	RSB-33	1.5	2.5	NA	1.25	NA		2.83	Maximum Result
1,2,3,4,7,8-HxCDD	1	3	33	ng/kg	2.83	2.83	0.423	0.545	RSB-33	1.5	2.5	NA	1.49	NA		2.83	Maximum Result
1,2,3,4,7,8-HxCDF	2	3	67	ng/kg	3.23	17.4	0.502	0.502	RSB-33	1.5	2.5	NA	9.16	NA		17.4	Maximum Result
1,2,3,6,7,8-HxCDD	3	3	100	ng/kg	0.943	5.59	NA	NA	RSB-33	1.5	2.5	NA	2.66	NA		5.59	Maximum Result
1,2,3,6,7,8-HxCDF	2	3	67	ng/kg	3.18	11.3	0.412	0.412	RSB-33	1.5	2.5	NA	5.74	NA		11.3	Maximum Result
1,2,3,7,8,9-HxCDD	1	3	33	ng/kg	3.75	3.75	0.423	0.473	RSB-33	1.5	2.5	NA	2.04	NA		3.75	Maximum Result
1,2,3,7,8,9-HxCDF	2	3	67	ng/kg	1.01	3.79	0.416	0.416	RSB-33	1.5	2.5	NA	1.88	NA		3.79	Maximum Result
1,2,3,7,8-PeCDD	2	3	67	ng/kg	1.76	3.37	0.603	0.603	RSB-33	1.5	2.5	NA	1.53	NA		3.37	Maximum Result

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
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Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
1,2,3,7,8-PeCDF	2	3	67	ng/kg	3.71	3.91	0.397	0.397	RSB-33	1.5	2.5	NA	2.09	NA		3.91	Maximum Result
2,3,4,6,7,8-HxCDF	3	3	100	ng/kg	0.724	15.5	NA	NA	RSB-33	1.5	2.5	NA	7.86	NA		15.5	Maximum Result
2,3,4,7,8-PeCDF	2	3	67	ng/kg	4.86	33.2	0.444	0.444	RSB-33	1.5	2.5	NA	17.9	NA		33.2	Maximum Result
2,3,7,8-TCDD	1	3	33	ng/kg	0.898	0.898	0.833	0.872	RSB-33	1.5	2.5	NA	0.273	NA		0.898	Maximum Result
2,3,7,8-TCDF	2	3	67	ng/kg	6.68	8.22	0.901	0.901	RSB-33	1.5	2.5	NA	4.11	NA		8.22	Maximum Result
OCDD	3	3	100	ng/kg	6.57	357	NA	NA	RSB-32	2	3	NA	176	NA		357	Maximum Result
OCDF	2	3	67	ng/kg	4.95	18.8	1.65	1.65	RSB-33	1.5	2.5	NA	9.42	NA		18.8	Maximum Result
Parking Lot - Deep																	
Metals																	
Aluminum	6	6	100	mg/kg	7130	14900	NA	NA	RSB-32	5	6	10300	3270	13000	95% Student's-t UCL	13000	95% Student's-t UCL
Antimony	4	6	67	mg/kg	3.4	216	12	12	RSB-33	1.5	2.5	39.8	86.3	391	99% Chebyshev (Mean, Sd) UCL	216	Maximum Result
Arsenic	6	6	100	mg/kg	2.3	20	NA	NA	RSB-33	1.5	2.5	7.33	6.7	12.8	95% Student's-t UCL	12.8	95% Student's-t UCL
Barium	6	6	100	mg/kg	80.2	3800	NA	NA	RSB-33	1.5	2.5	816	1470	3500	95% Approximate Gamma UCL	3500	95% Approximate Gamma UCL
Beryllium	6	6	100	mg/kg	0.22	0.92	NA	NA	RSB-33	1.5	2.5	0.398	0.261	0.674	95% Approximate Gamma UCL	0.674	95% Approximate Gamma UCL
Cadmium	6	6	100	mg/kg	0.2	11.1	NA	NA	RSB-32	2	3	2.91	4.31	12.6	95% Approximate Gamma UCL	11.1	Maximum Result
Chromium	6	6	100	mg/kg	32.5	102	NA	NA	RSB-32	2	3	58.4	26.3	80.1	95% Student's-t UCL	80.1	95% Student's-t UCL
Cobalt	6	6	100	mg/kg	5.3	15.1	NA	NA	RSB-32	2	3	7.9	3.82	11.9	95% Approximate Gamma UCL	11.9	95% Approximate Gamma UCL
Copper	6	6	100	mg/kg	11.5	418	NA	NA	RSB-33	1.5	2.5	163	175	307	95% Student's-t UCL	307	95% Student's-t UCL
Iron	6	6	100	mg/kg	12200	74500	NA	NA	RSB-33	1.5	2.5	30900	22500	57400	95% Approximate Gamma UCL	57400	95% Approximate Gamma UCL
Lead	6	6	100	mg/kg	3.6	2170	NA	NA	RSB-31	1.8	3	751	854	1450	95% Student's-t UCL	1450	95% Student's-t UCL
Manganese	6	6	100	mg/kg	156	1110	NA	NA	RSB-33	1.5	2.5	423	352	857	95% Approximate Gamma UCL	857	95% Approximate Gamma UCL
Nickel	6	6	100	mg/kg	25	72.1	NA	NA	RSB-32	2	3	42	20.3	58.7	95% Student's-t UCL	58.7	95% Student's-t UCL
Selenium	6	6	100	mg/kg	0.94	4.6	NA	NA	RSB-33	1.5	2.5	2.06	1.31	3.53	95% Approximate Gamma UCL	3.53	95% Approximate Gamma UCL
Silver	6	6	100	mg/kg	0.13	1.1	NA	NA	RSB-33	1.5	2.5	0.515	0.385	0.832	95% Student's-t UCL	0.832	95% Student's-t UCL
Thallium	6	6	100	mg/kg	0.41	4.9	NA	NA	RSB-33	1.5	2.5	1.57	1.67	3.81	95% Approximate Gamma UCL	3.81	95% Approximate Gamma UCL
Vanadium	6	6	100	mg/kg	25.7	64.2	NA	NA	RSB-33	1.5	2.5	37.6	14.4	49.5	95% Student's-t UCL	49.5	95% Student's-t UCL
Zinc	6	6	100	mg/kg	28.2	8030	NA	NA	RSB-33	1.5	2.5	1600	3160	19400	95% Adjusted Gamma UCL	8030	Maximum Result
Pesticides/PCBs																	
4,4'-DDD	3	6	50	ug/kg	3.7	65	3.9	4.5	RSB-33	4.5	5.5	14.1	25.1	60.8	95% Approximate Gamma UCL	60.8	95% Approximate Gamma UCL
4,4'-DDE	3	6	50	ug/kg	3.1	26	3.9	4.5	RSB-33	4.5	5.5	6.46	9.59	23.5	95% Chebyshev (Mean, Sd) UCL	23.5	95% Chebyshev (Mean, Sd) UCL
4,4'-DDT	3	6	50	ug/kg	2.6	9.5	3.9	4.5	RSB-32	2	3	3.54	2.95	8.79	95% Chebyshev (Mean, Sd) UCL	8.79	95% Chebyshev (Mean, Sd) UCL
Dieldrin	1	6	17	ug/kg	10	10	3.8	4.5	RSB-33	4.5	5.5	3.34	3.26	9.15	95% Chebyshev (Mean, Sd) UCL	9.15	95% Chebyshev (Mean, Sd) UCL
Endrin	1	6	17	ug/kg	5.5	5.5	1.8	4.5	RSB-33	1.5	2.5	2.43	1.58	4.27	95% Approximate Gamma UCL	4.27	95% Approximate Gamma UCL
Endrin ketone	3	6	50	ug/kg	2.4	14	3.9	4.5	RSB-33	1.5	2.5	4.73	4.78	13.2	95% Chebyshev (Mean, Sd) UCL	13.2	95% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	2	6	33	ug/kg	1.1	1.7	1.9	2.3	RSB-32	2	3	1.15	0.279	1.41	95% Approximate Gamma UCL	1.41	95% Approximate Gamma UCL
Methoxychlor	1	6	17	ug/kg	9.9	9.9	20	23	RSB-33	1.5	2.5	10.2	0.622	10.7	95% Student's-t UCL	9.9	Maximum Result
SVOCs/VOCs																	
1,4-Dioxane (p-dioxane)	6	6	100	ug/kg	280	340	NA	NA	RSB-31	1.8	3	302	20.4	318	95% Student's-t UCL	318	95% Student's-t UCL
2-Methylnaphthalene	2	6	33	ug/kg	170	2100	390	800	RSB-33	4.5	5.5	548	765	1910	95% Chebyshev (Mean, Sd) UCL	1910	95% Chebyshev (Mean, Sd) UCL
Acenaphthylene	3	6	50	ug/kg	260	1200	390	450	RSB-33	4.5	5.5	461	409	NA	95% H-UCL	1200	Maximum Result
Anthracene	3	6	50	ug/kg	240	940	390	450	RSB-33	4.5	5.5	443	356	1080	95% Chebyshev (Mean, Sd) UCL	940	Maximum Result
Benzo(a)anthracene	3	6	50	ug/kg	1000	4300	390	450	RSB-33	4.5	5.5	1200	1590	4140	95% Approximate Gamma UCL	4140	95% Approximate Gamma UCL
Benzo(a)pyrene	3	6	50	ug/kg	1000	8900	390	450	RSB-33	4.5	5.5	2190	3420	9750	95% Approximate Gamma UCL	8900	Maximum Result
Benzo(b)fluoranthene	2	6	33	ug/kg	1700	5600	390	720	RSB-33	4.5	5.5	1380	2150	5610	95% Approximate Gamma UCL	5600	Maximum Result
Benzo(g,h,i)perylene	2	6	33	ug/kg	2300	9000	390	510	RSB-33	4.5	5.5	2030	3520	16300	99% Chebyshev (Mean, Sd) UCL	9000	Maximum Result
Benzo(k)fluoranthene	2	6	33	ug/kg	1500	3500	390	850	RSB-33	4.5	5.5	1010	1320	3400	95% Approximate Gamma UCL	3400	95% Approximate Gamma UCL
Biphenyl (diphenyl)	1	6	17	ug/kg	160	160	380	770	RSB-32	2	3	225	81.1	303	95% Approximate Gamma UCL	160	Maximum Result
Chrysene	3	6	50	ug/kg	1300	6500	390	450	RSB-33	4.5	5.5	1700	2450	6740	95% Approximate Gamma UCL	6500	Maximum Result
Dibenz(a,h)anthracene	1	6	17	ug/kg	1100	1100	380	800	RSB-33	4.5	5.5	384	360	1020	95% Chebyshev (Mean, Sd) UCL	1020	95% Chebyshev (Mean, Sd) UCL
Fluoranthene	4	6	67	ug/kg	81	12000	390	450	RSB-33	4.5	5.5	3030	4590	30800	95% Adjusted Gamma UCL	12000	Maximum Result
Fluorene	1	6	17	ug/kg	500	500	380	770	RSB-32	2	3	282	130	423	95% Approximate Gamma UCL	423	95% Approximate Gamma UCL
Indeno(1,2,3-c,d)pyrene	2	6	33	ug/kg	2300	8300	390	630	RSB-33	4.5	5.5	1920	3230	15100	99% Chebyshev (Mean, Sd) UCL	8300	Maximum Result
Naphthalene	3	6	50	ug/kg	160	870	390	450	RSB-33	4.5	5.5	301	280	799	95% Chebyshev (Mean, Sd) UCL	799	95% Chebyshev (Mean, Sd) UCL
Phenanthrene	3	6	50	ug/kg	1000	4400	390	450	RSB-32	2	3	1740	2090	6770	95% Approximate Gamma UCL	4400	Maximum Result
Pyrene	3	6	50	ug/kg	3600	16000	390	450	RSB-33	4.5	5.5	4100	6120	41500	95% Adjusted Gamma UCL	16000	Maximum Result
Acetone	4	6	67	ug/kg	11	50	12	14	RSB-33	1.5	2.5	20.3	16.6	34	95% Student's-t UCL	34	95% Student's-t UCL
cis-1,2-Dichloroethene	1	6	17	ug/kg	2	2	12	14	RSB-33	1.5	2.5	5.5	1.76	6.95	95% Student's-t UCL	2	Maximum Result

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Methyl ethyl ketone	1	6	17	ug/kg	21	21	12	14	RSB-33	1.5	2.5	8.67	6.06	19.4	95% Chebyshev (Mean, Sd) UCL	19.4	95% Chebyshev (Mean, Sd) UCL
Methylene chloride	2	6	33	ug/kg	2	4	12	12	RSB-31	1.8	3	5	1.67	6.38	95% Student's-t UCL	4	Maximum Result
Toluene	2	6	33	ug/kg	3	9	12	14	RSB-33	1.5	2.5	6.17	1.94	7.76	95% Student's-t UCL	7.76	95% Student's-t UCL
Xylenes, total	1	6	17	ug/kg	5	5	12	14	RSB-33	1.5	2.5	6	0.632	6.52	95% Student's-t UCL	5	Maximum Result
Dioxins/Furans																	
1,2,3,4,6,7,8-HpCDD	3	3	100	ng/kg	4.49	35.1	NA	NA	RSB-33	1.5	2.5	NA	15.9	NA		35.1	Maximum Result
1,2,3,4,6,7,8-HpCDF	3	3	100	ng/kg	2.89	30.8	NA	NA	RSB-33	1.5	2.5	NA	15.4	NA		30.8	Maximum Result
1,2,3,4,7,8,9-HpCDF	2	3	67	ng/kg	0.892	2.83	0.984	0.984	RSB-33	1.5	2.5	NA	1.25	NA		2.83	Maximum Result
1,2,3,4,7,8-HxCDD	1	3	33	ng/kg	2.83	2.83	0.423	0.545	RSB-33	1.5	2.5	NA	1.49	NA		2.83	Maximum Result
1,2,3,4,7,8-HxCDF	2	3	67	ng/kg	3.23	17.4	0.502	0.502	RSB-33	1.5	2.5	NA	9.16	NA		17.4	Maximum Result
1,2,3,6,7,8-HxCDD	3	3	100	ng/kg	0.943	5.59	NA	NA	RSB-33	1.5	2.5	NA	2.66	NA		5.59	Maximum Result
1,2,3,6,7,8-HxCDF	2	3	67	ng/kg	3.18	11.3	0.412	0.412	RSB-33	1.5	2.5	NA	5.74	NA		11.3	Maximum Result
1,2,3,7,8,9-HxCDD	1	3	33	ng/kg	3.75	3.75	0.423	0.473	RSB-33	1.5	2.5	NA	2.04	NA		3.75	Maximum Result
1,2,3,7,8,9-HxCDF	2	3	67	ng/kg	1.01	3.79	0.416	0.416	RSB-33	1.5	2.5	NA	1.88	NA		3.79	Maximum Result
1,2,3,7,8-PeCDD	2	3	67	ng/kg	1.76	3.37	0.603	0.603	RSB-33	1.5	2.5	NA	1.53	NA		3.37	Maximum Result
1,2,3,7,8-PeCDF	2	3	67	ng/kg	3.71	3.91	0.397	0.397	RSB-33	1.5	2.5	NA	2.09	NA		3.91	Maximum Result
2,3,4,6,7,8-HxCDF	3	3	100	ng/kg	0.724	15.5	NA	NA	RSB-33	1.5	2.5	NA	7.86	NA		15.5	Maximum Result
2,3,4,7,8-PeCDF	2	3	67	ng/kg	4.86	33.2	0.444	0.444	RSB-33	1.5	2.5	NA	17.9	NA		33.2	Maximum Result
2,3,7,8-TCDD	1	3	33	ng/kg	0.898	0.898	0.833	0.872	RSB-33	1.5	2.5	NA	0.273	NA		0.898	Maximum Result
2,3,7,8-TCDF	2	3	67	ng/kg	6.68	8.22	0.901	0.901	RSB-33	1.5	2.5	NA	4.11	NA		8.22	Maximum Result
OCDD	3	3	100	ng/kg	6.57	357	NA	NA	RSB-32	2	3	NA	176	NA		357	Maximum Result
OCDF	2	3	67	ng/kg	4.95	18.8	1.65	1.65	RSB-33	1.5	2.5	NA	9.42	NA		18.8	Maximum Result
Large Vacant Lot - Shallow																	
Metals																	
Aluminum	14	14	100	mg/kg	5400	14000	NA	NA	RSB-27	1.8	3	8030	2420	9210	95% Approximate Gamma UCL	9210	95% Approximate Gamma UCL
Antimony	14	14	100	mg/kg	0.26	10.9	NA	NA	RSB-25	1.8	3	2.06	2.77	3.5	95% Approximate Gamma UCL	3.5	95% Approximate Gamma UCL
Arsenic	14	14	100	mg/kg	2.5	53.7	NA	NA	RSB-28	1.8	3	16.4	15.3	26.9	95% Approximate Gamma UCL	26.9	95% Approximate Gamma UCL
Barium	14	14	100	mg/kg	102	1990	NA	NA	RSB-36	2	3	354	500	937	95% Chebyshev (Mean, Sd) UCL	937	95% Chebyshev (Mean, Sd) UCL
Beryllium	14	14	100	mg/kg	0.23	0.44	NA	NA	RSB-36	2	3	0.276	0.0567	0.303	95% Student's-t UCL	0.303	95% Student's-t UCL
Cadmium	13	14	93	mg/kg	0.13	5.7	1	1	RSB-26	1.8	3	0.789	1.43	2.45	95% Chebyshev (Mean, Sd) UCL	2.45	95% Chebyshev (Mean, Sd) UCL
Chromium	14	14	100	mg/kg	22.9	348	NA	NA	RSB-01	2	3	98.1	89.7	154	95% Approximate Gamma UCL	154	95% Approximate Gamma UCL
Cobalt	14	14	100	mg/kg	3.4	11.3	NA	NA	RSB-27	1.8	3	6.01	2.21	7.06	95% Student's-t UCL	7.06	95% Student's-t UCL
Copper	14	14	100	mg/kg	13.6	409	NA	NA	RSB-25	1.8	3	91.9	105	149	95% Approximate Gamma UCL	149	95% Approximate Gamma UCL
Iron	14	14	100	mg/kg	10100	40200	NA	NA	RSB-01	2	3	19700	9590	24900	95% Approximate Gamma UCL	24900	95% Approximate Gamma UCL
Lead	14	14	100	mg/kg	73.1	5130	NA	NA	RSB-25	1.8	3	685	1380	4360	99% Chebyshev (Mean, Sd) UCL	4360	99% Chebyshev (Mean, Sd) UCL
Manganese	14	14	100	mg/kg	178	528	NA	NA	RSB-27	1.8	3	316	91.6	360	95% Student's-t UCL	360	95% Student's-t UCL
Nickel	14	14	100	mg/kg	17.9	36.3	NA	NA	RSB-26	1.8	3	23.1	5.87	25.8	95% Student's-t UCL	25.8	95% Student's-t UCL
Selenium	6	14	43	mg/kg	1.1	3	7	7	RSB-26	1.8	3	3.03	0.733	3.38	95% Student's-t UCL	3	Maximum Result
Silver	14	14	100	mg/kg	0.095	0.97	NA	NA	RSB-26	1.8	3	0.365	0.259	0.512	95% Approximate Gamma UCL	0.512	95% Approximate Gamma UCL
Thallium	7	14	50	mg/kg	0.36	2.6	5	5	RSB-28	1.8	3	1.76	0.962	2.88	95% Chebyshev (Mean, Sd) UCL	2.6	Maximum Result
Vanadium	14	14	100	mg/kg	17.5	58.3	NA	NA	RSB-27	1.8	3	28.2	9.66	32.6	95% Approximate Gamma UCL	32.6	95% Approximate Gamma UCL
Zinc	14	14	100	mg/kg	43.8	1390	NA	NA	RSB-26	1.8	3	292	334	453	95% Approximate Gamma UCL	453	95% Approximate Gamma UCL
Pesticides/PCBs																	
4,4'-DDD	11	14	79	ug/kg	2.4	11000	3.8	3.8	RSB-27	1.8	3	2190	3530	9090	95% Adjusted Gamma UCL	9090	95% Adjusted Gamma UCL
4,4'-DDE	13	14	93	ug/kg	1.3	8600	3.8	3.8	RSB-27	1.8	3	1330	2640	5260	95% Adjusted Gamma UCL	5260	95% Adjusted Gamma UCL
4,4'-DDT	12	14	86	ug/kg	5.4	140000	3.6	3.8	RSB-27	1.8	3	13000	37300	NA	95% Hall's Bootstrap UCL	140000	Maximum Result
alpha-BHC	1	14	7	ug/kg	6	6	1.8	960	RSB-01	2	3	40.9	127	379	99% Chebyshev (Mean, Sd) UCL	6	Maximum Result
alpha-Chlordane	5	14	36	ug/kg	1.3	81	1.9	960	RSB-26	1.8	3	47.3	127	384	99% Chebyshev (Mean, Sd) UCL	81	Maximum Result
beta-BHC	5	14	36	ug/kg	1.8	24	1.8	960	RSB-25	1.8	3	43.4	126	159	99% Chebyshev (MVUE) UCL	24	Maximum Result
Dieldrin	10	14	71	ug/kg	1.2	86	3.8	1900	RSB-36	2	3	81	251	246	99% Chebyshev (MVUE) UCL	86	Maximum Result
Endosulfan sulfate	1	14	7	ug/kg	4.4	4.4	3.5	1900	RSB-25	1.8	3	81.3	251	750	99% Chebyshev (Mean, Sd) UCL	4.4	Maximum Result
Endrin	3	14	21	ug/kg	0.8	14	3.6	1900	RSB-28	1.8	3	80.7	252	749	99% Chebyshev (Mean, Sd) UCL	14	Maximum Result
Endrin aldehyde	2	14	14	ug/kg	3	4.9	3.5	1900	RSB-40	1.5	2.5	81.4	251	750	99% Chebyshev (Mean, Sd) UCL	4.9	Maximum Result
Endrin ketone	2	14	14	ug/kg	2.3	6.9	3.5	1900	RSB-40	1.5	2.5	81.5	251	750	99% Chebyshev (Mean, Sd) UCL	6.9	Maximum Result
gamma-BHC	3	14	21	ug/kg	13	420	1.8	98	RSB-27	1.8	3	45.7	113	347	99% Chebyshev (Mean, Sd) UCL	347	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	6	14	43	ug/kg	1	83	1.9	960	RSB-26	1.8	3	48.2	126	225	99% Chebyshev (MVUE) UCL	83	Maximum Result
Heptachlor	1	14	7	ug/kg	0.65	0.65	1.8	960	RSB-40	1.5	2.5	41.1	127	379	99% Chebyshev (Mean, Sd) UCL	0.65	Maximum Result

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Heptachlor epoxide	1	14	7	ug/kg	2.8	2.8	1.8	960	RSB-26	1.8	3	41.2	127	379	99% Chebyshev (Mean, Sd) UCL	2.8	Maximum Result
Methoxychlor	1	14	7	ug/kg	7	7	18	9600	RSB-26	1.8	3	411	1270	3790	99% Chebyshev (Mean, Sd) UCL	7	Maximum Result
Aroclor-1260	2	14	14	ug/kg	20	33	35	19000	RSB-34	2	3	812	2510	7500	99% Chebyshev (Mean, Sd) UCL	33	Maximum Result
SVOCs/VOCs																	
1,2-Dichlorobenzene	2	14	14	ug/kg	13	15	11	12	RSB-38	2	3	6.79	3.09	8.25	95% Student's-t UCL	8.25	95% Student's-t UCL
1,4-Dichlorobenzene	1	14	7	ug/kg	2	2	11	12	RSB-38	2	3	5.32	0.973	5.78	95% Student's-t UCL	2	Maximum Result
1,4-Dioxane (p-dioxane)	1	1	100	ug/kg	280	280	NA	NA	RSB-01	2	3	NA	NA	NA		280	Maximum Result
2-Methylnaphthalene	6	14	43	ug/kg	77	4600	370	750	RSB-35	2	3	655	1210	3870	99% Chebyshev (Mean, Sd) UCL	3870	99% Chebyshev (Mean, Sd) UCL
Acetophenone	2	14	14	ug/kg	280	420	350	750	RSB-34	2	3	223	78.6	260	95% Student's-t UCL	260	95% Student's-t UCL
Benzo(a)anthracene	5	14	36	ug/kg	80	1200	350	1100	RSB-40	1.5	2.5	319	291	488	95% H-UCL	488	95% H-UCL
Benzo(a)pyrene	5	14	36	ug/kg	81	1400	350	1100	RSB-40	1.5	2.5	382	363	651	95% H-UCL	651	95% H-UCL
Benzo(b)fluoranthene	4	14	29	ug/kg	130	860	350	1100	RSB-40	1.5	2.5	341	256	640	95% Chebyshev (Mean, Sd) UCL	640	95% Chebyshev (Mean, Sd) UCL
Benzo(g,h,i)perylene	6	14	43	ug/kg	82	1200	350	1100	RSB-40	1.5	2.5	373	332	660	95% H-UCL	660	95% H-UCL
Benzo(k)fluoranthene	4	14	29	ug/kg	150	890	350	1100	RSB-40	1.5	2.5	340	243	623	95% Chebyshev (Mean, Sd) UCL	623	95% Chebyshev (Mean, Sd) UCL
bis(2-Ethylhexyl)phthalate	2	14	14	ug/kg	360	2300	350	1100	RSB-27	1.8	3	415	559	1070	95% Chebyshev (Mean, Sd) UCL	1070	95% Chebyshev (Mean, Sd) UCL
Caprolactam	1	14	7	ug/kg	230	230	350	1100	RSB-35	2	3	229	105	279	95% Student's-t UCL	230	Maximum Result
Chrysene	5	14	36	ug/kg	110	1500	350	1100	RSB-40	1.5	2.5	371	366	797	95% Chebyshev (Mean, Sd) UCL	797	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	3	14	21	ug/kg	100	370	350	1100	RSB-38	2	3	246	140	313	95% Student's-t UCL	313	95% Student's-t UCL
Fluoranthene	6	14	43	ug/kg	89	1800	350	1100	RSB-40	1.5	2.5	393	446	668	95% H-UCL	668	95% H-UCL
Indeno(1,2,3-c,d)pyrene	6	14	43	ug/kg	82	1100	350	1100	RSB-38	2	3	376	348	694	95% H-UCL	694	95% H-UCL
Naphthalene	4	14	29	ug/kg	81	600	350	750	RSB-35	2	3	224	125	283	95% Student's-t UCL	283	95% Student's-t UCL
Phenanthrene	5	14	36	ug/kg	78	440	350	1100	RSB-40	1.5	2.5	273	147	378	95% H-UCL	378	95% H-UCL
Pyrene	7	14	50	ug/kg	120	2900	350	1100	RSB-40	1.5	2.5	500	728	1350	95% Chebyshev (Mean, Sd) UCL	1350	95% Chebyshev (Mean, Sd) UCL
Acetone	4	14	29	ug/kg	53	150	11	78	RSB-41	2.1	3	37.8	45.1	158	99% Chebyshev (Mean, Sd) UCL	150	Maximum Result
Chlorobenzene	1	14	7	ug/kg	49	49	11	12	RSB-01	2	3	8.68	11.6	22.2	95% Chebyshev (Mean, Sd) UCL	22.2	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	4	14	29	ug/kg	3	44	11	12	RSB-38	2	3	8.5	10.3	20.5	95% Chebyshev (Mean, Sd) UCL	20.5	95% Chebyshev (Mean, Sd) UCL
Ethylbenzene	3	14	21	ug/kg	3	45	11	12	RSB-38	2	3	8.11	10.6	20.5	95% Chebyshev (Mean, Sd) UCL	20.5	95% Chebyshev (Mean, Sd) UCL
Isopropylbenzene (cumene)	1	14	7	ug/kg	430	430	11	12	RSB-38	2	3	35.9	113	338	99% Chebyshev (Mean, Sd) UCL	338	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	5	14	36	ug/kg	6	41	11	12	RSB-41	2.1	3	11.3	10.8	23.8	95% Chebyshev (Mean, Sd) UCL	23.8	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	1	14	7	ug/kg	12	12	11	12	RSB-38	2	3	6.04	1.73	6.85	95% Student's-t UCL	6.85	95% Student's-t UCL
Methylcyclohexane	2	14	14	ug/kg	15	440	11	12	RSB-34	2	3	37.3	116	346	99% Chebyshev (Mean, Sd) UCL	346	99% Chebyshev (Mean, Sd) UCL
Methylene chloride	1	14	7	ug/kg	11	11	11	12	RSB-38	2	3	5.96	1.46	6.66	95% Student's-t UCL	6.66	95% Student's-t UCL
Tetrachloroethene	1	14	7	ug/kg	11	11	11	12	RSB-27	1.8	3	5.96	1.46	6.66	95% Student's-t UCL	6.66	95% Student's-t UCL
Toluene	1	14	7	ug/kg	170	170	11	12	RSB-38	2	3	17.3	43.9	68.5	95% Chebyshev (Mean, Sd) UCL	68.5	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	3	14	21	ug/kg	3	4	11	12	RSB-26	1.8	3	5.14	0.842	5.54	95% Student's-t UCL	4	Maximum Result
Xylenes, total	2	14	14	ug/kg	14	370	11	12	RSB-38	2	3	32.2	97.2	291	99% Chebyshev (Mean, Sd) UCL	291	99% Chebyshev (Mean, Sd) UCL
Large Vacant Lot - Deep																	
Metals																	
Aluminum	23	23	100	mg/kg	5400	14000	NA	NA	RSB-27	1.8	3	7530	1990	8240	95% Student's-t UCL	8240	95% Student's-t UCL
Antimony	21	23	91	mg/kg	0.26	10.9	12	12	RSB-25	1.8	3	2.12	2.52	3.48	95% H-UCL	3.48	95% H-UCL
Arsenic	23	23	100	mg/kg	2.5	53.7	NA	NA	RSB-28	1.8	3	12.8	13	18.1	95% Approximate Gamma UCL	18.1	95% Approximate Gamma UCL
Barium	23	23	100	mg/kg	78.5	1990	NA	NA	RSB-36	2	3	291	397	652	95% Chebyshev (Mean, Sd) UCL	652	95% Chebyshev (Mean, Sd) UCL
Beryllium	23	23	100	mg/kg	0.18	0.44	NA	NA	RSB-36	2	3	0.262	0.052	0.281	95% Approximate Gamma UCL	0.281	95% Approximate Gamma UCL
Cadmium	19	23	83	mg/kg	0.13	5.7	1	1	RSB-26	1.8	3	0.683	1.12	1.71	95% Chebyshev (Mean, Sd) UCL	1.71	95% Chebyshev (Mean, Sd) UCL
Chromium	23	23	100	mg/kg	22.9	348	NA	NA	RSB-01	2	3	92.2	81.2	166	95% Chebyshev (Mean, Sd) UCL	166	95% Chebyshev (Mean, Sd) UCL
Cobalt	23	23	100	mg/kg	3.4	11.3	NA	NA	RSB-27	1.8	3	5.76	1.98	6.47	95% Student's-t UCL	6.47	95% Student's-t UCL
Copper	23	23	100	mg/kg	7.3	409	NA	NA	RSB-25	1.8	3	79.9	91.1	114	95% Approximate Gamma UCL	114	95% Approximate Gamma UCL
Iron	23	23	100	mg/kg	8610	40200	NA	NA	RSB-01	2	3	18000	9330	21400	95% Approximate Gamma UCL	21400	95% Approximate Gamma UCL
Lead	23	23	100	mg/kg	3.1	5130	NA	NA	RSB-25	1.8	3	465	1100	2750	99% Chebyshev (Mean, Sd) UCL	2750	99% Chebyshev (Mean, Sd) UCL
Manganese	23	23	100	mg/kg	139	528	NA	NA	RSB-27	1.8	3	288	101	324	95% Student's-t UCL	324	95% Student's-t UCL
Nickel	23	23	100	mg/kg	17.3	36.3	NA	NA	RSB-26	1.8	3	22.7	4.99	24.5	95% Student's-t UCL	24.5	95% Student's-t UCL
Selenium	13	23	57	mg/kg	0.31	3.5	7	7	RSB-25	4.8	6	2.59	1.09	3.59	95% Chebyshev (Mean, Sd) UCL	3.5	Maximum Result
Silver	22	23	96	mg/kg	0.095	0.97	2	2	RSB-26	1.8	3	0.365	0.267	0.495	95% H-UCL	0.495	95% H-UCL
Thallium	8	23	35	mg/kg	0.36	2.6	5	5	RSB-28	1.8	3	1.96	0.886	2.77	95% Chebyshev (Mean, Sd) UCL	2.6	Maximum Result
Vanadium	23	23	100	mg/kg	17.5	58.3	NA	NA	RSB-27	1.8	3	26.4	7.85	28.9	95% Approximate Gamma UCL	28.9	95% Approximate Gamma UCL
Zinc	23	23	100	mg/kg	17.5	1390	NA	NA	RSB-26	1.8	3	229	274	321	95% Approximate Gamma UCL	321	95% Approximate Gamma UCL
Pesticides/PCBs																	

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
4,4'-DDD	20	23	87	ug/kg	2.4	11000	3.8	3.8	RSB-27	1.8	3	1490	2880	3790	95% Adjusted Gamma UCL	3790	95% Adjusted Gamma UCL
4,4'-DDE	22	23	96	ug/kg	1.3	8600	3.8	3.8	RSB-27	1.8	3	850	2120	2100	95% Adjusted Gamma UCL	2100	95% Adjusted Gamma UCL
4,4'-DDT	20	23	87	ug/kg	5.4	140000	3.6	4	RSB-27	1.8	3	8270	29300	80500	99% Chebyshev (MVUE) UCL	80500	99% Chebyshev (MVUE) UCL
alpha-BHC	1	23	4	ug/kg	6	6	1.8	960	RSB-01	2	3	25.8	99.6	232	99% Chebyshev (Mean, Sd) UCL	6	Maximum Result
alpha-Chlordane	8	23	35	ug/kg	0.48	81	1.9	960	RSB-26	1.8	3	29.8	99.9	237	99% Chebyshev (Mean, Sd) UCL	81	Maximum Result
beta-BHC	10	23	43	ug/kg	1.2	24	1.8	960	RSB-25	1.8	3	27.6	99.2	233	99% Chebyshev (Mean, Sd) UCL	24	Maximum Result
Dieldrin	14	23	61	ug/kg	1.2	86	3.7	1900	RSB-36	2	3	51.3	197	459	99% Chebyshev (Mean, Sd) UCL	86	Maximum Result
Endosulfan I	1	23	4	ug/kg	0.74	0.74	1.8	960	RSB-28	4.8	6	25.9	99.6	232	99% Chebyshev (Mean, Sd) UCL	0.74	Maximum Result
Endosulfan sulfate	1	23	4	ug/kg	4.4	4.4	3.5	1900	RSB-25	1.8	3	51.2	197	460	99% Chebyshev (Mean, Sd) UCL	4.4	Maximum Result
Endrin	6	23	26	ug/kg	0.8	14	3.6	1900	RSB-28	1.8	3	50.8	197	460	99% Chebyshev (Mean, Sd) UCL	14	Maximum Result
Endrin aldehyde	2	23	9	ug/kg	3	4.9	3.5	1900	RSB-40	1.5	2.5	51.2	197	460	99% Chebyshev (Mean, Sd) UCL	4.9	Maximum Result
Endrin ketone	2	23	9	ug/kg	2.3	6.9	3.5	1900	RSB-40	1.5	2.5	51.3	197	460	99% Chebyshev (Mean, Sd) UCL	6.9	Maximum Result
gamma-BHC	6	23	26	ug/kg	1.2	420	1.8	98	RSB-27	1.8	3	29.5	89.7	216	99% Chebyshev (Mean, Sd) UCL	216	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	11	23	48	ug/kg	0.77	83	1.9	960	RSB-26	1.8	3	30.6	99.8	238	99% Chebyshev (Mean, Sd) UCL	83	Maximum Result
Heptachlor	1	23	4	ug/kg	0.65	0.65	1.8	960	RSB-40	1.5	2.5	25.9	99.6	232	99% Chebyshev (Mean, Sd) UCL	0.65	Maximum Result
Heptachlor epoxide	1	23	4	ug/kg	2.8	2.8	1.8	960	RSB-26	1.8	3	26	99.5	232	99% Chebyshev (Mean, Sd) UCL	2.8	Maximum Result
Methoxychlor	1	23	4	ug/kg	7	7	18	9600	RSB-26	1.8	3	259	996	2320	99% Chebyshev (Mean, Sd) UCL	7	Maximum Result
Aroclor-1260	2	23	9	ug/kg	20	33	35	19000	RSB-34	2	3	511	1970	4600	99% Chebyshev (Mean, Sd) UCL	33	Maximum Result
SVOCs/VOCs																	
1,1-Dichloroethane	1	23	4	ug/kg	15	15	11	13	RSB-27	4.8	6	6.13	1.96	6.83	95% Student's-t UCL	6.83	95% Student's-t UCL
1,2-Dichlorobenzene	3	23	13	ug/kg	13	2200	11	13	RSB-01	5	6	102	457	1050	99% Chebyshev (Mean, Sd) UCL	1050	99% Chebyshev (Mean, Sd) UCL
1,3-Dichlorobenzene	1	23	4	ug/kg	2	2	11	13	RSB-01	5	6	5.57	0.83	5.86	95% Student's-t UCL	2	Maximum Result
1,4-Dichlorobenzene	2	23	9	ug/kg	2	300	11	13	RSB-01	5	6	18.4	61.4	74.2	95% Chebyshev (Mean, Sd) UCL	74.2	95% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	2	2	100	ug/kg	280	310	NA	NA	RSB-01	5	6	NA	21.2	NA		310	Maximum Result
2-Methylnaphthalene	7	23	30	ug/kg	77	4600	370	750	RSB-35	2	3	488	954	1360	95% Chebyshev (Mean, Sd) UCL	1360	95% Chebyshev (Mean, Sd) UCL
Acetophenone	2	23	9	ug/kg	280	420	350	750	RSB-34	2	3	214	61.8	236	95% Student's-t UCL	236	95% Student's-t UCL
Anthracene	1	23	4	ug/kg	81	81	350	1100	RSB-25	4.8	6	227	112	267	95% Student's-t UCL	81	Maximum Result
Benzo(a)anthracene	7	23	30	ug/kg	80	1200	350	1100	RSB-40	1.5	2.5	280	236	495	95% Chebyshev (Mean, Sd) UCL	495	95% Chebyshev (Mean, Sd) UCL
Benzo(a)pyrene	7	23	30	ug/kg	81	1400	350	1100	RSB-40	1.5	2.5	337	309	617	95% Chebyshev (Mean, Sd) UCL	617	95% Chebyshev (Mean, Sd) UCL
Benzo(b)fluoranthene	6	23	26	ug/kg	130	860	350	1100	RSB-40	1.5	2.5	303	218	501	95% Chebyshev (Mean, Sd) UCL	501	95% Chebyshev (Mean, Sd) UCL
Benzo(g,h,i)perylene	8	23	35	ug/kg	82	1200	350	1100	RSB-40	1.5	2.5	327	279	581	95% Chebyshev (Mean, Sd) UCL	581	95% Chebyshev (Mean, Sd) UCL
Benzo(k)fluoranthene	6	23	26	ug/kg	150	890	350	1100	RSB-40	1.5	2.5	303	211	495	95% Chebyshev (Mean, Sd) UCL	495	95% Chebyshev (Mean, Sd) UCL
Benzyl butyl phthalate	1	23	4	ug/kg	270	270	350	1100	RSB-37	5	6	234	108	273	95% Student's-t UCL	270	Maximum Result
bis(2-Ethylhexyl)phthalate	3	23	13	ug/kg	360	2300	350	1100	RSB-27	1.8	3	405	549	904	95% Chebyshev (Mean, Sd) UCL	904	95% Chebyshev (Mean, Sd) UCL
Caprolactam	1	23	4	ug/kg	230	230	350	1100	RSB-35	2	3	217	82.6	247	95% Student's-t UCL	230	Maximum Result
Chrysene	7	23	30	ug/kg	110	1500	350	1100	RSB-40	1.5	2.5	323	302	597	95% Chebyshev (Mean, Sd) UCL	597	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	4	23	17	ug/kg	100	370	350	1100	RSB-38	2	3	227	111	267	95% Student's-t UCL	267	95% Student's-t UCL
Fluoranthene	8	23	35	ug/kg	89	1800	350	1100	RSB-40	1.5	2.5	361	412	735	95% Chebyshev (Mean, Sd) UCL	735	95% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	8	23	35	ug/kg	82	1100	350	1100	RSB-38	2	3	333	294	600	95% Chebyshev (Mean, Sd) UCL	600	95% Chebyshev (Mean, Sd) UCL
Naphthalene	4	23	17	ug/kg	81	600	350	750	RSB-35	2	3	214	97.2	249	95% Student's-t UCL	249	95% Student's-t UCL
Phenanthrene	7	23	30	ug/kg	78	550	350	1100	RSB-25	4.8	6	260	134	308	95% Student's-t UCL	308	95% Student's-t UCL
Pyrene	9	23	39	ug/kg	120	2900	350	1100	RSB-40	1.5	2.5	442	631	1020	95% Chebyshev (Mean, Sd) UCL	1020	95% Chebyshev (Mean, Sd) UCL
Acetone	11	23	48	ug/kg	24	150	11	78	RSB-41	2.1	3	41	39.3	60.5	95% Approximate Gamma UCL	60.5	95% Approximate Gamma UCL
Chlorobenzene	2	23	9	ug/kg	49	4700	11	13	RSB-01	5	6	212	978	2240	99% Chebyshev (Mean, Sd) UCL	2240	99% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	7	23	30	ug/kg	3	44	11	12	RSB-38	2	3	8.76	10.1	18	95% Chebyshev (Mean, Sd) UCL	18	95% Chebyshev (Mean, Sd) UCL
Ethylbenzene	4	23	17	ug/kg	3	45	11	13	RSB-38	2	3	7.15	8.3	10.1	95% Student's-t UCL	10.1	95% Student's-t UCL
Isopropylbenzene (cumene)	1	23	4	ug/kg	430	430	11	13	RSB-38	2	3	24.2	88.5	105	95% Chebyshev (Mean, Sd) UCL	105	95% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	6	23	26	ug/kg	6	41	11	13	RSB-41	2.1	3	9.83	8.93	17.9	95% Chebyshev (Mean, Sd) UCL	17.9	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	1	23	4	ug/kg	12	12	11	13	RSB-38	2	3	6.02	1.34	6.5	95% Student's-t UCL	6.5	95% Student's-t UCL
Methylcyclohexane	2	23	9	ug/kg	15	440	11	13	RSB-34	2	3	25	90.5	107	95% Chebyshev (Mean, Sd) UCL	107	95% Chebyshev (Mean, Sd) UCL
Methylene chloride	2	23	9	ug/kg	2	11	11	13	RSB-38	2	3	5.8	1.4	6.31	95% Student's-t UCL	6.31	95% Student's-t UCL
Tetrachloroethene	1	23	4	ug/kg	11	11	11	13	RSB-27	1.8	3	5.98	1.13	6.38	95% Student's-t UCL	6.38	95% Student's-t UCL
Toluene	1	23	4	ug/kg	170	170	11	13	RSB-38	2	3	12.9	34.2	44	95% Chebyshev (Mean, Sd) UCL	44	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	3	23	13	ug/kg	3	4	11	13	RSB-26	1.8	3	5.48	0.79	5.76	95% Student's-t UCL	4	Maximum Result
Vinyl chloride	1	23	4	ug/kg	1	1	11	13	RSB-36	5	6	5.52	1.03	5.89	95% Student's-t UCL	1	Maximum Result
Xylenes, total	2	23	9	ug/kg	14	370	11	13	RSB-38	2	3	22	75.9	90.9	95% Chebyshev (Mean, Sd) UCL	90.9	95% Chebyshev (Mean, Sd) UCL

Small Vacant Lot - Shallow

Table 1-1
AMCO Summary Statistics and Exposure Point Concentrations for 4 Soil Exposure Areas
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value[a]	Maximum Non-detected Value[a]	Location of Maximum Detected Value	Depth of Maximum Detected Value	Lower Depth of Maximum Detected Value	Arithmetic Mean Value[b]	Standard Deviation[b]	Exposure Point Concentration	EPC Basis	Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Metals																	
Aluminum	2	2	100	mg/kg	7300	8020	NA	NA	RSB-30	2	3	NA	509	NA		8020	Maximum Result
Arsenic	2	2	100	mg/kg	6.6	14.2	NA	NA	RSB-30	2	3	NA	5.37	NA		14.2	Maximum Result
Barium	2	2	100	mg/kg	264	278	NA	NA	RSB-02	2	3	NA	9.9	NA		278	Maximum Result
Beryllium	2	2	100	mg/kg	0.23	0.29	NA	NA	RSB-02	2	3	NA	0.0424	NA		0.29	Maximum Result
Cadmium	2	2	100	mg/kg	1.5	2.1	NA	NA	RSB-30	2	3	NA	0.424	NA		2.1	Maximum Result
Chromium	2	2	100	mg/kg	33.5	33.5	NA	NA	RSB-02	2	3	NA	0	NA		33.5	Maximum Result
Cobalt	2	2	100	mg/kg	5.9	6.7	NA	NA	RSB-02	2	3	NA	0.566	NA		6.7	Maximum Result
Copper	2	2	100	mg/kg	65.3	95.8	NA	NA	RSB-02	2	3	NA	21.6	NA		95.8	Maximum Result
Iron	2	2	100	mg/kg	13900	16300	NA	NA	RSB-30	2	3	NA	1700	NA		16300	Maximum Result
Lead	2	2	100	mg/kg	300	386	NA	NA	RSB-02	2	3	NA	60.8	NA		386	Maximum Result
Manganese	2	2	100	mg/kg	240	312	NA	NA	RSB-30	2	3	NA	50.9	NA		312	Maximum Result
Nickel	2	2	100	mg/kg	22.7	23.8	NA	NA	RSB-30	2	3	NA	0.778	NA		23.8	Maximum Result
Selenium	2	2	100	mg/kg	1	1.2	NA	NA	RSB-30	2	3	NA	0.141	NA		1.2	Maximum Result
Silver	2	2	100	mg/kg	0.43	0.65	NA	NA	RSB-02	2	3	NA	0.156	NA		0.65	Maximum Result
Thallium	2	2	100	mg/kg	0.45	0.96	NA	NA	RSB-30	2	3	NA	0.361	NA		0.96	Maximum Result
Vanadium	2	2	100	mg/kg	24.1	26.5	NA	NA	RSB-30	2	3	NA	1.7	NA		26.5	Maximum Result
Zinc	2	2	100	mg/kg	565	736	NA	NA	RSB-30	2	3	NA	121	NA		736	Maximum Result
Pesticides/PCBs																	
4,4'-DDD	2	2	100	ug/kg	4.1	5.9	NA	NA	RSB-30	2	3	NA	1.27	NA		5.9	Maximum Result
4,4'-DDE	2	2	100	ug/kg	11	18	NA	NA	RSB-02	2	3	NA	4.95	NA		18	Maximum Result
4,4'-DDT	2	2	100	ug/kg	29	45	NA	NA	RSB-30	2	3	NA	11.3	NA		45	Maximum Result
alpha-Chlordane	1	2	50	ug/kg	8.2	8.2	2	2	RSB-02	2	3	NA	5.09	NA		8.2	Maximum Result
Dieldrin	1	2	50	ug/kg	1.3	1.3	1.5	1.5	RSB-02	2	3	NA	0.389	NA		1.3	Maximum Result
gamma-Chlordane	2	2	100	ug/kg	0.65	5.9	NA	NA	RSB-02	2	3	NA	3.71	NA		5.9	Maximum Result

Notes:
EPC = exposure point concentration
a) For a discussion of reporting limits, please see Section 6.1.2 Reporting Limits, of Appendix H, Human Health Risk Assessment.
b) one-half the detection limit is used for non-detects to calculate this statistic.

Table 1-2
Soil Exposure Assumptions
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Parameter		Units	Reasonable Maximum Exposure (RME) Scenario: Occupational Worker		Construction Worker		Residential Adult		Residential Child		Intake Equation
Incidental Ingestion of Soil											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Ingestion Rate	IngR	mg/day	100	EPA, 1989	330	EPA, 1989	100	EPA, 1989	200	EPA, 1989	
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	$\frac{Cs \times IngR \times EF \times ED \times CF}{BW \times AT}$
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	
Conversion Factor	CF	kg/mg	1.00E-06		1.00E-06		1.00E-06		1.00E-06		
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	
Inhalation of Particulates											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Inhalation Rate	InhR	m^3/day	20	EPA, 1989	20	EPA, 1989	20	EPA, 1989	10	EPA, 1989	
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	$\frac{Cs \times InhR \times EF \times ED \times \left[(1/PEF)+(1/VF)\right]}{BW \times AT}$
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	
1/Particulate Emission Factor	1/PEF	kg/m^3	7.60E-10	EPA, 1996	7.60E-10	EPA, 1996	7.60E-10	EPA, 1996	7.60E-10	EPA, 1996	
1/Volatilization Factor	1/VF	kg/m^3	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	Chemical specific	EPA, 2004	
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	
Dermal Contact with Soil											
Concentration in Soil	C_s	mg/kg	Chemical specific		Chemical specific		Chemical specific		Chemical specific		
Exposure Frequency	EF	days/yr	250	EPA, 1989	250	EPA, 1989	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	25	EPA, 1989	1	EPA, 1989	24	EPA, 1989	6	EPA, 1989	
Skin Surface Area	SA	cm^2	5700	CalEPA, 2005	5700	CALEPA, 2005	5700	CalEPA, 2005	2900	CalEPA, 2005	$\frac{Cs \times SA \times EF \times ED \times AF \times ABS \times CF}{BW \times AT}$
Soil-Skin Adherence Factor	AF	mg/cm^2/day	0.2	CalEPA, 2005	0.8	CALEPA, 2005	0.07	CalEPA, 2005	0.2	CalEPA, 2005	
Absorption Factor	ABS	unitless	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	Chemical specific	CalEPA, 2005	
Conversion Factor	CF	kg/mg	1.00E-06		1.00E-06		1.00E-06		1.00E-06		
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	9,125	EPA, 1989	365	EPA, 1989	8,760	EPA, 1989	2,190	EPA, 1989	

Notes:
AT_C = 70 years x 365 days/year
AT_{NC} = ED (years) x 365 days/year
PEF = 1.32E-09 m^3/kg
RME = reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 1996: Soil Screening Guidance.
EPA, 2004: User's Guide and Background Technical Document for Preliminary Remediation Goals (PRG). Region 9. October.
CalEPA, DTSC, HERD, 2005: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Aluminum	1	PPRTV	0.005	0.0014	PPRTV	NA	--	NA	--	NA	NA	--
Antimony	0.0004	IRIS	NA	NA	--	Blood (glucose), Mortality	--	NA	--	NA	NA	--
Arsenic	0.0003	IRIS	NA	NA	--	Skin, Circulatory System	--	1.5	IRIS	4.30E+00	15.1	IRIS
Arsenic	NA	--	1.5E-05	0.000004	OEHHA	--	--	1.5	OEHHA	3.30E+00	0.9429	OEHHA
Barium	0.2	IRIS	0.0005	0.00014	HEAST	Kidney	--	NA	--	NA	NA	--
Beryllium	0.002	IRIS	2.0E-05	0.000006	IRIS	GI (Small intestinal lesions)	--	NA	--	NA	8.4	IRIS
Beryllium	NA	--	7.0E-06	0.000002	OEHHA	--	--	NA	--	2.40E+00	8.4	OEHHA
Boron	0.2	IRIS	2.0E-02	0.0057	HEAST	Testes	--	NA	--	NA	NA	--
Cadmium	0.0005	IRIS	1.0E-05	0.000003	ATSDR	Kidney	--	NA	--	NA	6.3	IRIS
Cadmium	0.000011	OEHHA*	0.02	0.000006	OEHHA	--	--	NA	--	4.20E+00	14.7	OEHHA
Chromium	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Hexavalent Chromium	0.003	IRIS	1.0E-04	0.000029	IRIS	NOAEL	--	0.5	NJ	8.40E+01	2.9E+02	IRIS
Cobalt	0.0003	PPRTV	6.0E-06	0.000002	PPRTV	Circulatory	--	NA	--	9.00E+00	3.2E+01	PPRTV
Copper	0.04	HEAST	NA	NA	--	GI	--	NA	--	NA	NA	--
Iron	0.7	PPRTV	NA	NA	--	NA	--	NA	--	NA	NA	--
Lead	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Manganese	0.024	IRIS	5.0E-05	0.000014	IRIS	CNS	--	NA	--	NA	NA	--
Manganese	0.03	OEHHA*	9.0E-05	0.000026	OEHHA	--	--	NA	--	NA	NA	--
Mercury	0.0003	IRIS	NA	NA	--	CNS	--	NA	--	NA	NA	--
Molybdenum	0.005	IRIS	NA	NA	--	Kidney	--	NA	--	NA	NA	--
Nickel	0.02	IRIS	9.0E-05	2.6E-05	ATSDR	Whole body	--	NA	--	NA	NA	--
Nickel	0.011	OEHHA*	5.0E-02	1.4E-02	OEHHA	--	--	NA	--	2.60E-01	0.91	OEHHA
Selenium	0.005	IRIS	0.02	0.0057	OEHHA	Respiratory system - selenosis	--	NA	--	NA	NA	--
Silver	0.005	IRIS	NA	NA	--	Skin	--	NA	--	NA	NA	--
Thallium	0.000066	IRIS	NA	NA	--	NA	3000/1	NA	--	NA	NA	--
Vanadium	0.005	RSL	NA	NA	--	NA	--	NA	--	NA	NA	--
Zinc	0.3	IRIS	NA	NA	--	Red blood cells	--	NA	--	NA	NA	--
Cyanide	0.02	IRIS	NA	NA	--	Weight loss, thyroid effects and myelin degeneration	100/5	NA	--	NA	NA	--
4,4'-DDD	NA	--	NA	NA	--	--	--	0.24	IRIS	6.90E-02	0.24	OEHHA/ Route Extrapolation
4,4'-DDE	NA	--	NA	NA	--	--	--	0.34	IRIS	9.70E-02	0.34	OEHHA/ Route Extrapolation
4,4'-DDT	0.0005	IRIS	NA	NA	--	Liver	--	0.34	IRIS	9.70E-02	0.34	IRIS
Aldrin	0.00003	IRIS	NA	NA	--	Liver	1000/1	17	IRIS	4.90E+00	17.2	IRIS/OEHHA
alpha-BHC	0.0005	NCEA	NA	NA	--	NA	NA	6.3	IRIS	1.80E+00	6.3	IRIS
alpha-BHC	NA	--	NA	NA	--	--	NA	2.7	OEHHA	7.70E-01	2.7	OEHHA
alpha-Chlordane	0.0005	IRIS	7.0E-04	0.0002	IRIS	Liver	300/1	0.35	IRIS	1.00E-01	0.35	IRIS
alpha-Chlordane	0.000033	OEHHA*	NA	NA	--	--	300/1	1.3	OEHHA	3.40E-01	1.2	OEHHA
beta-BHC	NA	--	NA	NA	--	--	NA	1.8	OEHHA	5.30E-01	1.9	OEHHA
beta-BHC	NA	--	NA	NA	--	--	NA	1.5	OEHHA	4.30E-01	1.5	OEHHA
delta-BHC	NA	--	NA	NA	--	--	NA	NA	--	NA	NA	--
Diazinon	0.0007	ATSDR	NA	NA	--	Liver	--	NA	--	NA	NA	--

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Dieldrin	0.00005	IRIS	NA	NA	--	Liver	100/1	16	IRIS	4.60E+00	16.1	IRIS
Endosulfan I	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endosulfan II	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endosulfan sulfate	0.006	IRIS	NA	NA	--	Reduced body weight	100/1	NA	--	NA	NA	--
Endrin	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
Endrin aldehyde	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
Endrin ketone	0.0003	IRIS	NA	NA	--	Liver	100/1	NA	--	NA	NA	--
gamma-BHC	0.0003	IRIS	NA	NA	--	Liver	1000/1	1.1	Cal/EPA	NA	NA	--
gamma-BHC	NA	--	NA	NA	--	--	1000/1	1.1	OEHHA	3.10E-01	1.1	OEHHA
gamma-Chlordane	0.0005	IRIS	7.0E-04	0.0002	IRIS	Liver	300/1	0.35	IRIS	1.00E-01	0.35	IRIS
gamma-Chlordane	0.000033	OEHHA*	NA	NA	--	--	300/1	1.2	OEHHA	3.40E-01	1.2	OEHHA
Heptachlor	0.0005	IRIS	NA	NA	--	Liver	300/1	4.5	IRIS	1.30E+00	4.55	IRIS
Heptachlor	0.00003	OEHHA*	NA	NA	--	--	300/1	4.1	OEHHA	NA	4.1	OEHHA
Heptachlor epoxide	0.000013	IRIS	NA	NA	--	Liver	1000/1	9.1	IRIS	NA	9.1	IRIS
Heptachlor epoxide	0.000013	OEHHA*	NA	NA	--	--	1000/1	5.5	OEHHA	NA	5.5	OEHHA
Methoxychlor	0.005	IRIS	NA	NA	--	Reproductive	1000/1	NA	--	NA	NA	--
Methoxychlor	0.00002	OEHHA*		NA	--			NA		0.00E+00	NA	
Toxaphene	NA	--	NA	NA	--	--	NA	1.1	IRIS	3.40E-01	1.2	IRIS
Toxaphene	NA	--	NA	NA	--	--	NA	1.2	OEHHA	3.40E-01	1.2	OEHHA
Aroclor-1016	0.00007	IRIS	NA	NA	--	Reduced birth weight	100/1	0.07	IRIS	2.00E-02	0.07000000	IRIS
Aroclor-1221	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	5.70E-01	2	IRIS
Aroclor-1232	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	5.70E-01	2	IRIS
Aroclor-1242	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	5.70E-01	2	IRIS
Aroclor-1248	0.00002	Surrogate	NA	NA	--	--	--	2	IRIS	5.70E-01	2	IRIS
Aroclor-1254	0.00002	IRIS	NA	NA	--	Eyes	300/1	2	IRIS	5.70E-01	2	IRIS
Aroclor-1260	0.00002	Surrogate	NA	NA	--	Eyes	300/1	2	IRIS	5.70E-01	2	IRIS
1,2,4,5-Tetrachlorobenzene	0.0003	IRIS	NA	NA	--	--	--	NA	--	NA	NA	--
2,4,5-Trichlorophenol	0.1	IRIS	NA	NA	--	--	--	NA	--	NA	NA	--
2,4,6-Trichlorophenol	0.001	PPRTV	NA	NA	--	--	--	0.011	IRIS	2.00E-02	0.070	IRIS
2,4,6-Trichlorophenol	NA	--	NA	NA	--	--	--	0.07	OEHHA	2.00E-02	0.07	OEHHA
2,2-Dichloropropane	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
2,4-Dichlorophenol	0.003	IRIS	NA	NA	--	Decreased delayed hypersensitivity response	100/1	NA	--	NA	NA	--
2,4-Dimethylphenol	0.02	IRIS	NA	NA	--	Clinical signs (lethargy, prostration, ataxia) and hematological changes	3000/1	NA	--	NA	NA	--
2,4-Dinitrophenol	0.002	IRIS	NA	NA	--	Cataract formation	1000/1	NA	--	NA	NA	--
2,4-Dinitrotoluene	0.002	IRIS	NA	NA	--	Neurotoxicity, Heinz bodies and biliary tract hyperplasia	100/1	0.68	IRIS	8.90E-02	0.31	Cal/EPA

Table 1-3
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Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$**	**References**	**Inhalation Unit Risk $(mg/m^3)^{-1}$**	**Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$**	**References**
2,4-Dinitrotoluene	NA	--	NA	NA	--	--	100/1	0.31	OEHHA	8.90E-02	0.31	OEHHA
2,6-Dinitrotoluene	0.001	PPRTV	NA	NA	--	--	--	NA	--	NA	NA	--
2-Chloronaphthalene	0.08	IRIS	NA	NA	--	Dyspnea, abnormal appearance, liver enlargement	3000/1	NA	--	NA	NA	--
2-Chlorophenol	0.005	IRIS	NA	NA	--	Reproductive effects	1000/1	NA	--	NA	NA	--
2-Chlorotoluene	0.02	IRIS	NA	NA	--	Decrease in body weight gain	1000/1	NA	--	NA	NA	--
2-Methylnaphthalene	0.004	IRIS	NA	NA	--	Pulmonary alveolar proteinosis	1000/1	NA	--	NA	NA	--
2-Methylphenol	0.05	IRIS	0.6	0.17	Cal/EPA	Decreased body weight & Neurotoxicity	1000/1	NA	--	NA	NA	--
2-Nitroaniline	0.01	X	0.00005	0.000014	X	NA	--	NA	--	NA	NA	--
2-Nitrophenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
3,3'-Dichlorobenzidine	NA	--	NA	NA	--	--	--	0.45	IRIS	3.40E-01	1.2	Cal/EPA
3,3'-Dichlorobenzidine	NA	--	NA	NA	--	--	--	1.2	OEHHA	3.40E-01	1.2	OEHHA
3,4-Methylphenol	0.005	HEAST	0.6	0.171429	Cal/EPA	Decreased body weights and neurotoxicity	1000/1	NA	--	NA	NA	--
3-Nitroaniline	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4,6-Dinitro-2-methylphenol	8.00E-05	X	NA	NA	--	--	--	NA	--	NA	NA	--
4-Bromophenylphenyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Chloro-3-methylphenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Chloroaniline	0.004	IRIS	NA	NA	--	Nonneoplastic lesions of splenic capsule	3000/1	0.2	PPRTV	NA	NA	--
4-Chlorophenylphenyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
4-Methylphenol	0.005	HEAST	0.6	0.17	Cal/EPA	--	--	NA	--	NA	NA	--
4-Nitroaniline	0.004	PPRTV	0.006	0.002	PPRTV	--	--	0.02	PPRTV	NA	NA	--
4-Nitrophenol	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Acenaphthene	0.06	IRIS	NA	NA	--	Hepatotoxicity	3000/1	NA	--	NA	NA	--
Acenaphthylene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Acetophenone	0.1	IRIS	NA	NA	--	General toxicity	3000/1	NA	--	NA	NA	--
Anthracene	0.3	IRIS	NA	NA	--	No observed effects	3000/1	NA	--	NA	NA	--
Atrazine	0.035	IRIS	NA	NA	--	Decreased body weight gain	100/1	0.23	Cal/EPA	NA	NA	--
Atrazine	NA	--	NA	NA	--	--	100/1	0.23	OEHHA	NA	NA	--
Benzaldehyde	0.1	IRIS	NA	NA	--	Forestomach lesions, kidney toxicity	1000/1	NA	--	NA	NA	--
Benzo(a)anthracene	NA	--	NA	NA	--	--	--	0.73	ECAO	1.10E-01	0.39	Cal/EPA
Benzo(a)anthracene	NA	--	NA	NA	--	--	--	1.2	OEHHA	1.10E-01	0.39	OEHHA
Benzo(a)pyrene	NA	--	NA	NA	--	--	--	7.3	IRIS	1.10E+00	3.85	Cal/EPA
Benzo(a)pyrene	NA	--	NA	NA	--	--	--	12	OEHHA	1.10E+00	3.85	OEHHA
Benzo(b)fluoranthene	NA	--	NA	NA	--	--	--	0.73	ECAO	1.10E-01	0.39	Cal/EPA

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
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1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Benzo(b)fluoranthene	NA	--	NA	NA	--	--	--	1.2	OEHHA	1.10E-01	0.39	OEHHA
Benzo(g,h,i)perylene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Benzo(k)fluoranthene	NA	--	NA	NA	--	--	--	0.073	NCEA	1.10E-01	0.39	Cal/EPA
Benzo(k)fluoranthene	NA	--	NA	NA	--	--	--	1.2	OEHHA	1.10E-01	0.39	OEHHA
Benzyl butyl phthalate	0.2	IRIS	NA	NA	--	Significantly increased liver-to-body weight and liver-to-brain weight ratios	1000/1	0.0019	PPRTV	NA	NA	--
Biphenyl (diphenyl)	0.05	IRIS	NA	NA	--	Kidney damage	100/10	NA	--	NA	NA	--
bis(2-Chloroethoxy)methane	0.003	PPRTV	NA	NA	--	--	--	NA	--	NA	NA	--
bis(2-Chloroethyl)ether	NA	--	NA	NA	--	--	--	1.1	IRIS	3.30E-01	1.2	IRIS
bis(2-Chloroethyl)ether	NA	--	NA	NA	--	--	--	2.5	OEHHA	7.10E-01	2.5	OEHHA
bis(2-Ethylhexyl)phthalate	NA	--	NA	NA	--	--	1000/1	0.003	OEHHA	2.40E-03	0.0084	OEHHA
Caprolactam	0.5	IRIS	NA	NA	--	Reduced offspring body weight	100/1	NA	--	NA	NA	--
Carbazole	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Chrysene	NA	--	NA	NA	--	--	--	0.0073	ECAO	1.10E-02	0.039	Cal/EPA
Chrysene	NA	--	NA	NA	--	--	--	0.12	OEHHA	1.10E-02	0.039	OEHHA
Dibenz(a,h)anthracene	NA	--	NA	NA	--	--	--	4.1	OEHHA	1.20E+00	4.2	OEHHA
Dibenzofuran	0.002	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Diethylphthalate	0.8	IRIS	NA	NA	--	Decreased growth rate, food consumption and altered organ weights	1000/1	NA	--	NA	NA	--
Dimethylphthalate	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Di-n-butyl phthalate	0.1	IRIS	NA	NA	--	Increased mortality	1000/1	NA	--	NA	NA	--
Di-n-octyl phthalate	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Fluoranthene	0.04	IRIS	NA	NA	--	Kidney, Liver, Circulatory	3000/1	NA	--	NA	NA	--
Fluorene	0.04	IRIS	NA	NA	--	Kidney, Liver, Circulatory	3000/1	NA	--	NA	NA	--
Hexachlorobenzene	0.0008	IRIS	NA	NA	--	Liver effects	100/1	0.078	IRIS	4.60E-01	1.6	IRIS
Hexachlorobenzene	--	--	NA	NA	--	--	100/1	1.8	OEHHA	5.10E-01	1.8	OEHHA
Hexachlorobutadiene	0.001	PPRTV	NA	0.0003	Route Extrapolation	--	--	0.078	IRIS	2.20E-02	0.077	IRIS
Hexachlorocyclopentadiene	0.006	IRIS	0.0002	0.000057	IRIS	Chronic irritation	1000/1	NA	--	NA	NA	--
Hexachloroethane	0.001	IRIS	NA	NA	--	Atrophy and degeneration of the renal tubules	1000/1	0.014	IRIS	4.00E-03	0.014	IRIS
Hexachloroethane	NA	--	NA	NA	--	--	1000/1	0.039	OEHHA	1.10E-02	0.04	OEHHA
Indeno(1,2,3-c,d)pyrene	NA	--	NA	NA	--	--	--	0.73	NCEA	1.10E-02	0.04	Cal/EPA
Indeno(1,2,3-c,d)pyrene	NA	--	NA	NA	--	--	--	1.2	OEHHA	1.10E-02	0.39	OEHHA
Isophorone	0.2	IRIS	2	0.57	Cal/EPA	No observed effects	1000/1	0.00095	IRIS	NA	NA	--
p-Cymene (p-Isopropyltoluene)	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
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1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Naphthalene	0.02	IRIS	0.003	0.00086	IRIS	Decreased body weight	3000/1	NA	--	3.40E-02	0.12	Cal/EPA
Naphthalene	NA	--	9	2.6	OEHHA	--	3000/1	0.12	OEHHA	3.40E-02	0.12	OEHHA
Nitrobenzene	0.002	IRIS	0.009	0.0026	IRIS	Hematologic, adrenal, renal and hepatic lesions	10000/1	NA	--	4.00E-02	0.14	IRIS
N-Nitrosodi-n-propylamine	NA	--	NA	NA	--	--	--	7	IRIS	2.00E-03	7	OEHHA
N-Nitrosodiphenylamine	0.02	PPRTV	NA	0.02	PPRTV	--	--	0.0049	IRIS	2.60E-03	0.009	Cal/EPA
N-Nitrosodiphenylamine	NA	--	NA	NA	--	--	--	0.009	OEHHA	2.60E-03	0.009	OEHHA
Pentachlorophenol	0.003	OEHHA*	NA	NA	--	--	--	0.018	OEHHA	5.10E-03	0.018	OEHHA
Phenanthrene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Phenol	NA	--	0.2	0.057	OEHHA	--	300/1	NA	--	NA	NA	--
n-Propylbenzene	0.04	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Pyrene	0.03	IRIS	NA	NA	--	tubular pathology,	3000/1	NA	--	NA	NA	--
1,1,1-Trichloroethane	2	IRIS	5	1.4	IRIS	--	--	NA	--	NA	NA	--
1,1,2,2-Tetrachloroethane	0.004	PPRTV	NA	0.06	Route Extrapolation	--	--	0.2	IRIS	5.80E-02	0.2	IRIS
1,1,2,2-Tetrachloroethane	NA	--	NA	NA	--	--	--	0.27	OEHHA	5.80E-02	0.2	OEHHA
1,1,2-Trichloroethane	0.004	IRIS	NA	NA	--	Clinical serum chemistry	1000/1	0.057	IRIS	1.60E-02	0.056	IRIS
1,1,2-Trichloroethane	NA	--	NA	NA	--	--	1000/1	0.072	OEHHA	1.60E-02	0.057	OEHHA
1,1-Dichloroethane	0.2	PPRTV	NA	NA	--	--	--	0.0057	OEHHA	1.60E-03	0.0057	OEHHA
1,1-Dichloroethene	0.05	IRIS	0.2	0.057	IRIS	--	--	NA	--	NA	0.091	IRIS
1,1-Dichloroethene	NA	--	0.07	0.02	OEHHA	--	--	NA	--	NA	NA	--
1,2,3-Trichlorobenzene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
1,2,4-Trichlorobenzene	NA	--	NA	NA	--	--	--	0.0036	OEHHA	NA	NA	--
1,2,4-Trimethylbenzene	0.007	PPRTV	NA	NA	--	NA	--	NA	--	NA	NA	--
1,2-Dibromo-3-chloropropane	0.0002	PPRTV	0.0002	0.000057	IRIS	--	--	0.8	PPRTV	6.00E-03	0.021	PPRTV
1,2-Dibromo-3-chloropropane	NA	--	NA	NA	--	--	--	7	OEHHA	2.00E+00	7	OEHHA
1,2-Dibromoethane	0.009	IRIS	0.009	0.0026	IRIS	Testicular atrophy, liver peliosis, and adrenal cortical degeneration	3000/1	2	IRIS	6.00E-01	2	IRIS
1,2-Dibromoethane	NA	--	NA	NA	--	--	--	3.6	OEHHA	7.10E-02	0.25	OEHHA
1,2-Dichlorobenzene	0.09	IRIS	0.2	0.057	HEAST	No adverse effects observed	1000/1	NA	--	NA	NA	--
1,2-Dichloroethane	NA	--	NA	NA	--	--	--	0.047	OEHHA	2.10E-02	0.074	OEHHA
1,2-Dichloropropane	0.09	ATSDR	0.004	0.0011	IRIS	--	--	0.036	OEHHA	1.00E-02	0.035	OEHHA
1,3-Butadiene	NA	--	0.002	0.00057	IRIS	--	--	3.4	OEHHA	3.00E-02	0.11	OEHHA
1,3-Dichlorobenzene	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
1,3,5-Trimethylbenzene	0.01	X	NA	NA	--	NA	--	NA	--	NA	NA	--
1,4-Dichlorobenzene	0.07	ATSDR	0.8	0.23	IRIS	--	--	0.0054	OEHHA	1.10E-02	0.04	OEHHA
1,4-Dioxane (p-dioxane)	0.1	ATSDR	3.6	1.03	ATSDR	--	--	0.011	IRIS	7.70E-03	0.027	Cal/EPA
1,4-Dioxane (p-dioxane)	NA	--	3	0.86	OEHHA	--	--	0.027	OEHHA	7.70E-03	0.027	OEHHA
2-Hexanone	0.005	IRIS	0.03	0.009	IRIS	--	--	NA	--	NA	NA	--
Acetone	0.9	IRIS	31	8.86	ATSDR	Nephropathy	1000/1	NA	--	NA	NA	--
Benzene	0.004	IRIS	0.03	0.0086	IRIS	Immune system (decreased lymphocyte count)	300/1	0.055	IRIS	7.80E-03	0.027	IRIS

Table 1-3
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Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Benzene	NA	--	0.06	0.017	OEHHA	--	300/1	0.1	OEHHA	2.90E-02	0.1	OEHHA
Bromodichloromethane	0.02	IRIS	NA	NA	--	Renal cytomegaly	1000/1	0.062	IRIS	3.70E-02	0.13	Cal/EPA
Bromodichloromethane	NA	--	NA	NA	--	--	1000/1	0.13	OEHHA	3.70E-02	0.1	OEHHA
Bromoform	0.02	IRIS	NA	NA	--	Hepatic lesions	1000/1	0.0079	IRIS	1.10E-03	0.0039	IRIS
Bromoform	NA	--	NA	NA	--	--	1000/1	0.011	OEHHA	NA	NA	--
Bromomethane	0.0014	IRIS	0.005	0.0014	IRIS	Epithelial hyperplasia of the forestomach	1000/1	NA	--	NA	NA	--
Carbon disulfide	NA	--	0.8	0.23	OEHHA	--	100/1	NA	--	NA	NA	--
Carbon tetrachloride	0.004	IRIS	0.1	0.03	IRIS	Liver lesions	1000/1	0.07	IRIS	6.00E-03	0.021	IRIS
Carbon tetrachloride	NA	--	0.04	0.011	OEHHA	--	1000/1	0.15	OEHHA	4.20E-02	0.15	OEHHA
Chlorobenzene	0.02	IRIS	0.05	0.014	PPRTV	Histopathologic changes in liver	1000/1	NA	--	NA	NA	--
Chlorobenzene	0.02	IRIS	0.05	0.014	PPRTV	Histopathologic changes in liver	1000/1	NA	--	NA	NA	--
Chlorobenzene	NA	--	1	0.29	OEHHA	--	1000/1	NA	--	NA	NA	--
Chloroethane	NA	--	10	2.86	IRIS	--	--	NA	--	NA	0.0029	Route Extrapolation
Chloroform	0.01	IRIS	0.098	0.028	ATSDR	Moderate/marked fatty cyst formation in the liver and elevated SGPT	100/1	0.031	OEHHA	5.30E-03	0.019	OEHHA
Chloromethane	NA	--	0.09	0.026	IRIS	Brain (cerebellar lesions)	1000/1	NA	--	NA	NA	--
cis-1,2-Dichloroethene	0.01	PPRTV	NA	NA	--	Decreased hematocrit and hemoglobin (Blood)	--	NA	--	NA	NA	--
cis-1,3-Dichloropropene	0.03	IRIS	0.02	0.0057	IRIS	Chronic irritation	100/1	0.1	IRIS	4.00E-03	0.014	IRIS
cis-1,3-Dichloropropene	NA	--	NA	NA	--	--	100/1	0.091	OEHHA	1.60E-02	0.056	OEHHA
Cyclohexane	NA	--	6	1.7	IRIS	--	--	NA	--	NA	NA	--
Dibromochloromethane	0.02	IRIS	NA	NA	--	Hepatic lesions	1000/1	0.084	IRIS	2.70E-02	0.095	CalEPA
Dibromochloromethane	NA	--	NA	NA	--	--	1000/1	0.094	OEHHA	2.70E-02	0.095	OEHHA
Ethyl tertiary butyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Ethylbenzene	NA	--	2	0.57	OEHHA	--	1000/1	0.011	OEHHA	2.50E-03	0.00875	OEHHA
Freon 11	0.3	IRIS	0.7	0.20	HEAST	Survival and histopathology	1000/1	NA	--	NA	NA	--
Freon 113	30	IRIS	30	8.57	HEAST	Psychomotor impairment	10/1	NA	--	NA	NA	--
Freon 12	0.2	IRIS	0.2	0.057	HEAST	Reduced body weight	100/1	NA	--	NA	NA	--
Isopropylbenzene (cumene)	0.1	IRIS	0.4	0.11	IRIS	Increased kidney weights in female rats and adrenal weights in male and female rats	1000/1	NA	--	NA	NA	--
Isopropyl ether	NA	--	NA	NA	--	--	--	NA	--	NA	NA	--
Methyl acetate	1	HEAST	NA	NA	--	--	--	NA	--	NA	NA	--
Methyl ethyl ketone	0.6	IRIS	5	1.4	IRIS	Decreased pup body weight	1000/1	NA	--	NA	NA	--
Methyl isobutyl ketone	0.08	HEAST	3	0.86	IRIS	--	--	NA	--	NA	NA	--
Methyl tert-butyl ether	NA	--	8	2.3	OEHHA	--	--	0.0018	OEHHA	2.60E-04	0.00091	OEHHA

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
Methylcyclohexane	NA	--	NA	0.86	HEAST	--	--	NA	--	NA	NA	--
Methylene chloride	0.06	IRIS	1	0.29	ATSDR	Liver toxicity	100/1	0.0075	IRIS	4.70E-04	0.0016	IRIS
Methylene chloride	NA	--	0.4	0.11	OEHHA	--	100/1	0.014	OEHHA	1.00E-03	0.0035	OEHHA
n-Butylbenzene	0.04	NCEA	NA	NA	--	--	--	NA	--	NA	NA	--
Styrene	0.2	IRIS	1	0.29	IRIS	Red blood cell and liver effects	1000/1	NA	--	NA	NA	--
Styrene	NA	--	0.9	0.26	OEHHA	--	1000/1	NA	--	NA	NA	--
sec-Butylbenzene	0.04	NCEA	NA	0.04	Route Extrapolation	--	--	NA	--	NA	NA	--
tert-Butyl alcohol	0.1	IRIS	NA	0.0026	NCEA	--	--	NA	--	NA	NA	--
tert-Butylbenzene	0.04	NCEA		NA	--	--	--	NA	--	NA	NA	--
Tetrachloroethene	0.01	IRIS	0.27	0.08	ATSDR	Hepatotoxicity in mice, weight gain in rats	1000/1	0.54	OEHHA	5.90E-03	0.021	OEHHA
Tetrachloroethene	NA		0.035	0.01	OEHHA	--	--	0.54	OEHHA	5.90E-03	0.021	OEHHA
Toluene	0.08	IRIS	5	1.43	IRIS	Kidney	3000/1	NA	--	NA	NA	--
Toluene	NA	--	0.3	0.086	OEHHA	--	--	NA	--	NA	NA	--
trans-1,2-Dichloroethene	0.02	IRIS	0.06	0.02	PPRTV	Increased serum alkaline phosphatase in male mice	1000/1	NA	--	NA	NA	--
trans-1,3-Dichloropropene	0.03	IRIS	0.02	0.0057	IRIS	Chronic irritation	100/1	0.1	IRIS	4.00E-03	0.014	IRIS
trans-1,3-Dichloropropene	NA	--	NA	NA	--	--	--	0.091	OEHHA	1.60E-02	0.056	OEHHA
Trichloroethene	0.0003	NCEA	NA	0.01	NCEA	NA	--	NA	--	NA	NA	--
Trichloroethene	NA	--	600	0.17	OEHHA	--	--	0.0059	OEHHA	2.00E-03	0.007	OEHHA
Vinyl chloride	0.003	IRIS	0.1	0.0286	IRIS	Liver	30/1	0.72	IRIS	4.40E-03	0.0154	IRIS
Vinyl chloride	NA	--	NA	NA	--	--	30/1	0.27	OEHHA	7.80E-02	0.27	OEHHA
o-Xylene	0.2	IRIS	0.7	0.2	OEHHA	Decreased body weight, increased mortality	1000/1	NA	--	NA	NA	--
m,p-Xylenes	0.2	IRIS	0.7	0.2	OEHHA	Decreased body weight, increased mortality	1000/1	NA	--	NA	NA	--
Xylenes, total	NA	--	0.7	0.2	OEHHA	--	1000/1	NA	--	NA	NA	--
1,2,3,4,6,7,8-HpCDD	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,6,7,8-HpCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	3.80E+05	1300	OEHHA
1,2,3,4,6,7,8-HpCDF	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,6,7,8-HpCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	3.80E+05	1300	OEHHA
1,2,3,4,7,8,9-HpCDF	NA	--	NA	NA	--	--	--	1500	calc using TEF	NA	1500	calc using TEF
1,2,3,4,7,8,9-HpCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	1300	OEHHA	3.80E+05	1300	OEHHA
1,2,3,4,7,8-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,4,7,8-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,4,7,8-HxCDF	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,4,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,6,7,8-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,6,7,8-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,6,7,8-HxCDF	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,6,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,7,8,9-HxCDD	NA	--	NA	NA	--	--	--	15000	calc using TEF	NA	15000	calc using TEF

Table 1-3
Cancer and Noncancer Toxicity Values for COPCs
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical of Potential Concern	**Oral RfD (mg/kg-day)**	**References**	**REL or Reference Conc (mg/m^3)**	**Inhalation RFD (mg/kg-day)**	**References**	**Primary Target Organ/Effect**	**Uncertainty/ Modifying Factors**	**Oral Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**	**Inhalation Unit Risk (mg/m^3)$^{-1}$**	**Inhalation Cancer Slope Factor (mg/kg-day)$^{-1}$**	**References**
1,2,3,7,8,9-HxCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,7,8,9-HxCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
1,2,3,7,8,9-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
1,2,3,7,8-PeCDD	NA	--	NA	--	--	--	--	150000	calc using TEF	NA	150000	calc using TEF
1,2,3,7,8-PeCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	6500	OEHHA	3.76E+07	130000	OEHHA
1,2,3,7,8-PeCDF	NA	--	NA	--	--	--	--	7500	calc using TEF	NA	7500	calc using TEF
1,2,3,7,8-PeCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	6500	OEHHA	1.86E+06	6500	OEHHA
2,3,4,6,7,8-HxCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
2,3,4,6,7,8-HxCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
2,3,4,7,8-PeCDF	NA	--	NA	--	--	--	--	75000	calc using TEF	NA	75000	calc using TEF
2,3,4,7,8-PeCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	65000	OEHHA	1.86E+07	65000	OEHHA
2,3,7,8-TCDD	NA	--	NA	--	--	--	--	150000	HEAST	NA	150000	HEAST
2,3,7,8-TCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	130000	OEHHA	3.76E+07	130000	OEHHA
2,3,7,8-TCDF	NA	--	NA	--	--	--	--	15000	calc using TEF	NA	15000	calc using TEF
2,3,7,8-TCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13000	OEHHA	3.76E+06	13000	OEHHA
OCDD	NA	--	NA	--	--	--	--	15	calc using TEF	NA	15	calc using TEF
OCDD	NA	--	0.00004	0.00000001	OEHHA	--	--	13	OEHHA	3.80E+03	13	OEHHA
OCDF	NA	--	NA	--	--	--	--	15	calc using TEF	NA	15	calc using TEF
OCDF	NA	--	0.00004	0.00000001	OEHHA	--	--	13	OEHHA	3.80E+03	13	OEHHA

References

HEAST: Health Effects Assessment Summary Tables (1997)

IRIS: Integrated Risk Information System (EPA 2006)

NCEA: National Center for Environmental Assessment (as cited on the Region 9 PRG Table, 2004)

OEHHA: California Office of Environmental Health Hazard Assessment. Toxicity Criteria Database (2005)

OEHHA*: California Office of Environmental Health Hazard Assessment. Child Reference Dose (2007)

PPRTV : Provisional Peer Reviewed Toxicity Value (as cited on the Region 9 PRG Table, 2004)

Region 9 Preliminary Remediation Goals (PRG) Table (October 2004)

Route Extrapolation: Route to route extrapolation

Shaded values are State of California toxicity values

Table 1-4
Volatilization Factors and Absorption Factors
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Absorption Factor[a]	Volatilization Factor[b] (m^3/kg)
Metals		
Aluminum	0.01	NV
Antimony	0.01	NV
Arsenic	0.03	NV
Barium	0.01	NV
Beryllium	0.01	NV
Cadmium	0.001	NV
Chromium	0.01	NV
Cobalt	0.01	NV
Copper	0.01	NV
Iron	0.01	NV
Lead	0.01	NV
Manganese	0.01	NV
Nickel	0.01	NV
Selenium	0.01	NV
Silver	0.01	NV
Thallium	0.01	NV
Vanadium	0.01	NV
Zinc	0.01	NV
Pesticides/PCBs		
4,4'-DDD	0.05	NV
4,4'-DDE	0.05	NV
4,4'-DDT	0.05	NV
Aldrin	0.05	NV
alpha-BHC	0.05	NV
alpha-Chlordane	0.05	NV
beta-BHC	0.05	NV
delta-BHC	0.05	NV
Dieldrin	0.05	NV
Endosulfan sulfate	0.05	NV
Endrin	0.05	NV
Endrin aldehyde	0.05	NV
Endrin ketone	0.05	NV
gamma-BHC	0.05	NV
gamma-Chlordane	0.05	NV
Heptachlor	0.05	NV
Methoxychlor	0.05	NV
Aroclor-1260	0.15	NV
SVOCs/VOCs		
1,2,4-Trichlorobenzene	0.1	4.76E+04
1,2-Dichlorobenzene	0.1	1.60E+04
1,3-Dichlorobenzene	0.1	1.60E+04
1,4-Dichlorobenzene	0.1	1.41E+04
1,4-Dioxane (p-dioxane)	0.1	NV

Table 1-4
Volatilization Factors and Absorption Factors
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Absorption Factor[a]	Volatilization Factor[b] (m^3/kg)
2-Methylnaphthalene	0.15	6.15E+04
2-Methylphenol	0.1	NV
4-Chloro-3-methylphenol	0.1	NV
4-Methylphenol	0.1	NV
Acenaphthene	0.15	2.42E+05
Acetophenone	0.1	NV
Anthracene	0.15	8.64E+05
Benzo(a)anthracene	0.15	NV
Benzo(a)pyrene	0.15	NV
Benzo(b)fluoranthene	0.15	NV
Benzo(g,h,i)perylene	0.15	NV
Benzo(k)fluoranthene	0.15	NV
Benzyl butyl phthalate	0.1	NV
Biphenyl (diphenyl)	0.1	NV
bis(2-Ethylhexyl)phthalate	0.1	NV
Caprolactam	0.1	NV
Carbazole	0.1	NV
Chrysene	0.15	NV
Dibenz(a,h)anthracene	0.15	NV
Dibenzofuran	0.1	5.55E+05
Di-n-butyl phthalate	0.1	NV
Fluoranthene	0.15	NV
Fluorene	0.15	5.62E+05
Indeno(1,2,3-c,d)pyrene	0.15	NV
Naphthalene	0.15	6.15E+04
Pentachlorophenol	0.25	NV
Phenanthrene	0.15	NV
Pyrene	0.15	NV
1,1,1-Trichloroethane	0.1	2.31E+03
1,1-Dichloroethane	0.1	2.42E+03
1,1-Dichloroethene	0.1	1.42E+03
1,2-Dichloroethane	0.1	3.85E+03
Acetone	0.1	1.08E+04
Benzene	0.1	2.82E+03
Carbon disulfide	0.1	1.16E+03
Chlorobenzene	0.1	6.79E+03
Chloroethane	0.1	1.13E+03
Chloromethane	0.1	5.36E+03
cis-1,2-Dichloroethene	0.1	2.95E+03
Cyclohexane	0.1	1.05E+03
Ethylbenzene	0.1	5.89E+03
Isopropylbenzene (cumene)	0.1	3.06E+03
Methyl ethyl ketone	0.1	1.66E+04
Methyl isobutyl ketone	0.1	2.14E+04

Table 1-4
Volatilization Factors and Absorption Factors
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Absorption Factor[a]	Volatilization Factor[b] (m^3/kg)
Methyl tert-butyl ether	0.1	4.00E+03
Methylcyclohexane	0.1	1.73E+03
Methylene chloride	0.1	2.13E+03
Styrene	0.1	1.14E+04
Tetrachloroethene	0.1	2.18E+03
Toluene	0.1	3.39E+03
trans-1,2-Dichloroethene	0.1	2.00E+03
Trichloroethene	0.1	2.78E+03
Vinyl chloride	0.1	8.90E+02
Xylenes, total	0.1	5.20E+03
Dioxans/Furans		
1,2,3,4,6,7,8-HpCDD	0.03	NV
1,2,3,4,6,7,8-HpCDF	0.03	NV
1,2,3,4,7,8,9-HpCDF	0.03	NV
1,2,3,4,7,8-HxCDD	0.03	NV
1,2,3,4,7,8-HxCDF	0.03	NV
1,2,3,6,7,8-HxCDD	0.03	NV
1,2,3,6,7,8-HxCDF	0.03	NV
1,2,3,7,8,9-HxCDD	0.03	NV
1,2,3,7,8,9-HxCDF	0.03	NV
1,2,3,7,8-PeCDD	0.03	NV
2,3,4,6,7,8-HxCDF	0.03	NV
2,3,4,7,8-PeCDF	0.03	NV
2,3,7,8-TCDF	0.03	NV
OCDD	0.03	NV
OCDF	0.03	NV

Notes:
[a]Source: DTSC Preliminary Endangerment Assessment Guidance Manual, January 1994.
[b]Calculated from equation in Soil Screening Guidance Manual, May 1996
NV = not volatile

Table 1-5
Exposure Point Concentrations - Shallow Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	1.26E+04	95% Student's-t UCL
Antimony	mg/kg	1.36E+01	95% Chebyshev (MVUE) UCL
Arsenic	mg/kg	7.71E+00	95% Approximate Gamma UCL
Barium	mg/kg	5.13E+02	95% Approximate Gamma UCL
Beryllium	mg/kg	6.14E-01	95% Approximate Gamma UCL
Cadmium	mg/kg	1.58E+00	95% H-UCL
Chromium	mg/kg	1.41E+03	99% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	8.75E+00	95% Approximate Gamma UCL
Copper	mg/kg	2.29E+02	95% Chebyshev (MVUE) UCL
Iron	mg/kg	2.61E+04	95% Approximate Gamma UCL
Lead	mg/kg	6.40E+02	95% Approximate Gamma UCL
Manganese	mg/kg	1.14E+03	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/kg	4.22E+01	95% Student's-t UCL
Selenium	mg/kg	2.50E+00	Maximum Result
Silver	mg/kg	8.43E-01	95% Approximate Gamma UCL
Thallium	mg/kg	3.16E+00	95% Chebyshev (Mean, Sd) UCL
Vanadium	mg/kg	4.16E+01	95% Approximate Gamma UCL
Zinc	mg/kg	5.91E+02	95% Approximate Gamma UCL
Pesticides/PCBs			
Aldrin	mg/kg	1.29E+00	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	mg/kg	2.60E-02	Maximum Result
alpha-Chlordane	mg/kg	4.04E-02	95% Chebyshev (MVUE) UCL
4,4'-DDD	mg/kg	9.16E+00	95% Adjusted Gamma UCL
4,4'-DDE	mg/kg	3.56E+00	95% Adjusted Gamma UCL
4,4'-DDT	mg/kg	3.25E-01	99% Chebyshev (Mean, Sd) UCL
beta-BHC	mg/kg	3.50E-02	Maximum Result
delta-BHC	mg/kg	4.10E-03	Maximum Result
Dieldrin	mg/kg	1.34E+00	95% Adjusted Gamma UCL
Endosulfan sulfate	mg/kg	1.60E-03	Maximum Result
Endrin	mg/kg	4.60E-03	Maximum Result
Endrin aldehyde	mg/kg	1.10E-03	Maximum Result
Endrin ketone	mg/kg	1.20E-02	Maximum Result
gamma-Chlordane	mg/kg	1.09E-01	99% Chebyshev (Mean, Sd) UCL
Heptachlor	mg/kg	8.80E-03	Maximum Result
Methoxychlor	mg/kg	3.90E-03	Maximum Result
Aroclor-1260	mg/kg	6.40E-01	Maximum Result
SVOCs/VOCs			
1,2,4-Trichlorobenzene	mg/kg	1.54E+00	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	mg/kg	5.47E+01	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	mg/kg	2.02E+00	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	mg/kg	2.55E+01	99% Chebyshev (Mean, Sd) UCL

Table 1-5
Exposure Point Concentrations - Shallow Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
2-Methylnaphthalene	mg/kg	1.14E+02	95% Hall's Bootstrap UCL
2-Methylphenol	mg/kg	9.90E-01	Maximum Result
4-Chloro-3-methylphenol	mg/kg	7.20E+00	Maximum Result
4-Methylphenol	mg/kg	3.60E+00	Maximum Result
Acenaphthene	mg/kg	9.18E+00	99% Chebyshev (Mean, Sd) UCL
Anthracene	mg/kg	1.10E+00	Maximum Result
Benzo(a)anthracene	mg/kg	5.50E-01	Maximum Result
Benzo(a)pyrene	mg/kg	5.00E-01	Maximum Result
Benzo(b)fluoranthene	mg/kg	4.20E-01	Maximum Result
Benzo(g,h,i)perylene	mg/kg	4.30E-01	Maximum Result
Benzo(k)fluoranthene	mg/kg	4.30E-01	Maximum Result
Benzyl butyl phthalate	mg/kg	7.60E+00	Maximum Result
Biphenyl (diphenyl)	mg/kg	4.40E+00	Maximum Result
bis(2-Ethylhexyl)phthalate	mg/kg	9.85E+00	99% Chebyshev (Mean, Sd) UCL
Caprolactam	mg/kg	9.50E-02	Maximum Result
Carbazole	mg/kg	1.10E+00	Maximum Result
Chrysene	mg/kg	9.10E-01	Maximum Result
Dibenz(a,h)anthracene	mg/kg	1.20E-01	Maximum Result
Dibenzofuran	mg/kg	4.10E+00	Maximum Result
Di-n-butyl phthalate	mg/kg	2.90E+00	Maximum Result
Fluoranthene	mg/kg	4.20E+00	Maximum Result
Fluorene	mg/kg	8.31E+00	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	mg/kg	4.40E-01	Maximum Result
Naphthalene	mg/kg	5.28E+01	99% Chebyshev (Mean, Sd) UCL
Phenanthrene	mg/kg	1.21E+01	99% Chebyshev (Mean, Sd) UCL
Pyrene	mg/kg	3.97E+00	95% Approximate Gamma UCL
1,1,1-Trichloroethane	mg/kg	2.51E-02	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	mg/kg	1.01E+01	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	mg/kg	6.80E-02	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	mg/kg	6.05E-02	95% Chebyshev (Mean, Sd) UCL
Acetone	mg/kg	2.26E-01	95% Approximate Gamma UCL
Benzene	mg/kg	1.93E+00	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	mg/kg	6.29E-03	95% Student's-t UCL
Chlorobenzene	mg/kg	1.01E+01	99% Chebyshev (Mean, Sd) UCL
Chloroethane	mg/kg	2.40E-02	95% Chebyshev (Mean, Sd) UCL
Chloromethane	mg/kg	1.27E-01	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	mg/kg	1.49E+02	95% Hall's Bootstrap UCL
Cyclohexane	mg/kg	2.55E+00	99% Chebyshev (Mean, Sd) UCL
Ethylbenzene	mg/kg	2.24E+01	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	mg/kg	5.35E+00	95% Hall's Bootstrap UCL
Methyl ethyl ketone	mg/kg	3.14E-01	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/kg	5.74E+00	99% Chebyshev (Mean, Sd) UCL

Table 1-5
Exposure Point Concentrations - Shallow Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Methyl tert-butyl ether	mg/kg	4.00E-03	Maximum Result
Methylcyclohexane	mg/kg	1.02E+01	95% Hall's Bootstrap UCL
Methylene chloride	mg/kg	8.38E-03	95% Student's-t UCL
Styrene	mg/kg	5.14E-01	99% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	mg/kg	8.76E-02	99% Chebyshev (Mean, Sd) UCL
Toluene	mg/kg	1.16E+02	95% Hall's Bootstrap UCL
trans-1,2-Dichloroethene	mg/kg	6.38E-01	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	mg/kg	5.21E-01	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	mg/kg	1.28E+00	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	mg/kg	1.57E+02	95% Hall's Bootstrap UCL
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/kg	9.72E-04	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	mg/kg	1.60E-04	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	mg/kg	7.93E-06	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	mg/kg	1.64E-05	Maximum Result
1,2,3,4,7,8-HxCDF	mg/kg	2.26E-06	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	mg/kg	7.35E-05	Maximum Result
1,2,3,6,7,8-HxCDF	mg/kg	1.50E-05	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	mg/kg	4.14E-05	Maximum Result
1,2,3,7,8,9-HxCDF	mg/kg	8.75E-06	Maximum Result
1,2,3,7,8-PeCDD	mg/kg	1.53E-05	Maximum Result
2,3,4,6,7,8-HxCDF	mg/kg	1.51E-05	95% Student's-t UCL
2,3,4,7,8-PeCDF	mg/kg	3.66E-05	95% Student's-t UCL
2,3,7,8-TCDF	mg/kg	4.63E-06	95% Student's-t UCL
OCDD	mg/kg	8.20E-03	95% Student's-t UCL
OCDF	mg/kg	3.25E-04	95% Student's-t UCL

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-6
Exposure Point Concentrations - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	1.25E+04	95% Student's-t UCL
Antimony	mg/kg	2.06E+01	99% Chebyshev (Mean, Sd) UCL
Arsenic	mg/kg	8.10E+00	95% Approximate Gamma UCL
Barium	mg/kg	5.55E+02	95% H-UCL
Beryllium	mg/kg	6.04E-01	95% Approximate Gamma UCL
Cadmium	mg/kg	1.74E+00	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	4.95E+02	95% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	7.90E+00	95% Approximate Gamma UCL
Copper	mg/kg	1.45E+02	95% Approximate Gamma UCL
Iron	mg/kg	2.34E+04	95% Approximate Gamma UCL
Lead	mg/kg	6.05E+02	95% Approximate Gamma UCL
Manganese	mg/kg	8.43E+02	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/kg	3.70E+01	95% Student's-t UCL
Selenium	mg/kg	3.30E+00	95% Chebyshev (Mean, Sd) UCL
Silver	mg/kg	7.75E-01	95% Approximate Gamma UCL
Thallium	mg/kg	2.88E+00	95% Chebyshev (Mean, Sd) UCL
Vanadium	mg/kg	4.05E+01	95% Approximate Gamma UCL
Zinc	mg/kg	4.41E+02	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	mg/kg	8.40E+00	95% Hall's Bootstrap UCL
4,4'-DDE	mg/kg	5.64E+00	99% Chebyshev (Mean, Sd) UCL
4,4'-DDT	mg/kg	2.47E-01	99% Chebyshev (Mean, Sd) UCL
Aldrin	mg/kg	9.24E-01	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	mg/kg	2.60E-02	Maximum Result
alpha-Chlordane	mg/kg	7.04E-02	99% Chebyshev (Mean, Sd) UCL
beta-BHC	mg/kg	3.50E-02	Maximum Result
delta-BHC	mg/kg	4.10E-03	Maximum Result
Dieldrin	mg/kg	2.08E+00	99% Chebyshev (Mean, Sd) UCL
Endosulfan sulfate	mg/kg	1.60E-03	Maximum Result
Endrin	mg/kg	4.60E-03	Maximum Result
Endrin aldehyde	mg/kg	1.10E-03	Maximum Result
Endrin ketone	mg/kg	1.20E-02	Maximum Result
gamma-BHC	mg/kg	2.50E-03	Maximum Result
gamma-Chlordane	mg/kg	8.75E-02	99% Chebyshev (Mean, Sd) UCL
Heptachlor	mg/kg	8.80E-03	Maximum Result
Methoxychlor	mg/kg	3.90E-03	Maximum Result
Aroclor-1260	mg/kg	9.80E-01	Maximum Result
SVOCs/VOCs			
1,2,4-Trichlorobenzene	mg/kg	1.05E+00	99% Chebyshev (Mean, Sd) UCL
1,2-Dichlorobenzene	mg/kg	4.02E+01	95% Hall's Bootstrap UCL
1,3-Dichlorobenzene	mg/kg	1.38E+00	99% Chebyshev (Mean, Sd) UCL

Table 1-6
Exposure Point Concentrations - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
1,4-Dichlorobenzene	mg/kg	1.76E+01	99% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	mg/kg	9.12E-01	95% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	mg/kg	4.02E+02	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	mg/kg	9.90E-01	Maximum Result
4-Chloro-3-methylphenol	mg/kg	7.20E+00	Maximum Result
4-Methylphenol	mg/kg	3.60E+00	Maximum Result
Acenaphthene	mg/kg	8.32E+00	99% Chebyshev (Mean, Sd) UCL
Acetophenone	mg/kg	8.73E+00	99% Chebyshev (Mean, Sd) UCL
Anthracene	mg/kg	1.10E+00	Maximum Result
Benzo(a)anthracene	mg/kg	5.50E-01	Maximum Result
Benzo(a)pyrene	mg/kg	5.00E-01	Maximum Result
Benzo(b)fluoranthene	mg/kg	4.20E-01	Maximum Result
Benzo(g,h,i)perylene	mg/kg	4.30E-01	Maximum Result
Benzo(k)fluoranthene	mg/kg	4.30E-01	Maximum Result
Benzyl butyl phthalate	mg/kg	7.60E+00	Maximum Result
Biphenyl (diphenyl)	mg/kg	7.10E+00	Maximum Result
bis(2-Ethylhexyl)phthalate	mg/kg	8.86E+00	99% Chebyshev (Mean, Sd) UCL
Caprolactam	mg/kg	9.50E-02	Maximum Result
Carbazole	mg/kg	1.10E+00	Maximum Result
Chrysene	mg/kg	3.50E+00	Maximum Result
Dibenz(a,h)anthracene	mg/kg	1.20E-01	Maximum Result
Dibenzofuran	mg/kg	4.10E+00	Maximum Result
Di-n-butyl phthalate	mg/kg	2.90E+00	Maximum Result
Fluoranthene	mg/kg	5.90E+00	Maximum Result
Fluorene	mg/kg	8.10E+00	99% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	mg/kg	4.40E-01	Maximum Result
Naphthalene	mg/kg	5.10E+01	99% Chebyshev (Mean, Sd) UCL
Pentachlorophenol	mg/kg	6.70E+00	Maximum Result
Phenanthrene	mg/kg	1.51E+01	99% Chebyshev (Mean, Sd) UCL
Pyrene	mg/kg	7.30E+00	99% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	mg/kg	2.31E-02	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	mg/kg	7.30E+00	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	mg/kg	5.26E-02	95% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	mg/kg	4.33E-02	95% Chebyshev (Mean, Sd) UCL
Acetone	mg/kg	2.09E-01	95% Approximate Gamma UCL
Benzene	mg/kg	1.42E+00	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	mg/kg	6.61E-03	95% Student's-t UCL
Chlorobenzene	mg/kg	6.89E+00	99% Chebyshev (Mean, Sd) UCL
Chloroethane	mg/kg	1.88E-02	95% Chebyshev (Mean, Sd) UCL
Chloromethane	mg/kg	8.80E-02	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	mg/kg	1.34E+02	95% Hall's Bootstrap UCL
Cyclohexane	mg/kg	2.38E+00	99% Chebyshev (Mean, Sd) UCL

Table 1-6
Exposure Point Concentrations - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Ethylbenzene	mg/kg	2.52E+01	95% Hall's Bootstrap UCL
Isopropylbenzene (cumene)	mg/kg	1.47E+01	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	mg/kg	2.81E-01	99% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/kg	4.19E+00	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	mg/kg	4.00E-03	Maximum Result
Methylcyclohexane	mg/kg	1.62E+01	95% Hall's Bootstrap UCL
Methylene chloride	mg/kg	8.66E-03	95% Student's-t UCL
Styrene	mg/kg	1.74E-01	95% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	mg/kg	5.09E-01	99% Chebyshev (Mean, Sd) UCL
Toluene	mg/kg	2.88E-03	95% Chebyshev (Mean, Sd) UCL
trans-1,2-Dichloroethene	mg/kg	5.29E-01	99% Chebyshev (Mean, Sd) UCL
Trichloroethene	mg/kg	2.63E+00	99% Chebyshev (Mean, Sd) UCL
Vinyl chloride	mg/kg	8.95E-01	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	mg/kg	1.40E+02	95% Hall's Bootstrap UCL
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/kg	9.72E-04	95% Student's-t UCL
1,2,3,4,6,7,8-HpCDF	mg/kg	1.60E-04	95% Student's-t UCL
1,2,3,4,7,8,9-HpCDF	mg/kg	7.93E-06	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	mg/kg	1.64E-05	Maximum Result
1,2,3,4,7,8-HxCDF	mg/kg	2.26E-06	95% Student's-t UCL
1,2,3,6,7,8-HxCDD	mg/kg	7.35E-05	Maximum Result
1,2,3,6,7,8-HxCDF	mg/kg	1.50E-05	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	mg/kg	4.14E-05	Maximum Result
1,2,3,7,8,9-HxCDF	mg/kg	8.75E-06	Maximum Result
1,2,3,7,8-PeCDD	mg/kg	1.53E-05	Maximum Result
2,3,4,6,7,8-HxCDF	mg/kg	1.51E-05	95% Student's-t UCL
2,3,4,7,8-PeCDF	mg/kg	3.66E-05	95% Student's-t UCL
2,3,7,8-TCDF	mg/kg	4.63E-06	95% Student's-t UCL
OCDD	mg/kg	8.20E-03	95% Student's-t UCL
OCDF	mg/kg	3.25E-04	95% Student's-t UCL

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-7
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	1.26E+04	5.92E-03	NA		2.36E-04	NA		8.99E-07	NA		
Antimony	1.36E+01	6.39E-06	NA		2.55E-07	NA		9.71E-10	NA		
Arsenic	7.71E+00	3.62E-06	1.50E+00	5.43E-06	4.33E-07	1.50E+00	6.50E-07	5.50E-10	1.51E+01	8.28E-09	**6.09E-06**
Barium	5.13E+02	2.41E-04	NA		9.61E-06	NA		3.66E-08	NA		
Beryllium	6.14E-01	2.88E-07	NA		1.15E-08	NA		4.38E-11	8.40E+00	3.68E-10	3.68E-10
Cadmium	1.58E+00	7.42E-07	NA		2.96E-09	NA		1.13E-10	6.30E+00	7.10E-10	7.10E-10
Chromium	1.41E+03	6.62E-04	NA		2.64E-05	NA		1.01E-07	NA		
Cobalt	8.75E+00	4.11E-06	NA		1.64E-07	NA		6.25E-10	3.15E+00	1.97E-09	1.97E-09
Copper	2.29E+02	1.08E-04	NA		4.29E-06	NA		1.63E-08	NA		
Iron	2.61E+04	1.23E-02	NA		4.89E-04	NA		1.86E-06	NA		
Lead	6.40E+02	3.01E-04	NA		1.20E-05	NA		4.57E-08	NA		
Manganese	1.14E+03	5.35E-04	NA		2.14E-05	NA		8.14E-08	NA		
Nickel	4.22E+01	1.98E-05	NA		7.91E-07	NA		3.01E-09	9.10E-01	2.74E-09	2.74E-09
Selenium	2.50E+00	1.17E-06	NA		4.68E-08	NA		1.78E-10	NA		
Silver	8.43E-01	3.96E-07	NA		1.58E-08	NA		6.02E-11	NA		
Thallium	3.16E+00	1.48E-06	NA		5.92E-08	NA		2.26E-10	NA		
Vanadium	4.16E+01	1.95E-05	NA		7.80E-07	NA		2.97E-09	NA		
Zinc	5.91E+02	2.78E-04	NA		1.11E-05	NA		4.22E-08	NA		
Pesticides/PCBs											
Aldrin	1.29E+00	6.06E-07	1.70E+01	1.03E-05	1.21E-07	1.70E+01	2.05E-06	9.21E-11	1.72E+01	1.58E-09	**1.24E-05**
alpha-BHC	2.60E-02	1.22E-08	6.30E+00	7.69E-08	2.44E-09	6.30E+00	1.53E-08	1.86E-12	6.30E+00	1.17E-11	9.23E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs	Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			Total Cancer Risk
		Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
alpha-Chlordane	4.04E-02	1.90E-08	1.30E+00	2.47E-08	3.79E-09	1.30E+00	4.92E-09	2.88E-12	3.50E-01	1.01E-12	2.96E-08
4,4'-DDD	9.16E+00	4.30E-06	2.40E-01	1.03E-06	8.58E-07	2.40E-01	2.06E-07	6.54E-10	2.42E-01	1.58E-10	**1.24E-06**
4,4'-DDE	3.56E+00	1.67E-06	3.40E-01	5.68E-07	3.34E-07	3.40E-01	1.13E-07	2.54E-10	3.40E-01	8.63E-11	6.82E-07
4,4'-DDT	3.25E-01	1.53E-07	3.40E-01	5.19E-08	3.05E-08	3.40E-01	1.04E-08	2.32E-11	3.40E-01	7.88E-12	6.23E-08
beta-BHC	3.50E-02	1.64E-08	1.80E+00	2.96E-08	3.28E-09	1.80E+00	5.90E-09	2.50E-12	1.86E+00	4.63E-12	3.55E-08
delta-BHC	4.10E-03	1.93E-09	NA		3.84E-10	NA		2.93E-13	NA		
Dieldrin	1.34E+00	6.29E-07	1.60E+01	1.01E-05	1.26E-07	1.60E+01	2.01E-06	9.56E-11	1.61E+01	1.54E-09	**1.21E-05**
Endosulfan sulfate	1.60E-03	7.51E-10	NA		1.50E-10	NA		1.14E-13	NA		
Endrin	4.60E-03	2.16E-09	NA		4.31E-10	NA		3.28E-13	NA		
Endrin aldehyde	1.10E-03	5.17E-10	NA		1.03E-10	NA		7.85E-14	NA		
Endrin ketone	1.20E-02	5.64E-09	NA		1.12E-09	NA		8.57E-13	NA		
gamma-Chlordane	1.09E-01	5.12E-08	1.20E+00	6.14E-08	1.02E-08	1.20E+00	1.23E-08	7.78E-12	3.50E-01	2.72E-12	7.37E-08
Heptachlor	8.80E-03	4.13E-09	4.50E+00	1.86E-08	8.25E-10	4.50E+00	3.71E-09	6.28E-13	4.55E+00	2.86E-12	2.23E-08
Methoxychlor	3.90E-03	1.83E-09	NA		3.65E-10	NA		2.78E-13	NA		
Aroclor-1260	6.40E-01	3.01E-07	2.00E+00	6.01E-07	1.80E-07	2.00E+00	3.60E-07	4.57E-11	2.00E+00	9.14E-11	9.61E-07
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	7.23E-07	2.90E-02	2.10E-08	2.89E-07	2.90E-02	8.37E-09	3.04E-06	NA		2.93E-08
1,2-Dichlorobenzene	5.47E+01	2.57E-05	NA		1.03E-05	NA		3.21E-04	NA		
1,3-Dichlorobenzene	2.02E+00	9.49E-07	NA		3.79E-07	NA		1.19E-05	NA		
1,4-Dichlorobenzene	2.55E+01	1.20E-05	5.40E-03	6.47E-08	4.78E-06	5.40E-03	2.58E-08	1.70E-04	3.85E-02	6.54E-06	**6.63E-06**
2-Methylnaphthalene	1.14E+02	5.35E-05	NA		3.20E-05	NA		1.74E-04	NA		
2-Methylphenol	9.90E-01	4.65E-07	NA		1.86E-07	NA		7.07E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	3.38E-06	NA		1.35E-06	NA		5.14E-10	NA		
4-Methylphenol	3.60E+00	1.69E-06	NA		6.75E-07	NA		2.57E-10	NA		
Acenaphthene	9.18E+00	4.31E-06	NA		2.58E-06	NA		3.57E-06	NA		
Anthracene	1.10E+00	5.17E-07	NA		3.09E-07	NA		1.20E-07	NA		
Benzo(a)anthracene	5.50E-01	2.58E-07	1.20E+00	3.10E-07	1.55E-07	1.20E+00	1.86E-07	3.93E-11	3.85E-01	1.51E-11	4.96E-07
Benzo(a)pyrene	5.00E-01	2.35E-07	1.20E+01	2.82E-06	1.41E-07	1.20E+01	1.69E-06	3.57E-11	3.85E+00	1.37E-10	**4.50E-06**
Benzo(b)fluoranthene	4.20E-01	1.97E-07	1.20E+00	2.37E-07	1.18E-07	1.20E+00	1.42E-07	3.00E-11	3.85E-01	1.15E-11	3.78E-07
Benzo(g,h,i)perylene	4.30E-01	2.02E-07	NA		1.21E-07	NA		3.07E-11	NA		
Benzo(k)fluoranthene	4.30E-01	2.02E-07	1.20E+00	2.42E-07	1.21E-07	1.20E+00	1.45E-07	3.07E-11	3.85E-01	1.18E-11	3.87E-07
Benzyl butyl phthalate	7.60E+00	3.57E-06	1.90E-03	6.78E-09	1.42E-06	1.90E-03	2.71E-09	5.42E-10	NA		9.49E-09
Biphenyl (diphenyl)	4.40E+00	2.07E-06	NA		8.25E-07	NA		3.14E-10	NA		
bis(2-Ethylhexyl)phthalate	9.85E+00	4.63E-06	1.40E-02	6.48E-08	1.85E-06	1.40E-02	2.58E-08	7.03E-10	8.40E-03	5.91E-12	9.06E-08
Caprolactam	9.50E-02	4.46E-08	NA		1.78E-08	NA		6.78E-12	NA		
Carbazole	1.10E+00	5.17E-07	NA		2.06E-07	NA		7.85E-11	NA		
Chrysene	9.10E-01	4.27E-07	1.20E-01	5.13E-08	2.56E-07	1.20E-01	3.07E-08	6.50E-11	3.85E-02	2.50E-12	8.20E-08
Dibenz(a,h)anthracene	1.20E-01	5.64E-08	7.30E+00	4.11E-07	3.37E-08	7.30E+00	2.46E-07	8.57E-12	4.20E+00	3.60E-11	6.58E-07
Dibenzofuran	4.10E+00	1.93E-06	NA		7.68E-07	NA		6.95E-07	NA		
Di-n-butyl phthalate	2.90E+00	1.36E-06	NA		5.43E-07	NA		2.07E-10	NA		
Fluoranthene	4.20E+00	1.97E-06	NA		1.18E-06	NA		3.00E-10	NA		
Fluorene	8.31E+00	3.90E-06	NA		2.34E-06	NA		1.39E-06	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	2.07E-07	1.20E+00	2.48E-07	1.24E-07	1.20E+00	1.48E-07	3.14E-11	3.85E-01	1.21E-11	3.96E-07
Naphthalene	5.28E+01	2.48E-05	1.20E-01	2.98E-06	1.48E-05	1.20E-01	1.78E-06	8.06E-05	1.19E-01	9.60E-06	**1.44E-05**
Phenanthrene	1.21E+01	5.68E-06	NA		3.40E-06	NA		8.64E-10	NA		
Pyrene	3.97E+00	1.86E-06	NA		1.12E-06	NA		8.91E-08	NA		
1,1,1-Trichloroethane	2.51E-02	1.18E-08	NA		4.70E-09	NA		1.02E-06	NA		
1,1-Dichloroethane	1.01E+01	4.74E-06	5.70E-03	2.70E-08	1.89E-06	5.70E-03	1.08E-08	3.92E-04	5.70E-03	2.23E-06	**2.27E-06**
1,1-Dichloroethene	6.80E-02	3.19E-08	NA		1.27E-08	NA		4.50E-06	9.10E-02	4.09E-07	4.09E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
1,2-Dichloroethane	6.05E-02	2.84E-08	9.10E-02	2.59E-09	1.13E-08	9.10E-02	1.03E-09	1.48E-06	9.10E-02	1.34E-07	1.38E-07
Acetone	2.26E-01	1.06E-07	NA		4.24E-08	NA		1.96E-06	NA		
Benzene	1.93E+00	9.06E-07	1.00E-01	9.06E-08	3.62E-07	1.00E-01	3.62E-08	6.43E-05	1.02E-01	6.53E-06	**6.66E-06**
Carbon disulfide	6.29E-03	2.95E-09	NA		1.18E-09	NA		5.08E-07	NA		
Chlorobenzene	1.01E+01	4.74E-06	NA		1.89E-06	NA		1.40E-04	NA		
Chloroethane	2.40E-02	1.13E-08	NA		4.50E-09	NA		1.99E-06	2.90E-03	5.77E-09	5.77E-09
Chloromethane	1.27E-01	5.96E-08	NA		2.38E-08	NA		2.22E-06	NA		
cis-1,2-Dichloroethene	1.49E+02	7.00E-05	NA		2.79E-05	NA		4.75E-03	NA		
Cyclohexane	2.55E+00	1.20E-06	NA		4.78E-07	NA		2.29E-04	NA		
Ethylbenzene	2.24E+01	1.05E-05	1.10E-02	1.16E-07	4.20E-06	1.10E-02	4.62E-08	3.57E-04	8.75E-03	3.13E-06	**3.29E-06**
Isopropylbenzene (cumene)	5.35E+00	2.51E-06	NA		1.00E-06	NA		1.64E-04	NA		
Methyl ethyl ketone	3.14E-01	1.47E-07	NA		5.88E-08	NA		1.78E-06	NA		
Methyl isobutyl ketone	5.74E+00	2.70E-06	NA		1.08E-06	NA		2.52E-05	NA		
Methyl tert-butyl ether	4.00E-03	1.88E-09	1.80E-03	3.38E-12	7.50E-10	1.80E-03	1.35E-12	9.40E-08	9.10E-04	8.55E-11	9.02E-11
Methylcyclohexane	1.02E+01	4.79E-06	NA		1.91E-06	NA		5.55E-04	NA		
Methylene chloride	8.38E-03	3.94E-09	1.40E-02	5.51E-11	1.57E-09	1.40E-02	2.20E-11	3.70E-07	3.50E-03	1.30E-09	1.37E-09
Styrene	5.14E-01	2.41E-07	NA		9.63E-08	NA		4.22E-06	NA		
Tetrachloroethene	8.76E-02	4.11E-08	5.40E-01	2.22E-08	1.64E-08	5.40E-01	8.86E-09	3.78E-06	2.07E-02	7.81E-08	1.09E-07
Toluene	1.16E+02	5.45E-05	NA		2.17E-05	NA		3.21E-03	NA		
trans-1,2-Dichloroethene	6.38E-01	3.00E-07	NA		1.20E-07	NA		3.00E-05	NA		
Trichloroethene	5.21E-01	2.45E-07	5.90E-03	1.44E-09	9.76E-08	5.90E-03	5.76E-10	1.76E-05	7.00E-03	1.23E-07	1.25E-07
Vinyl chloride	1.28E+00	6.01E-07	7.20E-01	4.33E-07	2.40E-07	7.20E-01	1.73E-07	1.35E-04	2.73E-01	3.69E-05	**3.75E-05**
Xylenes, total	1.57E+02	7.37E-05	NA		2.94E-05	NA		2.84E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	4.57E-10	1.50E+03	6.85E-07	5.46E-11	1.50E+03	8.20E-08	6.94E-14	1.50E+03	1.04E-10	7.67E-07
1,2,3,4,6,7,8-HpCDF	1.60E-04	7.51E-11	1.50E+03	1.13E-07	9.00E-12	1.50E+03	1.35E-08	1.14E-14	1.50E+03	1.71E-11	1.26E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	3.72E-12	1.50E+03	5.59E-09	4.46E-13	1.50E+03	6.69E-10	5.66E-16	1.50E+03	8.49E-13	6.26E-09
1,2,3,4,7,8-HxCDD	1.64E-05	7.70E-12	1.50E+04	1.16E-07	9.22E-13	1.50E+04	1.38E-08	1.17E-15	1.50E+04	1.76E-11	1.29E-07
1,2,3,4,7,8-HxCDF	2.26E-06	1.06E-12	1.50E+04	1.59E-08	1.27E-13	1.50E+04	1.91E-09	1.61E-16	1.50E+04	2.42E-12	1.78E-08
1,2,3,6,7,8-HxCDD	7.35E-05	3.45E-11	1.50E+04	5.18E-07	4.13E-12	1.50E+04	6.20E-08	5.25E-15	1.50E+04	7.87E-11	5.80E-07
1,2,3,6,7,8-HxCDF	1.50E-05	7.05E-12	1.50E+04	1.06E-07	8.43E-13	1.50E+04	1.26E-08	1.07E-15	1.50E+04	1.61E-11	1.18E-07
1,2,3,7,8,9-HxCDD	4.14E-05	1.94E-11	1.50E+04	2.92E-07	2.33E-12	1.50E+04	3.49E-08	2.96E-15	1.50E+04	4.43E-11	3.27E-07
1,2,3,7,8,9-HxCDF	8.75E-06	4.11E-12	1.50E+04	6.16E-08	4.92E-13	1.50E+04	7.38E-09	6.25E-16	1.50E+04	9.37E-12	6.90E-08
1,2,3,7,8-PeCDD	1.53E-05	7.19E-12	1.50E+05	1.08E-06	8.60E-13	1.50E+05	1.29E-07	1.09E-15	1.50E+05	1.64E-10	**1.21E-06**
2,3,4,6,7,8-HxCDF	1.51E-05	7.09E-12	1.50E+04	1.06E-07	8.49E-13	1.50E+04	1.27E-08	1.08E-15	1.50E+04	1.62E-11	1.19E-07
2,3,4,7,8-PeCDF	3.66E-05	1.72E-11	7.50E+04	1.29E-06	2.06E-12	7.50E+04	1.54E-07	2.61E-15	7.50E+04	1.96E-10	**1.44E-06**
2,3,7,8-TCDF	4.63E-06	2.17E-12	1.50E+04	3.26E-08	2.60E-13	1.50E+04	3.90E-09	3.30E-16	1.50E+04	4.96E-12	3.65E-08
OCDD	8.20E-03	3.85E-09	1.50E+01	5.78E-08	4.61E-10	1.50E+01	6.91E-09	5.85E-13	1.50E+01	8.78E-12	6.47E-08
OCDF	3.25E-04	1.53E-10	1.50E+01	2.29E-09	1.83E-11	1.50E+01	2.74E-10	2.32E-14	1.50E+01	3.48E-13	2.56E-09
			Total Risk:	4.09E-05		**Total Risk:**	1.07E-05		**Total Risk:**	6.57E-05	**1.17E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-8
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.26E+04	1.73E-02	1.00E+00	1.73E-02	6.89E-04	1.00E+00	6.89E-04	2.62E-06	1.40E-03	1.87E-03	1.98E-02
Antimony	1.36E+01	1.86E-05	4.00E-04	4.66E-02	7.43E-07	4.00E-04	1.86E-03	2.83E-09	NA		4.84E-02
Arsenic	7.71E+00	1.06E-05	3.00E-04	3.52E-02	1.26E-06	3.00E-04	4.21E-03	1.61E-09	4.29E-06	3.75E-04	3.98E-02
Barium	5.13E+02	7.03E-04	2.00E-01	3.51E-03	2.80E-05	2.00E-01	1.40E-04	1.07E-07	1.43E-04	7.48E-04	4.40E-03
Beryllium	6.14E-01	8.41E-07	2.00E-03	4.21E-04	3.36E-08	2.00E-03	1.68E-05	1.28E-10	2.00E-06	6.39E-05	5.01E-04
Cadmium	1.58E+00	2.16E-06	5.00E-04	4.33E-03	8.64E-09	5.00E-04	1.73E-05	3.29E-10	2.86E-06	1.15E-04	4.46E-03
Chromium	1.41E+03	1.93E-03	NA		7.71E-05	NA		2.94E-07	NA		
Cobalt	8.75E+00	1.20E-05	3.00E-04	4.00E-02	4.78E-07	3.00E-04	1.59E-03	1.82E-09	1.71E-06	1.06E-03	4.26E-02
Copper	2.29E+02	3.14E-04	4.00E-02	7.84E-03	1.25E-05	4.00E-02	3.13E-04	4.77E-08	NA		8.16E-03
Iron	2.61E+04	3.58E-02	7.00E-01	5.11E-02	1.43E-03	7.00E-01	2.04E-03	5.43E-06	NA		5.31E-02
Lead	6.40E+02	8.77E-04	NA		3.50E-05	NA		1.33E-07	NA		
Manganese	1.14E+03	1.56E-03	2.40E-02	6.51E-02	6.23E-05	2.40E-02	2.60E-03	2.37E-07	1.43E-05	1.66E-02	8.43E-02
Nickel	4.22E+01	5.78E-05	2.00E-02	2.89E-03	2.31E-06	2.00E-02	1.15E-04	8.79E-09	2.57E-05	3.42E-04	3.35E-03
Selenium	2.50E+00	3.42E-06	5.00E-03	6.85E-04	1.37E-07	5.00E-03	2.73E-05	5.20E-10	5.71E-03	9.11E-08	7.12E-04
Silver	8.43E-01	1.15E-06	5.00E-03	2.31E-04	4.61E-08	5.00E-03	9.22E-06	1.76E-10	NA		2.40E-04
Thallium	3.16E+00	4.33E-06	6.60E-05	6.56E-02	1.73E-07	6.60E-05	2.62E-03	6.58E-10	NA		6.82E-02
Vanadium	4.16E+01	5.70E-05	5.00E-03	1.14E-02	2.27E-06	5.00E-03	4.55E-04	8.66E-09	NA		1.19E-02
Zinc	5.91E+02	8.10E-04	3.00E-01	2.70E-03	3.23E-05	3.00E-01	1.08E-04	1.23E-07	NA		2.81E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
Aldrin	1.29E+00	1.77E-06	3.00E-05	5.89E-02	3.53E-07	3.00E-05	1.18E-02	2.69E-10	NA		7.07E-02
alpha-BHC	2.60E-02	3.56E-08	5.00E-04	7.12E-05	7.11E-09	5.00E-04	1.42E-05	5.41E-12	NA		8.54E-05
alpha-Chlordane	4.04E-02	5.53E-08	5.00E-04	1.11E-04	1.10E-08	5.00E-04	2.21E-05	8.41E-12	2.00E-04	4.21E-08	1.33E-04
4,4'-DDD	9.16E+00	1.25E-05	NA		2.50E-06	NA		1.91E-09	NA		
4,4'-DDE	3.56E+00	4.88E-06	NA		9.73E-07	NA		7.41E-10	NA		
4,4'-DDT	3.25E-01	4.45E-07	5.00E-04	8.90E-04	8.88E-08	5.00E-04	1.78E-04	6.77E-11	NA		1.07E-03
beta-BHC	3.50E-02	4.79E-08	NA		9.57E-09	NA		7.29E-12	NA		
delta-BHC	4.10E-03	5.62E-09	NA		1.12E-09	NA		8.54E-13	NA		
Dieldrin	1.34E+00	1.84E-06	5.00E-05	3.67E-02	3.66E-07	5.00E-05	7.32E-03	2.79E-10	NA		4.40E-02
Endosulfan sulfate	1.60E-03	2.19E-09	6.00E-03	3.65E-07	4.37E-10	6.00E-03	7.29E-08	3.33E-13	NA		4.38E-07
Endrin	4.60E-03	6.30E-09	3.00E-04	2.10E-05	1.26E-09	3.00E-04	4.19E-06	9.58E-13	NA		2.52E-05
Endrin aldehyde	1.10E-03	1.51E-09	3.00E-04	5.02E-06	3.01E-10	3.00E-04	1.00E-06	2.29E-13	NA		6.02E-06
Endrin ketone	1.20E-02	1.64E-08	3.00E-04	5.48E-05	3.28E-09	3.00E-04	1.09E-05	2.50E-12	NA		6.57E-05
gamma-Chlordane	1.09E-01	1.49E-07	5.00E-04	2.99E-04	2.98E-08	5.00E-04	5.96E-05	2.27E-11	2.00E-04	1.13E-07	3.58E-04
Heptachlor	8.80E-03	1.21E-08	3.00E-05	4.02E-04	2.40E-09	3.00E-05	8.02E-05	1.83E-12	NA		4.82E-04
Methoxychlor	3.90E-03	5.34E-09	2.00E-05	2.67E-04	1.07E-09	2.00E-05	5.33E-05	8.12E-13	NA		3.20E-04
Aroclor-1260	6.40E-01	8.77E-07	2.00E-05	4.38E-02	5.25E-07	2.00E-05	2.62E-02	1.33E-10	NA		7.01E-02
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	2.11E-06	1.00E-02	2.11E-04	8.42E-07	1.00E-02	8.42E-05	8.87E-06	5.71E-04	1.55E-02	1.58E-02
1,2-Dichlorobenzene	5.47E+01	7.49E-05	9.00E-02	8.33E-04	2.99E-05	9.00E-02	3.32E-04	9.37E-04	5.71E-02	1.64E-02	1.76E-02
1,3-Dichlorobenzene	2.02E+00	2.77E-06	NA		1.10E-06	NA		3.46E-05	NA		
1,4-Dichlorobenzene	2.55E+01	3.49E-05	7.00E-02	4.99E-04	1.39E-05	7.00E-02	1.99E-04	4.96E-04	2.29E-01	2.17E-03	2.87E-03
2-Methylnaphthalene	1.14E+02	1.56E-04	4.00E-03	3.90E-02	9.35E-05	4.00E-03	2.34E-02	5.08E-04	NA		6.24E-02
2-Methylphenol	9.90E-01	1.36E-06	5.00E-02	2.71E-05	5.41E-07	5.00E-02	1.08E-05	2.06E-10	1.71E-01	1.20E-09	3.79E-05
4-Chloro-3-methylphenol	7.20E+00	9.86E-06	NA		3.94E-06	NA		1.50E-09	NA		
4-Methylphenol	3.60E+00	4.93E-06	5.00E-03	9.86E-04	1.97E-06	5.00E-03	3.94E-04	7.49E-10	1.71E-01	4.37E-09	1.38E-03
Acenaphthene	9.18E+00	1.26E-05	6.00E-02	2.10E-04	7.53E-06	6.00E-02	1.25E-04	1.04E-05	NA		3.35E-04
Anthracene	1.10E+00	1.51E-06	3.00E-01	5.02E-06	9.02E-07	3.00E-01	3.01E-06	3.49E-07	NA		8.03E-06
Benzo(a)anthracene	5.50E-01	7.53E-07	NA		4.51E-07	NA		1.15E-10	NA		
Benzo(a)pyrene	5.00E-01	6.85E-07	NA		4.10E-07	NA		1.04E-10	NA		
Benzo(b)fluoranthene	4.20E-01	5.75E-07	NA		3.44E-07	NA		8.74E-11	NA		
Benzo(g,h,i)perylene	4.30E-01	5.89E-07	NA		3.53E-07	NA		8.95E-11	NA		
Benzo(k)fluoranthene	4.30E-01	5.89E-07	NA		3.53E-07	NA		8.95E-11	NA		
Benzyl butyl phthalate	7.60E+00	1.04E-05	2.00E-01	5.21E-05	4.15E-06	2.00E-01	2.08E-05	1.58E-09	NA		7.28E-05
Biphenyl (diphenyl)	4.40E+00	6.03E-06	5.00E-02	1.21E-04	2.40E-06	5.00E-02	4.81E-05	9.16E-10	NA		1.69E-04
bis(2-Ethylhexyl)phthalate	9.85E+00	1.35E-05	2.00E-02	6.75E-04	5.38E-06	2.00E-02	2.69E-04	2.05E-09	NA		9.44E-04
Caprolactam	9.50E-02	1.30E-07	5.00E-01	2.60E-07	5.19E-08	5.00E-01	1.04E-07	1.98E-11	NA		3.64E-07
Carbazole	1.10E+00	1.51E-06	NA		6.01E-07	NA		2.29E-10	NA		
Chrysene	9.10E-01	1.25E-06	NA		7.46E-07	NA		1.89E-10	NA		
Dibenz(a,h)anthracene	1.20E-01	1.64E-07	NA		9.84E-08	NA		2.50E-11	NA		
Dibenzofuran	4.10E+00	5.62E-06	2.00E-03	2.81E-03	2.24E-06	2.00E-03	1.12E-03	2.03E-06	NA		3.93E-03
Di-n-butyl phthalate	2.90E+00	3.97E-06	1.00E-01	3.97E-05	1.59E-06	1.00E-01	1.59E-05	6.04E-10	NA		5.56E-05
Fluoranthene	4.20E+00	5.75E-06	4.00E-02	1.44E-04	3.44E-06	4.00E-02	8.61E-05	8.74E-10	NA		2.30E-04
Fluorene	8.31E+00	1.14E-05	4.00E-02	2.85E-04	6.81E-06	4.00E-02	1.70E-04	4.05E-06	NA		4.55E-04
Indeno(1,2,3-c,d)pyrene	4.40E-01	6.03E-07	NA		3.61E-07	NA		9.16E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw	Exposure Route = Oral: Chronic Daily Intake	Exposure Route = Oral: Reference Dose	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake	Exposure Route = Dermal: Reference Dose	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake	Exposure Route = Inhalation: Reference Dose	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient
	[mg/kg]	[mg/kg/day]	[mg/kg/day]		[mg/kg/day]	[mg/kg/day]		[mg/kg/day]	[mg/kg/day]		[-]
Naphthalene	5.28E+01	7.23E-05	2.00E-02	3.62E-03	4.33E-05	2.00E-02	2.16E-03	2.35E-04	8.57E-04	2.74E-01	**2.80E-01**
Phenanthrene	1.21E+01	1.66E-05	NA		9.92E-06	NA		2.52E-09	NA		
Pyrene	3.97E+00	5.44E-06	3.00E-02	1.81E-04	3.25E-06	3.00E-02	1.08E-04	2.60E-07	NA		2.90E-04
1,1,1-Trichloroethane	2.51E-02	3.44E-08	2.00E+00	1.72E-08	1.37E-08	2.00E+00	6.86E-09	2.98E-06	1.43E+00	2.09E-06	2.11E-06
1,1-Dichloroethane	1.01E+01	1.38E-05	2.00E-01	6.92E-05	5.52E-06	2.00E-01	2.76E-05	1.14E-03	NA		9.68E-05
1,1-Dichloroethene	6.80E-02	9.32E-08	5.00E-02	1.86E-06	3.72E-08	5.00E-02	7.43E-07	1.31E-05	2.00E-02	6.56E-04	6.58E-04
1,2-Dichloroethane	6.05E-02	8.29E-08	2.00E-02	4.14E-06	3.31E-08	2.00E-02	1.65E-06	4.31E-06	6.86E-01	6.28E-06	1.21E-05
Acetone	2.26E-01	3.10E-07	9.00E-01	3.44E-07	1.24E-07	9.00E-01	1.37E-07	5.72E-06	8.86E+00	6.46E-07	1.13E-06
Benzene	1.93E+00	2.64E-06	4.00E-03	6.61E-04	1.05E-06	4.00E-03	2.64E-04	1.88E-04	8.57E-03	2.19E-02	2.28E-02
Carbon disulfide	6.29E-03	8.62E-09	1.00E-01	8.62E-08	3.44E-09	1.00E-01	3.44E-08	1.48E-06	2.00E-01	7.41E-06	7.53E-06
Chlorobenzene	1.01E+01	1.38E-05	2.00E-02	6.92E-04	5.52E-06	2.00E-02	2.76E-04	4.07E-04	1.43E-02	2.85E-02	2.95E-02
Chloroethane	2.40E-02	3.29E-08	NA		1.31E-08	NA		5.81E-06	2.86E+00	2.03E-06	2.03E-06
Chloromethane	1.27E-01	1.74E-07	NA		6.94E-08	NA		6.49E-06	2.57E-02	2.52E-04	2.52E-04
cis-1,2-Dichloroethene	1.49E+02	2.04E-04	1.00E-02	2.04E-02	8.14E-05	1.00E-02	8.14E-03	1.39E-02	NA		2.86E-02
Cyclohexane	2.55E+00	3.49E-06	NA		1.39E-06	NA		6.68E-04	1.71E+00	3.90E-04	3.90E-04
Ethylbenzene	2.24E+01	3.07E-05	1.00E-01	3.07E-04	1.22E-05	1.00E-01	1.22E-04	1.04E-03	2.86E-01	3.65E-03	4.08E-03
Isopropylbenzene (cumene)	5.35E+00	7.33E-06	1.00E-01	7.33E-05	2.92E-06	1.00E-01	2.92E-05	4.79E-04	1.14E-01	4.19E-03	4.30E-03
Methyl ethyl ketone	3.14E-01	4.30E-07	6.00E-01	7.17E-07	1.72E-07	6.00E-01	2.86E-07	5.20E-06	1.43E+00	3.64E-06	4.64E-06
Methyl isobutyl ketone	5.74E+00	7.86E-06	8.00E-02	9.83E-05	3.14E-06	8.00E-02	3.92E-05	7.34E-05	8.57E-01	8.56E-05	2.23E-04
Methyl tert-butyl ether	4.00E-03	5.48E-09	NA		2.19E-09	NA		2.74E-07	8.57E-01	3.20E-07	3.20E-07
Methylcyclohexane	1.02E+01	1.40E-05	NA		5.58E-06	NA		1.62E-03	8.60E-01	1.88E-03	1.88E-03
Methylene chloride	8.38E-03	1.15E-08	6.00E-02	1.91E-07	4.58E-09	6.00E-02	7.63E-08	1.08E-06	2.86E-01	3.78E-06	4.05E-06
Styrene	5.14E-01	7.04E-07	2.00E-01	3.52E-06	2.81E-07	2.00E-01	1.40E-06	1.23E-05	2.57E-01	4.79E-05	5.28E-05
Tetrachloroethene	8.76E-02	1.20E-07	1.00E-02	1.20E-05	4.79E-08	1.00E-02	4.79E-06	1.10E-05	1.00E-02	1.10E-03	1.12E-03
Toluene	1.16E+02	1.59E-04	8.00E-02	1.99E-03	6.34E-05	8.00E-02	7.93E-04	9.37E-03	8.57E-02	1.09E-01	**1.12E-01**
trans-1,2-Dichloroethene	6.38E-01	8.74E-07	2.00E-02	4.37E-05	3.49E-07	2.00E-02	1.74E-05	8.75E-05	1.71E-02	5.11E-03	5.17E-03
Trichloroethene	5.21E-01	7.14E-07	3.00E-04	2.38E-03	2.85E-07	3.00E-04	9.49E-04	5.13E-05	1.00E-02	5.13E-03	8.46E-03
Vinyl chloride	1.28E+00	1.75E-06	3.00E-03	5.84E-04	7.00E-07	3.00E-03	2.33E-04	3.94E-04	2.86E-02	1.38E-02	1.46E-02
Xylenes, total	1.57E+02	2.15E-04	2.00E-01	1.08E-03	8.58E-05	2.00E-01	4.29E-04	8.27E-03	2.86E-02	2.90E-01	**2.91E-01**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.33E-09	NA		1.59E-10	NA		2.02E-13	1.14E-08	1.77E-05	1.77E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	2.19E-10	NA		2.62E-11	NA		3.33E-14	1.14E-08	2.91E-06	2.91E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	1.09E-11	NA		1.30E-12	NA		1.65E-15	1.14E-08	1.44E-07	1.44E-07
1,2,3,4,7,8-HxCDD	1.64E-05	2.25E-11	NA		2.69E-12	NA		3.41E-15	1.14E-08	2.99E-07	2.99E-07
1,2,3,4,7,8-HxCDF	2.26E-06	3.10E-12	NA		3.71E-13	NA		4.71E-16	1.14E-08	4.12E-08	4.12E-08
1,2,3,6,7,8-HxCDD	7.35E-05	1.01E-10	NA		1.21E-11	NA		1.53E-14	1.14E-08	1.34E-06	1.34E-06
1,2,3,6,7,8-HxCDF	1.50E-05	2.05E-11	NA		2.46E-12	NA		3.12E-15	1.14E-08	2.73E-07	2.73E-07
1,2,3,7,8,9-HxCDD	4.14E-05	5.67E-11	NA		6.79E-12	NA		8.62E-15	1.14E-08	7.54E-07	7.54E-07
1,2,3,7,8,9-HxCDF	8.75E-06	1.20E-11	NA		1.43E-12	NA		1.82E-15	1.14E-08	1.59E-07	1.59E-07
1,2,3,7,8-PeCDD	1.53E-05	2.10E-11	NA		2.51E-12	NA		3.19E-15	1.14E-08	2.79E-07	2.79E-07
2,3,4,6,7,8-HxCDF	1.51E-05	2.07E-11	NA		2.48E-12	NA		3.14E-15	1.14E-08	2.75E-07	2.75E-07
2,3,4,7,8-PeCDF	3.66E-05	5.01E-11	NA		6.00E-12	NA		7.62E-15	1.14E-08	6.67E-07	6.67E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
2,3,7,8-TCDF	4.63E-06	6.34E-12	NA		7.59E-13	NA		9.64E-16	1.14E-08	8.43E-08	8.43E-08
OCDD	8.20E-03	1.12E-08	NA		1.34E-09	NA		1.71E-12	1.14E-08	1.49E-04	1.49E-04
OCDF	3.25E-04	4.45E-10	NA		5.33E-11	NA		6.77E-14	1.14E-08	5.92E-06	5.92E-06
		Total Risk (Hazard Index):		0.57	Total Risk (Hazard Index):		0.10	Total Risk (Hazard Index):		0.82	**1.49**

Notes:

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-9

Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.26E+04	1.38E-02	NA		4.00E-04	NA		5.25E-07	NA		
Antimony	1.36E+01	1.49E-05	NA		4.32E-07	NA		5.66E-10	NA		
Arsenic	7.71E+00	8.45E-06	1.50E+00	1.27E-05	7.35E-07	1.50E+00	1.10E-06	3.21E-10	1.51E+01	4.83E-09	**1.38E-05**
Barium	5.13E+02	5.62E-04	NA		1.63E-05	NA		2.14E-08	NA		
Beryllium	6.14E-01	6.73E-07	NA		1.95E-08	NA		2.56E-11	8.40E+00	2.15E-10	2.15E-10
Cadmium	1.58E+00	1.73E-06	NA		5.02E-09	NA		6.58E-11	6.30E+00	4.14E-10	4.14E-10
Chromium	1.41E+03	1.55E-03	NA		4.48E-05	NA		5.87E-08	NA		
Cobalt	8.75E+00	9.59E-06	NA		2.78E-07	NA		3.64E-10	3.15E+00	1.15E-09	1.15E-09
Copper	2.29E+02	2.51E-04	NA		7.28E-06	NA		9.53E-09	NA		
Iron	2.61E+04	2.86E-02	NA		8.29E-04	NA		1.09E-06	NA		
Lead	6.40E+02	7.01E-04	NA		2.03E-05	NA		2.66E-08	NA		
Manganese	1.14E+03	1.25E-03	NA		3.62E-05	NA		4.75E-08	NA		
Nickel	4.22E+01	4.62E-05	NA		1.34E-06	NA		1.76E-09	9.10E-01	1.60E-09	1.60E-09
Selenium	2.50E+00	2.74E-06	NA		7.95E-08	NA		1.04E-10	NA		
Silver	8.43E-01	9.24E-07	NA		2.68E-08	NA		3.51E-11	NA		
Thallium	3.16E+00	3.46E-06	NA		1.00E-07	NA		1.32E-10	NA		
Vanadium	4.16E+01	4.56E-05	NA		1.32E-06	NA		1.73E-09	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Zinc	5.91E+02	6.48E-04	NA		1.88E-05	NA		2.46E-08	NA		
Pesticides/PCBs											
Aldrin	1.29E+00	1.41E-06	1.70E+01	2.40E-05	2.05E-07	1.70E+01	3.48E-06	5.37E-11	1.72E+01	9.21E-10	**2.75E-05**
alpha-BHC	2.60E-02	2.85E-08	6.30E+00	1.80E-07	4.13E-09	6.30E+00	2.60E-08	1.08E-12	6.30E+00	6.82E-12	2.06E-07
alpha-Chlordane	4.04E-02	4.43E-08	1.30E+00	5.76E-08	6.42E-09	1.30E+00	8.35E-09	1.68E-12	3.50E-01	5.89E-13	6.59E-08
4,4'-DDD	9.16E+00	1.00E-05	2.40E-01	2.41E-06	1.46E-06	2.40E-01	3.49E-07	3.81E-10	2.42E-01	9.21E-11	**2.76E-06**
4,4'-DDE	3.56E+00	3.90E-06	3.40E-01	1.33E-06	5.66E-07	3.40E-01	1.92E-07	1.48E-10	3.40E-01	5.03E-11	**1.52E-06**
4,4'-DDT	3.25E-01	3.56E-07	3.40E-01	1.21E-07	5.16E-08	3.40E-01	1.76E-08	1.35E-11	3.40E-01	4.59E-12	1.39E-07
beta-BHC	3.50E-02	3.84E-08	1.80E+00	6.90E-08	5.56E-09	1.80E+00	1.00E-08	1.46E-12	1.86E+00	2.70E-12	7.91E-08
delta-BHC	4.10E-03	4.49E-09	NA		6.52E-10	NA		1.71E-13	NA		
Dieldrin	1.34E+00	1.47E-06	1.60E+01	2.35E-05	2.13E-07	1.60E+01	3.41E-06	5.58E-11	1.61E+01	8.98E-10	**2.69E-05**
Endosulfan sulfate	1.60E-03	1.75E-09	NA		2.54E-10	NA		6.66E-14	NA		
Endrin	4.60E-03	5.04E-09	NA		7.31E-10	NA		1.92E-13	NA		
Endrin aldehyde	1.10E-03	1.21E-09	NA		1.75E-10	NA		4.58E-14	NA		
Endrin ketone	1.20E-02	1.32E-08	NA		1.91E-09	NA		5.00E-13	NA		
gamma-Chlordane	1.09E-01	1.19E-07	1.20E+00	1.43E-07	1.73E-08	1.20E+00	2.08E-08	4.54E-12	3.50E-01	1.59E-12	1.64E-07
Heptachlor	8.80E-03	9.64E-09	4.50E+00	4.34E-08	1.40E-09	4.50E+00	6.29E-09	3.66E-13	4.55E+00	1.67E-12	4.97E-08
Methoxychlor	3.90E-03	4.27E-09	NA		6.20E-10	NA		1.62E-13	NA		
Aroclor-1260	6.40E-01	7.01E-07	2.00E+00	1.40E-06	3.05E-07	2.00E+00	6.10E-07	2.66E-11	2.00E+00	5.33E-11	**2.01E-06**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	1.69E-06	2.90E-02	4.89E-08	4.89E-07	2.90E-02	1.42E-08	1.77E-06	NA		6.31E-08
1,2-Dichlorobenzene	5.47E+01	5.99E-05	NA		1.74E-05	NA		1.87E-04	NA		
1,3-Dichlorobenzene	2.02E+00	2.21E-06	NA		6.42E-07	NA		6.92E-06	NA		
1,4-Dichlorobenzene	2.55E+01	2.79E-05	5.40E-03	1.51E-07	8.10E-06	5.40E-03	4.38E-08	9.91E-05	3.85E-02	3.82E-06	**4.01E-06**
2-Methylnaphthalene	1.14E+02	1.25E-04	NA		5.43E-05	NA		1.02E-04	NA		
2-Methylphenol	9.90E-01	1.08E-06	NA		3.15E-07	NA		4.12E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	7.89E-06	NA		2.29E-06	NA		3.00E-10	NA		
4-Methylphenol	3.60E+00	3.95E-06	NA		1.14E-06	NA		1.50E-10	NA		
Acenaphthene	9.18E+00	1.01E-05	NA		4.38E-06	NA		2.08E-06	NA		
Anthracene	1.10E+00	1.21E-06	NA		5.24E-07	NA		6.98E-08	NA		
Benzo(a)anthracene	5.50E-01	6.03E-07	1.20E+00	7.23E-07	2.62E-07	1.20E+00	3.15E-07	2.29E-11	3.85E-01	8.82E-12	**1.04E-06**
Benzo(a)pyrene	5.00E-01	5.48E-07	1.20E+01	6.58E-06	2.38E-07	1.20E+01	2.86E-06	2.08E-11	3.85E+00	8.02E-11	**9.44E-06**
Benzo(b)fluoranthene	4.20E-01	4.60E-07	1.20E+00	5.52E-07	2.00E-07	1.20E+00	2.40E-07	1.75E-11	3.85E-01	6.73E-12	7.93E-07
Benzo(g,h,i)perylene	4.30E-01	4.71E-07	NA		2.05E-07	NA		1.79E-11	NA		
Benzo(k)fluoranthene	4.30E-01	4.71E-07	1.20E+00	5.65E-07	2.05E-07	1.20E+00	2.46E-07	1.79E-11	3.85E-01	6.89E-12	8.11E-07
Benzyl butyl phthalate	7.60E+00	8.33E-06	1.90E-03	1.58E-08	2.42E-06	1.90E-03	4.59E-09	3.16E-10	NA		2.04E-08
Biphenyl (diphenyl)	4.40E+00	4.82E-06	NA		1.40E-06	NA		1.83E-10	NA		
bis(2-Ethylhexyl)phthalate	9.85E+00	1.08E-05	1.40E-02	1.51E-07	3.13E-06	1.40E-02	4.38E-08	4.10E-10	8.40E-03	3.45E-12	1.95E-07
Caprolactam	9.50E-02	1.04E-07	NA		3.02E-08	NA		3.96E-12	NA		
Carbazole	1.10E+00	1.21E-06	NA		3.50E-07	NA		4.58E-11	NA		
Chrysene	9.10E-01	9.97E-07	1.20E-01	1.20E-07	4.34E-07	1.20E-01	5.21E-08	3.79E-11	3.85E-02	1.46E-12	1.72E-07
Dibenz(a,h)anthracene	1.20E-01	1.32E-07	7.30E+00	9.60E-07	5.72E-08	7.30E+00	4.18E-07	5.00E-12	4.20E+00	2.10E-11	**1.38E-06**
Dibenzofuran	4.10E+00	4.49E-06	NA		1.30E-06	NA		4.05E-07	NA		
Di-n-butyl phthalate	2.90E+00	3.18E-06	NA		9.22E-07	NA		1.21E-10	NA		
Fluoranthene	4.20E+00	4.60E-06	NA		2.00E-06	NA		1.75E-10	NA		
Fluorene	8.31E+00	9.11E-06	NA		3.96E-06	NA		8.11E-07	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Indeno(1,2,3-c,d)pyrene	4.40E-01	4.82E-07	1.20E+00	5.79E-07	2.10E-07	1.20E+00	2.52E-07	1.83E-11	3.85E-01	7.05E-12	8.30E-07
Naphthalene	5.28E+01	5.79E-05	1.20E-01	6.94E-06	2.52E-05	1.20E-01	3.02E-06	4.70E-05	1.19E-01	5.60E-06	**1.56E-05**
Phenanthrene	1.21E+01	1.33E-05	NA		5.77E-06	NA		5.04E-10	NA		
Pyrene	3.97E+00	4.35E-06	NA		1.89E-06	NA		5.20E-08	NA		
1,1,1-Trichloroethane	2.51E-02	2.75E-08	NA		7.98E-09	NA		5.96E-07	NA		
1,1-Dichloroethane	1.01E+01	1.11E-05	5.70E-03	6.31E-08	3.21E-06	5.70E-03	1.83E-08	2.29E-04	5.70E-03	1.30E-06	**1.38E-06**
1,1-Dichloroethene	6.80E-02	7.45E-08	NA		2.16E-08	NA		2.62E-06	9.10E-02	2.39E-07	2.39E-07
1,2-Dichloroethane	6.05E-02	6.63E-08	9.10E-02	6.03E-09	1.92E-08	9.10E-02	1.75E-09	8.61E-07	9.10E-02	7.84E-08	8.62E-08
Acetone	2.26E-01	2.48E-07	NA		7.18E-08	NA		1.14E-06	NA		
Benzene	1.93E+00	2.12E-06	1.00E-01	2.12E-07	6.13E-07	1.00E-01	6.13E-08	3.75E-05	1.02E-01	3.81E-06	**4.08E-06**
Carbon disulfide	6.29E-03	6.89E-09	NA		2.00E-09	NA		2.96E-07	NA		
Chlorobenzene	1.01E+01	1.11E-05	NA		3.21E-06	NA		8.15E-05	NA		
Chloroethane	2.40E-02	2.63E-08	NA		7.63E-09	NA		1.16E-06	2.90E-03	3.37E-09	3.37E-09
Chloromethane	1.27E-01	1.39E-07	NA		4.04E-08	NA		1.30E-06	NA		
cis-1,2-Dichloroethene	1.49E+02	1.63E-04	NA		4.74E-05	NA		2.77E-03	NA		
Cyclohexane	2.55E+00	2.79E-06	NA		8.10E-07	NA		1.34E-04	NA		
Ethylbenzene	2.24E+01	2.45E-05	1.10E-02	2.70E-07	7.12E-06	1.10E-02	7.83E-08	2.08E-04	8.75E-03	1.82E-06	**2.17E-06**
Isopropylbenzene (cumene)	5.35E+00	5.86E-06	NA		1.70E-06	NA		9.58E-05	NA		
Methyl ethyl ketone	3.14E-01	3.44E-07	NA		9.98E-08	NA		1.04E-06	NA		
Methyl isobutyl ketone	5.74E+00	6.29E-06	NA		1.82E-06	NA		1.47E-05	NA		
Methyl tert-butyl ether	4.00E-03	4.38E-09	1.80E-03	7.89E-12	1.27E-09	1.80E-03	2.29E-12	5.48E-08	9.10E-04	4.99E-11	6.01E-11
Methylcyclohexane	1.02E+01	1.12E-05	NA		3.24E-06	NA		3.24E-04	NA		
Methylene chloride	8.38E-03	9.18E-09	1.40E-02	1.29E-10	2.66E-09	1.40E-02	3.73E-11	2.16E-07	3.50E-03	7.56E-10	9.22E-10
Styrene	5.14E-01	5.63E-07	NA		1.63E-07	NA		2.46E-06	NA		
Tetrachloroethene	8.76E-02	9.60E-08	5.40E-01	5.18E-08	2.78E-08	5.40E-01	1.50E-08	2.21E-06	2.07E-02	4.55E-08	1.12E-07
Toluene	1.16E+02	1.27E-04	NA		3.69E-05	NA		1.87E-03	NA		
trans-1,2-Dichloroethene	6.38E-01	6.99E-07	NA		2.03E-07	NA		1.75E-05	NA		
Trichloroethene	5.21E-01	5.71E-07	5.90E-03	3.37E-09	1.66E-07	5.90E-03	9.77E-10	1.03E-05	7.00E-03	7.19E-08	7.62E-08
Vinyl chloride	1.28E+00	1.40E-06	7.20E-01	1.01E-06	4.07E-07	7.20E-01	2.93E-07	7.88E-05	2.73E-01	2.15E-05	**2.28E-05**
Xylenes, total	1.57E+02	1.72E-04	NA		4.99E-05	NA		1.65E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.07E-09	1.50E+03	1.60E-06	9.27E-11	1.50E+03	1.39E-07	4.05E-14	1.50E+03	6.07E-11	**1.74E-06**
1,2,3,4,6,7,8-HpCDF	1.60E-04	1.75E-10	1.50E+03	2.63E-07	1.53E-11	1.50E+03	2.29E-08	6.66E-15	1.50E+03	9.99E-12	2.86E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	8.69E-12	1.50E+03	1.30E-08	7.56E-13	1.50E+03	1.13E-09	3.30E-16	1.50E+03	4.95E-13	1.42E-08
1,2,3,4,7,8-HxCDD	1.64E-05	1.80E-11	1.50E+04	2.70E-07	1.56E-12	1.50E+04	2.35E-08	6.83E-16	1.50E+04	1.02E-11	2.93E-07
1,2,3,4,7,8-HxCDF	2.26E-06	2.48E-12	1.50E+04	3.72E-08	2.15E-13	1.50E+04	3.23E-09	9.41E-17	1.50E+04	1.41E-12	4.04E-08
1,2,3,6,7,8-HxCDD	7.35E-05	8.05E-11	1.50E+04	1.21E-06	7.01E-12	1.50E+04	1.05E-07	3.06E-15	1.50E+04	4.59E-11	**1.31E-06**
1,2,3,6,7,8-HxCDF	1.50E-05	1.64E-11	1.50E+04	2.47E-07	1.43E-12	1.50E+04	2.15E-08	6.25E-16	1.50E+04	9.37E-12	2.68E-07
1,2,3,7,8,9-HxCDD	4.14E-05	4.54E-11	1.50E+04	6.81E-07	3.95E-12	1.50E+04	5.92E-08	1.72E-15	1.50E+04	2.59E-11	7.40E-07
1,2,3,7,8,9-HxCDF	8.75E-06	9.59E-12	1.50E+04	1.44E-07	8.34E-13	1.50E+04	1.25E-08	3.64E-16	1.50E+04	5.46E-12	1.56E-07
1,2,3,7,8-PeCDD	1.53E-05	1.68E-11	1.50E+05	2.52E-06	1.46E-12	1.50E+05	2.19E-07	6.37E-16	1.50E+05	9.56E-11	**2.73E-06**
2,3,4,6,7,8-HxCDF	1.51E-05	1.65E-11	1.50E+04	2.48E-07	1.44E-12	1.50E+04	2.16E-08	6.29E-16	1.50E+04	9.43E-12	2.70E-07
2,3,4,7,8-PeCDF	3.66E-05	4.01E-11	7.50E+04	3.01E-06	3.49E-12	7.50E+04	2.62E-07	1.52E-15	7.50E+04	1.14E-10	**3.27E-06**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
2,3,7,8-TCDF	4.63E-06	5.07E-12	1.50E+04	7.61E-08	4.41E-13	1.50E+04	6.62E-09	1.93E-16	1.50E+04	2.89E-12	8.27E-08
OCDD	8.20E-03	8.99E-09	1.50E+01	1.35E-07	7.82E-10	1.50E+01	1.17E-08	3.41E-13	1.50E+01	5.12E-12	1.47E-07
OCDF	3.25E-04	3.56E-10	1.50E+01	5.34E-09	3.10E-11	1.50E+01	4.65E-10	1.35E-14	1.50E+01	2.03E-13	5.81E-09
			Total Risk:	9.54E-05		**Total Risk:**	1.81E-05		**Total Risk:**	3.83E-05	**1.52E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-10
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.26E+04	1.61E-01	1.00E+00	1.61E-01	4.67E-03	1.00E+00	4.67E-03	6.12E-06	1.40E-03	4.37E-03	1.70E-01
Antimony	1.36E+01	1.74E-04	4.00E-04	4.35E-01	5.04E-06	4.00E-04	1.26E-02	6.61E-09	NA		4.47E-01
Arsenic	7.71E+00	9.86E-05	3.00E-04	3.29E-01	8.58E-06	3.00E-04	2.86E-02	3.75E-09	4.29E-06	8.74E-04	3.58E-01
Barium	5.13E+02	6.56E-03	2.00E-01	3.28E-02	1.90E-04	2.00E-01	9.51E-04	2.49E-07	1.43E-04	1.74E-03	3.55E-02
Beryllium	6.14E-01	7.85E-06	2.00E-03	3.93E-03	2.28E-07	2.00E-03	1.14E-04	2.98E-10	2.00E-06	1.49E-04	4.19E-03
Cadmium	1.58E+00	2.02E-05	1.10E-05	1.84E+00	5.86E-08	1.10E-05	5.33E-03	7.68E-10	2.86E-06	2.69E-04	**1.84E+00**
Chromium	1.41E+03	1.80E-02	NA		5.23E-04	NA		6.85E-07	NA		
Cobalt	8.75E+00	1.12E-04	3.00E-04	3.73E-01	3.24E-06	3.00E-04	1.08E-02	4.25E-09	1.71E-06	2.48E-03	3.86E-01
Copper	2.29E+02	2.93E-03	4.00E-02	7.32E-02	8.49E-05	4.00E-02	2.12E-03	1.11E-07	NA		7.53E-02
Iron	2.61E+04	3.34E-01	7.00E-01	4.77E-01	9.68E-03	7.00E-01	1.38E-02	1.27E-05	NA		4.91E-01
Lead	6.40E+02	8.18E-03	NA		2.37E-04	NA		3.11E-07	NA		
Manganese	1.14E+03	1.46E-02	2.40E-02	6.07E-01	4.23E-04	2.40E-02	1.76E-02	5.54E-07	1.43E-05	3.88E-02	6.64E-01
Nickel	4.22E+01	5.40E-04	1.10E-02	4.90E-02	1.56E-05	1.10E-02	1.42E-03	2.05E-08	2.57E-05	7.97E-04	5.13E-02
Selenium	2.50E+00	3.20E-05	5.00E-03	6.39E-03	9.27E-07	5.00E-03	1.85E-04	1.21E-09	5.71E-03	2.13E-07	6.58E-03
Silver	8.43E-01	1.08E-05	5.00E-03	2.16E-03	3.13E-07	5.00E-03	6.25E-05	4.10E-10	NA		2.22E-03
Thallium	3.16E+00	4.04E-05	6.60E-05	6.12E-01	1.17E-06	6.60E-05	1.78E-02	1.54E-09	NA		6.30E-01
Vanadium	4.16E+01	5.32E-04	5.00E-03	1.06E-01	1.54E-05	5.00E-03	3.08E-03	2.02E-08	NA		1.09E-01

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Zinc	5.91E+02	7.56E-03	3.00E-01	2.52E-02	2.19E-04	3.00E-01	7.30E-04	2.87E-07	NA		2.59E-02
Pesticides/PCBs											
Aldrin	1.29E+00	1.65E-05	3.00E-05	5.50E-01	2.39E-06	3.00E-05	7.97E-02	6.27E-10	NA		6.29E-01
alpha-BHC	2.60E-02	3.32E-07	5.00E-04	6.65E-04	4.82E-08	5.00E-04	9.64E-05	1.26E-11	NA		7.61E-04
alpha-Chlordane	4.04E-02	5.17E-07	3.30E-05	1.57E-02	7.49E-08	3.30E-05	2.27E-03	1.96E-11	2.00E-04	9.81E-08	1.79E-02
4,4'-DDD	9.16E+00	1.17E-04	NA		1.70E-05	NA		4.45E-09	NA		
4,4'-DDE	3.56E+00	4.55E-05	NA		6.60E-06	NA		1.73E-09	NA		
4,4'-DDT	3.25E-01	4.16E-06	5.00E-04	8.31E-03	6.03E-07	5.00E-04	1.21E-03	1.58E-10	NA		9.52E-03
beta-BHC	3.50E-02	4.47E-07	NA		6.49E-08	NA		1.70E-11	NA		
delta-BHC	4.10E-03	5.24E-08	NA		7.60E-09	NA		1.99E-12	NA		
Dieldrin	1.34E+00	1.71E-05	5.00E-05	3.43E-01	2.48E-06	5.00E-05	4.97E-02	6.51E-10	NA		3.92E-01
Endosulfan sulfate	1.60E-03	2.05E-08	6.00E-03	3.41E-06	2.97E-09	6.00E-03	4.94E-07	7.77E-13	NA		3.90E-06
Endrin	4.60E-03	5.88E-08	3.00E-04	1.96E-04	8.53E-09	3.00E-04	2.84E-05	2.23E-12	NA		2.24E-04
Endrin aldehyde	1.10E-03	1.41E-08	3.00E-04	4.69E-05	2.04E-09	3.00E-04	6.80E-06	5.34E-13	NA		5.37E-05
Endrin ketone	1.20E-02	1.53E-07	3.00E-04	5.11E-04	2.22E-08	3.00E-04	7.42E-05	5.83E-12	NA		5.86E-04
gamma-Chlordane	1.09E-01	1.39E-06	3.30E-05	4.22E-02	2.02E-07	3.30E-05	6.12E-03	5.29E-11	2.00E-04	2.65E-07	4.84E-02
Heptachlor	8.80E-03	1.13E-07	3.00E-05	3.75E-03	1.63E-08	3.00E-05	5.44E-04	4.27E-12	3.00E-05	1.42E-07	4.29E-03
Methoxychlor	3.90E-03	4.99E-08	2.00E-05	2.49E-03	7.23E-09	2.00E-05	3.62E-04	1.89E-12	2.00E-05	9.47E-08	2.85E-03
Aroclor-1260	6.40E-01	8.18E-06	2.00E-05	4.09E-01	3.56E-06	2.00E-05	1.78E-01	3.11E-10	NA		5.87E-01
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	1.97E-05	1.00E-02	1.97E-03	5.71E-06	1.00E-02	5.71E-04	2.07E-05	5.71E-04	3.62E-02	3.88E-02
1,2-Dichlorobenzene	5.47E+01	6.99E-04	9.00E-02	7.77E-03	2.03E-04	9.00E-02	2.25E-03	2.19E-03	5.71E-02	3.82E-02	4.83E-02
1,3-Dichlorobenzene	2.02E+00	2.58E-05	NA		7.49E-06	NA		8.07E-05	NA		
1,4-Dichlorobenzene	2.55E+01	3.26E-04	7.00E-02	4.66E-03	9.45E-05	7.00E-02	1.35E-03	1.16E-03	2.29E-01	5.06E-03	1.11E-02
2-Methylnaphthalene	1.14E+02	1.46E-03	4.00E-03	3.64E-01	6.34E-04	4.00E-03	1.59E-01	1.18E-03	NA		5.23E-01
2-Methylphenol	9.90E-01	1.27E-05	5.00E-02	2.53E-04	3.67E-06	5.00E-02	7.34E-05	4.81E-10	1.71E-01	2.81E-09	3.27E-04
4-Chloro-3-methylphenol	7.20E+00	9.21E-05	NA		2.67E-05	NA		3.50E-09	NA		
4-Methylphenol	3.60E+00	4.60E-05	5.00E-03	9.21E-03	1.33E-05	5.00E-03	2.67E-03	1.75E-09	1.71E-01	1.02E-08	1.19E-02
Acenaphthene	9.18E+00	1.17E-04	6.00E-02	1.96E-03	5.11E-05	6.00E-02	8.51E-04	2.43E-05	NA		2.81E-03
Anthracene	1.10E+00	1.41E-05	3.00E-01	4.69E-05	6.12E-06	3.00E-01	2.04E-05	8.15E-07	NA		6.73E-05
Benzo(a)anthracene	5.50E-01	7.03E-06	NA		3.06E-06	NA		2.67E-10	NA		
Benzo(a)pyrene	5.00E-01	6.39E-06	NA		2.78E-06	NA		2.43E-10	NA		
Benzo(b)fluoranthene	4.20E-01	5.37E-06	NA		2.34E-06	NA		2.04E-10	NA		
Benzo(g,h,i)perylene	4.30E-01	5.50E-06	NA		2.39E-06	NA		2.09E-10	NA		
Benzo(k)fluoranthene	4.30E-01	5.50E-06	NA		2.39E-06	NA		2.09E-10	NA		
Benzyl butyl phthalate	7.60E+00	9.72E-05	2.00E-01	4.86E-04	2.82E-05	2.00E-01	1.41E-04	3.69E-09	NA		6.27E-04
Biphenyl (diphenyl)	4.40E+00	5.63E-05	5.00E-02	1.13E-03	1.63E-05	5.00E-02	3.26E-04	2.14E-09	NA		1.45E-03
bis(2-Ethylhexyl)phthalate	9.85E+00	1.26E-04	2.00E-02	6.30E-03	3.65E-05	2.00E-02	1.83E-03	4.78E-09	NA		8.12E-03
Caprolactam	9.50E-02	1.21E-06	5.00E-01	2.43E-06	3.52E-07	5.00E-01	7.04E-07	4.61E-11	NA		3.13E-06
Carbazole	1.10E+00	1.41E-05	NA		4.08E-06	NA		5.34E-10	NA		
Chrysene	9.10E-01	1.16E-05	NA		5.06E-06	NA		4.42E-10	NA		
Dibenz(a,h)anthracene	1.20E-01	1.53E-06	NA		6.67E-07	NA		5.83E-11	NA		
Dibenzofuran	4.10E+00	5.24E-05	2.00E-03	2.62E-02	1.52E-05	2.00E-03	7.60E-03	4.73E-06	NA		3.38E-02
Di-n-butyl phthalate	2.90E+00	3.71E-05	1.00E-01	3.71E-04	1.08E-05	1.00E-01	1.08E-04	1.41E-09	NA		4.78E-04
Fluoranthene	4.20E+00	5.37E-05	4.00E-02	1.34E-03	2.34E-05	4.00E-02	5.84E-04	2.04E-09	NA		1.93E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Fluorene	8.31E+00	1.06E-04	4.00E-02	2.66E-03	4.62E-05	4.00E-02	1.16E-03	9.46E-06	NA		3.81E-03
Indeno(1,2,3-c,d)pyrene	4.40E-01	5.63E-06	NA		2.45E-06	NA		2.14E-10	NA		
Naphthalene	5.28E+01	6.75E-04	2.00E-02	3.38E-02	2.94E-04	2.00E-02	1.47E-02	5.49E-04	8.57E-04	6.40E-01	6.89E-01
Phenanthrene	1.21E+01	1.55E-04	NA		6.73E-05	NA		5.88E-09	NA		
Pyrene	3.97E+00	5.08E-05	3.00E-02	1.69E-03	2.21E-05	3.00E-02	7.36E-04	6.07E-07	NA		2.43E-03
1,1,1-Trichloroethane	2.51E-02	3.21E-07	2.00E+00	1.60E-07	9.31E-08	2.00E+00	4.65E-08	6.95E-06	1.43E+00	4.87E-06	5.07E-06
1,1-Dichloroethane	1.01E+01	1.29E-04	2.00E-01	6.46E-04	3.74E-05	2.00E-01	1.87E-04	2.67E-03	NA		8.33E-04
1,1-Dichloroethene	6.80E-02	8.69E-07	5.00E-02	1.74E-05	2.52E-07	5.00E-02	5.04E-06	3.06E-05	2.00E-02	1.53E-03	1.55E-03
1,2-Dichloroethane	6.05E-02	7.74E-07	2.00E-02	3.87E-05	2.24E-07	2.00E-02	1.12E-05	1.00E-05	6.86E-01	1.47E-05	6.45E-05
Acetone	2.26E-01	2.89E-06	9.00E-01	3.21E-06	8.38E-07	9.00E-01	9.31E-07	1.34E-05	8.86E+00	1.51E-06	5.65E-06
Benzene	1.93E+00	2.47E-05	4.00E-03	6.17E-03	7.16E-06	4.00E-03	1.79E-03	4.38E-04	8.57E-03	5.11E-02	5.90E-02
Carbon disulfide	6.29E-03	8.04E-08	1.00E-01	8.04E-07	2.33E-08	1.00E-01	2.33E-07	3.46E-06	2.00E-01	1.73E-05	1.83E-05
Chlorobenzene	1.01E+01	1.29E-04	2.00E-02	6.46E-03	3.74E-05	2.00E-02	1.87E-03	9.51E-04	1.43E-02	6.65E-02	7.49E-02
Chloroethane	2.40E-02	3.07E-07	NA		8.90E-08	NA		1.35E-05	2.86E+00	4.74E-06	4.74E-06
Chloromethane	1.27E-01	1.62E-06	NA		4.71E-07	NA		1.51E-05	2.57E-02	5.89E-04	5.89E-04
cis-1,2-Dichloroethene	1.49E+02	1.91E-03	1.00E-02	1.91E-01	5.52E-04	1.00E-02	5.52E-02	3.23E-02	NA		2.46E-01
Cyclohexane	2.55E+00	3.26E-05	NA		9.45E-06	NA		1.56E-03	1.71E+00	9.09E-04	9.09E-04
Ethylbenzene	2.24E+01	2.86E-04	1.00E-01	2.86E-03	8.31E-05	1.00E-01	8.31E-04	2.43E-03	2.86E-01	8.51E-03	1.22E-02
Isopropylbenzene (cumene)	5.35E+00	6.84E-05	1.00E-01	6.84E-04	1.98E-05	1.00E-01	1.98E-04	1.12E-03	1.14E-01	9.78E-03	1.07E-02
Methyl ethyl ketone	3.14E-01	4.01E-06	6.00E-01	6.69E-06	1.16E-06	6.00E-01	1.94E-06	1.21E-05	1.43E+00	8.49E-06	1.71E-05
Methyl isobutyl ketone	5.74E+00	7.34E-05	8.00E-02	9.17E-04	2.13E-05	8.00E-02	2.66E-04	1.71E-04	8.57E-01	2.00E-04	1.38E-03
Methyl tert-butyl ether	4.00E-03	5.11E-08	NA		1.48E-08	NA		6.40E-07	8.57E-01	7.46E-07	7.46E-07
Methylcyclohexane	1.02E+01	1.30E-04	NA		3.78E-05	NA		3.77E-03	8.60E-01	4.39E-03	4.39E-03
Methylene chloride	8.38E-03	1.07E-07	6.00E-02	1.79E-06	3.11E-08	6.00E-02	5.18E-07	2.52E-06	2.86E-01	8.82E-06	1.11E-05
Styrene	5.14E-01	6.57E-06	2.00E-01	3.29E-05	1.91E-06	2.00E-01	9.53E-06	2.87E-05	2.57E-01	1.12E-04	1.54E-04
Tetrachloroethene	8.76E-02	1.12E-06	1.00E-02	1.12E-04	3.25E-07	1.00E-02	3.25E-05	2.57E-05	1.00E-02	2.57E-03	2.72E-03
Toluene	1.16E+02	1.48E-03	8.00E-02	1.85E-02	4.30E-04	8.00E-02	5.38E-03	2.19E-02	8.57E-02	2.55E-01	2.79E-01
trans-1,2-Dichloroethene	6.38E-01	8.16E-06	2.00E-02	4.08E-04	2.37E-06	2.00E-02	1.18E-04	2.04E-04	1.71E-02	1.19E-02	1.24E-02
Trichloroethene	5.21E-01	6.66E-06	3.00E-04	2.22E-02	1.93E-06	3.00E-04	6.44E-03	1.20E-04	1.00E-02	1.20E-02	4.06E-02
Vinyl chloride	1.28E+00	1.64E-05	3.00E-03	5.46E-03	4.75E-06	3.00E-03	1.58E-03	9.19E-04	2.86E-02	3.22E-02	3.92E-02
Xylenes, total	1.57E+02	2.01E-03	2.00E-01	1.00E-02	5.82E-04	2.00E-01	2.91E-03	1.93E-02	2.86E-02	6.76E-01	6.89E-01
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.24E-08	NA		1.08E-09	NA		4.72E-13	1.14E-08	4.13E-05	4.13E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	2.05E-09	NA		1.78E-10	NA		7.77E-14	1.14E-08	6.80E-06	6.80E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	1.01E-10	NA		8.82E-12	NA		3.85E-15	1.14E-08	3.37E-07	3.37E-07
1,2,3,4,7,8-HxCDD	1.64E-05	2.10E-10	NA		1.82E-11	NA		7.97E-15	1.14E-08	6.97E-07	6.97E-07
1,2,3,4,7,8-HxCDF	2.26E-06	2.89E-11	NA		2.51E-12	NA		1.10E-15	1.14E-08	9.61E-08	9.61E-08
1,2,3,6,7,8-HxCDD	7.35E-05	9.40E-10	NA		8.18E-11	NA		3.57E-14	1.14E-08	3.12E-06	3.12E-06
1,2,3,6,7,8-HxCDF	1.50E-05	1.92E-10	NA		1.67E-11	NA		7.29E-15	1.14E-08	6.38E-07	6.38E-07
1,2,3,7,8,9-HxCDD	4.14E-05	5.29E-10	NA		4.61E-11	NA		2.01E-14	1.14E-08	1.76E-06	1.76E-06
1,2,3,7,8,9-HxCDF	8.75E-06	1.12E-10	NA		9.73E-12	NA		4.25E-15	1.14E-08	3.72E-07	3.72E-07
1,2,3,7,8-PeCDD	1.53E-05	1.96E-10	NA		1.70E-11	NA		7.43E-15	1.14E-08	6.50E-07	6.50E-07
2,3,4,6,7,8-HxCDF	1.51E-05	1.93E-10	NA		1.68E-11	NA		7.34E-15	1.14E-08	6.42E-07	6.42E-07
2,3,4,7,8-PeCDF	3.66E-05	4.68E-10	NA		4.07E-11	NA		1.78E-14	1.14E-08	1.56E-06	1.56E-06
2,3,7,8-TCDF	4.63E-06	5.92E-11	NA		5.15E-12	NA		2.25E-15	1.14E-08	1.97E-07	1.97E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
OCDD	8.20E-03	1.05E-07	NA		9.12E-09	NA		3.98E-12	1.14E-08	3.49E-04	3.49E-04
OCDF	3.25E-04	4.16E-09	NA		3.62E-10	NA		1.58E-13	1.14E-08	1.38E-05	1.38E-05
		Total Risk (Hazard Index):		7.23	Total Risk (Hazard Index):		0.71	Total Risk (Hazard Index):		1.90	**9.84**

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : 10

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-11
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
	Future Residential									
Chemical of Potential Concern	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**5.4E-06**	6.5E-07	8.3E-09	**6.1E-06**	5%	**1.3E-05**	**1.1E-06**	4.8E-09	**1.4E-05**	9%
Subtotal Metals	**5.4E-06**	6.5E-07	1.4E-08	**6.1E-06**	5%	**1.3E-05**	**1.1E-06**	8.2E-09	**1.4E-05**	9%
Pesticides/PCBs										
Aldrin	**1.0E-05**	**2.1E-06**	1.6E-09	**1.2E-05**	11%	**2.4E-05**	**3.5E-06**	9.2E-10	**2.8E-05**	18%
4,4'-DDD	**1.0E-06**	2.1E-07	1.6E-10	**1.2E-06**	1.1%	**2.4E-06**	3.5E-07	9.2E-11	**2.8E-06**	2%
4,4'-DDE	5.7E-07	1.1E-07	8.6E-11	6.8E-07	0.6%	**1.3E-06**	1.9E-07	5.0E-11	**1.5E-06**	1.0%
Dieldrin	**1.0E-05**	**2.0E-06**	1.5E-09	**1.2E-05**	10%	**2.3E-05**	**3.4E-06**	9.0E-10	**2.7E-05**	18%
Aroclor-1260	6.0E-07	3.6E-07	9.1E-11	9.6E-07	0.8%	**1.4E-06**	6.1E-07	5.3E-11	**2.0E-06**	1.3%
Subtotal Pesticides/PCBs	**2.3E-05**	**4.8E-06**	3.5E-09	**2.8E-05**	24%	**5.3E-05**	**8.1E-06**	2.0E-09	**6.1E-05**	40%
SVOCs/VOCs										
1,4-Dichlorobenzene	6.5E-08	2.6E-08	**6.5E-06**	**6.6E-06**	6%	1.5E-07	4.4E-08	**3.8E-06**	**4.0E-06**	3%
Benzo(a)anthracene	3.1E-07	1.9E-07	1.5E-11	5.0E-07	0.4%	7.2E-07	3.1E-07	8.8E-12	**1.0E-06**	0.7%
Benzo(a)pyrene	**2.8E-06**	**1.7E-06**	1.4E-10	**4.5E-06**	4%	**6.6E-06**	**2.9E-06**	8.0E-11	**9.4E-06**	6%
Dibenz(a,h)anthracene	4.1E-07	2.5E-07	3.6E-11	6.6E-07	0.6%	9.6E-07	4.2E-07	2.1E-11	**1.4E-06**	0.9%
Naphthalene	**3.0E-06**	**1.8E-06**	**9.6E-06**	**1.4E-05**	12%	**6.9E-06**	**3.0E-06**	**5.6E-06**	**1.6E-05**	10%
1,1-Dichloroethane	2.7E-08	1.1E-08	**2.2E-06**	**2.3E-06**	2%	6.3E-08	1.8E-08	**1.3E-06**	**1.4E-06**	0.9%
Benzene	9.1E-08	3.6E-08	**6.5E-06**	**6.7E-06**	6%	2.1E-07	6.1E-08	**3.8E-06**	**4.1E-06**	3%
Ethylbenzene	1.2E-07	4.6E-08	**3.1E-06**	**3.3E-06**	3%	2.7E-07	7.8E-08	**1.8E-06**	**2.2E-06**	1%
Vinyl chloride	4.3E-07	1.7E-07	**3.7E-05**	**3.7E-05**	32%	**1.0E-06**	2.9E-07	**2.2E-05**	**2.3E-05**	15%
Subtotal SVOCs/VOCs	**8.1E-06**	**4.7E-06**	**6.6E-05**	**7.9E-05**	67%	**1.9E-05**	**8.0E-06**	**3.8E-05**	**6.5E-05**	43%
Dioxans/Furans										
1,2,3,4,6,7,8-HpCDD	6.8E-07	8.2E-08	1.0E-10	7.7E-07	0.7%	**1.6E-06**	1.4E-07	6.1E-11	**1.7E-06**	1.1%
1,2,3,6,7,8-HxCDD	5.2E-07	6.2E-08	7.9E-11	5.8E-07	0.5%	**1.2E-06**	1.1E-07	4.6E-11	**1.3E-06**	0.9%

Table 1-11
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
	Future Residential									
Chemical of Potential Concern	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
1,2,3,7,8-PeCDD	**1.1E-06**	1.3E-07	1.6E-10	**1.2E-06**	1.0%	**2.5E-06**	2.2E-07	9.6E-11	**2.7E-06**	2%
2,3,4,7,8-PeCDF	**1.3E-06**	1.5E-07	2.0E-10	**1.4E-06**	1.2%	**3.0E-06**	2.6E-07	1.1E-10	**3.3E-06**	2%
Subtotal Dioxans/Furans	**4.5E-06**	5.4E-07	6.8E-10	**5.0E-06**	4%	**1.0E-05**	9.1E-07	4.0E-10	**1.1E-05**	7%
Total:	**4.1E-05**	**1.1E-05**	**6.6E-05**	**1.2E-04**		**9.5E-05**	**1.8E-05**	**3.8E-05**	**1.5E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:	**1E-04**	**2E-04**

	Ingestion	Dermal	Inhalation	Total
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):	**1.4E-04**	**2.9E-05**	**1.0E-04**	**2.69E-04**

Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes: **3E-04**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-12

Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.7E-02	6.9E-04	1.9E-03	2.0E-02	1%	**1.6E-01**	4.7E-03	4.4E-03	**1.7E-01**	2%
Antimony	4.7E-02	1.9E-03		4.8E-02	3%	**4.3E-01**	1.3E-02		**4.5E-01**	5%
Arsenic	3.5E-02	4.2E-03	3.7E-04	4.0E-02	3%	**3.3E-01**	2.9E-02	8.7E-04	**3.6E-01**	4%
Cadmium	4.3E-03	1.7E-05	1.2E-04	4.5E-03	0%	**1.8E+00**	5.3E-03	2.7E-04	**1.8E+00**	19%
Cobalt	4.0E-02	1.6E-03	1.1E-03	4.3E-02	3%	**3.7E-01**	1.1E-02	2.5E-03	**3.9E-01**	4%
Iron	5.1E-02	2.0E-03		5.3E-02	4%	**4.8E-01**	1.4E-02		**4.9E-01**	5%
Manganese	6.5E-02	2.6E-03	1.7E-02	8.4E-02	6%	**6.1E-01**	1.8E-02	3.9E-02	**6.6E-01**	7%
Thallium	6.6E-02	2.6E-03		6.8E-02	5%	**6.1E-01**	1.8E-02		**6.3E-01**	6%
Vanadium	1.1E-02	4.5E-04		1.2E-02	1%	**1.1E-01**	3.1E-03		**1.1E-01**	1%
Subtotal Metals	**3.5E-01**	1.7E-02	2.1E-02	**3.9E-01**	26%	**5.1E+00**	**1.2E-01**	4.9E-02	**5.3E+00**	54%
Pesticides/PCBs										
Aldrin	5.9E-02	1.2E-02		7.1E-02	5%	**5.5E-01**	8.0E-02		**6.3E-01**	6%
Dieldrin	3.7E-02	7.3E-03		4.4E-02	3%	**3.4E-01**	5.0E-02		**3.9E-01**	4%
Aroclor-1260	4.4E-02	2.6E-02		7.0E-02	5%	**4.1E-01**	**1.8E-01**		**5.9E-01**	6%
Subtotal Pesticides/PCBs	**1.4E-01**	4.6E-02	1.6E-07	**1.9E-01**	13%	**1.4E+00**	**3.2E-01**	6.0E-07	**1.7E+00**	17%
SVOCs/VOCs										
2-Methylnaphthalene	3.9E-02	2.3E-02		6.2E-02	4%	**3.6E-01**	**1.6E-01**		**5.2E-01**	5%
Naphthalene	3.6E-03	2.2E-03	**2.7E-01**	**2.8E-01**	19%	3.4E-02	1.5E-02	**6.4E-01**	**6.9E-01**	7%
cis-1,2-Dichloroethene	2.0E-02	8.1E-03		2.9E-02	2%	**1.9E-01**	5.5E-02		**2.5E-01**	2%
Toluene	2.0E-03	7.9E-04	**1.1E-01**	**1.1E-01**	8%	1.9E-02	5.4E-03	**2.6E-01**	**2.8E-01**	3%
Xylenes, total	1.1E-03	4.3E-04	**2.9E-01**	**2.9E-01**	20%	1.0E-02	2.9E-03	**6.8E-01**	**6.9E-01**	7%
Subtotal SVOCs/VOCs	7.8E-02	4.0E-02	**7.9E-01**	**9.1E-01**	61%	**7.3E-01**	**2.7E-01**	**1.9E+00**	**2.9E+00**	29%
Total:	**0.6**	**0.1**	**0.8**	**1.5**		**7.2**	**0.7**	**1.9**	**9.8**	

Total Estimated Hazard Index Across All Exposure Routes: Adult Resident: **1**; Child Resident: **10**

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-13
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.26E+04	4.40E-03	NA		5.02E-04	NA		6.69E-07	NA		
Antimony	1.36E+01	4.75E-06	NA		5.42E-07	NA		7.22E-10	NA		
Arsenic	7.71E+00	2.69E-06	1.50E+00	4.04E-06	9.21E-07	1.50E+00	1.38E-06	4.09E-10	1.51E+01	6.16E-09	**5.43E-06**
Barium	5.13E+02	1.79E-04	NA		2.04E-05	NA		2.72E-08	NA		
Beryllium	6.14E-01	2.15E-07	NA		2.45E-08	NA		3.26E-11	8.40E+00	2.74E-10	2.74E-10
Cadmium	1.58E+00	5.52E-07	NA		6.29E-09	NA		8.39E-11	6.30E+00	5.29E-10	5.29E-10
Chromium	1.41E+03	4.93E-04	NA		5.62E-05	NA		7.49E-08	NA		
Cobalt	8.75E+00	3.06E-06	NA		3.49E-07	NA		4.65E-10	3.15E+00	1.46E-09	1.46E-09
Copper	2.29E+02	8.00E-05	NA		9.12E-06	NA		1.22E-08	NA		
Iron	2.61E+04	9.12E-03	NA		1.04E-03	NA		1.39E-06	NA		
Lead	6.40E+02	2.24E-04	NA		2.55E-05	NA		3.40E-08	NA		
Manganese	1.14E+03	3.98E-04	NA		4.54E-05	NA		6.05E-08	NA		
Nickel	4.22E+01	1.47E-05	NA		1.68E-06	NA		2.24E-09	9.10E-01	2.04E-09	2.04E-09
Selenium	2.50E+00	8.74E-07	NA		9.96E-08	NA		1.33E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Silver	8.43E-01	2.95E-07	NA		3.36E-08	NA		4.48E-11	NA		
Thallium	3.16E+00	1.10E-06	NA		1.26E-07	NA		1.68E-10	NA		
Vanadium	4.16E+01	1.45E-05	NA		1.66E-06	NA		2.21E-09	NA		
Zinc	5.91E+02	2.07E-04	NA		2.35E-05	NA		3.14E-08	NA		
Pesticides/PCBs											
Aldrin	1.29E+00	4.51E-07	1.70E+01	7.66E-06	2.57E-07	1.70E+01	4.37E-06	6.85E-11	1.72E+01	1.17E-09	**1.20E-05**
alpha-BHC	2.60E-02	9.09E-09	6.30E+00	5.72E-08	5.18E-09	6.30E+00	3.26E-08	1.38E-12	6.30E+00	8.70E-12	8.99E-08
alpha-Chlordane	4.04E-02	1.41E-08	1.30E+00	1.84E-08	8.05E-09	1.30E+00	1.05E-08	2.15E-12	3.50E-01	7.51E-13	2.88E-08
4,4'-DDD	9.16E+00	3.20E-06	2.40E-01	7.68E-07	1.82E-06	2.40E-01	4.38E-07	4.86E-10	2.42E-01	1.17E-10	**1.21E-06**
4,4'-DDE	3.56E+00	1.24E-06	3.40E-01	4.23E-07	7.09E-07	3.40E-01	2.41E-07	1.89E-10	3.40E-01	6.42E-11	6.64E-07
4,4'-DDT	3.25E-01	1.14E-07	3.40E-01	3.86E-08	6.47E-08	3.40E-01	2.20E-08	1.73E-11	3.40E-01	5.86E-12	6.06E-08
beta-BHC	3.50E-02	1.22E-08	1.80E+00	2.20E-08	6.97E-09	1.80E+00	1.25E-08	1.86E-12	1.86E+00	3.45E-12	3.46E-08
delta-BHC	4.10E-03	1.43E-09	NA		8.17E-10	NA		2.18E-13	NA		
Dieldrin	1.34E+00	4.68E-07	1.60E+01	7.49E-06	2.67E-07	1.60E+01	4.27E-06	7.12E-11	1.61E+01	1.15E-09	**1.18E-05**
Endosulfan sulfate	1.60E-03	5.59E-10	NA		3.19E-10	NA		8.50E-14	NA		
Endrin	4.60E-03	1.61E-09	NA		9.16E-10	NA		2.44E-13	NA		
Endrin aldehyde	1.10E-03	3.84E-10	NA		2.19E-10	NA		5.84E-14	NA		
Endrin ketone	1.20E-02	4.19E-09	NA		2.39E-09	NA		6.37E-13	NA		
gamma-Chlordane	1.09E-01	3.81E-08	1.20E+00	4.57E-08	2.17E-08	1.20E+00	2.61E-08	5.79E-12	3.50E-01	2.03E-12	7.18E-08
Heptachlor	8.80E-03	3.08E-09	4.50E+00	1.38E-08	1.75E-09	4.50E+00	7.89E-09	4.67E-13	4.55E+00	2.13E-12	2.17E-08
Methoxychlor	3.90E-03	1.36E-09	NA		7.77E-10	NA		2.07E-13	NA		
Aroclor-1260	6.40E-01	2.24E-07	2.00E+00	4.47E-07	3.82E-07	2.00E+00	7.65E-07	3.40E-11	2.00E+00	6.80E-11	**1.21E-06**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	5.38E-07	2.90E-02	1.56E-08	6.14E-07	2.90E-02	1.78E-08	2.26E-06	NA		3.34E-08
1,2-Dichlorobenzene	5.47E+01	1.91E-05	NA		2.18E-05	NA		2.39E-04	NA		
1,3-Dichlorobenzene	2.02E+00	7.06E-07	NA		8.05E-07	NA		8.82E-06	NA		
1,4-Dichlorobenzene	2.55E+01	8.91E-06	5.40E-03	4.81E-08	1.02E-05	5.40E-03	5.49E-08	1.26E-04	3.85E-02	4.87E-06	**4.97E-06**
2-Methylnaphthalene	1.14E+02	3.98E-05	NA		6.81E-05	NA		1.30E-04	NA		
2-Methylphenol	9.90E-01	3.46E-07	NA		3.94E-07	NA		5.26E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	2.52E-06	NA		2.87E-06	NA		3.82E-10	NA		
4-Methylphenol	3.60E+00	1.26E-06	NA		1.43E-06	NA		1.91E-10	NA		
Acenaphthene	9.18E+00	3.21E-06	NA		5.49E-06	NA		2.66E-06	NA		
Anthracene	1.10E+00	3.84E-07	NA		6.57E-07	NA		8.91E-08	NA		
Benzo(a)anthracene	5.50E-01	1.92E-07	1.20E+00	2.31E-07	3.29E-07	1.20E+00	3.94E-07	2.92E-11	3.85E-01	1.12E-11	6.25E-07
Benzo(a)pyrene	5.00E-01	1.75E-07	1.20E+01	2.10E-06	2.99E-07	1.20E+01	3.59E-06	2.66E-11	3.85E+00	1.02E-10	**5.68E-06**
Benzo(b)fluoranthene	4.20E-01	1.47E-07	1.20E+00	1.76E-07	2.51E-07	1.20E+00	3.01E-07	2.23E-11	3.85E-01	8.59E-12	4.77E-07
Benzo(g,h,i)perylene	4.30E-01	1.50E-07	NA		2.57E-07	NA		2.28E-11	NA		
Benzo(k)fluoranthene	4.30E-01	1.50E-07	1.20E+00	1.80E-07	2.57E-07	1.20E+00	3.08E-07	2.28E-11	3.85E-01	8.79E-12	4.89E-07
Benzyl butyl phthalate	7.60E+00	2.66E-06	1.90E-03	5.05E-09	3.03E-06	1.90E-03	5.75E-09	4.04E-10	NA		1.08E-08
Biphenyl (diphenyl)	4.40E+00	1.54E-06	NA		1.75E-06	NA		2.34E-10	NA		
bis(2-Ethylhexyl)phthalate	9.85E+00	3.44E-06	1.40E-02	4.82E-08	3.92E-06	1.40E-02	5.49E-08	5.23E-10	8.40E-03	4.39E-12	1.03E-07
Caprolactam	9.50E-02	3.32E-08	NA		3.78E-08	NA		5.05E-12	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Carbazole	1.10E+00	3.84E-07	NA		4.38E-07	NA		5.84E-11	NA		
Chrysene	9.10E-01	3.18E-07	1.20E-01	3.82E-08	5.44E-07	1.20E-01	6.53E-08	4.83E-11	3.85E-02	1.86E-12	1.03E-07
Dibenz(a,h)anthracene	1.20E-01	4.19E-08	7.30E+00	3.06E-07	7.17E-08	7.30E+00	5.23E-07	6.37E-12	4.20E+00	2.68E-11	8.30E-07
Dibenzofuran	4.10E+00	1.43E-06	NA		1.63E-06	NA		5.17E-07	NA		
Di-n-butyl phthalate	2.90E+00	1.01E-06	NA		1.16E-06	NA		1.54E-10	NA		
Fluoranthene	4.20E+00	1.47E-06	NA		2.51E-06	NA		2.23E-10	NA		
Fluorene	8.31E+00	2.90E-06	NA		4.97E-06	NA		1.03E-06	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	1.54E-07	1.20E+00	1.85E-07	2.63E-07	1.20E+00	3.16E-07	2.34E-11	3.85E-01	9.00E-12	5.00E-07
Naphthalene	5.28E+01	1.85E-05	1.20E-01	2.21E-06	3.16E-05	1.20E-01	3.79E-06	6.00E-05	1.19E-01	7.14E-06	**1.31E-05**
Phenanthrene	1.21E+01	4.23E-06	NA		7.23E-06	NA		6.43E-10	NA		
Pyrene	3.97E+00	1.39E-06	NA		2.37E-06	NA		6.63E-08	NA		
1,1,1-Trichloroethane	2.51E-02	8.77E-09	NA		1.00E-08	NA		7.60E-07	NA		
1,1-Dichloroethane	1.01E+01	3.53E-06	5.70E-03	2.01E-08	4.02E-06	5.70E-03	2.29E-08	2.92E-04	5.70E-03	1.66E-06	**1.71E-06**
1,1-Dichloroethene	6.80E-02	2.38E-08	NA		2.71E-08	NA		3.34E-06	9.10E-02	3.04E-07	3.04E-07
1,2-Dichloroethane	6.05E-02	2.11E-08	9.10E-02	1.92E-09	2.41E-08	9.10E-02	2.19E-09	1.10E-06	9.10E-02	1.00E-07	1.04E-07
Acetone	2.26E-01	7.90E-08	NA		9.00E-08	NA		1.46E-06	NA		
Benzene	1.93E+00	6.74E-07	1.00E-01	6.74E-08	7.69E-07	1.00E-01	7.69E-08	4.79E-05	1.02E-01	4.86E-06	**5.00E-06**
Carbon disulfide	6.29E-03	2.20E-09	NA		2.51E-09	NA		3.78E-07	NA		
Chlorobenzene	1.01E+01	3.53E-06	NA		4.02E-06	NA		1.04E-04	NA		
Chloroethane	2.40E-02	8.39E-09	NA		9.56E-09	NA		1.48E-06	2.90E-03	4.30E-09	4.30E-09
Chloromethane	1.27E-01	4.44E-08	NA		5.06E-08	NA		1.66E-06	NA		
cis-1,2-Dichloroethene	1.49E+02	5.21E-05	NA		5.94E-05	NA		3.53E-03	NA		
Cyclohexane	2.55E+00	8.91E-07	NA		1.02E-06	NA		1.70E-04	NA		
Ethylbenzene	2.24E+01	7.83E-06	1.10E-02	8.61E-08	8.92E-06	1.10E-02	9.82E-08	2.66E-04	8.75E-03	2.33E-06	**2.51E-06**
Isopropylbenzene (cumene)	5.35E+00	1.87E-06	NA		2.13E-06	NA		1.22E-04	NA		
Methyl ethyl ketone	3.14E-01	1.10E-07	NA		1.25E-07	NA		1.33E-06	NA		
Methyl isobutyl ketone	5.74E+00	2.01E-06	NA		2.29E-06	NA		1.87E-05	NA		
Methyl tert-butyl ether	4.00E-03	1.40E-09	1.80E-03	2.52E-12	1.59E-09	1.80E-03	2.87E-12	6.99E-08	9.10E-04	6.36E-11	6.90E-11
Methylcyclohexane	1.02E+01	3.56E-06	NA		4.06E-06	NA		4.13E-04	NA		
Methylene chloride	8.38E-03	2.93E-09	1.40E-02	4.10E-11	3.34E-09	1.40E-02	4.67E-11	2.75E-07	3.50E-03	9.64E-10	1.05E-09
Styrene	5.14E-01	1.80E-07	NA		2.05E-07	NA		3.14E-06	NA		
Tetrachloroethene	8.76E-02	3.06E-08	5.40E-01	1.65E-08	3.49E-08	5.40E-01	1.88E-08	2.81E-06	2.07E-02	5.81E-08	9.35E-08
Toluene	1.16E+02	4.05E-05	NA		4.62E-05	NA		2.39E-03	NA		
trans-1,2-Dichloroethene	6.38E-01	2.23E-07	NA		2.54E-07	NA		2.23E-05	NA		
Trichloroethene	5.21E-01	1.82E-07	5.90E-03	1.07E-09	2.08E-07	5.90E-03	1.22E-09	1.31E-05	7.00E-03	9.17E-08	9.40E-08
Vinyl chloride	1.28E+00	4.47E-07	7.20E-01	3.22E-07	5.10E-07	7.20E-01	3.67E-07	1.01E-04	2.73E-01	2.74E-05	**2.81E-05**
Xylenes, total	1.57E+02	5.49E-05	NA		6.25E-05	NA		2.11E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	3.40E-10	1.50E+03	5.10E-07	1.16E-10	1.50E+03	1.74E-07	5.16E-14	1.50E+03	7.74E-11	6.84E-07
1,2,3,4,6,7,8-HpCDF	1.60E-04	5.59E-11	1.50E+03	8.39E-08	1.91E-11	1.50E+03	2.87E-08	8.50E-15	1.50E+03	1.27E-11	1.13E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	2.77E-12	1.50E+03	4.16E-09	9.48E-13	1.50E+03	1.42E-09	4.21E-16	1.50E+03	6.32E-13	5.58E-09
1,2,3,4,7,8-HxCDD	1.64E-05	5.73E-12	1.50E+04	8.60E-08	1.96E-12	1.50E+04	2.94E-08	8.71E-16	1.50E+04	1.31E-11	1.15E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs	Oral: Chronic Daily Intake	Oral: Cancer Slope Factor, SF	Oral: Cancer Risk	Dermal: Chronic Daily Intake	Dermal: Cancer Slope Factor, SF	Dermal: Cancer Risk	Inhalation: Chronic Daily Intake	Inhalation: Cancer Slope Factor, SF	Inhalation: Cancer Risk	Total Cancer Risk
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
1,2,3,4,7,8-HxCDF	2.26E-06	7.90E-13	1.50E+04	1.18E-08	2.70E-13	1.50E+04	4.05E-09	1.20E-16	1.50E+04	1.80E-12	1.59E-08
1,2,3,6,7,8-HxCDD	7.35E-05	2.57E-11	1.50E+04	3.85E-07	8.78E-12	1.50E+04	1.32E-07	3.90E-15	1.50E+04	5.86E-11	5.17E-07
1,2,3,6,7,8-HxCDF	1.50E-05	5.24E-12	1.50E+04	7.86E-08	1.79E-12	1.50E+04	2.69E-08	7.97E-16	1.50E+04	1.19E-11	1.06E-07
1,2,3,7,8,9-HxCDD	4.14E-05	1.45E-11	1.50E+04	2.17E-07	4.95E-12	1.50E+04	7.42E-08	2.20E-15	1.50E+04	3.30E-11	2.91E-07
1,2,3,7,8,9-HxCDF	8.75E-06	3.06E-12	1.50E+04	4.59E-08	1.05E-12	1.50E+04	1.57E-08	4.65E-16	1.50E+04	6.97E-12	6.16E-08
1,2,3,7,8-PeCDD	1.53E-05	5.35E-12	1.50E+05	8.02E-07	1.83E-12	1.50E+05	2.74E-07	8.13E-16	1.50E+05	1.22E-10	**1.08E-06**
2,3,4,6,7,8-HxCDF	1.51E-05	5.28E-12	1.50E+04	7.92E-08	1.80E-12	1.50E+04	2.71E-08	8.02E-16	1.50E+04	1.20E-11	1.06E-07
2,3,4,7,8-PeCDF	3.66E-05	1.28E-11	7.50E+04	9.59E-07	4.37E-12	7.50E+04	3.28E-07	1.94E-15	7.50E+04	1.46E-10	**1.29E-06**
2,3,7,8-TCDF	4.63E-06	1.62E-12	1.50E+04	2.43E-08	5.53E-13	1.50E+04	8.30E-09	2.46E-16	1.50E+04	3.69E-12	3.26E-08
OCDD	8.20E-03	2.87E-09	1.50E+01	4.30E-08	9.80E-10	1.50E+01	1.47E-08	4.35E-13	1.50E+01	6.53E-12	5.77E-08
OCDF	3.25E-04	1.14E-10	1.50E+01	1.70E-09	3.88E-11	1.50E+01	5.83E-10	1.73E-14	1.50E+01	2.59E-13	2.29E-09
			Total Risk:	3.04E-05		**Total Risk:**	2.27E-05		**Total Risk:**	4.89E-05	**1.02E-04**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-14

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.26E+04	1.23E-02	1.00E+00	1.23E-02	1.41E-03	1.00E+00	1.41E-03	1.87E-06	1.40E-03	1.34E-03	1.51E-02
Antimony	1.36E+01	1.33E-05	4.00E-04	3.33E-02	1.52E-06	4.00E-04	3.79E-03	2.02E-09	NA		3.71E-02
Arsenic	7.71E+00	7.54E-06	3.00E-04	2.51E-02	2.58E-06	3.00E-04	8.60E-03	1.15E-09	4.29E-06	2.68E-04	3.40E-02
Barium	5.13E+02	5.02E-04	2.00E-01	2.51E-03	5.72E-05	2.00E-01	2.86E-04	7.63E-08	1.43E-04	5.34E-04	3.33E-03
Beryllium	6.14E-01	6.01E-07	2.00E-03	3.00E-04	6.85E-08	2.00E-03	3.42E-05	9.13E-11	2.00E-06	4.57E-05	3.80E-04
Cadmium	1.58E+00	1.55E-06	5.00E-04	3.09E-03	1.76E-08	5.00E-04	3.52E-05	2.35E-10	2.86E-06	8.22E-05	3.21E-03
Chromium	1.41E+03	1.38E-03	NA		1.57E-04	NA		2.10E-07	NA		
Cobalt	8.75E+00	8.56E-06	3.00E-04	2.85E-02	9.76E-07	3.00E-04	3.25E-03	1.30E-09	1.71E-06	7.59E-04	3.26E-02
Copper	2.29E+02	2.24E-04	4.00E-02	5.60E-03	2.55E-05	4.00E-02	6.39E-04	3.41E-08	NA		6.24E-03
Iron	2.61E+04	2.55E-02	7.00E-01	3.65E-02	2.91E-03	7.00E-01	4.16E-03	3.88E-06	NA		4.06E-02
Lead	6.40E+02	6.26E-04	NA		7.14E-05	NA		9.52E-08	NA		
Manganese	1.14E+03	1.12E-03	2.40E-02	4.65E-02	1.27E-04	2.40E-02	5.30E-03	1.70E-07	1.43E-05	1.19E-02	6.36E-02
Nickel	4.22E+01	4.13E-05	2.00E-02	2.06E-03	4.71E-06	2.00E-02	2.35E-04	6.28E-09	2.57E-05	2.44E-04	2.54E-03
Selenium	2.50E+00	2.45E-06	5.00E-03	4.89E-04	2.79E-07	5.00E-03	5.58E-05	3.72E-10	5.71E-03	6.51E-08	5.45E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Silver	8.43E-01	8.25E-07	5.00E-03	1.65E-04	9.40E-08	5.00E-03	1.88E-05	1.25E-10	NA		1.84E-04
Thallium	3.16E+00	3.09E-06	6.60E-05	4.68E-02	3.52E-07	6.60E-05	5.34E-03	4.70E-10	NA		5.22E-02
Vanadium	4.16E+01	4.07E-05	5.00E-03	8.14E-03	4.64E-06	5.00E-03	9.28E-04	6.19E-09	NA		9.07E-03
Zinc	5.91E+02	5.78E-04	3.00E-01	1.93E-03	6.59E-05	3.00E-01	2.20E-04	8.79E-08	NA		2.15E-03
Pesticides/PCBs											
Aldrin	1.29E+00	1.26E-06	3.00E-05	4.21E-02	7.19E-07	3.00E-05	2.40E-02	1.92E-10	NA		6.61E-02
alpha-BHC	2.60E-02	2.54E-08	5.00E-04	5.09E-05	1.45E-08	5.00E-04	2.90E-05	3.87E-12	NA		7.99E-05
alpha-Chlordane	4.04E-02	3.95E-08	5.00E-04	7.91E-05	2.25E-08	5.00E-04	4.51E-05	6.01E-12	2.00E-04	3.00E-08	1.24E-04
4,4'-DDD	9.16E+00	8.96E-06	NA		5.11E-06	NA		1.36E-09	NA		
4,4'-DDE	3.56E+00	3.48E-06	NA		1.99E-06	NA		5.29E-10	NA		
4,4'-DDT	3.25E-01	3.18E-07	5.00E-04	6.36E-04	1.81E-07	5.00E-04	3.63E-04	4.83E-11	NA		9.99E-04
beta-BHC	3.50E-02	3.42E-08	NA		1.95E-08	NA		5.20E-12	NA		
delta-BHC	4.10E-03	4.01E-09	NA		2.29E-09	NA		6.10E-13	NA		
Dieldrin	1.34E+00	1.31E-06	5.00E-05	2.62E-02	7.47E-07	5.00E-05	1.49E-02	1.99E-10	NA		4.12E-02
Endosulfan sulfate	1.60E-03	1.57E-09	6.00E-03	2.61E-07	8.92E-10	6.00E-03	1.49E-07	2.38E-13	NA		4.10E-07
Endrin	4.60E-03	4.50E-09	3.00E-04	1.50E-05	2.57E-09	3.00E-04	8.55E-06	6.84E-13	NA		2.36E-05
Endrin aldehyde	1.10E-03	1.08E-09	3.00E-04	3.59E-06	6.14E-10	3.00E-04	2.05E-06	1.64E-13	NA		5.63E-06
Endrin ketone	1.20E-02	1.17E-08	3.00E-04	3.91E-05	6.69E-09	3.00E-04	2.23E-05	1.78E-12	NA		6.14E-05
gamma-Chlordane	1.09E-01	1.07E-07	5.00E-04	2.13E-04	6.08E-08	5.00E-04	1.22E-04	1.62E-11	2.00E-04	8.10E-08	3.35E-04
Heptachlor	8.80E-03	8.61E-09	3.00E-05	2.87E-04	4.91E-09	3.00E-05	1.64E-04	1.31E-12	NA		4.51E-04
Methoxychlor	3.90E-03	3.82E-09	2.00E-05	1.91E-04	2.18E-09	2.00E-05	1.09E-04	5.80E-13	NA		3.00E-04
Aroclor-1260	6.40E-01	6.26E-07	2.00E-05	3.13E-02	1.07E-06	2.00E-05	5.35E-02	9.52E-11	NA		8.49E-02
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	1.51E-06	1.00E-02	1.51E-04	1.72E-06	1.00E-02	1.72E-04	6.34E-06	5.71E-04	1.11E-02	1.14E-02
1,2-Dichlorobenzene	5.47E+01	5.35E-05	9.00E-02	5.95E-04	6.10E-05	9.00E-02	6.78E-04	6.69E-04	5.71E-02	1.17E-02	1.30E-02
1,3-Dichlorobenzene	2.02E+00	1.98E-06	NA		2.25E-06	NA		2.47E-05	NA		
1,4-Dichlorobenzene	2.55E+01	2.50E-05	7.00E-02	3.56E-04	2.84E-05	7.00E-02	4.06E-04	3.54E-04	2.29E-01	1.55E-03	2.31E-03
2-Methylnaphthalene	1.14E+02	1.12E-04	4.00E-03	2.79E-02	1.91E-04	4.00E-03	4.77E-02	3.63E-04	NA		7.56E-02
2-Methylphenol	9.90E-01	9.69E-07	5.00E-02	1.94E-05	1.10E-06	5.00E-02	2.21E-05	1.47E-10	1.71E-01	8.59E-10	4.15E-05
4-Chloro-3-methylphenol	7.20E+00	7.05E-06	NA		8.03E-06	NA		1.07E-09	NA		
4-Methylphenol	3.60E+00	3.52E-06	5.00E-03	7.05E-04	4.02E-06	5.00E-03	8.03E-04	5.35E-10	1.71E-01	3.12E-09	1.51E-03
Acenaphthene	9.18E+00	8.98E-06	6.00E-02	1.50E-04	1.54E-05	6.00E-02	2.56E-04	7.44E-06	NA		4.06E-04
Anthracene	1.10E+00	1.08E-06	3.00E-01	3.59E-06	1.84E-06	3.00E-01	6.14E-06	2.49E-07	NA		9.72E-06
Benzo(a)anthracene	5.50E-01	5.38E-07	NA		9.20E-07	NA		8.18E-11	NA		
Benzo(a)pyrene	5.00E-01	4.89E-07	NA		8.37E-07	NA		7.44E-11	NA		
Benzo(b)fluoranthene	4.20E-01	4.11E-07	NA		7.03E-07	NA		6.25E-11	NA		
Benzo(g,h,i)perylene	4.30E-01	4.21E-07	NA		7.19E-07	NA		6.39E-11	NA		
Benzo(k)fluoranthene	4.30E-01	4.21E-07	NA		7.19E-07	NA		6.39E-11	NA		
Benzyl butyl phthalate	7.60E+00	7.44E-06	2.00E-01	3.72E-05	8.48E-06	2.00E-01	4.24E-05	1.13E-09	NA		7.96E-05
Biphenyl (diphenyl)	4.40E+00	4.31E-06	5.00E-02	8.61E-05	4.91E-06	5.00E-02	9.82E-05	6.54E-10	NA		1.84E-04
bis(2-Ethylhexyl)phthalate	9.85E+00	9.64E-06	2.00E-02	4.82E-04	1.10E-05	2.00E-02	5.49E-04	1.46E-09	NA		1.03E-03
Caprolactam	9.50E-02	9.30E-08	5.00E-01	1.86E-07	1.06E-07	5.00E-01	2.12E-07	1.41E-11	NA		3.98E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Carbazole	1.10E+00	1.08E-06	NA		1.23E-06	NA		1.64E-10	NA		
Chrysene	9.10E-01	8.90E-07	NA		1.52E-06	NA		1.35E-10	NA		
Dibenz(a,h)anthracene	1.20E-01	1.17E-07	NA		2.01E-07	NA		1.78E-11	NA		
Dibenzofuran	4.10E+00	4.01E-06	2.00E-03	2.01E-03	4.57E-06	2.00E-03	2.29E-03	1.45E-06	NA		4.29E-03
Di-n-butyl phthalate	2.90E+00	2.84E-06	1.00E-01	2.84E-05	3.23E-06	1.00E-01	3.23E-05	4.31E-10	NA		6.07E-05
Fluoranthene	4.20E+00	4.11E-06	4.00E-02	1.03E-04	7.03E-06	4.00E-02	1.76E-04	6.25E-10	NA		2.78E-04
Fluorene	8.31E+00	8.13E-06	4.00E-02	2.03E-04	1.39E-05	4.00E-02	3.48E-04	2.90E-06	NA		5.51E-04
Indeno(1,2,3-c,d)pyrene	4.40E-01	4.31E-07	NA		7.36E-07	NA		6.54E-11	NA		
Naphthalene	5.28E+01	5.17E-05	2.00E-02	2.58E-03	8.83E-05	2.00E-02	4.42E-03	1.68E-04	8.57E-04	1.96E-01	2.03E-01
Phenanthrene	1.21E+01	1.18E-05	NA		2.02E-05	NA		1.80E-09	NA		
Pyrene	3.97E+00	3.88E-06	3.00E-02	1.29E-04	6.64E-06	3.00E-02	2.21E-04	1.86E-07	NA		3.51E-04
1,1,1-Trichloroethane	2.51E-02	2.46E-08	2.00E+00	1.23E-08	2.80E-08	2.00E+00	1.40E-08	2.13E-06	1.43E+00	1.49E-06	1.52E-06
1,1-Dichloroethane	1.01E+01	9.88E-06	2.00E-01	4.94E-05	1.13E-05	2.00E-01	5.63E-05	8.16E-04	NA		1.06E-04
1,1-Dichloroethene	6.80E-02	6.65E-08	5.00E-02	1.33E-06	7.59E-08	5.00E-02	1.52E-06	9.36E-06	2.00E-02	4.68E-04	4.71E-04
1,2-Dichloroethane	6.05E-02	5.92E-08	2.00E-02	2.96E-06	6.75E-08	2.00E-02	3.37E-06	3.08E-06	6.86E-01	4.49E-06	1.08E-05
Acetone	2.26E-01	2.21E-07	9.00E-01	2.46E-07	2.52E-07	9.00E-01	2.80E-07	4.09E-06	8.86E+00	4.62E-07	9.87E-07
Benzene	1.93E+00	1.89E-06	4.00E-03	4.72E-04	2.15E-06	4.00E-03	5.38E-04	1.34E-04	8.57E-03	1.56E-02	1.66E-02
Carbon disulfide	6.29E-03	6.15E-09	1.00E-01	6.15E-08	7.02E-09	1.00E-01	7.02E-08	1.06E-06	2.00E-01	5.29E-06	5.42E-06
Chlorobenzene	1.01E+01	9.88E-06	2.00E-02	4.94E-04	1.13E-05	2.00E-02	5.63E-04	2.91E-04	1.43E-02	2.04E-02	2.14E-02
Chloroethane	2.40E-02	2.35E-08	NA		2.68E-08	NA		4.15E-06	2.86E+00	1.45E-06	1.45E-06
Chloromethane	1.27E-01	1.24E-07	NA		1.42E-07	NA		4.64E-06	2.57E-02	1.80E-04	1.80E-04
cis-1,2-Dichloroethene	1.49E+02	1.46E-04	1.00E-02	1.46E-02	1.66E-04	1.00E-02	1.66E-02	9.90E-03	NA		3.12E-02
Cyclohexane	2.55E+00	2.50E-06	NA		2.84E-06	NA		4.77E-04	1.71E+00	2.78E-04	2.78E-04
Ethylbenzene	2.24E+01	2.19E-05	1.00E-01	2.19E-04	2.50E-05	1.00E-01	2.50E-04	7.45E-04	2.86E-01	2.61E-03	3.08E-03
Isopropylbenzene (cumene)	5.35E+00	5.23E-06	1.00E-01	5.23E-05	5.97E-06	1.00E-01	5.97E-05	3.42E-04	1.14E-01	3.00E-03	3.11E-03
Methyl ethyl ketone	3.14E-01	3.07E-07	6.00E-01	5.12E-07	3.50E-07	6.00E-01	5.84E-07	3.71E-06	1.43E+00	2.60E-06	3.69E-06
Methyl isobutyl ketone	5.74E+00	5.62E-06	8.00E-02	7.02E-05	6.40E-06	8.00E-02	8.00E-05	5.24E-05	8.57E-01	6.11E-05	2.11E-04
Methyl tert-butyl ether	4.00E-03	3.91E-09	NA		4.46E-09	NA		1.96E-07	8.57E-01	2.28E-07	2.28E-07
Methylcyclohexane	1.02E+01	9.98E-06	NA		1.14E-05	NA		1.16E-03	8.60E-01	1.34E-03	1.34E-03
Methylene chloride	8.38E-03	8.20E-09	6.00E-02	1.37E-07	9.35E-09	6.00E-02	1.56E-07	7.71E-07	2.86E-01	2.70E-06	2.99E-06
Styrene	5.14E-01	5.03E-07	2.00E-01	2.51E-06	5.73E-07	2.00E-01	2.87E-06	8.80E-06	2.57E-01	3.42E-05	3.96E-05
Tetrachloroethene	8.76E-02	8.57E-08	1.00E-02	8.57E-06	9.77E-08	1.00E-02	9.77E-06	7.88E-06	1.00E-02	7.88E-04	8.06E-04
Toluene	1.16E+02	1.14E-04	8.00E-02	1.42E-03	1.29E-04	8.00E-02	1.62E-03	6.69E-03	8.57E-02	7.81E-02	8.11E-02
trans-1,2-Dichloroethene	6.38E-01	6.24E-07	2.00E-02	3.12E-05	7.12E-07	2.00E-02	3.56E-05	6.25E-05	1.71E-02	3.65E-03	3.71E-03
Trichloroethene	5.21E-01	5.10E-07	3.00E-04	1.70E-03	5.81E-07	3.00E-04	1.94E-03	3.67E-05	1.00E-02	3.67E-03	7.30E-03
Vinyl chloride	1.28E+00	1.25E-06	3.00E-03	4.17E-04	1.43E-06	3.00E-03	4.76E-04	2.81E-04	2.86E-02	9.85E-03	1.07E-02
Xylenes, total	1.57E+02	1.54E-04	2.00E-01	7.68E-04	1.75E-04	2.00E-01	8.76E-04	5.91E-03	2.86E-02	2.07E-01	2.08E-01
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	9.51E-10	NA		3.25E-10	NA		1.45E-13	1.14E-08	1.26E-05	1.26E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	1.57E-10	NA		5.35E-11	NA		2.38E-14	1.14E-08	2.08E-06	2.08E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	7.76E-12	NA		2.65E-12	NA		1.18E-15	1.14E-08	1.03E-07	1.03E-07
1,2,3,4,7,8-HxCDD	1.64E-05	1.60E-11	NA		5.49E-12	NA		2.44E-15	1.14E-08	2.13E-07	2.13E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
1,2,3,4,7,8-HxCDF	2.26E-06	2.21E-12	NA		7.56E-13	NA		3.36E-16	1.14E-08	2.94E-08	2.94E-08
1,2,3,6,7,8-HxCDD	7.35E-05	7.19E-11	NA		2.46E-11	NA		1.09E-14	1.14E-08	9.56E-07	9.56E-07
1,2,3,6,7,8-HxCDF	1.50E-05	1.47E-11	NA		5.02E-12	NA		2.23E-15	1.14E-08	1.95E-07	1.95E-07
1,2,3,7,8,9-HxCDD	4.14E-05	4.05E-11	NA		1.39E-11	NA		6.16E-15	1.14E-08	5.39E-07	5.39E-07
1,2,3,7,8,9-HxCDF	8.75E-06	8.56E-12	NA		2.93E-12	NA		1.30E-15	1.14E-08	1.14E-07	1.14E-07
1,2,3,7,8-PeCDD	1.53E-05	1.50E-11	NA		5.12E-12	NA		2.28E-15	1.14E-08	1.99E-07	1.99E-07
2,3,4,6,7,8-HxCDF	1.51E-05	1.48E-11	NA		5.05E-12	NA		2.25E-15	1.14E-08	1.96E-07	1.96E-07
2,3,4,7,8-PeCDF	3.66E-05	3.58E-11	NA		1.22E-11	NA		5.44E-15	1.14E-08	4.76E-07	4.76E-07
2,3,7,8-TCDF	4.63E-06	4.53E-12	NA		1.55E-12	NA		6.89E-16	1.14E-08	6.02E-08	6.02E-08
OCDD	8.20E-03	8.02E-09	NA		2.74E-09	NA		1.22E-12	1.14E-08	1.07E-04	1.07E-04
OCDF	3.25E-04	3.18E-10	NA		1.09E-10	NA		4.83E-14	1.14E-08	4.23E-06	4.23E-06
		Total Risk (Hazard Index):		4.10E-01	Total Risk (Hazard Index):		2.09E-01	Total Risk (Hazard Index):		5.82E-01	**1.20E+00**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-15

Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.26E+04	5.81E-04	NA		8.03E-05	NA		3.52E-05	NA		
Antimony	1.36E+01	6.27E-07	NA		8.67E-08	NA		3.80E-08	NA		
Arsenic	7.71E+00	3.56E-07	1.50E+00	5.33E-07	1.47E-07	1.50E+00	2.21E-07	2.16E-08	1.51E+01	3.24E-07	**1.08E-06**
Barium	5.13E+02	2.37E-05	NA		3.27E-06	NA		1.43E-06	NA		
Beryllium	6.14E-01	2.83E-08	NA		3.91E-09	NA		1.72E-09	8.40E+00	1.44E-08	1.44E-08
Cadmium	1.58E+00	7.29E-08	NA		1.01E-09	NA		4.42E-09	6.30E+00	2.78E-08	2.78E-08
Chromium	1.41E+03	6.50E-05	NA		8.99E-06	NA		3.94E-06	NA		
Cobalt	8.75E+00	4.04E-07	NA		5.58E-08	NA		2.45E-08	3.15E+00	7.71E-08	7.71E-08
Copper	2.29E+02	1.06E-05	NA		1.46E-06	NA		6.40E-07	NA		
Iron	2.61E+04	1.20E-03	NA		1.66E-04	NA		7.30E-05	NA		
Lead	6.40E+02	2.95E-05	NA		4.08E-06	NA		1.79E-06	NA		
Manganese	1.14E+03	5.26E-05	NA		7.27E-06	NA		3.19E-06	NA		
Nickel	4.22E+01	1.95E-06	NA		2.69E-07	NA		1.18E-07	9.10E-01	1.07E-07	1.07E-07
Selenium	2.50E+00	1.15E-07	NA		1.59E-08	NA		6.99E-09	NA		
Silver	8.43E-01	3.89E-08	NA		5.37E-09	NA		2.36E-09	NA		
Thallium	3.16E+00	1.46E-07	NA		2.01E-08	NA		8.83E-09	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Vanadium	4.16E+01	1.92E-06	NA		2.65E-07	NA		1.16E-07	NA		
Zinc	5.91E+02	2.73E-05	NA		3.77E-06	NA		1.65E-06	NA		
Pesticides/PCBs											
Aldrin	1.29E+00	5.95E-08	1.70E+01	1.01E-06	4.11E-08	1.70E+01	6.99E-07	3.61E-09	1.72E+01	6.18E-08	**1.77E-06**
alpha-BHC	2.60E-02	1.20E-09	6.30E+00	7.56E-09	8.29E-10	6.30E+00	5.22E-09	7.27E-11	6.30E+00	4.58E-10	1.32E-08
alpha-Chlordane	4.04E-02	1.86E-09	1.30E+00	2.42E-09	1.29E-09	1.30E+00	1.67E-09	1.13E-10	3.50E-01	3.95E-11	4.14E-09
4,4'-DDD	9.16E+00	4.23E-07	2.40E-01	1.01E-07	2.92E-07	2.40E-01	7.01E-08	2.56E-08	2.42E-01	6.18E-09	1.78E-07
4,4'-DDE	3.56E+00	1.64E-07	3.40E-01	5.58E-08	1.13E-07	3.40E-01	3.86E-08	9.95E-09	3.40E-01	3.38E-09	9.78E-08
4,4'-DDT	3.25E-01	1.50E-08	3.40E-01	5.10E-09	1.04E-08	3.40E-01	3.52E-09	9.09E-10	3.40E-01	3.08E-10	8.93E-09
beta-BHC	3.50E-02	1.61E-09	1.80E+00	2.91E-09	1.12E-09	1.80E+00	2.01E-09	9.78E-11	1.86E+00	1.82E-10	5.10E-09
delta-BHC	4.10E-03	1.89E-10	NA		1.31E-10	NA		1.15E-11	NA		
Dieldrin	1.34E+00	6.18E-08	1.60E+01	9.89E-07	4.27E-08	1.60E+01	6.83E-07	3.75E-09	1.61E+01	6.03E-08	**1.73E-06**
Endosulfan sulfate	1.60E-03	7.38E-11	NA		5.10E-11	NA		4.47E-12	NA		
Endrin	4.60E-03	2.12E-10	NA		1.47E-10	NA		1.29E-11	NA		
Endrin aldehyde	1.10E-03	5.07E-11	NA		3.51E-11	NA		3.08E-12	NA		
Endrin ketone	1.20E-02	5.54E-10	NA		3.82E-10	NA		3.35E-11	NA		
gamma-Chlordane	1.09E-01	5.03E-09	1.20E+00	6.03E-09	3.47E-09	1.20E+00	4.17E-09	3.05E-10	3.50E-01	1.07E-10	1.03E-08
Heptachlor	8.80E-03	4.06E-10	4.50E+00	1.83E-09	2.80E-10	4.50E+00	1.26E-09	2.46E-11	4.55E+00	1.12E-10	3.20E-09
Methoxychlor	3.90E-03	1.80E-10	NA		1.24E-10	NA		1.09E-11	NA		
Aroclor-1260	6.40E-01	2.95E-08	2.00E+00	5.90E-08	6.12E-08	2.00E+00	1.22E-07	1.79E-09	2.00E+00	3.58E-09	1.85E-07
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	7.10E-08	2.90E-02	2.06E-09	9.82E-08	2.90E-02	2.85E-09	4.31E-09	NA		4.91E-09
1,2-Dichlorobenzene	5.47E+01	2.52E-06	NA		3.49E-06	NA		9.71E-06	NA		
1,3-Dichlorobenzene	2.02E+00	9.32E-08	NA		1.29E-07	NA		3.59E-07	NA		
1,4-Dichlorobenzene	2.55E+01	1.18E-06	5.40E-03	6.35E-09	1.63E-06	5.40E-03	8.78E-09	5.13E-06	3.85E-02	1.97E-07	2.13E-07
2-Methylnaphthalene	1.14E+02	5.26E-06	NA		1.09E-05	NA		5.50E-06	NA		
2-Methylphenol	9.90E-01	4.57E-08	NA		6.31E-08	NA		2.77E-09	NA		
4-Chloro-3-methylphenol	7.20E+00	3.32E-07	NA		4.59E-07	NA		2.01E-08	NA		
4-Methylphenol	3.60E+00	1.66E-07	NA		2.29E-07	NA		1.01E-08	NA		
Acenaphthene	9.18E+00	4.23E-07	NA		8.78E-07	NA		1.32E-07	NA		
Anthracene	1.10E+00	5.07E-08	NA		1.05E-07	NA		6.64E-09	NA		
Benzo(a)anthracene	5.50E-01	2.54E-08	1.20E+00	3.04E-08	5.26E-08	1.20E+00	6.31E-08	1.54E-09	3.85E-01	5.92E-10	9.41E-08
Benzo(a)pyrene	5.00E-01	2.31E-08	1.20E+01	2.77E-07	4.78E-08	1.20E+01	5.74E-07	1.40E-09	3.85E+00	5.38E-09	8.56E-07
Benzo(b)fluoranthene	4.20E-01	1.94E-08	1.20E+00	2.32E-08	4.02E-08	1.20E+00	4.82E-08	1.17E-09	3.85E-01	4.52E-10	7.19E-08
Benzo(g,h,i)perylene	4.30E-01	1.98E-08	NA		4.11E-08	NA		1.20E-09	NA		
Benzo(k)fluoranthene	4.30E-01	1.98E-08	1.20E+00	2.38E-08	4.11E-08	1.20E+00	4.93E-08	1.20E-09	3.85E-01	4.63E-10	7.36E-08
Benzyl butyl phthalate	7.60E+00	3.51E-07	1.90E-03	6.66E-10	4.84E-07	1.90E-03	9.20E-10	2.12E-08	NA		1.59E-09
Biphenyl (diphenyl)	4.40E+00	2.03E-07	NA		2.80E-07	NA		1.23E-08	NA		
bis(2-Ethylhexyl)phthalate	9.85E+00	4.54E-07	1.40E-02	6.36E-09	6.28E-07	1.40E-02	8.79E-09	2.75E-08	8.40E-03	2.31E-10	1.54E-08
Caprolactam	9.50E-02	4.38E-09	NA		6.06E-09	NA		2.66E-10	NA		
Carbazole	1.10E+00	5.07E-08	NA		7.01E-08	NA		3.08E-09	NA		
Chrysene	9.10E-01	4.20E-08	1.20E-01	5.04E-09	8.70E-08	1.20E-01	1.04E-08	2.54E-09	3.85E-02	9.79E-11	1.56E-08
Dibenz(a,h)anthracene	1.20E-01	5.54E-09	7.30E+00	4.04E-08	1.15E-08	7.30E+00	8.38E-08	3.35E-10	4.20E+00	1.41E-09	1.26E-07
Dibenzofuran	4.10E+00	1.89E-07	NA		2.61E-07	NA		3.21E-08	NA		
Di-n-butyl phthalate	2.90E+00	1.34E-07	NA		1.85E-07	NA		8.11E-09	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Fluoranthene	4.20E+00	1.94E-07	NA		4.02E-07	NA		1.17E-08	NA		
Fluorene	8.31E+00	3.83E-07	NA		7.95E-07	NA		6.46E-08	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	2.03E-08	1.20E+00	2.44E-08	4.21E-08	1.20E+00	5.05E-08	1.23E-09	3.85E-01	4.74E-10	7.53E-08
Naphthalene	5.28E+01	2.44E-06	1.20E-01	2.92E-07	5.05E-06	1.20E-01	6.06E-07	2.55E-06	1.19E-01	3.03E-07	**1.20E-06**
Phenanthrene	1.21E+01	5.58E-07	NA		1.16E-06	NA		3.38E-08	NA		
Pyrene	3.97E+00	1.83E-07	NA		3.80E-07	NA		1.37E-08	NA		
1,1,1-Trichloroethane	2.51E-02	1.16E-09	NA		1.60E-09	NA		3.05E-08	NA		
1,1-Dichloroethane	1.01E+01	4.66E-07	5.70E-03	2.66E-09	6.44E-07	5.70E-03	3.67E-09	1.17E-05	5.70E-03	6.66E-08	7.30E-08
1,1-Dichloroethene	6.80E-02	3.14E-09	NA		4.33E-09	NA		1.34E-07	9.10E-02	1.22E-08	1.22E-08
1,2-Dichloroethane	6.05E-02	2.79E-09	9.10E-02	2.54E-10	3.86E-09	9.10E-02	3.51E-10	4.41E-08	9.10E-02	4.01E-09	4.62E-09
Acetone	2.26E-01	1.04E-08	NA		1.44E-08	NA		5.90E-08	NA		
Benzene	1.93E+00	8.90E-08	1.00E-01	8.90E-09	1.23E-07	1.00E-01	1.23E-08	1.92E-06	1.02E-01	1.95E-07	2.16E-07
Carbon disulfide	6.29E-03	2.90E-10	NA		4.01E-10	NA		1.51E-08	NA		
Chlorobenzene	1.01E+01	4.66E-07	NA		6.44E-07	NA		4.19E-06	NA		
Chloroethane	2.40E-02	1.11E-09	NA		1.53E-09	NA		5.93E-08	2.90E-03	1.72E-10	1.72E-10
Chloromethane	1.27E-01	5.86E-09	NA		8.10E-09	NA		6.66E-08	NA		
cis-1,2-Dichloroethene	1.49E+02	6.87E-06	NA		9.50E-06	NA		1.42E-04	NA		
Cyclohexane	2.55E+00	1.18E-07	NA		1.63E-07	NA		6.82E-06	NA		
Ethylbenzene	2.24E+01	1.03E-06	1.10E-02	1.14E-08	1.43E-06	1.10E-02	1.57E-08	1.07E-05	8.75E-03	9.36E-08	1.21E-07
Isopropylbenzene (cumene)	5.35E+00	2.47E-07	NA		3.41E-07	NA		4.90E-06	NA		
Methyl ethyl ketone	3.14E-01	1.45E-08	NA		2.00E-08	NA		5.39E-08	NA		
Methyl isobutyl ketone	5.74E+00	2.65E-07	NA		3.66E-07	NA		7.65E-07	NA		
Methyl tert-butyl ether	4.00E-03	1.85E-10	1.80E-03	3.32E-13	2.55E-10	1.80E-03	4.59E-13	2.81E-09	9.10E-04	2.56E-12	3.35E-12
Methylcyclohexane	1.02E+01	4.71E-07	NA		6.50E-07	NA		1.65E-05	NA		
Methylene chloride	8.38E-03	3.87E-10	1.40E-02	5.41E-12	5.34E-10	1.40E-02	7.48E-12	1.10E-08	3.50E-03	3.86E-11	5.15E-11
Styrene	5.14E-01	2.37E-08	NA		3.28E-08	NA		1.27E-07	NA		
Tetrachloroethene	8.76E-02	4.04E-09	5.40E-01	2.18E-09	5.58E-09	5.40E-01	3.02E-09	1.13E-07	2.07E-02	2.33E-09	7.53E-09
Toluene	1.16E+02	5.35E-06	NA		7.39E-06	NA		9.59E-05	NA		
trans-1,2-Dichloroethene	6.38E-01	2.94E-08	NA		4.07E-08	NA		8.95E-07	NA		
Trichloroethene	5.21E-01	2.40E-08	5.90E-03	1.42E-10	3.32E-08	5.90E-03	1.96E-10	5.25E-07	7.00E-03	3.68E-09	4.02E-09
Vinyl chloride	1.28E+00	5.90E-08	7.20E-01	4.25E-08	8.16E-08	7.20E-01	5.87E-08	4.02E-06	2.73E-01	1.10E-06	**1.20E-06**
Xylenes, total	1.57E+02	7.24E-06	NA		1.00E-05	NA		8.49E-05	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	4.48E-11	1.50E+03	6.73E-08	1.86E-11	1.50E+03	2.79E-08	2.72E-12	1.50E+03	4.08E-09	9.92E-08
1,2,3,4,6,7,8-HpCDF	1.60E-04	7.38E-12	1.50E+03	1.11E-08	3.06E-12	1.50E+03	4.59E-09	4.47E-13	1.50E+03	6.71E-10	1.63E-08
1,2,3,4,7,8,9-HpCDF	7.93E-06	3.66E-13	1.50E+03	5.49E-10	1.52E-13	1.50E+03	2.27E-10	2.22E-14	1.50E+03	3.33E-11	8.09E-10
1,2,3,4,7,8-HxCDD	1.64E-05	7.56E-13	1.50E+04	1.13E-08	3.14E-13	1.50E+04	4.70E-09	4.58E-14	1.50E+04	6.88E-10	1.67E-08
1,2,3,4,7,8-HxCDF	2.26E-06	1.04E-13	1.50E+04	1.56E-09	4.32E-14	1.50E+04	6.48E-10	6.32E-15	1.50E+04	9.48E-11	2.31E-09
1,2,3,6,7,8-HxCDD	7.35E-05	3.39E-12	1.50E+04	5.09E-08	1.41E-12	1.50E+04	2.11E-08	2.05E-13	1.50E+04	3.08E-09	7.50E-08
1,2,3,6,7,8-HxCDF	1.50E-05	6.92E-13	1.50E+04	1.04E-08	2.87E-13	1.50E+04	4.30E-09	4.19E-14	1.50E+04	6.29E-10	1.53E-08
1,2,3,7,8,9-HxCDD	4.14E-05	1.91E-12	1.50E+04	2.86E-08	7.92E-13	1.50E+04	1.19E-08	1.16E-13	1.50E+04	1.74E-09	4.23E-08
1,2,3,7,8,9-HxCDF	8.75E-06	4.04E-13	1.50E+04	6.05E-09	1.67E-13	1.50E+04	2.51E-09	2.45E-14	1.50E+04	3.67E-10	8.93E-09
1,2,3,7,8-PeCDD	1.53E-05	7.06E-13	1.50E+05	1.06E-07	2.93E-13	1.50E+05	4.39E-08	4.28E-14	1.50E+05	6.42E-09	1.56E-07
2,3,4,6,7,8-HxCDF	1.51E-05	6.97E-13	1.50E+04	1.04E-08	2.89E-13	1.50E+04	4.33E-09	4.22E-14	1.50E+04	6.33E-10	1.54E-08
2,3,4,7,8-PeCDF	3.66E-05	1.69E-12	7.50E+04	1.27E-07	7.00E-13	7.50E+04	5.25E-08	1.02E-13	7.50E+04	7.67E-09	1.87E-07

Risk Calculations											
		Exposure Route = Oral			**Exposure Route = Dermal**			**Exposure Route = Inhalation**			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
2,3,7,8-TCDF	4.63E-06	2.14E-13	1.50E+04	3.20E-09	8.85E-14	1.50E+04	1.33E-09	1.29E-14	1.50E+04	1.94E-10	4.73E-09
OCDD	8.20E-03	3.78E-10	1.50E+01	5.67E-09	1.57E-10	1.50E+01	2.35E-09	2.29E-11	1.50E+01	3.44E-10	8.37E-09
OCDF	3.25E-04	1.50E-11	1.50E+01	2.25E-10	6.21E-12	1.50E+01	9.32E-11	9.09E-13	1.50E+01	1.36E-11	3.32E-10
			Total Risk:	4.02E-06		**Total Risk:**	3.63E-06		**Total Risk:**	2.70E-06	**1.04E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-16
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.26E+04	4.07E-02	1.00E+00	4.07E-02	5.62E-03	1.00E+00	5.62E-03	2.47E-03	1.40E-03	1.76E+00	**1.81E+00**
Antimony	1.36E+01	4.39E-05	4.00E-04	1.10E-01	6.07E-06	4.00E-04	1.52E-02	2.66E-06	NA		1.25E-01
Arsenic	7.71E+00	2.49E-05	3.00E-04	8.30E-02	1.03E-05	3.00E-04	3.44E-02	1.51E-06	4.29E-06	3.52E-01	4.69E-01
Barium	5.13E+02	1.66E-03	2.00E-01	8.28E-03	2.29E-04	2.00E-01	1.14E-03	1.00E-04	1.43E-04	7.03E-01	7.12E-01
Beryllium	6.14E-01	1.98E-06	2.00E-03	9.91E-04	2.74E-07	2.00E-03	1.37E-04	1.20E-07	2.00E-06	6.01E-02	6.12E-02
Cadmium	1.58E+00	5.10E-06	5.00E-04	1.02E-02	7.05E-08	5.00E-04	1.41E-04	3.09E-07	2.86E-06	1.08E-01	1.19E-01
Chromium	1.41E+03	4.55E-03	NA		6.29E-04	NA		2.76E-04	NA		
Cobalt	8.75E+00	2.83E-05	3.00E-04	9.42E-02	3.90E-06	3.00E-04	1.30E-02	1.71E-06	1.71E-06	9.99E-01	**1.11E+00**
Copper	2.29E+02	7.39E-04	4.00E-02	1.85E-02	1.02E-04	4.00E-02	2.55E-03	4.48E-05	NA		2.10E-02
Iron	2.61E+04	8.43E-02	7.00E-01	1.20E-01	1.16E-02	7.00E-01	1.66E-02	5.11E-03	NA		1.37E-01
Lead	6.40E+02	2.07E-03	NA		2.86E-04	NA		1.25E-04	NA		
Manganese	1.14E+03	3.68E-03	2.40E-02	1.53E-01	5.09E-04	2.40E-02	2.12E-02	2.23E-04	1.43E-05	1.56E+01	**1.58E+01**
Nickel	4.22E+01	1.36E-04	2.00E-02	6.81E-03	1.88E-05	2.00E-02	9.41E-04	8.26E-06	2.57E-05	3.21E-01	3.29E-01
Selenium	2.50E+00	8.07E-06	5.00E-03	1.61E-03	1.12E-06	5.00E-03	2.23E-04	4.89E-07	5.71E-03	8.56E-05	1.92E-03
Silver	8.43E-01	2.72E-06	5.00E-03	5.44E-04	3.76E-07	5.00E-03	7.52E-05	1.65E-07	NA		6.20E-04
Thallium	3.16E+00	1.02E-05	6.60E-05	1.55E-01	1.41E-06	6.60E-05	2.14E-02	6.18E-07	NA		1.76E-01

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Vanadium	4.16E+01	1.34E-04	5.00E-03	2.69E-02	1.86E-05	5.00E-03	3.71E-03	8.14E-06	NA		3.06E-02
Zinc	5.91E+02	1.91E-03	3.00E-01	6.36E-03	2.64E-04	3.00E-01	8.79E-04	1.16E-04	NA		7.24E-03
Pesticides/PCBs											
Aldrin	1.29E+00	4.17E-06	3.00E-05	1.39E-01	2.88E-06	3.00E-05	9.59E-02	2.52E-07	NA		2.35E-01
alpha-BHC	2.60E-02	8.40E-08	5.00E-04	1.68E-04	5.80E-08	5.00E-04	1.16E-04	5.09E-09	NA		2.84E-04
alpha-Chlordane	4.04E-02	1.30E-07	5.00E-04	2.61E-04	9.01E-08	5.00E-04	1.80E-04	7.91E-09	2.00E-04	3.95E-05	4.81E-04
4,4'-DDD	9.16E+00	2.96E-05	NA		2.04E-05	NA		1.79E-06	NA		
4,4'-DDE	3.56E+00	1.15E-05	NA		7.94E-06	NA		6.97E-07	NA		
4,4'-DDT	3.25E-01	1.05E-06	5.00E-04	2.10E-03	7.25E-07	5.00E-04	1.45E-03	6.36E-08	NA		3.55E-03
beta-BHC	3.50E-02	1.13E-07	NA		7.81E-08	NA		6.85E-09	NA		
delta-BHC	4.10E-03	1.32E-08	NA		9.15E-09	NA		8.02E-10	NA		
Dieldrin	1.34E+00	4.33E-06	5.00E-05	8.65E-02	2.99E-06	5.00E-05	5.98E-02	2.62E-07	NA		1.46E-01
Endosulfan sulfate	1.60E-03	5.17E-09	6.00E-03	8.61E-07	3.57E-09	6.00E-03	5.95E-07	3.13E-10	NA		1.46E-06
Endrin	4.60E-03	1.49E-08	3.00E-04	4.95E-05	1.03E-08	3.00E-04	3.42E-05	9.00E-10	NA		8.37E-05
Endrin aldehyde	1.10E-03	3.55E-09	3.00E-04	1.18E-05	2.45E-09	3.00E-04	8.18E-06	2.15E-10	NA		2.00E-05
Endrin ketone	1.20E-02	3.87E-08	3.00E-04	1.29E-04	2.68E-08	3.00E-04	8.92E-05	2.35E-09	NA		2.18E-04
gamma-Chlordane	1.09E-01	3.52E-07	5.00E-04	7.04E-04	2.43E-07	5.00E-04	4.86E-04	2.13E-08	2.00E-04	1.07E-04	1.30E-03
Heptachlor	8.80E-03	2.84E-08	3.00E-05	9.47E-04	1.96E-08	3.00E-05	6.54E-04	1.72E-09	NA		1.60E-03
Methoxychlor	3.90E-03	1.26E-08	2.00E-05	6.30E-04	8.70E-09	2.00E-05	4.35E-04	7.63E-10	NA		1.06E-03
Aroclor-1260	6.40E-01	2.07E-06	2.00E-05	1.03E-01	4.28E-06	2.00E-05	2.14E-01	1.25E-07	NA		3.17E-01
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.54E+00	4.97E-06	1.00E-02	4.97E-04	6.87E-06	1.00E-02	6.87E-04	6.64E-06	5.71E-04	1.16E-02	1.28E-02
1,2-Dichlorobenzene	5.47E+01	1.77E-04	9.00E-02	1.96E-03	2.44E-04	9.00E-02	2.71E-03	6.80E-04	5.71E-02	1.19E-02	1.66E-02
1,3-Dichlorobenzene	2.02E+00	6.52E-06	NA		9.01E-06	NA		2.51E-05	NA		
1,4-Dichlorobenzene	2.55E+01	8.23E-05	7.00E-02	1.18E-03	1.14E-04	7.00E-02	1.63E-03	3.59E-04	2.29E-01	1.57E-03	4.37E-03
2-Methylnaphthalene	1.14E+02	3.68E-04	4.00E-03	9.20E-02	7.63E-04	4.00E-03	1.91E-01	3.85E-04	NA		2.83E-01
2-Methylphenol	9.90E-01	3.20E-06	5.00E-02	6.39E-05	4.42E-06	5.00E-02	8.83E-05	1.94E-07	1.71E-01	1.13E-06	1.53E-04
4-Chloro-3-methylphenol	7.20E+00	2.32E-05	NA		3.21E-05	NA		1.41E-06	NA		
4-Methylphenol	3.60E+00	1.16E-05	5.00E-03	2.32E-03	1.61E-05	5.00E-03	3.21E-03	7.05E-07	1.71E-01	4.11E-06	5.54E-03
Acenaphthene	9.18E+00	2.96E-05	6.00E-02	4.94E-04	6.14E-05	6.00E-02	1.02E-03	9.24E-06	NA		1.52E-03
Anthracene	1.10E+00	3.55E-06	3.00E-01	1.18E-05	7.36E-06	3.00E-01	2.45E-05	4.64E-07	NA		3.64E-05
Benzo(a)anthracene	5.50E-01	1.78E-06	NA		3.68E-06	NA		1.08E-07	NA		
Benzo(a)pyrene	5.00E-01	1.61E-06	NA		3.35E-06	NA		9.78E-08	NA		
Benzo(b)fluoranthene	4.20E-01	1.36E-06	NA		2.81E-06	NA		8.22E-08	NA		
Benzo(g,h,i)perylene	4.30E-01	1.39E-06	NA		2.88E-06	NA		8.41E-08	NA		
Benzo(k)fluoranthene	4.30E-01	1.39E-06	NA		2.88E-06	NA		8.41E-08	NA		
Benzyl butyl phthalate	7.60E+00	2.45E-05	2.00E-01	1.23E-04	3.39E-05	2.00E-01	1.70E-04	1.49E-06	NA		2.92E-04
Biphenyl (diphenyl)	4.40E+00	1.42E-05	5.00E-02	2.84E-04	1.96E-05	5.00E-02	3.93E-04	8.61E-07	NA		6.77E-04
bis(2-Ethylhexyl)phthalate	9.85E+00	3.18E-05	2.00E-02	1.59E-03	4.39E-05	2.00E-02	2.20E-03	1.93E-06	NA		3.79E-03
Caprolactam	9.50E-02	3.07E-07	5.00E-01	6.14E-07	4.24E-07	5.00E-01	8.48E-07	1.86E-08	NA		1.46E-06
Carbazole	1.10E+00	3.55E-06	NA		4.91E-06	NA		2.15E-07	NA		
Chrysene	9.10E-01	2.94E-06	NA		6.09E-06	NA		1.78E-07	NA		
Dibenz(a,h)anthracene	1.20E-01	3.87E-07	NA		8.03E-07	NA		2.35E-08	NA		
Dibenzofuran	4.10E+00	1.32E-05	2.00E-03	6.62E-03	1.83E-05	2.00E-03	9.15E-03	2.25E-06	NA		1.58E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Di-n-butyl phthalate	2.90E+00	9.36E-06	1.00E-01	9.36E-05	1.29E-05	1.00E-01	1.29E-04	5.68E-07	NA		2.23E-04
Fluoranthene	4.20E+00	1.36E-05	4.00E-02	3.39E-04	2.81E-05	4.00E-02	7.03E-04	8.22E-07	NA		1.04E-03
Fluorene	8.31E+00	2.68E-05	4.00E-02	6.71E-04	5.56E-05	4.00E-02	1.39E-03	4.52E-06	NA		2.06E-03
Indeno(1,2,3-c,d)pyrene	4.40E-01	1.42E-06	NA		2.94E-06	NA		8.61E-08	NA		
Naphthalene	5.28E+01	1.70E-04	2.00E-02	8.52E-03	3.53E-04	2.00E-02	1.77E-02	1.78E-04	8.57E-04	2.08E-01	2.34E-01
Phenanthrene	1.21E+01	3.91E-05	NA		8.10E-05	NA		2.37E-06	NA		
Pyrene	3.97E+00	1.28E-05	3.00E-02	4.27E-04	2.66E-05	3.00E-02	8.86E-04	9.62E-07	NA		1.31E-03
1,1,1-Trichloroethane	2.51E-02	8.10E-08	2.00E+00	4.05E-08	1.12E-07	2.00E+00	5.60E-08	2.13E-06	1.43E+00	1.49E-06	1.59E-06
1,1-Dichloroethane	1.01E+01	3.26E-05	2.00E-01	1.63E-04	4.51E-05	2.00E-01	2.25E-04	8.18E-04	NA		3.88E-04
1,1-Dichloroethene	6.80E-02	2.20E-07	5.00E-02	4.39E-06	3.03E-07	5.00E-02	6.07E-06	9.38E-06	2.00E-02	4.69E-04	4.79E-04
1,2-Dichloroethane	6.05E-02	1.95E-07	2.00E-02	9.77E-06	2.70E-07	2.00E-02	1.35E-05	3.09E-06	6.86E-01	4.50E-06	2.78E-05
Acetone	2.26E-01	7.30E-07	9.00E-01	8.11E-07	1.01E-06	9.00E-01	1.12E-06	4.13E-06	8.86E+00	4.67E-07	2.40E-06
Benzene	1.93E+00	6.23E-06	4.00E-03	1.56E-03	8.61E-06	4.00E-03	2.15E-03	1.34E-04	8.57E-03	1.57E-02	1.94E-02
Carbon disulfide	6.29E-03	2.03E-08	1.00E-01	2.03E-07	2.81E-08	1.00E-01	2.81E-07	1.06E-06	2.00E-01	5.30E-06	5.78E-06
Chlorobenzene	1.01E+01	3.26E-05	2.00E-02	1.63E-03	4.51E-05	2.00E-02	2.25E-03	2.93E-04	1.43E-02	2.05E-02	2.44E-02
Chloroethane	2.40E-02	7.75E-08	NA		1.07E-07	NA		4.15E-06	2.86E+00	1.45E-06	1.45E-06
Chloromethane	1.27E-01	4.10E-07	NA		5.67E-07	NA		4.66E-06	2.57E-02	1.81E-04	1.81E-04
cis-1,2-Dichloroethene	1.49E+02	4.81E-04	1.00E-02	4.81E-02	6.65E-04	1.00E-02	6.65E-02	9.93E-03	NA		1.15E-01
Cyclohexane	2.55E+00	8.23E-06	NA		1.14E-05	NA		4.78E-04	1.71E+00	2.79E-04	2.79E-04
Ethylbenzene	2.24E+01	7.23E-05	1.00E-01	7.23E-04	9.99E-05	1.00E-01	9.99E-04	7.49E-04	2.86E-01	2.62E-03	4.34E-03
Isopropylbenzene (cumene)	5.35E+00	1.73E-05	1.00E-01	1.73E-04	2.39E-05	1.00E-01	2.39E-04	3.43E-04	1.14E-01	3.00E-03	3.42E-03
Methyl ethyl ketone	3.14E-01	1.01E-06	6.00E-01	1.69E-06	1.40E-06	6.00E-01	2.34E-06	3.77E-06	1.43E+00	2.64E-06	6.67E-06
Methyl isobutyl ketone	5.74E+00	1.85E-05	8.00E-02	2.32E-04	2.56E-05	8.00E-02	3.20E-04	5.35E-05	8.57E-01	6.24E-05	6.14E-04
Methyl tert-butyl ether	4.00E-03	1.29E-08	NA		1.78E-08	NA		1.97E-07	8.57E-01	2.29E-07	2.29E-07
Methylcyclohexane	1.02E+01	3.29E-05	NA		4.55E-05	NA		1.16E-03	8.60E-01	1.35E-03	1.35E-03
Methylene chloride	8.38E-03	2.71E-08	6.00E-02	4.51E-07	3.74E-08	6.00E-02	6.23E-07	7.73E-07	2.86E-01	2.71E-06	3.78E-06
Styrene	5.14E-01	1.66E-06	2.00E-01	8.30E-06	2.29E-06	2.00E-01	1.15E-05	8.90E-06	2.57E-01	3.46E-05	5.44E-05
Tetrachloroethene	8.76E-02	2.83E-07	1.00E-02	2.83E-05	3.91E-07	1.00E-02	3.91E-05	7.89E-06	1.00E-02	7.89E-04	8.57E-04
Toluene	1.16E+02	3.75E-04	8.00E-02	4.68E-03	5.18E-04	8.00E-02	6.47E-03	6.72E-03	8.57E-02	7.83E-02	8.95E-02
trans-1,2-Dichloroethene	6.38E-01	2.06E-06	2.00E-02	1.03E-04	2.85E-06	2.00E-02	1.42E-04	6.26E-05	1.71E-02	3.65E-03	3.90E-03
Trichloroethene	5.21E-01	1.68E-06	3.00E-04	5.61E-03	2.32E-06	3.00E-04	7.75E-03	3.68E-05	1.00E-02	3.68E-03	1.70E-02
Vinyl chloride	1.28E+00	4.13E-06	3.00E-03	1.38E-03	5.71E-06	3.00E-03	1.90E-03	2.82E-04	2.86E-02	9.86E-03	1.31E-02
Xylenes, total	1.57E+02	5.07E-04	2.00E-01	2.53E-03	7.01E-04	2.00E-01	3.50E-03	5.94E-03	2.86E-02	2.08E-01	2.14E-01
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	3.14E-09	NA		1.30E-09	NA		1.90E-10	1.14E-08	1.66E-02	1.66E-02
1,2,3,4,6,7,8-HpCDF	1.60E-04	5.17E-10	NA		2.14E-10	NA		3.13E-11	1.14E-08	2.74E-03	2.74E-03
1,2,3,4,7,8,9-HpCDF	7.93E-06	2.56E-11	NA		1.06E-11	NA		1.55E-12	1.14E-08	1.36E-04	1.36E-04
1,2,3,4,7,8-HxCDD	1.64E-05	5.30E-11	NA		2.20E-11	NA		3.21E-12	1.14E-08	2.81E-04	2.81E-04
1,2,3,4,7,8-HxCDF	2.26E-06	7.30E-12	NA		3.03E-12	NA		4.42E-13	1.14E-08	3.87E-05	3.87E-05
1,2,3,6,7,8-HxCDD	7.35E-05	2.37E-10	NA		9.84E-11	NA		1.44E-11	1.14E-08	1.26E-03	1.26E-03
1,2,3,6,7,8-HxCDF	1.50E-05	4.84E-11	NA		2.01E-11	NA		2.94E-12	1.14E-08	2.57E-04	2.57E-04
1,2,3,7,8,9-HxCDD	4.14E-05	1.34E-10	NA		5.54E-11	NA		8.10E-12	1.14E-08	7.09E-04	7.09E-04
1,2,3,7,8,9-HxCDF	8.75E-06	2.83E-11	NA		1.17E-11	NA		1.71E-12	1.14E-08	1.50E-04	1.50E-04
1,2,3,7,8-PeCDD	1.53E-05	4.94E-11	NA		2.05E-11	NA		2.99E-12	1.14E-08	2.62E-04	2.62E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
2,3,4,6,7,8-HxCDF	1.51E-05	4.88E-11	NA		2.02E-11	NA		2.95E-12	1.14E-08	2.59E-04	2.59E-04
2,3,4,7,8-PeCDF	3.66E-05	1.18E-10	NA		4.90E-11	NA		7.16E-12	1.14E-08	6.27E-04	6.27E-04
2,3,7,8-TCDF	4.63E-06	1.50E-11	NA		6.20E-12	NA		9.06E-13	1.14E-08	7.93E-05	7.93E-05
OCDD	8.20E-03	2.65E-08	NA		1.10E-08	NA		1.60E-09	1.14E-08	1.40E-01	1.40E-01
OCDF	3.25E-04	1.05E-09	NA		4.35E-10	NA		6.36E-11	1.14E-08	5.57E-03	5.57E-03
		Total Risk (Hazard Index):		1.35E+00	Total Risk (Hazard Index):		8.36E-01	Total Risk (Hazard Index):		2.067E+01	**2.29E+01**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 23

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-17

Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**4.0E-06**	**1.4E-06**	6.2E-09	**5.4E-06**	5%	5.3E-07	2.2E-07	3.2E-07	**1.1E-06**	10%
Subtotal Metals	**4.0E-06**	**1.4E-06**	1.0E-08	**5.4E-06**	5%	5.3E-07	2.2E-07	5.5E-07	**1.3E-06**	13%
Pesticides/PCBs										
Aldrin	**7.7E-06**	**4.4E-06**	1.2E-09	**1.2E-05**	12%	**1.0E-06**	7.0E-07	6.2E-08	**1.8E-06**	17%
4,4'-DDD	7.7E-07	4.4E-07	1.2E-10	**1.2E-06**	1.2%	1.0E-07	7.0E-08	6.2E-09	1.8E-07	2%
Dieldrin	**7.5E-06**	**4.3E-06**	1.1E-09	**1.2E-05**	12%	9.9E-07	6.8E-07	6.0E-08	**1.7E-06**	17%
Aroclor-1260	4.5E-07	7.6E-07	6.8E-11	**1.2E-06**	1.2%	5.9E-08	1.2E-07	3.6E-09	1.9E-07	2%
Subtotal Pesticides/PCBs	**1.7E-05**	**1.0E-05**	2.6E-09	**2.7E-05**	27%	**2.2E-06**	**1.6E-06**	1.4E-07	**4.0E-06**	39%
SVOCs/VOCs										
1,4-Dichlorobenzene	4.8E-08	5.5E-08	**4.9E-06**	**5.0E-06**	5%	6.4E-09	8.8E-09	2.0E-07	2.1E-07	2%
Benzo(a)pyrene	**2.1E-06**	**3.6E-06**	1.0E-10	**5.7E-06**	6%	2.8E-07	5.7E-07	5.4E-09	8.6E-07	8%
Naphthalene	**2.2E-06**	**3.8E-06**	**7.1E-06**	**1.3E-05**	13%	2.9E-07	6.1E-07	3.0E-07	**1.2E-06**	12%
1,1-Dichloroethane	2.0E-08	2.3E-08	**1.7E-06**	**1.7E-06**	2%	2.7E-09	3.7E-09	6.7E-08	7.3E-08	0.7%
Benzene	6.7E-08	7.7E-08	**4.9E-06**	**5.0E-06**	5%	8.9E-09	1.2E-08	1.9E-07	2.2E-07	2%
Ethylbenzene	8.6E-08	9.8E-08	**2.3E-06**	**2.5E-06**	2%	1.1E-08	1.6E-08	9.4E-08	1.2E-07	1%
Vinyl chloride	3.2E-07	3.7E-07	**2.7E-05**	**2.8E-05**	28%	4.3E-08	5.9E-08	**1.1E-06**	**1.2E-06**	12%
Subtotal SVOCs/VOCs	**6.1E-06**	**1.0E-05**	**4.9E-05**	**6.5E-05**	64%	8.0E-07	**1.6E-06**	**2.0E-06**	**4.4E-06**	42%
Dioxans/Furans										
1,2,3,7,8-PeCDD	8.0E-07	2.7E-07	1.2E-10	**1.1E-06**	1.1%	1.1E-07	4.4E-08	6.4E-09	1.6E-07	1.5%
2,3,4,7,8-PeCDF	9.6E-07	3.3E-07	1.5E-10	**1.3E-06**	1%	1.3E-07	5.2E-08	7.7E-09	1.9E-07	2%
Subtotal Dioxans/Furans	**3.3E-06**	**1.1E-06**	5.1E-10	**4.5E-06**	4%	4.4E-07	1.8E-07	2.7E-08	6.5E-07	6%
Total:	**3.0E-05**	**2.3E-05**	**4.9E-05**	**1.02E-04**		**4.0E-06**	**3.6E-06**	**2.7E-06**	**1.04E-05**	

Table heading: **Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates**

	Industrial Worker	Future Construction Worker
Total Estimated Cancer Risk Across All Exposure Routes:	**1E-04**	**1E-05**

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-18

Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.2E-02	1.4E-03	1.3E-03	1.5E-02	1%	4.1E-02	5.6E-03	**1.8E+00**	**1.8E+00**	8%
Antimony	3.3E-02	3.8E-03		3.7E-02	3%	**1.1E-01**	1.5E-02		**1.2E-01**	1%
Arsenic	2.5E-02	8.6E-03	2.7E-04	3.4E-02	3%	8.3E-02	3.4E-02	**3.5E-01**	**4.7E-01**	2%
Barium	2.5E-03	2.9E-04	5.3E-04	3.3E-03	0%	8.3E-03	1.1E-03	**7.0E-01**	**7.1E-01**	3%
Cadmium	3.1E-03	3.5E-05	8.2E-05	3.2E-03	0%	1.0E-02	1.4E-04	**1.1E-01**	**1.2E-01**	1%
Cobalt	2.9E-02	3.3E-03	7.6E-04	3.3E-02	3%	9.4E-02	1.3E-02	**1.0E+00**	**1.1E+00**	5%
Iron	3.6E-02	4.2E-03		4.1E-02	3%	**1.2E-01**	1.7E-02		**1.4E-01**	1%
Manganese	4.6E-02	5.3E-03	1.2E-02	6.4E-02	5%	**1.5E-01**	2.1E-02	**1.6E+01**	**1.6E+01**	69%
Nickel	2.1E-03	2.4E-04	2.4E-04	2.5E-03	0%	6.8E-03	9.4E-04	**3.2E-01**	**3.3E-01**	1%
Thallium	4.7E-02	5.3E-03		5.2E-02	4%	**1.5E-01**	2.1E-02		**1.8E-01**	1%
Subtotal Metals	**2.5E-01**	3.4E-02	1.5E-02	**3.0E-01**	25%	**8.4E-01**	**1.4E-01**	**2.0E+01**	**2.1E+01**	91%
Pesticides/PCBs										
Aldrin	4.2E-02	2.4E-02		6.6E-02	5%	**1.4E-01**	9.6E-02		**2.3E-01**	1%
Dieldrin	2.6E-02	1.5E-02		4.1E-02	3%	8.7E-02	6.0E-02		**1.5E-01**	1%
Aroclor-1260	3.1E-02	5.4E-02		8.5E-02	7.1%	**1.0E-01**	**2.1E-01**		**3.2E-01**	1.4%
Subtotal Pesticides/PCBs	**1.0E-01**	9.3E-02	1.1E-07	**1.9E-01**	16%	**3.3E-01**	**3.7E-01**	1.5E-04	**7.1E-01**	3%
SVOCs/VOCs										
2-Methylnaphthalene	2.8E-02	4.8E-02		7.6E-02	6%	9.2E-02	**1.9E-01**		**2.8E-01**	1%
Naphthalene	2.6E-03	4.4E-03	**2.0E-01**	**2.0E-01**	17%	8.5E-03	1.8E-02	**2.1E-01**	**2.3E-01**	1%
cis-1,2-Dichloroethene	1.5E-02	1.7E-02		3.1E-02	3%	4.8E-02	6.6E-02		**1.1E-01**	1%
Xylenes, total	7.7E-04	8.8E-04	**2.1E-01**	**2.1E-01**	17%	2.5E-03	3.5E-03	**2.1E-01**	**2.1E-01**	1%
Subtotal SVOCs/VOCs	5.6E-02	8.1E-02	**5.7E-01**	**7.0E-01**	59%	**1.8E-01**	**3.3E-01**	**5.8E-01**	**1.1E+00**	5%
OCDD			1.1E-04	1.1E-04	0%			**1.4E-01**	**1.4E-01**	1%
Total:	**0.4**	**0.2**	**0.6**	**1.2**		**1.4**	**0.8**	**20.7**	**22.9**	

Total Estimated Hazard Index Across All Exposure Routes:	**1** (Industrial Worker)	**23** (Future Construction Worker)

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-19

Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.25E+04	5.87E-03	NA		2.34E-04	NA		8.92E-07	NA		
Antimony	2.06E+01	9.68E-06	NA		3.86E-07	NA		1.47E-09	NA		
Arsenic	8.10E+00	3.80E-06	1.50E+00	5.71E-06	4.55E-07	1.50E+00	6.83E-07	5.78E-10	1.51E+01	8.70E-09	6.40E-06
Barium	5.55E+02	2.61E-04	NA		1.04E-05	NA		3.96E-08	NA		
Beryllium	6.04E-01	2.84E-07	NA		1.13E-08	NA		4.31E-11	8.40E+00	3.62E-10	3.62E-10
Cadmium	1.74E+00	8.17E-07	NA		3.26E-09	NA		1.24E-10	6.30E+00	7.82E-10	7.82E-10
Chromium	4.95E+02	2.32E-04	NA		9.28E-06	NA		3.53E-08	NA		
Cobalt	7.90E+00	3.71E-06	NA		1.48E-07	NA		5.64E-10	3.15E+00	1.78E-09	1.78E-09
Copper	1.45E+02	6.81E-05	NA		2.72E-06	NA		1.03E-08	NA		
Iron	2.34E+04	1.10E-02	NA		4.39E-04	NA		1.67E-06	NA		
Lead	6.05E+02	2.84E-04	NA		1.13E-05	NA		4.32E-08	NA		
Manganese	8.43E+02	3.96E-04	NA		1.58E-05	NA		6.02E-08	NA		
Nickel	3.70E+01	1.74E-05	NA		6.93E-07	NA		2.64E-09	9.10E-01	2.40E-09	2.40E-09
Selenium	3.30E+00	1.55E-06	NA		6.18E-08	NA		2.36E-10	NA		
Silver	7.75E-01	3.64E-07	NA		1.45E-08	NA		5.53E-11	NA		
Thallium	2.88E+00	1.35E-06	NA		5.40E-08	NA		2.06E-10	NA		
Vanadium	4.05E+01	1.90E-05	NA		7.59E-07	NA		2.89E-09	NA		
Zinc	4.41E+02	2.07E-04	NA		8.26E-06	NA		3.15E-08	NA		
Pesticides/PCBs											
4,4'-DDD	8.40E+00	3.95E-06	2.40E-01	9.47E-07	7.87E-07	2.40E-01	1.89E-07	6.00E-10	2.42E-01	1.45E-10	1.14E-06
4,4'-DDE	5.64E+00	2.65E-06	3.40E-01	9.01E-07	5.28E-07	3.40E-01	1.80E-07	4.03E-10	3.40E-01	1.37E-10	1.08E-06
4,4'-DDT	2.47E-01	1.16E-07	3.40E-01	3.94E-08	2.31E-08	3.40E-01	7.87E-09	1.76E-11	3.40E-01	5.99E-12	4.73E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Aldrin	9.24E-01	4.34E-07	1.70E+01	7.38E-06	8.66E-08	1.70E+01	1.47E-06	6.60E-11	1.72E+01	1.13E-09	8.85E-06
alpha-BHC	2.60E-02	1.22E-08	6.30E+00	7.69E-08	2.44E-09	6.30E+00	1.53E-08	1.86E-12	6.30E+00	1.17E-11	9.23E-08
alpha-Chlordane	7.04E-02	3.31E-08	1.30E+00	4.30E-08	6.60E-09	1.30E+00	8.58E-09	5.03E-12	3.50E-01	1.76E-12	5.16E-08
beta-BHC	3.50E-02	1.64E-08	1.80E+00	2.96E-08	3.28E-09	1.80E+00	5.90E-09	2.50E-12	1.86E+00	4.63E-12	3.55E-08
delta-BHC	4.10E-03	1.93E-09	NA		3.84E-10	NA		2.93E-13	NA		
Dieldrin	2.08E+00	9.77E-07	1.60E+01	1.56E-05	1.95E-07	1.60E+01	3.12E-06	1.48E-10	1.61E+01	2.39E-09	1.88E-05
Endosulfan sulfate	1.60E-03	7.51E-10	NA		1.50E-10	NA		1.14E-13	NA		
Endrin	4.60E-03	2.16E-09	NA		4.31E-10	NA		3.28E-13	NA		
Endrin aldehyde	1.10E-03	5.17E-10	NA		1.03E-10	NA		7.85E-14	NA		
Endrin ketone	1.20E-02	5.64E-09	NA		1.12E-09	NA		8.57E-13	NA		
gamma-BHC	2.50E-03	1.17E-09	1.10E+00	1.29E-09	2.34E-10	1.10E+00	2.58E-10	1.78E-13	1.09E+00	1.94E-13	1.55E-09
gamma-Chlordane	8.75E-02	4.11E-08	1.20E+00	4.93E-08	8.20E-09	1.20E+00	9.84E-09	6.25E-12	3.50E-01	2.19E-12	5.92E-08
Heptachlor	8.80E-03	4.13E-09	4.50E+00	1.86E-08	8.25E-10	4.50E+00	3.71E-09	6.28E-13	4.55E+00	2.86E-12	2.23E-08
Methoxychlor	3.90E-03	1.83E-09	NA		3.65E-10	NA		2.78E-13	NA		
Aroclor-1260	9.80E-01	4.60E-07	2.00E+00	9.21E-07	2.75E-07	2.00E+00	5.51E-07	7.00E-11	2.00E+00	1.40E-10	1.47E-06
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	4.93E-07	2.90E-02	1.43E-08	1.97E-07	2.90E-02	5.71E-09	2.07E-06	NA		2.00E-08
1,2-Dichlorobenzene	4.02E+01	1.89E-05	NA		7.53E-06	NA		2.36E-04	NA		
1,3-Dichlorobenzene	1.38E+00	6.48E-07	NA		2.59E-07	NA		8.10E-06	NA		
1,4-Dichlorobenzene	1.76E+01	8.27E-06	5.40E-03	4.46E-08	3.30E-06	5.40E-03	1.78E-08	1.17E-04	3.85E-02	4.52E-06	4.58E-06
1,4-Dioxane (p-dioxane)	9.12E-01	4.28E-07	2.70E-02	1.16E-08	1.71E-07	2.70E-02	4.61E-09	6.51E-11	2.70E-02	1.75E-12	1.62E-08
2-Methylnaphthalene	4.02E+02	1.89E-04	NA		1.13E-04	NA		6.14E-04	NA		
2-Methylphenol	9.90E-01	4.65E-07	NA		1.86E-07	NA		7.07E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	3.38E-06	NA		1.35E-06	NA		5.14E-10	NA		
4-Methylphenol	3.60E+00	1.69E-06	NA		6.75E-07	NA		2.57E-10	NA		
Acenaphthene	8.32E+00	3.91E-06	NA		2.34E-06	NA		3.24E-06	NA		
Acetophenone	8.73E+00	4.10E-06	NA		1.64E-06	NA		6.23E-10	NA		
Anthracene	1.10E+00	5.17E-07	NA		3.09E-07	NA		1.20E-07	NA		
Benzo(a)anthracene	5.50E-01	2.58E-07	1.20E+00	3.10E-07	1.55E-07	1.20E+00	1.86E-07	3.93E-11	3.85E-01	1.51E-11	4.96E-07
Benzo(a)pyrene	5.00E-01	2.35E-07	1.20E+01	2.82E-06	1.41E-07	1.20E+01	1.69E-06	3.57E-11	3.85E+00	1.37E-10	4.50E-06
Benzo(b)fluoranthene	4.20E-01	1.97E-07	1.20E+00	2.37E-07	1.18E-07	1.20E+00	1.42E-07	3.00E-11	3.85E-01	1.15E-11	3.78E-07
Benzo(g,h,i)perylene	4.30E-01	2.02E-07	NA		1.21E-07	NA		3.07E-11	NA		
Benzo(k)fluoranthene	4.30E-01	2.02E-07	1.20E+00	2.42E-07	1.21E-07	1.20E+00	1.45E-07	3.07E-11	3.85E-01	1.18E-11	3.87E-07
Benzyl butyl phthalate	7.60E+00	3.57E-06	1.90E-03	6.78E-09	1.42E-06	1.90E-03	2.71E-09	5.42E-10	NA		9.49E-09
Biphenyl (diphenyl)	7.10E+00	3.33E-06	NA		1.33E-06	NA		5.07E-10	NA		
bis(2-Ethylhexyl)phthalate	8.86E+00	4.16E-06	1.40E-02	5.83E-08	1.66E-06	1.40E-02	2.32E-08	6.32E-10	8.40E-03	5.31E-12	8.15E-08
Caprolactam	9.50E-02	4.46E-08	NA		1.78E-08	NA		6.78E-12	NA		
Carbazole	1.10E+00	5.17E-07	NA		2.06E-07	NA		7.85E-11	NA		
Chrysene	3.50E+00	1.64E-06	1.20E-01	1.97E-07	9.84E-07	1.20E-01	1.18E-07	2.50E-10	3.85E-02	9.62E-12	3.15E-07
Dibenz(a,h)anthracene	1.20E-01	5.64E-08	7.30E+00	4.11E-07	3.37E-08	7.30E+00	2.46E-07	8.57E-12	4.20E+00	3.60E-11	6.58E-07
Dibenzofuran	4.10E+00	1.93E-06	NA		7.68E-07	NA		6.95E-07	NA		
Di-n-butyl phthalate	2.90E+00	1.36E-06	NA		5.43E-07	NA		2.07E-10	NA		
Fluoranthene	5.90E+00	2.77E-06	NA		1.66E-06	NA		4.21E-10	NA		
Fluorene	8.10E+00	3.80E-06	NA		2.28E-06	NA		1.36E-06	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	2.07E-07	1.20E+00	2.48E-07	1.24E-07	1.20E+00	1.48E-07	3.14E-11	3.85E-01	1.21E-11	3.96E-07
Naphthalene	5.10E+01	2.40E-05	1.20E-01	2.87E-06	1.43E-05	1.20E-01	1.72E-06	7.79E-05	1.19E-01	9.27E-06	1.39E-05
Pentachlorophenol	6.70E+00	3.15E-06	1.20E-01	3.78E-07	3.14E-06	1.20E-01	3.77E-07	4.78E-10	1.79E-02	8.54E-12	7.54E-07
Phenanthrene	1.51E+01	7.09E-06	NA		4.24E-06	NA		1.08E-09	NA		
Pyrene	7.30E+00	3.43E-06	NA		2.05E-06	NA		1.64E-07	NA		
1,1,1-Trichloroethane	2.31E-02	1.08E-08	NA		4.33E-09	NA		9.40E-07	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
1,1-Dichloroethane	7.30E+00	3.43E-06	5.70E-03	1.95E-08	1.37E-06	5.70E-03	7.80E-09	2.83E-04	5.70E-03	1.61E-06	1.64E-06
1,1-Dichloroethene	5.26E-02	2.47E-08	NA		9.86E-09	NA		3.48E-06	9.10E-02	3.16E-07	3.16E-07
1,2-Dichloroethane	4.33E-02	2.03E-08	9.10E-02	1.85E-09	8.11E-09	9.10E-02	7.38E-10	1.06E-06	9.10E-02	9.62E-08	9.87E-08
Acetone	2.09E-01	9.82E-08	NA		3.92E-08	NA		1.81E-06	NA		
Benzene	1.42E+00	6.67E-07	1.00E-01	6.67E-08	2.66E-07	1.00E-01	2.66E-08	4.73E-05	1.02E-01	4.80E-06	4.90E-06
Carbon disulfide	6.61E-03	3.10E-09	NA		1.24E-09	NA		5.34E-07	NA		
Chlorobenzene	6.89E+00	3.24E-06	NA		1.29E-06	NA		9.53E-05	NA		
Chloroethane	1.88E-02	8.83E-09	NA		3.52E-09	NA		1.56E-06	2.90E-03	4.52E-09	4.52E-09
Chloromethane	8.80E-02	4.13E-08	NA		1.65E-08	NA		1.54E-06	NA		
cis-1,2-Dichloroethene	1.34E+02	6.29E-05	NA		2.51E-05	NA		4.27E-03	NA		
Cyclohexane	2.38E+00	1.12E-06	NA		4.46E-07	NA		2.14E-04	NA		
Ethylbenzene	2.52E+01	1.18E-05	1.10E-02	1.30E-07	4.72E-06	1.10E-02	5.19E-08	4.02E-04	8.75E-03	3.52E-06	3.70E-06
Isopropylbenzene (cumene)	1.47E+01	6.90E-06	NA		2.75E-06	NA		4.51E-04	NA		
Methyl ethyl ketone	2.81E-01	1.32E-07	NA		5.27E-08	NA		1.59E-06	NA		
Methyl isobutyl ketone	4.19E+00	1.97E-06	NA		7.85E-07	NA		1.84E-05	NA		
Methyl tert-butyl ether	4.00E-03	1.88E-09	1.80E-03	3.38E-12	7.50E-10	1.80E-03	1.35E-12	9.40E-08	9.10E-04	8.55E-11	9.02E-11
Methylcyclohexane	1.62E+01	7.61E-06	NA		3.04E-06	NA		8.81E-04	NA		
Methylene chloride	8.66E-03	4.07E-09	1.40E-02	5.69E-11	1.62E-09	1.40E-02	2.27E-11	3.83E-07	3.50E-03	1.34E-09	1.42E-09
Styrene	1.74E-01	8.17E-08	NA		3.26E-08	NA		1.43E-06	NA		
Tetrachloroethene	5.09E-01	2.39E-07	5.40E-01	1.29E-07	9.54E-08	5.40E-01	5.15E-08	2.20E-05	2.07E-02	4.54E-07	6.34E-07
Toluene	2.88E-03	1.35E-09	NA		5.40E-10	NA		7.98E-08	NA		
trans-1,2-Dichloroethene	5.29E-01	2.48E-07	NA		9.91E-08	NA		2.49E-05	NA		
Trichloroethene	2.63E+00	1.24E-06	5.90E-03	7.29E-09	4.93E-07	5.90E-03	2.91E-09	8.89E-05	7.00E-03	6.22E-07	6.32E-07
Vinyl chloride	8.95E-01	4.20E-07	7.20E-01	3.03E-07	1.68E-07	7.20E-01	1.21E-07	9.45E-05	2.73E-01	2.58E-05	2.62E-05
Xylenes, total	1.40E+02	6.58E-05	NA		2.62E-05	NA		2.53E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	4.57E-10	1.50E+03	6.85E-07	5.46E-11	1.50E+03	8.20E-08	6.94E-14	1.50E+03	1.04E-10	7.67E-07
1,2,3,4,6,7,8-HpCDF	1.60E-04	7.51E-11	1.50E+03	1.13E-07	9.00E-12	1.50E+03	1.35E-08	1.14E-14	1.50E+03	1.71E-11	1.26E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	3.72E-12	1.50E+03	5.59E-09	4.46E-13	1.50E+03	6.69E-10	5.66E-16	1.50E+03	8.49E-13	6.26E-09
1,2,3,4,7,8-HxCDD	1.64E-05	7.70E-12	1.50E+04	1.16E-07	9.22E-13	1.50E+04	1.38E-08	1.17E-15	1.50E+04	1.76E-11	1.29E-07
1,2,3,4,7,8-HxCDF	2.26E-06	1.06E-12	1.50E+04	1.59E-08	1.27E-13	1.50E+04	1.91E-09	1.61E-16	1.50E+04	2.42E-12	1.78E-08
1,2,3,6,7,8-HxCDD	7.35E-05	3.45E-11	1.50E+04	5.18E-07	4.13E-12	1.50E+04	6.20E-08	5.25E-15	1.50E+04	7.87E-11	5.80E-07
1,2,3,6,7,8-HxCDF	1.50E-05	7.05E-12	1.50E+04	1.06E-07	8.43E-13	1.50E+04	1.26E-08	1.07E-15	1.50E+04	1.61E-11	1.18E-07
1,2,3,7,8,9-HxCDD	4.14E-05	1.94E-11	1.50E+04	2.92E-07	2.33E-12	1.50E+04	3.49E-08	2.96E-15	1.50E+04	4.43E-11	3.27E-07
1,2,3,7,8,9-HxCDF	8.75E-06	4.11E-12	1.50E+04	6.16E-08	4.92E-13	1.50E+04	7.38E-09	6.25E-16	1.50E+04	9.37E-12	6.90E-08
1,2,3,7,8-PeCDD	1.53E-05	7.19E-12	1.50E+05	1.08E-06	8.60E-13	1.50E+05	1.29E-07	1.09E-15	1.50E+05	1.64E-10	1.21E-06
2,3,4,6,7,8-HxCDF	1.51E-05	7.09E-12	1.50E+04	1.06E-07	8.49E-13	1.50E+04	1.27E-08	1.08E-15	1.50E+04	1.62E-11	1.19E-07
2,3,4,7,8-PeCDF	3.66E-05	1.72E-11	7.50E+04	1.29E-06	2.06E-12	7.50E+04	1.54E-07	2.61E-15	7.50E+04	1.96E-10	1.44E-06
2,3,7,8-TCDF	4.63E-06	2.17E-12	1.50E+04	3.26E-08	2.60E-13	1.50E+04	3.90E-09	3.30E-16	1.50E+04	4.96E-12	3.65E-08
OCDD	8.20E-03	3.85E-09	1.50E+01	5.78E-08	4.61E-10	1.50E+01	6.91E-09	5.85E-13	1.50E+01	8.78E-12	6.47E-08
OCDF	3.25E-04	1.53E-10	1.50E+01	2.29E-09	1.83E-11	1.50E+01	2.74E-10	2.32E-14	1.50E+01	3.48E-13	2.56E-09
			Total Risk:	4.47E-05		**Total Risk:**	1.19E-05		**Total Risk:**	5.10E-05	1.08E-04

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-20
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.25E+04	1.71E-02	1.00E+00	1.71E-02	6.83E-04	1.00E+00	6.83E-04	2.60E-06	1.40E-03	1.86E-03	1.97E-02
Antimony	2.06E+01	2.82E-05	4.00E-04	7.05E-02	1.13E-06	4.00E-04	2.81E-03	4.29E-09	NA		7.34E-02
Arsenic	8.10E+00	1.11E-05	3.00E-04	3.70E-02	1.33E-06	3.00E-04	4.43E-03	1.69E-09	4.29E-06	3.93E-04	4.18E-02
Barium	5.55E+02	7.60E-04	2.00E-01	3.80E-03	3.03E-05	2.00E-01	1.52E-04	1.16E-07	1.43E-04	8.09E-04	4.76E-03
Beryllium	6.04E-01	8.27E-07	2.00E-03	4.14E-04	3.30E-08	2.00E-03	1.65E-05	1.26E-10	2.00E-06	6.29E-05	4.93E-04
Cadmium	1.74E+00	2.38E-06	5.00E-04	4.77E-03	9.51E-09	5.00E-04	1.90E-05	3.62E-10	2.86E-06	1.27E-04	4.91E-03
Chromium	4.95E+02	6.78E-04	NA		2.71E-05	NA		1.03E-07	NA		
Cobalt	7.90E+00	1.08E-05	3.00E-04	3.61E-02	4.32E-07	3.00E-04	1.44E-03	1.64E-09	1.71E-06	9.59E-04	3.85E-02
Copper	1.45E+02	1.99E-04	4.00E-02	4.97E-03	7.93E-06	4.00E-02	1.98E-04	3.02E-08	NA		5.16E-03
Iron	2.34E+04	3.21E-02	7.00E-01	4.58E-02	1.28E-03	7.00E-01	1.83E-03	4.87E-06	NA		4.76E-02
Lead	6.05E+02	8.29E-04	NA		3.31E-05	NA		1.26E-07	NA		
Manganese	8.43E+02	1.15E-03	2.40E-02	4.81E-02	4.61E-05	2.40E-02	1.92E-03	1.76E-07	1.43E-05	1.23E-02	6.23E-02
Nickel	3.70E+01	5.07E-05	2.00E-02	2.53E-03	2.02E-06	2.00E-02	1.01E-04	7.70E-09	2.57E-05	3.00E-04	2.93E-03
Selenium	3.30E+00	4.52E-06	5.00E-03	9.04E-04	1.80E-07	5.00E-03	3.61E-05	6.87E-10	5.71E-03	1.20E-07	9.40E-04
Silver	7.75E-01	1.06E-06	5.00E-03	2.12E-04	4.24E-08	5.00E-03	8.47E-06	1.61E-10	NA		2.21E-04

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Thallium	2.88E+00	3.95E-06	6.60E-05	5.98E-02	1.57E-07	6.60E-05	2.39E-03	6.00E-10	NA		6.22E-02
Vanadium	4.05E+01	5.55E-05	5.00E-03	1.11E-02	2.21E-06	5.00E-03	4.43E-04	8.43E-09	NA		1.15E-02
Zinc	4.41E+02	6.04E-04	3.00E-01	2.01E-03	2.41E-05	3.00E-01	8.03E-05	9.18E-08	NA		2.09E-03
Pesticides/PCBs											
4,4'-DDD	8.40E+00	1.15E-05	NA		2.30E-06	NA		1.75E-09	NA		
4,4'-DDE	5.64E+00	7.73E-06	NA		1.54E-06	NA		1.17E-09	NA		
4,4'-DDT	2.47E-01	3.38E-07	5.00E-04	6.77E-04	6.75E-08	5.00E-04	1.35E-04	5.14E-11	NA		8.12E-04
Aldrin	9.24E-01	1.27E-06	3.00E-05	4.22E-02	2.53E-07	3.00E-05	8.42E-03	1.92E-10	NA		5.06E-02
alpha-BHC	2.60E-02	3.56E-08	5.00E-04	7.12E-05	7.11E-09	5.00E-04	1.42E-05	5.41E-12	NA		8.54E-05
alpha-Chlordane	7.04E-02	9.64E-08	5.00E-04	1.93E-04	1.92E-08	5.00E-04	3.85E-05	1.47E-11	2.00E-04	7.33E-08	2.31E-04
beta-BHC	3.50E-02	4.79E-08	NA		9.57E-09	NA		7.29E-12	NA		
delta-BHC	4.10E-03	5.62E-09	NA		1.12E-09	NA		8.54E-13	NA		
Dieldrin	2.08E+00	2.85E-06	5.00E-05	5.70E-02	5.68E-07	5.00E-05	1.14E-02	4.33E-10	NA		6.84E-02
Endosulfan sulfate	1.60E-03	2.19E-09	6.00E-03	3.65E-07	4.37E-10	6.00E-03	7.29E-08	3.33E-13	NA		4.38E-07
Endrin	4.60E-03	6.30E-09	3.00E-04	2.10E-05	1.26E-09	3.00E-04	4.19E-06	9.58E-13	NA		2.52E-05
Endrin aldehyde	1.10E-03	1.51E-09	3.00E-04	5.02E-06	3.01E-10	3.00E-04	1.00E-06	2.29E-13	NA		6.02E-06
Endrin ketone	1.20E-02	1.64E-08	3.00E-04	5.48E-05	3.28E-09	3.00E-04	1.09E-05	2.50E-12	NA		6.57E-05
gamma-BHC	2.50E-03	3.42E-09	3.00E-04	1.14E-05	6.83E-10	3.00E-04	2.28E-06	5.20E-13	NA		1.37E-05
gamma-Chlordane	8.75E-02	1.20E-07	5.00E-04	2.40E-04	2.39E-08	5.00E-04	4.78E-05	1.82E-11	2.00E-04	9.11E-08	2.88E-04
Heptachlor	8.80E-03	1.21E-08	3.00E-05	4.02E-04	2.40E-09	3.00E-05	8.02E-05	1.83E-12	NA		4.82E-04
Methoxychlor	3.90E-03	5.34E-09	2.00E-05	2.67E-04	1.07E-09	2.00E-05	5.33E-05	8.12E-13	NA		3.20E-04
Aroclor-1260	9.80E-01	1.34E-06	2.00E-05	6.71E-02	8.03E-07	2.00E-05	4.02E-02	2.04E-10	NA		**1.07E-01**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	1.44E-06	1.00E-02	1.44E-04	5.74E-07	1.00E-02	5.74E-05	6.05E-06	5.71E-04	1.06E-02	1.08E-02
1,2-Dichlorobenzene	4.02E+01	5.51E-05	9.00E-02	6.12E-04	2.20E-05	9.00E-02	2.44E-04	6.88E-04	5.71E-02	1.20E-02	1.29E-02
1,3-Dichlorobenzene	1.38E+00	1.89E-06	NA		7.54E-07	NA		2.36E-05	NA		
1,4-Dichlorobenzene	1.76E+01	2.41E-05	7.00E-02	3.44E-04	9.62E-06	7.00E-02	1.37E-04	3.42E-04	2.29E-01	1.50E-03	1.98E-03
1,4-Dioxane (p-dioxane)	9.12E-01	1.25E-06	1.00E-01	1.25E-05	4.98E-07	1.00E-01	4.98E-06	1.90E-10	8.57E-01	2.22E-10	1.75E-05
2-Methylnaphthalene	4.02E+02	5.51E-04	4.00E-03	1.38E-01	3.30E-04	4.00E-03	8.24E-02	1.79E-03	NA		**2.20E-01**
2-Methylphenol	9.90E-01	1.36E-06	5.00E-02	2.71E-05	5.41E-07	5.00E-02	1.08E-05	2.06E-10	1.71E-01	1.20E-09	3.79E-05
4-Chloro-3-methylphenol	7.20E+00	9.86E-06	NA		3.94E-06	NA		1.50E-09	NA		
4-Methylphenol	3.60E+00	4.93E-06	5.00E-03	9.86E-04	1.97E-06	5.00E-03	3.94E-04	7.49E-10	1.71E-01	4.37E-09	1.38E-03
Acenaphthene	8.32E+00	1.14E-05	6.00E-02	1.90E-04	6.82E-06	6.00E-02	1.14E-04	9.44E-06	NA		3.04E-04
Acetophenone	8.73E+00	1.20E-05	1.00E-01	1.20E-04	4.77E-06	1.00E-01	4.77E-05	1.82E-09	NA		1.67E-04
Anthracene	1.10E+00	1.51E-06	3.00E-01	5.02E-06	9.02E-07	3.00E-01	3.01E-06	3.49E-07	NA		8.03E-06
Benzo(a)anthracene	5.50E-01	7.53E-07	NA		4.51E-07	NA		1.15E-10	NA		
Benzo(a)pyrene	5.00E-01	6.85E-07	NA		4.10E-07	NA		1.04E-10	NA		
Benzo(b)fluoranthene	4.20E-01	5.75E-07	NA		3.44E-07	NA		8.74E-11	NA		
Benzo(g,h,i)perylene	4.30E-01	5.89E-07	NA		3.53E-07	NA		8.95E-11	NA		
Benzo(k)fluoranthene	4.30E-01	5.89E-07	NA		3.53E-07	NA		8.95E-11	NA		
Benzyl butyl phthalate	7.60E+00	1.04E-05	2.00E-01	5.21E-05	4.15E-06	2.00E-01	2.08E-05	1.58E-09	NA		7.28E-05
Biphenyl (diphenyl)	7.10E+00	9.73E-06	5.00E-02	1.95E-04	3.88E-06	5.00E-02	7.76E-05	1.48E-09	NA		2.72E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
bis(2-Ethylhexyl)phthalate	8.86E+00	1.21E-05	2.00E-02	6.07E-04	4.84E-06	2.00E-02	2.42E-04	1.84E-09	NA		8.49E-04
Caprolactam	9.50E-02	1.30E-07	5.00E-01	2.60E-07	5.19E-08	5.00E-01	1.04E-07	1.98E-11	NA		3.64E-07
Carbazole	1.10E+00	1.51E-06	NA		6.01E-07	NA		2.29E-10	NA		
Chrysene	3.50E+00	4.79E-06	NA		2.87E-06	NA		7.29E-10	NA		
Dibenz(a,h)anthracene	1.20E-01	1.64E-07	NA		9.84E-08	NA		2.50E-11	NA		
Dibenzofuran	4.10E+00	5.62E-06	2.00E-03	2.81E-03	2.24E-06	2.00E-03	1.12E-03	2.03E-06	NA		3.93E-03
Di-n-butyl phthalate	2.90E+00	3.97E-06	1.00E-01	3.97E-05	1.59E-06	1.00E-01	1.59E-05	6.04E-10	NA		5.56E-05
Fluoranthene	5.90E+00	8.08E-06	4.00E-02	2.02E-04	4.84E-06	4.00E-02	1.21E-04	1.23E-09	NA		3.23E-04
Fluorene	8.10E+00	1.11E-05	4.00E-02	2.77E-04	6.64E-06	4.00E-02	1.66E-04	3.95E-06	NA		4.43E-04
Indeno(1,2,3-c,d)pyrene	4.40E-01	6.03E-07	NA		3.61E-07	NA		9.16E-11	NA		
Naphthalene	5.10E+01	6.99E-05	2.00E-02	3.49E-03	4.18E-05	2.00E-02	2.09E-03	2.27E-04	8.57E-04	2.65E-01	**2.71E-01**
Pentachlorophenol	6.70E+00	9.18E-06	3.00E-02	3.06E-04	9.16E-06	3.00E-02	3.05E-04	1.39E-09	3.00E-02	4.65E-08	6.11E-04
Phenanthrene	1.51E+01	2.07E-05	NA		1.24E-05	NA		3.14E-09	NA		
Pyrene	7.30E+00	1.00E-05	3.00E-02	3.33E-04	5.99E-06	3.00E-02	2.00E-04	4.78E-07	NA		5.33E-04
1,1,1-Trichloroethane	2.31E-02	3.16E-08	2.00E+00	1.58E-08	1.26E-08	2.00E+00	6.31E-09	2.74E-06	1.43E+00	1.92E-06	1.94E-06
1,1-Dichloroethane	7.30E+00	1.00E-05	2.00E-01	5.00E-05	3.99E-06	2.00E-01	2.00E-05	8.26E-04	NA		7.00E-05
1,1-Dichloroethene	5.26E-02	7.21E-08	5.00E-02	1.44E-06	2.87E-08	5.00E-02	5.75E-07	1.01E-05	2.00E-02	5.07E-04	5.09E-04
1,2-Dichloroethane	4.33E-02	5.93E-08	2.00E-02	2.97E-06	2.37E-08	2.00E-02	1.18E-06	3.08E-06	6.86E-01	4.49E-06	8.64E-06
Acetone	2.09E-01	2.86E-07	9.00E-01	3.18E-07	1.14E-07	9.00E-01	1.27E-07	5.29E-06	8.86E+00	5.98E-07	1.04E-06
Benzene	1.42E+00	1.95E-06	4.00E-03	4.86E-04	7.76E-07	4.00E-03	1.94E-04	1.38E-04	8.57E-03	1.61E-02	1.68E-02
Carbon disulfide	6.61E-03	9.05E-09	1.00E-01	9.05E-08	3.61E-09	1.00E-01	3.61E-08	1.56E-06	2.00E-01	7.78E-06	7.91E-06
Chlorobenzene	6.89E+00	9.44E-06	2.00E-02	4.72E-04	3.77E-06	2.00E-02	1.88E-04	2.78E-04	1.43E-02	1.95E-02	2.01E-02
Chloroethane	1.88E-02	2.58E-08	NA		1.03E-08	NA		4.55E-06	2.86E+00	1.59E-06	1.59E-06
Chloromethane	8.80E-02	1.21E-07	NA		4.81E-08	NA		4.50E-06	2.57E-02	1.75E-04	1.75E-04
cis-1,2-Dichloroethene	1.34E+02	1.84E-04	1.00E-02	1.84E-02	7.32E-05	1.00E-02	7.32E-03	1.25E-02	NA		2.57E-02
Cyclohexane	2.38E+00	3.26E-06	NA		1.30E-06	NA		6.24E-04	1.71E+00	3.64E-04	3.64E-04
Ethylbenzene	2.52E+01	3.45E-05	1.00E-01	3.45E-04	1.38E-05	1.00E-01	1.38E-04	1.17E-03	2.86E-01	4.10E-03	4.59E-03
Isopropylbenzene (cumene)	1.47E+01	2.01E-05	1.00E-01	2.01E-04	8.03E-06	1.00E-01	8.03E-05	1.32E-03	1.14E-01	1.15E-02	1.18E-02
Methyl ethyl ketone	2.81E-01	3.85E-07	6.00E-01	6.42E-07	1.54E-07	6.00E-01	2.56E-07	4.65E-06	1.43E+00	3.26E-06	4.15E-06
Methyl isobutyl ketone	4.19E+00	5.74E-06	8.00E-02	7.17E-05	2.29E-06	8.00E-02	2.86E-05	5.36E-05	8.57E-01	6.25E-05	1.63E-04
Methyl tert-butyl ether	4.00E-03	5.48E-09	NA		2.19E-09	NA		2.74E-07	8.57E-01	3.20E-07	3.20E-07
Methylcyclohexane	1.62E+01	2.22E-05	NA		8.85E-06	NA		2.57E-03	8.60E-01	2.99E-03	2.99E-03
Methylene chloride	8.66E-03	1.19E-08	6.00E-02	1.98E-07	4.73E-09	6.00E-02	7.89E-08	1.12E-06	2.86E-01	3.91E-06	4.18E-06
Styrene	1.74E-01	2.38E-07	2.00E-01	1.19E-06	9.51E-08	2.00E-01	4.76E-07	4.17E-06	2.57E-01	1.62E-05	1.79E-05
Tetrachloroethene	5.09E-01	6.97E-07	1.00E-02	6.97E-05	2.78E-07	1.00E-02	2.78E-05	6.41E-05	1.00E-02	6.41E-03	6.50E-03
Toluene	2.88E-03	3.95E-09	8.00E-02	4.93E-08	1.57E-09	8.00E-02	1.97E-08	2.33E-07	8.57E-02	2.71E-06	2.78E-06
trans-1,2-Dichloroethene	5.29E-01	7.25E-07	2.00E-02	3.62E-05	2.89E-07	2.00E-02	1.45E-05	7.26E-05	1.71E-02	4.23E-03	4.28E-03
Trichloroethene	2.63E+00	3.60E-06	3.00E-04	1.20E-02	1.44E-06	3.00E-04	4.79E-03	2.59E-04	1.00E-02	2.59E-02	4.27E-02
Vinyl chloride	8.95E-01	1.23E-06	3.00E-03	4.09E-04	4.89E-07	3.00E-03	1.63E-04	2.76E-04	2.86E-02	9.64E-03	1.02E-02
Xylenes, total	1.40E+02	1.92E-04	2.00E-01	9.59E-04	7.65E-05	2.00E-01	3.83E-04	7.38E-03	2.86E-02	2.58E-01	**2.60E-01**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.33E-09	NA		1.59E-10	NA		2.02E-13	1.14E-08	1.77E-05	1.77E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	2.19E-10	NA		2.62E-11	NA		3.33E-14	1.14E-08	2.91E-06	2.91E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	1.09E-11	NA		1.30E-12	NA		1.65E-15	1.14E-08	1.44E-07	1.44E-07
1,2,3,4,7,8-HxCDD	1.64E-05	2.25E-11	NA		2.69E-12	NA		3.41E-15	1.14E-08	2.99E-07	2.99E-07
1,2,3,4,7,8-HxCDF	2.26E-06	3.10E-12	NA		3.71E-13	NA		4.71E-16	1.14E-08	4.12E-08	4.12E-08
1,2,3,6,7,8-HxCDD	7.35E-05	1.01E-10	NA		1.21E-11	NA		1.53E-14	1.14E-08	1.34E-06	1.34E-06
1,2,3,6,7,8-HxCDF	1.50E-05	2.05E-11	NA		2.46E-12	NA		3.12E-15	1.14E-08	2.73E-07	2.73E-07
1,2,3,7,8,9-HxCDD	4.14E-05	5.67E-11	NA		6.79E-12	NA		8.62E-15	1.14E-08	7.54E-07	7.54E-07
1,2,3,7,8,9-HxCDF	8.75E-06	1.20E-11	NA		1.43E-12	NA		1.82E-15	1.14E-08	1.59E-07	1.59E-07
1,2,3,7,8-PeCDD	1.53E-05	2.10E-11	NA		2.51E-12	NA		3.19E-15	1.14E-08	2.79E-07	2.79E-07
2,3,4,6,7,8-HxCDF	1.51E-05	2.07E-11	NA		2.48E-12	NA		3.14E-15	1.14E-08	2.75E-07	2.75E-07
2,3,4,7,8-PeCDF	3.66E-05	5.01E-11	NA		6.00E-12	NA		7.62E-15	1.14E-08	6.67E-07	6.67E-07
2,3,7,8-TCDF	4.63E-06	6.34E-12	NA		7.59E-13	NA		9.64E-16	1.14E-08	8.43E-08	8.43E-08
OCDD	8.20E-03	1.12E-08	NA		1.34E-09	NA		1.71E-12	1.14E-08	1.49E-04	1.49E-04
OCDF	3.25E-04	4.45E-10	NA		5.33E-11	NA		6.77E-14	1.14E-08	5.92E-06	5.92E-06
		Total Risk (Hazard Index):		0.70	**Total Risk (Hazard Index):**		0.18	**Total Risk (Hazard Index):**		6.66E-01	**1.54**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **2**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-21
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.25E+04	1.37E-02	NA		3.97E-04	NA		5.20E-07	NA		
Antimony	2.06E+01	2.26E-05	NA		6.55E-07	NA		8.58E-10	NA		
Arsenic	8.10E+00	8.88E-06	1.50E+00	1.33E-05	7.72E-07	1.50E+00	1.16E-06	3.37E-10	1.51E+01	5.08E-09	1.45E-05
Barium	5.55E+02	6.08E-04	NA		1.76E-05	NA		2.31E-08	NA		
Beryllium	6.04E-01	6.62E-07	NA		1.92E-08	NA		2.51E-11	8.40E+00	2.11E-10	2.11E-10
Cadmium	1.74E+00	1.91E-06	NA		5.53E-09	NA		7.24E-11	6.30E+00	4.56E-10	4.56E-10
Chromium	4.95E+02	5.42E-04	NA		1.57E-05	NA		2.06E-08	NA		
Cobalt	7.90E+00	8.66E-06	NA		2.51E-07	NA		3.29E-10	3.15E+00	1.04E-09	1.04E-09
Copper	1.45E+02	1.59E-04	NA		4.61E-06	NA		6.04E-09	NA		
Iron	2.34E+04	2.56E-02	NA		7.44E-04	NA		9.74E-07	NA		
Lead	6.05E+02	6.63E-04	NA		1.92E-05	NA		2.52E-08	NA		
Manganese	8.43E+02	9.24E-04	NA		2.68E-05	NA		3.51E-08	NA		
Nickel	3.70E+01	4.05E-05	NA		1.18E-06	NA		1.54E-09	9.10E-01	1.40E-09	1.40E-09
Selenium	3.30E+00	3.62E-06	NA		1.05E-07	NA		1.37E-10	NA		
Silver	7.75E-01	8.49E-07	NA		2.46E-08	NA		3.23E-11	NA		
Thallium	2.88E+00	3.16E-06	NA		9.15E-08	NA		1.20E-10	NA		
Vanadium	4.05E+01	4.44E-05	NA		1.29E-06	NA		1.69E-09	NA		
Zinc	4.41E+02	4.83E-04	NA		1.40E-05	NA		1.84E-08	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	8.40E+00	9.21E-06	2.40E-01	2.21E-06	1.33E-06	2.40E-01	3.20E-07	3.50E-10	2.42E-01	8.45E-11	2.53E-06
4,4'-DDE	5.64E+00	6.18E-06	3.40E-01	2.10E-06	8.96E-07	3.40E-01	3.05E-07	2.35E-10	3.40E-01	7.97E-11	2.41E-06
4,4'-DDT	2.47E-01	2.71E-07	3.40E-01	9.20E-08	3.92E-08	3.40E-01	1.33E-08	1.03E-11	3.40E-01	3.49E-12	1.05E-07
Aldrin	9.24E-01	1.01E-06	1.70E+01	1.72E-05	1.47E-07	1.70E+01	2.50E-06	3.85E-11	1.72E+01	6.60E-10	1.97E-05
alpha-BHC	2.60E-02	2.85E-08	6.30E+00	1.80E-07	4.13E-09	6.30E+00	2.60E-08	1.08E-12	6.30E+00	6.82E-12	2.06E-07
alpha-Chlordane	7.04E-02	7.72E-08	1.30E+00	1.00E-07	1.12E-08	1.30E+00	1.45E-08	2.93E-12	3.50E-01	1.03E-12	1.15E-07
beta-BHC	3.50E-02	3.84E-08	1.80E+00	6.90E-08	5.56E-09	1.80E+00	1.00E-08	1.46E-12	1.86E+00	2.70E-12	7.91E-08
delta-BHC	4.10E-03	4.49E-09	NA		6.52E-10	NA		1.71E-13	NA		
Dieldrin	2.08E+00	2.28E-06	1.60E+01	3.65E-05	3.31E-07	1.60E+01	5.29E-06	8.66E-11	1.61E+01	1.39E-09	4.18E-05
Endosulfan sulfate	1.60E-03	1.75E-09	NA		2.54E-10	NA		6.66E-14	NA		
Endrin	4.60E-03	5.04E-09	NA		7.31E-10	NA		1.92E-13	NA		
Endrin aldehyde	1.10E-03	1.21E-09	NA		1.75E-10	NA		4.58E-14	NA		
Endrin ketone	1.20E-02	1.32E-08	NA		1.91E-09	NA		5.00E-13	NA		
gamma-BHC	2.50E-03	2.74E-09	1.10E+00	3.01E-09	3.97E-10	1.10E+00	4.37E-10	1.04E-13	1.09E+00	1.13E-13	3.45E-09
gamma-Chlordane	8.75E-02	9.59E-08	1.20E+00	1.15E-07	1.39E-08	1.20E+00	1.67E-08	3.64E-12	3.50E-01	1.28E-12	1.32E-07
Heptachlor	8.80E-03	9.64E-09	4.50E+00	4.34E-08	1.40E-09	4.50E+00	6.29E-09	3.66E-13	4.55E+00	1.67E-12	4.97E-08
Methoxychlor	3.90E-03	4.27E-09	NA		6.20E-10	NA		1.62E-13	NA		
Aroclor-1260	9.80E-01	1.07E-06	2.00E+00	2.15E-06	4.67E-07	2.00E+00	9.34E-07	4.08E-11	2.00E+00	8.16E-11	3.08E-06
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	1.15E-06	2.90E-02	3.34E-08	3.34E-07	2.90E-02	9.68E-09	1.21E-06	NA		4.30E-08
1,2-Dichlorobenzene	4.02E+01	4.41E-05	NA		1.28E-05	NA		1.38E-04	NA		
1,3-Dichlorobenzene	1.38E+00	1.51E-06	NA		4.39E-07	NA		4.73E-06	NA		
1,4-Dichlorobenzene	1.76E+01	1.93E-05	5.40E-03	1.04E-07	5.59E-06	5.40E-03	3.02E-08	6.84E-05	3.85E-02	2.63E-06	2.77E-06
1,4-Dioxane (p-dioxane)	9.12E-01	9.99E-07	2.70E-02	2.70E-08	2.90E-07	2.70E-02	7.83E-09	3.80E-11	2.70E-02	1.02E-12	3.48E-08
2-Methylnaphthalene	4.02E+02	4.41E-04	NA		1.92E-04	NA		3.58E-04	NA		
2-Methylphenol	9.90E-01	1.08E-06	NA		3.15E-07	NA		4.12E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	7.89E-06	NA		2.29E-06	NA		3.00E-10	NA		
4-Methylphenol	3.60E+00	3.95E-06	NA		1.14E-06	NA		1.50E-10	NA		
Acenaphthene	8.32E+00	9.12E-06	NA		3.97E-06	NA		1.89E-06	NA		
Acetophenone	8.73E+00	9.57E-06	NA		2.77E-06	NA		3.63E-10	NA		
Anthracene	1.10E+00	1.21E-06	NA		5.24E-07	NA		6.98E-08	NA		
Benzo(a)anthracene	5.50E-01	6.03E-07	1.20E+00	7.23E-07	2.62E-07	1.20E+00	3.15E-07	2.29E-11	3.85E-01	8.82E-12	1.04E-06
Benzo(a)pyrene	5.00E-01	5.48E-07	1.20E+01	6.58E-06	2.38E-07	1.20E+01	2.86E-06	2.08E-11	3.85E+00	8.02E-11	9.44E-06
Benzo(b)fluoranthene	4.20E-01	4.60E-07	1.20E+00	5.52E-07	2.00E-07	1.20E+00	2.40E-07	1.75E-11	3.85E-01	6.73E-12	7.93E-07
Benzo(g,h,i)perylene	4.30E-01	4.71E-07	NA		2.05E-07	NA		1.79E-11	NA		
Benzo(k)fluoranthene	4.30E-01	4.71E-07	1.20E+00	5.65E-07	2.05E-07	1.20E+00	2.46E-07	1.79E-11	3.85E-01	6.89E-12	8.11E-07
Benzyl butyl phthalate	7.60E+00	8.33E-06	1.90E-03	1.58E-08	2.42E-06	1.90E-03	4.59E-09	3.16E-10	NA		2.04E-08
Biphenyl (diphenyl)	7.10E+00	7.78E-06	NA		2.26E-06	NA		2.96E-10	NA		
bis(2-Ethylhexyl)phthalate	8.86E+00	9.71E-06	1.40E-02	1.36E-07	2.82E-06	1.40E-02	3.94E-08	3.69E-10	8.40E-03	3.10E-12	1.75E-07
Caprolactam	9.50E-02	1.04E-07	NA		3.02E-08	NA		3.96E-12	NA		
Carbazole	1.10E+00	1.21E-06	NA		3.50E-07	NA		4.58E-11	NA		
Chrysene	3.50E+00	3.84E-06	1.20E-01	4.60E-07	1.67E-06	1.20E-01	2.00E-07	1.46E-10	3.85E-02	5.61E-12	6.60E-07
Dibenz(a,h)anthracene	1.20E-01	1.32E-07	7.30E+00	9.60E-07	5.72E-08	7.30E+00	4.18E-07	5.00E-12	4.20E+00	2.10E-11	1.38E-06
Dibenzofuran	4.10E+00	4.49E-06	NA		1.30E-06	NA		4.05E-07	NA		
Di-n-butyl phthalate	2.90E+00	3.18E-06	NA		9.22E-07	NA		1.21E-10	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Fluoranthene	5.90E+00	6.47E-06	NA		2.81E-06	NA		2.46E-10	NA		
Fluorene	8.10E+00	8.88E-06	NA		3.86E-06	NA		7.90E-07	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	4.82E-07	1.20E+00	5.79E-07	2.10E-07	1.20E+00	2.52E-07	1.83E-11	3.85E-01	7.05E-12	8.30E-07
Naphthalene	5.10E+01	5.59E-05	1.20E-01	6.71E-06	2.43E-05	1.20E-01	2.92E-06	4.54E-05	1.19E-01	5.41E-06	1.50E-05
Pentachlorophenol	6.70E+00	7.34E-06	1.20E-01	8.81E-07	5.32E-06	1.20E-01	6.39E-07	2.79E-10	1.79E-02	4.98E-12	1.52E-06
Phenanthrene	1.51E+01	1.65E-05	NA		7.20E-06	NA		6.29E-10	NA		
Pyrene	7.30E+00	8.00E-06	NA		3.48E-06	NA		9.56E-08	NA		
1,1,1-Trichloroethane	2.31E-02	2.53E-08	NA		7.34E-09	NA		5.48E-07	NA		
1,1-Dichloroethane	7.30E+00	8.00E-06	5.70E-03	4.56E-08	2.32E-06	5.70E-03	1.32E-08	1.65E-04	5.70E-03	9.42E-07	1.00E-06
1,1-Dichloroethene	5.26E-02	5.76E-08	NA		1.67E-08	NA		2.03E-06	9.10E-02	1.85E-07	1.85E-07
1,2-Dichloroethane	4.33E-02	4.75E-08	9.10E-02	4.32E-09	1.38E-08	9.10E-02	1.25E-09	6.16E-07	9.10E-02	5.61E-08	6.17E-08
Acetone	2.09E-01	2.29E-07	NA		6.64E-08	NA		1.06E-06	NA		
Benzene	1.42E+00	1.56E-06	1.00E-01	1.56E-07	4.51E-07	1.00E-01	4.51E-08	2.76E-05	1.02E-01	2.80E-06	3.00E-06
Carbon disulfide	6.61E-03	7.24E-09	NA		2.10E-09	NA		3.11E-07	NA		
Chlorobenzene	6.89E+00	7.55E-06	NA		2.19E-06	NA		5.56E-05	NA		
Chloroethane	1.88E-02	2.06E-08	NA		5.97E-09	NA		9.10E-07	2.90E-03	2.64E-09	2.64E-09
Chloromethane	8.80E-02	9.64E-08	NA		2.80E-08	NA		8.99E-07	NA		
cis-1,2-Dichloroethene	1.34E+02	1.47E-04	NA		4.26E-05	NA		2.49E-03	NA		
Cyclohexane	2.38E+00	2.61E-06	NA		7.56E-07	NA		1.25E-04	NA		
Ethylbenzene	2.52E+01	2.76E-05	1.10E-02	3.04E-07	8.01E-06	1.10E-02	8.81E-08	2.35E-04	8.75E-03	2.05E-06	2.44E-06
Isopropylbenzene (cumene)	1.47E+01	1.61E-05	NA		4.67E-06	NA		2.63E-04	NA		
Methyl ethyl ketone	2.81E-01	3.08E-07	NA		8.93E-08	NA		9.30E-07	NA		
Methyl isobutyl ketone	4.19E+00	4.59E-06	NA		1.33E-06	NA		1.07E-05	NA		
Methyl tert-butyl ether	4.00E-03	4.38E-09	1.80E-03	7.89E-12	1.27E-09	1.80E-03	2.29E-12	5.48E-08	9.10E-04	4.99E-11	6.01E-11
Methylcyclohexane	1.62E+01	1.78E-05	NA		5.15E-06	NA		5.14E-04	NA		
Methylene chloride	8.66E-03	9.49E-09	1.40E-02	1.33E-10	2.75E-09	1.40E-02	3.85E-11	2.23E-07	3.50E-03	7.81E-10	9.52E-10
Styrene	1.74E-01	1.91E-07	NA		5.53E-08	NA		8.34E-07	NA		
Tetrachloroethene	5.09E-01	5.58E-07	5.40E-01	3.01E-07	1.62E-07	5.40E-01	8.74E-08	1.28E-05	2.07E-02	2.65E-07	6.53E-07
Toluene	2.88E-03	3.16E-09	NA		9.15E-10	NA		4.65E-08	NA		
trans-1,2-Dichloroethene	5.29E-01	5.80E-07	NA		1.68E-07	NA		1.45E-05	NA		
Trichloroethene	2.63E+00	2.88E-06	5.90E-03	1.70E-08	8.36E-07	5.90E-03	4.93E-09	5.18E-05	7.00E-03	3.63E-07	3.85E-07
Vinyl chloride	8.95E-01	9.81E-07	7.20E-01	7.06E-07	2.84E-07	7.20E-01	2.05E-07	5.51E-05	2.73E-01	1.50E-05	1.60E-05
Xylenes, total	1.40E+02	1.53E-04	NA		4.45E-05	NA		1.48E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.07E-09	1.50E+03	1.60E-06	9.27E-11	1.50E+03	1.39E-07	4.05E-14	1.50E+03	6.07E-11	1.74E-06
1,2,3,4,6,7,8-HpCDF	1.60E-04	1.75E-10	1.50E+03	2.63E-07	1.53E-11	1.50E+03	2.29E-08	6.66E-15	1.50E+03	9.99E-12	2.86E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	8.69E-12	1.50E+03	1.30E-08	7.56E-13	1.50E+03	1.13E-09	3.30E-16	1.50E+03	4.95E-13	1.42E-08
1,2,3,4,7,8-HxCDD	1.64E-05	1.80E-11	1.50E+04	2.70E-07	1.56E-12	1.50E+04	2.35E-08	6.83E-16	1.50E+04	1.02E-11	2.93E-07
1,2,3,4,7,8-HxCDF	2.26E-06	2.48E-12	1.50E+04	3.72E-08	2.15E-13	1.50E+04	3.23E-09	9.41E-17	1.50E+04	1.41E-12	4.04E-08
1,2,3,6,7,8-HxCDD	7.35E-05	8.05E-11	1.50E+04	1.21E-06	7.01E-12	1.50E+04	1.05E-07	3.06E-15	1.50E+04	4.59E-11	1.31E-06
1,2,3,6,7,8-HxCDF	1.50E-05	1.64E-11	1.50E+04	2.47E-07	1.43E-12	1.50E+04	2.15E-08	6.25E-16	1.50E+04	9.37E-12	2.68E-07
1,2,3,7,8,9-HxCDD	4.14E-05	4.54E-11	1.50E+04	6.81E-07	3.95E-12	1.50E+04	5.92E-08	1.72E-15	1.50E+04	2.59E-11	7.40E-07
1,2,3,7,8,9-HxCDF	8.75E-06	9.59E-12	1.50E+04	1.44E-07	8.34E-13	1.50E+04	1.25E-08	3.64E-16	1.50E+04	5.46E-12	1.56E-07
1,2,3,7,8-PeCDD	1.53E-05	1.68E-11	1.50E+05	2.52E-06	1.46E-12	1.50E+05	2.19E-07	6.37E-16	1.50E+05	9.56E-11	2.73E-06
2,3,4,6,7,8-HxCDF	1.51E-05	1.65E-11	1.50E+04	2.48E-07	1.44E-12	1.50E+04	2.16E-08	6.29E-16	1.50E+04	9.43E-12	2.70E-07
2,3,4,7,8-PeCDF	3.66E-05	4.01E-11	7.50E+04	3.01E-06	3.49E-12	7.50E+04	2.62E-07	1.52E-15	7.50E+04	1.14E-10	3.27E-06

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
2,3,7,8-TCDF	4.63E-06	5.07E-12	1.50E+04	7.61E-08	4.41E-13	1.50E+04	6.62E-09	1.93E-16	1.50E+04	2.89E-12	8.27E-08
OCDD	8.20E-03	8.99E-09	1.50E+01	1.35E-07	7.82E-10	1.50E+01	1.17E-08	3.41E-13	1.50E+01	5.12E-12	1.47E-07
OCDF	3.25E-04	3.56E-10	1.50E+01	5.34E-09	3.10E-11	1.50E+01	4.65E-10	1.35E-14	1.50E+01	2.03E-13	5.81E-09
			Total Risk:	1.04E-04		Total Risk:	2.01E-05		Total Risk:	2.98E-05	1.54E-04

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-22
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.25E+04	1.60E-01	1.00E+00	1.60E-01	4.63E-03	1.00E+00	4.63E-03	6.07E-06	1.40E-03	4.34E-03	**1.69E-01**
Antimony	2.06E+01	2.63E-04	4.00E-04	6.58E-01	7.64E-06	4.00E-04	1.91E-02	1.00E-08	NA		**6.78E-01**
Arsenic	8.10E+00	1.04E-04	3.00E-04	3.45E-01	9.01E-06	3.00E-04	3.00E-02	3.93E-09	4.29E-06	9.18E-04	**3.76E-01**
Barium	5.55E+02	7.10E-03	2.00E-01	3.55E-02	2.06E-04	2.00E-01	1.03E-03	2.70E-07	1.43E-04	1.89E-03	3.84E-02
Beryllium	6.04E-01	7.72E-06	2.00E-03	3.86E-03	2.24E-07	2.00E-03	1.12E-04	2.93E-10	2.00E-06	1.47E-04	4.12E-03
Cadmium	1.74E+00	2.22E-05	1.10E-05	2.02E+00	6.45E-08	1.10E-05	5.87E-03	8.45E-10	2.86E-06	2.96E-04	**2.03E+00**
Chromium	4.95E+02	6.33E-03	NA		1.84E-04	NA		2.40E-07	NA		
Cobalt	7.90E+00	1.01E-04	3.00E-04	3.37E-01	2.93E-06	3.00E-04	9.76E-03	3.84E-09	1.71E-06	2.24E-03	**3.49E-01**
Copper	1.45E+02	1.85E-03	4.00E-02	4.63E-02	5.38E-05	4.00E-02	1.34E-03	7.04E-08	NA		4.77E-02
Iron	2.34E+04	2.99E-01	7.00E-01	4.27E-01	8.68E-03	7.00E-01	1.24E-02	1.14E-05	NA		**4.40E-01**
Lead	6.05E+02	7.74E-03	NA		2.24E-04	NA		2.94E-07	NA		
Manganese	8.43E+02	1.08E-02	2.40E-02	4.49E-01	3.13E-04	2.40E-02	1.30E-02	4.10E-07	1.43E-05	2.87E-02	**4.91E-01**
Nickel	3.70E+01	4.73E-04	1.10E-02	4.30E-02	1.37E-05	1.10E-02	1.25E-03	1.80E-08	2.57E-05	6.99E-04	4.50E-02
Selenium	3.30E+00	4.22E-05	5.00E-03	8.44E-03	1.22E-06	5.00E-03	2.45E-04	1.60E-09	5.71E-03	2.81E-07	8.68E-03
Silver	7.75E-01	9.91E-06	5.00E-03	1.98E-03	2.87E-07	5.00E-03	5.75E-05	3.76E-10	NA		2.04E-03
Thallium	2.88E+00	3.68E-05	6.60E-05	5.58E-01	1.07E-06	6.60E-05	1.62E-02	1.40E-09	NA		**5.74E-01**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Vanadium	4.05E+01	5.18E-04	5.00E-03	1.04E-01	1.50E-05	5.00E-03	3.00E-03	1.97E-08	NA		**1.07E-01**
Zinc	4.41E+02	5.64E-03	3.00E-01	1.88E-02	1.64E-04	3.00E-01	5.45E-04	2.14E-07	NA		1.93E-02
Pesticides/PCBs											
4,4'-DDD	8.40E+00	1.07E-04	NA		1.56E-05	NA		4.08E-09	NA		
4,4'-DDE	5.64E+00	7.21E-05	NA		1.05E-05	NA		2.74E-09	NA		
4,4'-DDT	2.47E-01	3.16E-06	5.00E-04	6.32E-03	4.58E-07	5.00E-04	9.16E-04	1.20E-10	NA		7.23E-03
Aldrin	9.24E-01	1.18E-05	3.00E-05	3.94E-01	1.71E-06	3.00E-05	5.71E-02	4.49E-10	NA		**4.51E-01**
alpha-BHC	2.60E-02	3.32E-07	5.00E-04	6.65E-04	4.82E-08	5.00E-04	9.64E-05	1.26E-11	NA		7.61E-04
alpha-Chlordane	7.04E-02	9.00E-07	3.30E-05	2.73E-02	1.31E-07	3.30E-05	3.95E-03	3.42E-11	2.00E-04	1.71E-07	3.12E-02
beta-BHC	3.50E-02	4.47E-07	NA		6.49E-08	NA		1.70E-11	NA		
delta-BHC	4.10E-03	5.24E-08	NA		7.60E-09	NA		1.99E-12	NA		
Dieldrin	2.08E+00	2.66E-05	5.00E-05	5.32E-01	3.86E-06	5.00E-05	7.71E-02	1.01E-09	NA		**6.09E-01**
Endosulfan sulfate	1.60E-03	2.05E-08	6.00E-03	3.41E-06	2.97E-09	6.00E-03	4.94E-07	7.77E-13	NA		3.90E-06
Endrin	4.60E-03	5.88E-08	3.00E-04	1.96E-04	8.53E-09	3.00E-04	2.84E-05	2.23E-12	NA		2.24E-04
Endrin aldehyde	1.10E-03	1.41E-08	3.00E-04	4.69E-05	2.04E-09	3.00E-04	6.80E-06	5.34E-13	NA		5.37E-05
Endrin ketone	1.20E-02	1.53E-07	3.00E-04	5.11E-04	2.22E-08	3.00E-04	7.42E-05	5.83E-12	NA		5.86E-04
gamma-BHC	2.50E-03	3.20E-08	3.00E-04	1.07E-04	4.63E-09	3.00E-04	1.54E-05	1.21E-12	NA		1.22E-04
gamma-Chlordane	8.75E-02	1.12E-06	3.30E-05	3.39E-02	1.62E-07	3.30E-05	4.92E-03	4.25E-11	2.00E-04	2.13E-07	3.88E-02
Heptachlor	8.80E-03	1.13E-07	3.00E-05	3.75E-03	1.63E-08	3.00E-05	5.44E-04	4.27E-12	3.00E-05	1.42E-07	4.29E-03
Methoxychlor	3.90E-03	4.99E-08	2.00E-05	2.49E-03	7.23E-09	2.00E-05	3.62E-04	1.89E-12	2.00E-05	9.47E-08	2.85E-03
Aroclor-1260	9.80E-01	1.25E-05	2.00E-05	6.26E-01	5.45E-06	2.00E-05	2.73E-01	4.76E-10	NA		**9.0E-01**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	1.34E-05	1.00E-02	1.34E-03	3.89E-06	1.00E-02	3.89E-04	1.41E-05	5.71E-04	2.47E-02	2.64E-02
1,2-Dichlorobenzene	4.02E+01	5.14E-04	9.00E-02	5.71E-03	1.49E-04	9.00E-02	1.66E-03	1.61E-03	5.71E-02	2.81E-02	3.55E-02
1,3-Dichlorobenzene	1.38E+00	1.76E-05	NA		5.12E-06	NA		5.51E-05	NA		
1,4-Dichlorobenzene	1.76E+01	2.25E-04	7.00E-02	3.21E-03	6.53E-05	7.00E-02	9.32E-04	7.98E-04	2.29E-01	3.49E-03	7.64E-03
1,4-Dioxane (p-dioxane)	9.12E-01	1.17E-05	1.00E-01	1.17E-04	3.38E-06	1.00E-01	3.38E-05	4.43E-10	8.57E-01	5.17E-10	1.50E-04
2-Methylnaphthalene	4.02E+02	5.14E-03	4.00E-03	1.28E+00	2.24E-03	4.00E-03	5.59E-01	4.18E-03	NA		**1.84E+00**
2-Methylphenol	9.90E-01	1.27E-05	5.00E-02	2.53E-04	3.67E-06	5.00E-02	7.34E-05	4.81E-10	1.71E-01	2.81E-09	3.27E-04
4-Chloro-3-methylphenol	7.20E+00	9.21E-05	NA		2.67E-05	NA		3.50E-09	NA		
4-Methylphenol	3.60E+00	4.60E-05	5.00E-03	9.21E-03	1.33E-05	5.00E-03	2.67E-03	1.75E-09	1.71E-01	1.02E-08	1.19E-02
Acenaphthene	8.32E+00	1.06E-04	6.00E-02	1.77E-03	4.63E-05	6.00E-02	7.71E-04	2.20E-05	NA		2.54E-03
Acetophenone	8.73E+00	1.12E-04	1.00E-01	1.12E-03	3.24E-05	1.00E-01	3.24E-04	4.24E-09	NA		1.44E-03
Anthracene	1.10E+00	1.41E-05	3.00E-01	4.69E-05	6.12E-06	3.00E-01	2.04E-05	8.15E-07	NA		6.73E-05
Benzo(a)anthracene	5.50E-01	7.03E-06	NA		3.06E-06	NA		2.67E-10	NA		
Benzo(a)pyrene	5.00E-01	6.39E-06	NA		2.78E-06	NA		2.43E-10	NA		
Benzo(b)fluoranthene	4.20E-01	5.37E-06	NA		2.34E-06	NA		2.04E-10	NA		
Benzo(g,h,i)perylene	4.30E-01	5.50E-06	NA		2.39E-06	NA		2.09E-10	NA		
Benzo(k)fluoranthene	4.30E-01	5.50E-06	NA		2.39E-06	NA		2.09E-10	NA		
Benzyl butyl phthalate	7.60E+00	9.72E-05	2.00E-01	4.86E-04	2.82E-05	2.00E-01	1.41E-04	3.69E-09	NA		6.27E-04
Biphenyl (diphenyl)	7.10E+00	9.08E-05	5.00E-02	1.82E-03	2.63E-05	5.00E-02	5.27E-04	3.45E-09	NA		2.34E-03
bis(2-Ethylhexyl)phthalate	8.86E+00	1.13E-04	2.00E-02	5.66E-03	3.29E-05	2.00E-02	1.64E-03	4.30E-09	NA		7.31E-03
Caprolactam	9.50E-02	1.21E-06	5.00E-01	2.43E-06	3.52E-07	5.00E-01	7.04E-07	4.61E-11	NA		3.13E-06
Carbazole	1.10E+00	1.41E-05	NA		4.08E-06	NA		5.34E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Chrysene	3.50E+00	4.47E-05	NA		1.95E-05	NA		1.70E-09	NA		
Dibenz(a,h)anthracene	1.20E-01	1.53E-06	NA		6.67E-07	NA		5.83E-11	NA		
Dibenzofuran	4.10E+00	5.24E-05	2.00E-03	2.62E-02	1.52E-05	2.00E-03	7.60E-03	4.73E-06	NA		3.38E-02
Di-n-butyl phthalate	2.90E+00	3.71E-05	1.00E-01	3.71E-04	1.08E-05	1.00E-01	1.08E-04	1.41E-09	NA		4.78E-04
Fluoranthene	5.90E+00	7.54E-05	4.00E-02	1.89E-03	3.28E-05	4.00E-02	8.20E-04	2.87E-09	NA		2.71E-03
Fluorene	8.10E+00	1.04E-04	4.00E-02	2.59E-03	4.50E-05	4.00E-02	1.13E-03	9.22E-06	NA		3.72E-03
Indeno(1,2,3-c,d)pyrene	4.40E-01	5.63E-06	NA		2.45E-06	NA		2.14E-10	NA		
Naphthalene	5.10E+01	6.52E-04	2.00E-02	3.26E-02	2.84E-04	2.00E-02	1.42E-02	5.30E-04	8.57E-04	6.18E-01	**6.65E-01**
Pentachlorophenol	6.70E+00	8.57E-05	3.00E-02	2.86E-03	6.21E-05	3.00E-02	2.07E-03	3.25E-09	3.00E-02	1.08E-07	4.93E-03
Phenanthrene	1.51E+01	1.93E-04	NA		8.40E-05	NA		7.34E-09	NA		
Pyrene	7.30E+00	9.33E-05	3.00E-02	3.11E-03	4.06E-05	3.00E-02	1.35E-03	1.12E-06	NA		4.46E-03
1,1,1-Trichloroethane	2.31E-02	2.95E-07	2.00E+00	1.48E-07	8.56E-08	2.00E+00	4.28E-08	6.40E-06	1.43E+00	4.48E-06	4.67E-06
1,1-Dichloroethane	7.30E+00	9.33E-05	2.00E-01	4.67E-04	2.71E-05	2.00E-01	1.35E-04	1.93E-03	NA		6.02E-04
1,1-Dichloroethene	5.26E-02	6.73E-07	5.00E-02	1.35E-05	1.95E-07	5.00E-02	3.90E-06	2.37E-05	2.00E-02	1.18E-03	1.20E-03
1,2-Dichloroethane	4.33E-02	5.54E-07	2.00E-02	2.77E-05	1.61E-07	2.00E-02	8.03E-06	7.19E-06	6.86E-01	1.05E-05	4.62E-05
Acetone	2.09E-01	2.67E-06	9.00E-01	2.97E-06	7.75E-07	9.00E-01	8.61E-07	1.24E-05	8.86E+00	1.39E-06	5.22E-06
Benzene	1.42E+00	1.82E-05	4.00E-03	4.54E-03	5.27E-06	4.00E-03	1.32E-03	3.22E-04	8.57E-03	3.76E-02	4.34E-02
Carbon disulfide	6.61E-03	8.45E-08	1.00E-01	8.45E-07	2.45E-08	1.00E-01	2.45E-07	3.63E-06	2.00E-01	1.82E-05	1.93E-05
Chlorobenzene	6.89E+00	8.81E-05	2.00E-02	4.40E-03	2.55E-05	2.00E-02	1.28E-03	6.48E-04	1.43E-02	4.54E-02	5.11E-02
Chloroethane	1.88E-02	2.40E-07	NA		6.97E-08	NA		1.06E-05	2.86E+00	3.71E-06	3.71E-06
Chloromethane	8.80E-02	1.13E-06	NA		3.26E-07	NA		1.05E-05	2.57E-02	4.08E-04	4.08E-04
cis-1,2-Dichloroethene	1.34E+02	1.71E-03	1.00E-02	1.71E-01	4.97E-04	1.00E-02	4.97E-02	2.91E-02	NA		**2.21E-01**
Cyclohexane	2.38E+00	3.04E-05	NA		8.82E-06	NA		1.45E-03	1.71E+00	8.49E-04	8.49E-04
Ethylbenzene	2.52E+01	3.22E-04	1.00E-01	3.22E-03	9.34E-05	1.00E-01	9.34E-04	2.74E-03	2.86E-01	9.58E-03	1.37E-02
Isopropylbenzene (cumene)	1.47E+01	1.88E-04	1.00E-01	1.88E-03	5.45E-05	1.00E-01	5.45E-04	3.07E-03	1.14E-01	2.69E-02	2.93E-02
Methyl ethyl ketone	2.81E-01	3.59E-06	6.00E-01	5.99E-06	1.04E-06	6.00E-01	1.74E-06	1.09E-05	1.43E+00	7.60E-06	1.53E-05
Methyl isobutyl ketone	4.19E+00	5.36E-05	8.00E-02	6.70E-04	1.55E-05	8.00E-02	1.94E-04	1.25E-04	8.57E-01	1.46E-04	1.01E-03
Methyl tert-butyl ether	4.00E-03	5.11E-08	NA		1.48E-08	NA		6.40E-07	8.57E-01	7.46E-07	7.46E-07
Methylcyclohexane	1.62E+01	2.07E-04	NA		6.01E-05	NA		5.99E-03	8.60E-01	6.97E-03	6.97E-03
Methylene chloride	8.66E-03	1.11E-07	6.00E-02	1.85E-06	3.21E-08	6.00E-02	5.35E-07	2.60E-06	2.86E-01	9.11E-06	1.15E-05
Styrene	1.74E-01	2.22E-06	2.00E-01	1.11E-05	6.45E-07	2.00E-01	3.23E-06	9.73E-06	2.57E-01	3.78E-05	5.22E-05
Tetrachloroethene	5.09E-01	6.51E-06	1.00E-02	6.51E-04	1.89E-06	1.00E-02	1.89E-04	1.49E-04	1.00E-02	1.49E-02	1.58E-02
Toluene	2.88E-03	3.68E-08	8.00E-02	4.60E-07	1.07E-08	8.00E-02	1.33E-07	5.43E-07	8.57E-02	6.33E-06	6.93E-06
trans-1,2-Dichloroethene	5.29E-01	6.76E-06	2.00E-02	3.38E-04	1.96E-06	2.00E-02	9.81E-05	1.69E-04	1.71E-02	9.88E-03	1.03E-02
Trichloroethene	2.63E+00	3.36E-05	3.00E-04	1.12E-01	9.75E-06	3.00E-04	3.25E-02	6.05E-04	1.00E-02	6.05E-02	**2.05E-01**
Vinyl chloride	8.95E-01	1.14E-05	3.00E-03	3.81E-03	3.32E-06	3.00E-03	1.11E-03	6.43E-04	2.86E-02	2.25E-02	2.74E-02
Xylenes, total	1.40E+02	1.79E-03	2.00E-01	8.95E-03	5.19E-04	2.00E-01	2.60E-03	1.72E-02	2.86E-02	6.03E-01	**6.14E-01**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	1.24E-08	NA		1.08E-09	NA		4.72E-13	1.14E-08	4.13E-05	4.13E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	2.05E-09	NA		1.78E-10	NA		7.77E-14	1.14E-08	6.80E-06	6.80E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	1.01E-10	NA		8.82E-12	NA		3.85E-15	1.14E-08	3.37E-07	3.37E-07
1,2,3,4,7,8-HxCDD	1.64E-05	2.10E-10	NA		1.82E-11	NA		7.97E-15	1.14E-08	6.97E-07	6.97E-07
1,2,3,4,7,8-HxCDF	2.26E-06	2.89E-11	NA		2.51E-12	NA		1.10E-15	1.14E-08	9.61E-08	9.61E-08
1,2,3,6,7,8-HxCDD	7.35E-05	9.40E-10	NA		8.18E-11	NA		3.57E-14	1.14E-08	3.12E-06	3.12E-06

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
1,2,3,6,7,8-HxCDF	1.50E-05	1.92E-10	NA		1.67E-11	NA		7.29E-15	1.14E-08	6.38E-07	6.38E-07
1,2,3,7,8,9-HxCDD	4.14E-05	5.29E-10	NA		4.61E-11	NA		2.01E-14	1.14E-08	1.76E-06	1.76E-06
1,2,3,7,8,9-HxCDF	8.75E-06	1.12E-10	NA		9.73E-12	NA		4.25E-15	1.14E-08	3.72E-07	3.72E-07
1,2,3,7,8-PeCDD	1.53E-05	1.96E-10	NA		1.70E-11	NA		7.43E-15	1.14E-08	6.50E-07	6.50E-07
2,3,4,6,7,8-HxCDF	1.51E-05	1.93E-10	NA		1.68E-11	NA		7.34E-15	1.14E-08	6.42E-07	6.42E-07
2,3,4,7,8-PeCDF	3.66E-05	4.68E-10	NA		4.07E-11	NA		1.78E-14	1.14E-08	1.56E-06	1.56E-06
2,3,7,8-TCDF	4.63E-06	5.92E-11	NA		5.15E-12	NA		2.25E-15	1.14E-08	1.97E-07	1.97E-07
OCDD	8.20E-03	1.05E-07	NA		9.12E-09	NA		3.98E-12	1.14E-08	3.49E-04	3.49E-04
OCDF	3.25E-04	4.16E-09	NA		3.62E-10	NA		1.58E-13	1.14E-08	1.38E-05	1.38E-05
			Total Risk (Hazard Index):	8.5E+00		**Total Risk (Hazard Index):**	1.2E+00		**Total Risk (Hazard Index):**	1.55	**11.32**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **11**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-23
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**5.7E-06**	6.8E-07	8.7E-09	**6.4E-06**	6%	**1.3E-05**	**1.2E-06**	5.1E-09	**1.4E-05**	9%
Subtotal Metals	**5.7E-06**	6.8E-07	1.4E-08	**6.4E-06**	6%	**1.3E-05**	**1.2E-06**	8.2E-09	**1.4E-05**	9%
Pesticides/PCBs										
4,4'-DDD	9.5E-07	1.9E-07	1.4E-10	**1.1E-06**	1.1%	**2.2E-06**	3.2E-07	8.4E-11	**2.5E-06**	2%
4,4'-DDE	9.0E-07	1.8E-07	1.4E-10	**1.1E-06**	1.0%	**2.1E-06**	3.0E-07	8.0E-11	**2.4E-06**	1.6%
Aldrin	**7.4E-06**	**1.5E-06**	1.1E-09	**8.9E-06**	8%	**1.7E-05**	**2.5E-06**	6.6E-10	**2.0E-05**	13%
Dieldrin	**1.6E-05**	**3.1E-06**	2.4E-09	**1.9E-05**	17%	**3.6E-05**	**5.3E-06**	1.4E-09	**4.2E-05**	27%
Aroclor-1260	9.2E-07	5.5E-07	1.4E-10	**1.5E-06**	1.4%	**2.1E-06**	9.3E-07	8.2E-11	**3.1E-06**	2%
Subtotal Pesticides/PCBs	**2.6E-05**	**5.6E-06**	4.0E-09	**3.2E-05**	29%	**6.1E-05**	**9.4E-06**	2.3E-09	**7.0E-05**	45%
SVOCs/VOCs										
1,4-Dichlorobenzene	4.5E-08	1.8E-08	**4.5E-06**	**4.6E-06**	4%	1.0E-07	3.0E-08	**2.6E-06**	**2.8E-06**	2%
Benzo(a)anthracene	3.1E-07	1.9E-07	1.5E-11	5.0E-07	0.5%	7.2E-07	3.1E-07	8.8E-12	**1.0E-06**	0.7%
Benzo(a)pyrene	**2.8E-06**	**1.7E-06**	1.4E-10	**4.5E-06**	4%	**6.6E-06**	**2.9E-06**	8.0E-11	**9.4E-06**	6%
Dibenz(a,h)anthracene	4.1E-07	2.5E-07	3.6E-11	6.6E-07	0.6%	9.6E-07	4.2E-07	2.1E-11	**1.4E-06**	0.9%
Naphthalene	**2.9E-06**	**1.7E-06**	**9.3E-06**	**1.4E-05**	13%	**6.7E-06**	**2.9E-06**	**5.4E-06**	**1.5E-05**	10%
Pentachlorophenol	3.8E-07	3.8E-07	8.5E-12	7.5E-07	0.7%	8.8E-07	6.4E-07	5.0E-12	**1.5E-06**	1.0%
1,1-Dichloroethane	2.0E-08	7.8E-09	**1.6E-06**	**1.6E-06**	1.5%	4.6E-08	1.3E-08	9.4E-07	**1.0E-06**	0.6%
Benzene	6.7E-08	2.7E-08	**4.8E-06**	**4.9E-06**	5%	1.6E-07	4.5E-08	**2.8E-06**	**3.0E-06**	2%
Ethylbenzene	1.3E-07	5.2E-08	**3.5E-06**	**3.7E-06**	3%	3.0E-07	8.8E-08	**2.1E-06**	**2.4E-06**	2%
Vinyl chloride	3.0E-07	1.2E-07	**2.6E-05**	**2.6E-05**	24%	7.1E-07	2.0E-07	**1.5E-05**	**1.6E-05**	10%
Subtotal SVOCs/VOCs	**8.5E-06**	**5.1E-06**	**5.1E-05**	**6.5E-05**	60%	**2.0E-05**	**8.6E-06**	**3.0E-05**	**5.8E-05**	38%
Dioxans/Furans										
1,2,3,4,6,7,8-HpCDD	6.8E-07	8.2E-08	1.0E-10	7.7E-07	0.7%	**1.6E-06**	1.4E-07	6.1E-11	**1.7E-06**	1.1%
1,2,3,6,7,8-HxCDD	5.2E-07	6.2E-08	7.9E-11	5.8E-07	0.5%	**1.2E-06**	1.1E-07	4.6E-11	**1.3E-06**	0.9%
1,2,3,7,8-PeCDD	**1.1E-06**	1.3E-07	1.6E-10	**1.2E-06**	1.1%	**2.5E-06**	2.2E-07	9.6E-11	**2.7E-06**	2%

Table 1-23
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
2,3,4,7,8-PeCDF	**1.3E-06**	1.5E-07	2.0E-10	**1.4E-06**	1.3%	**3.0E-06**	2.6E-07	1.1E-10	**3.3E-06**	2%
Subtotal Dioxans/Furans	**4.5E-06**	5.4E-07	6.8E-10	**5.0E-06**	5%	**1.0E-05**	9.1E-07	4.0E-10	**1.1E-05**	7%
Total:	**4.5E-05**	**1.2E-05**	**5.1E-05**	**1.1E-04**		**1.0E-04**	**2.0E-05**	**3.0E-05**	**1.5E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:	**1E-04** (Adult)				**2E-04** (Child)
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):		**1.5E-04**	**3.2E-05**	**8.1E-05**	**2.62E-04**
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:					**3E-04**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-24
Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.7E-02	6.8E-04	1.9E-03	2.0E-02	1.3%	**1.6E-01**	4.6E-03	4.3E-03	**1.7E-01**	1%
Antimony	7.1E-02	2.8E-03		7.3E-02	5%	**6.6E-01**	1.9E-02		**6.8E-01**	6%
Arsenic	3.7E-02	4.4E-03	3.9E-04	4.2E-02	3%	**3.5E-01**	3.0E-02	9.2E-04	**3.8E-01**	3%
Cadmium	4.8E-03	1.9E-05	1.3E-04	4.9E-03	0%	**2.0E+00**	5.9E-03	3.0E-04	**2.0E+00**	18%
Cobalt	3.6E-02	1.4E-03	9.6E-04	3.8E-02	2%	**3.4E-01**	9.8E-03	2.2E-03	**3.5E-01**	3%
Iron	4.6E-02	1.8E-03		4.8E-02	3%	**4.3E-01**	1.2E-02		**4.4E-01**	4%
Manganese	4.8E-02	1.9E-03	1.2E-02	6.2E-02	4%	**4.5E-01**	1.3E-02	2.9E-02	**4.9E-01**	4%
Thallium	6.0E-02	2.4E-03		6.2E-02	4%	**5.6E-01**	1.6E-02		**5.7E-01**	5%
Vanadium	1.1E-02	4.4E-04		1.2E-02	1%	**1.0E-01**	3.0E-03		**1.1E-01**	1%
Subtotal Metals	**3.5E-01**	1.7E-02	1.7E-02	**3.8E-01**	25%	**5.2E+00**	**1.2E-01**	3.9E-02	**5.4E+00**	47%
Pesticides/PCBs										
Aldrin	4.2E-02	8.4E-03		5.1E-02	3%	**3.9E-01**	5.7E-02		**4.5E-01**	4%
Dieldrin	5.7E-02	1.1E-02		6.8E-02	4%	**5.3E-01**	7.7E-02		**6.1E-01**	5%
Aroclor-1260	6.7E-02	4.0E-02		**1.1E-01**	7%	**6.3E-01**	**2.7E-01**		**9.0E-01**	8%
Subtotal Pesticides/PCBs	**1.7E-01**	6.0E-02	1.6E-07	**2.3E-01**	15%	**1.6E+00**	**4.2E-01**	6.2E-07	**2.0E+00**	18%
SVOCs/VOCs										
2-Methylnaphthalene	**1.4E-01**	8.2E-02		**2.2E-01**	14%	**1.3E+00**	**5.6E-01**		**1.8E+00**	16%
Naphthalene	3.5E-03	2.1E-03	**2.7E-01**	**2.7E-01**	18%	3.3E-02	1.4E-02	**6.2E-01**	**6.7E-01**	6%
cis-1,2-Dichloroethene	1.8E-02	7.3E-03		2.6E-02	2%	**1.7E-01**	5.0E-02		**2.2E-01**	2%
Trichloroethene	1.2E-02	4.8E-03	2.6E-02	4.3E-02	3%	**1.1E-01**	3.3E-02	6.0E-02	**2.1E-01**	2%
Xylenes, total	9.6E-04	3.8E-04	**2.6E-01**	**2.6E-01**	17%	8.9E-03	2.6E-03	**6.0E-01**	**6.1E-01**	5%
Subtotal SVOCs/VOCs	**1.8E-01**	**1.0E-01**	**6.5E-01**	**9.3E-01**	61%	**1.7E+00**	**6.9E-01**	**1.5E+00**	**3.9E+00**	34%
Total:	**0.7**	**0.2**	**0.7**	**1.5**		**8.5**	**1.2**	**1.6**	**11.3**	

Total Estimated Hazard Index Across All Exposure Routes:	**2**	**11**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

Table 1-25
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.25E+04	4.37E-03	NA		4.98E-04	NA		6.64E-07	NA		
Antimony	2.06E+01	7.20E-06	NA		8.21E-07	NA		1.09E-09	NA		
Arsenic	8.10E+00	2.83E-06	1.50E+00	4.25E-06	9.68E-07	1.50E+00	1.45E-06	4.30E-10	1.51E+01	6.47E-09	**5.70E-06**
Barium	5.55E+02	1.94E-04	NA		2.21E-05	NA		2.95E-08	NA		
Beryllium	6.04E-01	2.11E-07	NA		2.41E-08	NA		3.21E-11	8.40E+00	2.69E-10	2.69E-10
Cadmium	1.74E+00	6.08E-07	NA		6.93E-09	NA		9.24E-11	6.30E+00	5.82E-10	5.82E-10
Chromium	4.95E+02	1.73E-04	NA		1.97E-05	NA		2.63E-08	NA		
Cobalt	7.90E+00	2.76E-06	NA		3.15E-07	NA		4.20E-10	3.15E+00	1.32E-09	1.32E-09
Copper	1.45E+02	5.07E-05	NA		5.78E-06	NA		7.70E-09	NA		
Iron	2.34E+04	8.18E-03	NA		9.32E-04	NA		1.24E-06	NA		
Lead	6.05E+02	2.11E-04	NA		2.41E-05	NA		3.21E-08	NA		
Manganese	8.43E+02	2.95E-04	NA		3.36E-05	NA		4.48E-08	NA		
Nickel	3.70E+01	1.29E-05	NA		1.47E-06	NA		1.97E-09	9.10E-01	1.79E-09	1.79E-09
Selenium	3.30E+00	1.15E-06	NA		1.31E-07	NA		1.75E-10	NA		
Silver	7.75E-01	2.71E-07	NA		3.09E-08	NA		4.12E-11	NA		
Thallium	2.88E+00	1.01E-06	NA		1.15E-07	NA		1.53E-10	NA		
Vanadium	4.05E+01	1.42E-05	NA		1.61E-06	NA		2.15E-09	NA		
Zinc	4.41E+02	1.54E-04	NA		1.76E-05	NA		2.34E-08	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Pesticides/PCBs											
4,4'-DDD	8.40E+00	2.94E-06	2.40E-01	7.05E-07	1.67E-06	2.40E-01	4.02E-07	4.46E-10	2.42E-01	1.08E-10	**1.11E-06**
4,4'-DDE	5.64E+00	1.97E-06	3.40E-01	6.70E-07	1.12E-06	3.40E-01	3.82E-07	3.00E-10	3.40E-01	1.02E-10	**1.05E-06**
4,4'-DDT	2.47E-01	8.63E-08	3.40E-01	2.93E-08	4.92E-08	3.40E-01	1.67E-08	1.31E-11	3.40E-01	4.45E-12	4.61E-08
Aldrin	9.24E-01	3.23E-07	1.70E+01	5.49E-06	1.84E-07	1.70E+01	3.13E-06	4.91E-11	1.72E+01	8.42E-10	**8.62E-06**
alpha-BHC	2.60E-02	9.09E-09	6.30E+00	5.72E-08	5.18E-09	6.30E+00	3.26E-08	1.38E-12	6.30E+00	8.70E-12	8.99E-08
alpha-Chlordane	7.04E-02	2.46E-08	1.30E+00	3.20E-08	1.40E-08	1.30E+00	1.82E-08	3.74E-12	3.50E-01	1.31E-12	5.02E-08
beta-BHC	3.50E-02	1.22E-08	1.80E+00	2.20E-08	6.97E-09	1.80E+00	1.25E-08	1.86E-12	1.86E+00	3.45E-12	3.46E-08
delta-BHC	4.10E-03	1.43E-09	NA		8.17E-10	NA		2.18E-13	NA		
Dieldrin	2.08E+00	7.27E-07	1.60E+01	1.16E-05	4.14E-07	1.60E+01	6.63E-06	1.10E-10	1.61E+01	1.78E-09	**1.83E-05**
Endosulfan sulfate	1.60E-03	5.59E-10	NA		3.19E-10	NA		8.50E-14	NA		
Endrin	4.60E-03	1.61E-09	NA		9.16E-10	NA		2.44E-13	NA		
Endrin aldehyde	1.10E-03	3.84E-10	NA		2.19E-10	NA		5.84E-14	NA		
Endrin ketone	1.20E-02	4.19E-09	NA		2.39E-09	NA		6.37E-13	NA		
gamma-BHC	2.50E-03	8.74E-10	1.10E+00	9.61E-10	4.98E-10	1.10E+00	5.48E-10	1.33E-13	1.09E+00	1.44E-13	1.51E-09
gamma-Chlordane	8.75E-02	3.06E-08	1.20E+00	3.67E-08	1.74E-08	1.20E+00	2.09E-08	4.65E-12	3.50E-01	1.63E-12	5.76E-08
Heptachlor	8.80E-03	3.08E-09	4.50E+00	1.38E-08	1.75E-09	4.50E+00	7.89E-09	4.67E-13	4.55E+00	2.13E-12	2.17E-08
Methoxychlor	3.90E-03	1.36E-09	NA		7.77E-10	NA		2.07E-13	NA		
Aroclor-1260	9.80E-01	3.42E-07	2.00E+00	6.85E-07	5.86E-07	2.00E+00	1.17E-06	5.20E-11	2.00E+00	1.04E-10	**1.86E-06**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	3.67E-07	2.90E-02	1.06E-08	4.18E-07	2.90E-02	1.21E-08	1.54E-06	NA		2.28E-08
1,2-Dichlorobenzene	4.02E+01	1.40E-05	NA		1.60E-05	NA		1.76E-04	NA		
1,3-Dichlorobenzene	1.38E+00	4.82E-07	NA		5.50E-07	NA		6.03E-06	NA		
1,4-Dichlorobenzene	1.76E+01	6.15E-06	5.40E-03	3.32E-08	7.01E-06	5.40E-03	3.79E-08	8.73E-05	3.85E-02	3.36E-06	**3.43E-06**
1,4-Dioxane (p-dioxane)	9.12E-01	3.19E-07	2.70E-02	8.60E-09	3.63E-07	2.70E-02	9.81E-09	4.84E-11	2.70E-02	1.31E-12	1.84E-08
2-Methylnaphthalene	4.02E+02	1.40E-04	NA		2.40E-04	NA		4.57E-04	NA		
2-Methylphenol	9.90E-01	3.46E-07	NA		3.94E-07	NA		5.26E-11	NA		
4-Chloro-3-methylphenol	7.20E+00	2.52E-06	NA		2.87E-06	NA		3.82E-10	NA		
4-Methylphenol	3.60E+00	1.26E-06	NA		1.43E-06	NA		1.91E-10	NA		
Acenaphthene	8.32E+00	2.91E-06	NA		4.97E-06	NA		2.41E-06	NA		
Acetophenone	8.73E+00	3.05E-06	NA		3.48E-06	NA		4.64E-10	NA		
Anthracene	1.10E+00	3.84E-07	NA		6.57E-07	NA		8.91E-08	NA		
Benzo(a)anthracene	5.50E-01	1.92E-07	1.20E+00	2.31E-07	3.29E-07	1.20E+00	3.94E-07	2.92E-11	3.85E-01	1.12E-11	6.25E-07
Benzo(a)pyrene	5.00E-01	1.75E-07	1.20E+01	2.10E-06	2.99E-07	1.20E+01	3.59E-06	2.66E-11	3.85E+00	1.02E-10	**5.68E-06**
Benzo(b)fluoranthene	4.20E-01	1.47E-07	1.20E+00	1.76E-07	2.51E-07	1.20E+00	3.01E-07	2.23E-11	3.85E-01	8.59E-12	4.77E-07
Benzo(g,h,i)perylene	4.30E-01	1.50E-07	NA		2.57E-07	NA		2.28E-11	NA		
Benzo(k)fluoranthene	4.30E-01	1.50E-07	1.20E+00	1.80E-07	2.57E-07	1.20E+00	3.08E-07	2.28E-11	3.85E-01	8.79E-12	4.89E-07
Benzyl butyl phthalate	7.60E+00	2.66E-06	1.90E-03	5.05E-09	3.03E-06	1.90E-03	5.75E-09	4.04E-10	NA		1.08E-08
Biphenyl (diphenyl)	7.10E+00	2.48E-06	NA		2.83E-06	NA		3.77E-10	NA		
bis(2-Ethylhexyl)phthalate	8.86E+00	3.10E-06	1.40E-02	4.33E-08	3.53E-06	1.40E-02	4.94E-08	4.71E-10	8.40E-03	3.95E-12	9.28E-08
Caprolactam	9.50E-02	3.32E-08	NA		3.78E-08	NA		5.05E-12	NA		
Carbazole	1.10E+00	3.84E-07	NA		4.38E-07	NA		5.84E-11	NA		
Chrysene	3.50E+00	1.22E-06	1.20E-01	1.47E-07	2.09E-06	1.20E-01	2.51E-07	1.86E-10	3.85E-02	7.16E-12	3.98E-07
Dibenz(a,h)anthracene	1.20E-01	4.19E-08	7.30E+00	3.06E-07	7.17E-08	7.30E+00	5.23E-07	6.37E-12	4.20E+00	2.68E-11	8.30E-07
Dibenzofuran	4.10E+00	1.43E-06	NA		1.63E-06	NA		5.17E-07	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Di-n-butyl phthalate	2.90E+00	1.01E-06	NA		1.16E-06	NA		1.54E-10	NA		
Fluoranthene	5.90E+00	2.06E-06	NA		3.53E-06	NA		3.13E-10	NA		
Fluorene	8.10E+00	2.83E-06	NA		4.84E-06	NA		1.01E-06	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	1.54E-07	1.20E+00	1.85E-07	2.63E-07	1.20E+00	3.16E-07	2.34E-11	3.85E-01	9.00E-12	5.00E-07
Naphthalene	5.10E+01	1.78E-05	1.20E-01	2.14E-06	3.05E-05	1.20E-01	3.66E-06	5.79E-05	1.19E-01	6.90E-06	**1.27E-05**
Pentachlorophenol	6.70E+00	2.34E-06	1.20E-01	2.81E-07	6.67E-06	1.20E-01	8.01E-07	3.56E-10	1.79E-02	6.35E-12	**1.08E-06**
Phenanthrene	1.51E+01	5.28E-06	NA		9.02E-06	NA		8.02E-10	NA		
Pyrene	7.30E+00	2.55E-06	NA		4.36E-06	NA		1.22E-07	NA		
1,1,1-Trichloroethane	2.31E-02	8.07E-09	NA		9.20E-09	NA		7.00E-07	NA		
1,1-Dichloroethane	7.30E+00	2.55E-06	5.70E-03	1.45E-08	2.91E-06	5.70E-03	1.66E-08	2.11E-04	5.70E-03	1.20E-06	**1.23E-06**
1,1-Dichloroethene	5.26E-02	1.84E-08	NA		2.10E-08	NA		2.59E-06	9.10E-02	2.35E-07	2.35E-07
1,2-Dichloroethane	4.33E-02	1.51E-08	9.10E-02	1.38E-09	1.72E-08	9.10E-02	1.57E-09	7.86E-07	9.10E-02	7.15E-08	7.45E-08
Acetone	2.09E-01	7.30E-08	NA		8.33E-08	NA		1.35E-06	NA		
Benzene	1.42E+00	4.96E-07	1.00E-01	4.96E-08	5.66E-07	1.00E-01	5.66E-08	3.52E-05	1.02E-01	3.57E-06	**3.68E-06**
Carbon disulfide	6.61E-03	2.31E-09	NA		2.63E-09	NA		3.97E-07	NA		
Chlorobenzene	6.89E+00	2.41E-06	NA		2.74E-06	NA		7.09E-05	NA		
Chloroethane	1.88E-02	6.57E-09	NA		7.49E-09	NA		1.16E-06	2.90E-03	3.37E-09	3.37E-09
Chloromethane	8.80E-02	3.08E-08	NA		3.51E-08	NA		1.15E-06	NA		
cis-1,2-Dichloroethene	1.34E+02	4.68E-05	NA		5.34E-05	NA		3.18E-03	NA		
Cyclohexane	2.38E+00	8.32E-07	NA		9.48E-07	NA		1.59E-04	NA		
Ethylbenzene	2.52E+01	8.81E-06	1.10E-02	9.69E-08	1.00E-05	1.10E-02	1.10E-07	2.99E-04	8.75E-03	2.62E-06	**2.83E-06**
Isopropylbenzene (cumene)	1.47E+01	5.14E-06	NA		5.86E-06	NA		3.36E-04	NA		
Methyl ethyl ketone	2.81E-01	9.82E-08	NA		1.12E-07	NA		1.19E-06	NA		
Methyl isobutyl ketone	4.19E+00	1.46E-06	NA		1.67E-06	NA		1.37E-05	NA		
Methyl tert-butyl ether	4.00E-03	1.40E-09	1.80E-03	2.52E-12	1.59E-09	1.80E-03	2.87E-12	6.99E-08	9.10E-04	6.36E-11	6.90E-11
Methylcyclohexane	1.62E+01	5.66E-06	NA		6.45E-06	NA		6.55E-04	NA		
Methylene chloride	8.66E-03	3.03E-09	1.40E-02	4.24E-11	3.45E-09	1.40E-02	4.83E-11	2.85E-07	3.50E-03	9.96E-10	1.09E-09
Styrene	1.74E-01	6.08E-08	NA		6.93E-08	NA		1.06E-06	NA		
Tetrachloroethene	5.09E-01	1.78E-07	5.40E-01	9.61E-08	2.03E-07	5.40E-01	1.09E-07	1.63E-05	2.07E-02	3.38E-07	5.43E-07
Toluene	2.88E-03	1.01E-09	NA		1.15E-09	NA		5.93E-08	NA		
trans-1,2-Dichloroethene	5.29E-01	1.85E-07	NA		2.11E-07	NA		1.85E-05	NA		
Trichloroethene	2.63E+00	9.19E-07	5.90E-03	5.42E-09	1.05E-06	5.90E-03	6.18E-09	6.61E-05	7.00E-03	4.63E-07	4.74E-07
Vinyl chloride	8.95E-01	3.13E-07	7.20E-01	2.25E-07	3.57E-07	7.20E-01	2.57E-07	7.03E-05	2.73E-01	1.92E-05	**1.97E-05**
Xylenes, total	1.40E+02	4.89E-05	NA		5.58E-05	NA		1.88E-03	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	3.40E-10	1.50E+03	5.10E-07	1.16E-10	1.50E+03	1.74E-07	5.16E-14	1.50E+03	7.74E-11	6.84E-07
1,2,3,4,6,7,8-HpCDF	1.60E-04	5.59E-11	1.50E+03	8.39E-08	1.91E-11	1.50E+03	2.87E-08	8.50E-15	1.50E+03	1.27E-11	1.13E-07
1,2,3,4,7,8,9-HpCDF	7.93E-06	2.77E-12	1.50E+03	4.16E-09	9.48E-13	1.50E+03	1.42E-09	4.21E-16	1.50E+03	6.32E-13	5.58E-09
1,2,3,4,7,8-HxCDD	1.64E-05	5.73E-12	1.50E+04	8.60E-08	1.96E-12	1.50E+04	2.94E-08	8.71E-16	1.50E+04	1.31E-11	1.15E-07
1,2,3,4,7,8-HxCDF	2.26E-06	7.90E-13	1.50E+04	1.18E-08	2.70E-13	1.50E+04	4.05E-09	1.20E-16	1.50E+04	1.80E-12	1.59E-08
1,2,3,6,7,8-HxCDD	7.35E-05	2.57E-11	1.50E+04	3.85E-07	8.78E-12	1.50E+04	1.32E-07	3.90E-15	1.50E+04	5.86E-11	5.17E-07
1,2,3,6,7,8-HxCDF	1.50E-05	5.24E-12	1.50E+04	7.86E-08	1.79E-12	1.50E+04	2.69E-08	7.97E-16	1.50E+04	1.19E-11	1.06E-07
1,2,3,7,8,9-HxCDD	4.14E-05	1.45E-11	1.50E+04	2.17E-07	4.95E-12	1.50E+04	7.42E-08	2.20E-15	1.50E+04	3.30E-11	2.91E-07
1,2,3,7,8,9-HxCDF	8.75E-06	3.06E-12	1.50E+04	4.59E-08	1.05E-12	1.50E+04	1.57E-08	4.65E-16	1.50E+04	6.97E-12	6.16E-08
1,2,3,7,8-PeCDD	1.53E-05	5.35E-12	1.50E+05	8.02E-07	1.83E-12	1.50E+05	2.74E-07	8.13E-16	1.50E+05	1.22E-10	**1.08E-06**

Risk Calculations												
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
2,3,4,6,7,8-HxCDF	1.51E-05	5.28E-12	1.50E+04	7.92E-08	1.80E-12	1.50E+04	2.71E-08	8.02E-16	1.50E+04	1.20E-11	1.06E-07
2,3,4,7,8-PeCDF	3.66E-05	1.28E-11	7.50E+04	9.59E-07	4.37E-12	7.50E+04	3.28E-07	1.94E-15	7.50E+04	1.46E-10	**1.29E-06**
2,3,7,8-TCDF	4.63E-06	1.62E-12	1.50E+04	2.43E-08	5.53E-13	1.50E+04	8.30E-09	2.46E-16	1.50E+04	3.69E-12	3.26E-08
OCDD	8.20E-03	2.87E-09	1.50E+01	4.30E-08	9.80E-10	1.50E+01	1.47E-08	4.35E-13	1.50E+01	6.53E-12	5.77E-08
OCDF	3.25E-04	1.14E-10	1.50E+01	1.70E-09	3.88E-11	1.50E+01	5.83E-10	1.73E-14	1.50E+01	2.59E-13	2.29E-09
			Total Risk:	3.33E-05		**Total Risk:**	2.52E-05		**Total Risk:**	3.80E-05	**9.65E-05**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-26

Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.25E+04	1.22E-02	1.00E+00	1.22E-02	1.39E-03	1.00E+00	1.39E-03	1.86E-06	1.40E-03	1.33E-03	1.50E-02
Antimony	2.06E+01	2.02E-05	4.00E-04	5.04E-02	2.30E-06	4.00E-04	5.74E-03	3.06E-09	NA		5.61E-02
Arsenic	8.10E+00	7.93E-06	3.00E-04	2.64E-02	2.71E-06	3.00E-04	9.04E-03	1.20E-09	4.29E-06	2.81E-04	3.57E-02
Barium	5.55E+02	5.43E-04	2.00E-01	2.72E-03	6.19E-05	2.00E-01	3.10E-04	8.25E-08	1.43E-04	5.78E-04	3.60E-03
Beryllium	6.04E-01	5.91E-07	2.00E-03	2.95E-04	6.74E-08	2.00E-03	3.37E-05	8.98E-11	2.00E-06	4.49E-05	3.74E-04
Cadmium	1.74E+00	1.70E-06	5.00E-04	3.41E-03	1.94E-08	5.00E-04	3.88E-05	2.59E-10	2.86E-06	9.06E-05	3.53E-03
Chromium	4.95E+02	4.84E-04	NA		5.52E-05	NA		7.36E-08	NA		
Cobalt	7.90E+00	7.73E-06	3.00E-04	2.58E-02	8.81E-07	3.00E-04	2.94E-03	1.17E-09	1.71E-06	6.85E-04	2.94E-02
Copper	1.45E+02	1.42E-04	4.00E-02	3.55E-03	1.62E-05	4.00E-02	4.04E-04	2.16E-08	NA		3.95E-03
Iron	2.34E+04	2.29E-02	7.00E-01	3.27E-02	2.61E-03	7.00E-01	3.73E-03	3.48E-06	NA		3.64E-02
Lead	6.05E+02	5.92E-04	NA		6.75E-05	NA		9.00E-08	NA		
Manganese	8.43E+02	8.25E-04	2.40E-02	3.44E-02	9.40E-05	2.40E-02	3.92E-03	1.25E-07	1.43E-05	8.78E-03	4.71E-02
Nickel	3.70E+01	3.62E-05	2.00E-02	1.81E-03	4.13E-06	2.00E-02	2.06E-04	5.50E-09	2.57E-05	2.14E-04	2.23E-03
Selenium	3.30E+00	3.23E-06	5.00E-03	6.46E-04	3.68E-07	5.00E-03	7.36E-05	4.91E-10	5.71E-03	8.59E-08	7.19E-04

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Silver	7.75E-01	7.58E-07	5.00E-03	1.52E-04	8.64E-08	5.00E-03	1.73E-05	1.15E-10	NA		1.69E-04
Thallium	2.88E+00	2.82E-06	6.60E-05	4.27E-02	3.21E-07	6.60E-05	4.87E-03	4.28E-10	NA		4.76E-02
Vanadium	4.05E+01	3.96E-05	5.00E-03	7.93E-03	4.52E-06	5.00E-03	9.04E-04	6.02E-09	NA		8.83E-03
Zinc	4.41E+02	4.32E-04	3.00E-01	1.44E-03	4.92E-05	3.00E-01	1.64E-04	6.56E-08	NA		1.60E-03
Pesticides/PCBs											
4,4'-DDD	8.40E+00	8.22E-06	NA		4.68E-06	NA		1.25E-09	NA		
4,4'-DDE	5.64E+00	5.52E-06	NA		3.15E-06	NA		8.39E-10	NA		
4,4'-DDT	2.47E-01	2.42E-07	5.00E-04	4.83E-04	1.38E-07	5.00E-04	2.76E-04	3.67E-11	NA		7.59E-04
Aldrin	9.24E-01	9.04E-07	3.00E-05	3.01E-02	5.15E-07	3.00E-05	1.72E-02	1.37E-10	NA		4.73E-02
alpha-BHC	2.60E-02	2.54E-08	5.00E-04	5.09E-05	1.45E-08	5.00E-04	2.90E-05	3.87E-12	NA		7.99E-05
alpha-Chlordane	7.04E-02	6.89E-08	5.00E-04	1.38E-04	3.93E-08	5.00E-04	7.85E-05	1.05E-11	2.00E-04	5.23E-08	2.16E-04
beta-BHC	3.50E-02	3.42E-08	NA		1.95E-08	NA		5.20E-12	NA		
delta-BHC	4.10E-03	4.01E-09	NA		2.29E-09	NA		6.10E-13	NA		
Dieldrin	2.08E+00	2.04E-06	5.00E-05	4.07E-02	1.16E-06	5.00E-05	2.32E-02	3.09E-10	NA		6.39E-02
Endosulfan sulfate	1.60E-03	1.57E-09	6.00E-03	2.61E-07	8.92E-10	6.00E-03	1.49E-07	2.38E-13	NA		4.10E-07
Endrin	4.60E-03	4.50E-09	3.00E-04	1.50E-05	2.57E-09	3.00E-04	8.55E-06	6.84E-13	NA		2.36E-05
Endrin aldehyde	1.10E-03	1.08E-09	3.00E-04	3.59E-06	6.14E-10	3.00E-04	2.05E-06	1.64E-13	NA		5.63E-06
Endrin ketone	1.20E-02	1.17E-08	3.00E-04	3.91E-05	6.69E-09	3.00E-04	2.23E-05	1.78E-12	NA		6.14E-05
gamma-BHC	2.50E-03	2.45E-09	3.00E-04	8.15E-06	1.39E-09	3.00E-04	4.65E-06	3.72E-13	NA		1.28E-05
gamma-Chlordane	8.75E-02	8.56E-08	5.00E-04	1.71E-04	4.88E-08	5.00E-04	9.76E-05	1.30E-11	2.00E-04	6.51E-08	2.69E-04
Heptachlor	8.80E-03	8.61E-09	3.00E-05	2.87E-04	4.91E-09	3.00E-05	1.64E-04	1.31E-12	NA		4.51E-04
Methoxychlor	3.90E-03	3.82E-09	2.00E-05	1.91E-04	2.18E-09	2.00E-05	1.09E-04	5.80E-13	NA		3.00E-04
Aroclor-1260	9.80E-01	9.59E-07	2.00E-05	4.79E-02	1.64E-06	2.00E-05	8.20E-02	1.46E-10	NA		1.30E-01
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	1.03E-06	1.00E-02	1.03E-04	1.17E-06	1.00E-02	1.17E-04	4.32E-06	5.71E-04	7.56E-03	7.78E-03
1,2-Dichlorobenzene	4.02E+01	3.93E-05	9.00E-02	4.37E-04	4.48E-05	9.00E-02	4.98E-04	4.92E-04	5.71E-02	8.60E-03	9.54E-03
1,3-Dichlorobenzene	1.38E+00	1.35E-06	NA		1.54E-06	NA		1.69E-05	NA		
1,4-Dichlorobenzene	1.76E+01	1.72E-05	7.00E-02	2.46E-04	1.96E-05	7.00E-02	2.80E-04	2.44E-04	2.29E-01	1.07E-03	1.60E-03
1,4-Dioxane (p-dioxane)	9.12E-01	8.92E-07	1.00E-01	8.92E-06	1.02E-06	1.00E-01	1.02E-05	1.36E-10	8.57E-01	1.58E-10	1.91E-05
2-Methylnaphthalene	4.02E+02	3.93E-04	4.00E-03	9.83E-02	6.73E-04	4.00E-03	1.68E-01	1.28E-03	NA		2.66E-01
2-Methylphenol	9.90E-01	9.69E-07	5.00E-02	1.94E-05	1.10E-06	5.00E-02	2.21E-05	1.47E-10	1.71E-01	8.59E-10	4.15E-05
4-Chloro-3-methylphenol	7.20E+00	7.05E-06	NA		8.03E-06	NA		1.07E-09	NA		
4-Methylphenol	3.60E+00	3.52E-06	5.00E-03	7.05E-04	4.02E-06	5.00E-03	8.03E-04	5.35E-10	1.71E-01	3.12E-09	1.51E-03
Acenaphthene	8.32E+00	8.14E-06	6.00E-02	1.36E-04	1.39E-05	6.00E-02	2.32E-04	6.74E-06	NA		3.68E-04
Acetophenone	8.73E+00	8.54E-06	1.00E-01	8.54E-05	9.74E-06	1.00E-01	9.74E-05	1.30E-09	NA		1.83E-04
Anthracene	1.10E+00	1.08E-06	3.00E-01	3.59E-06	1.84E-06	3.00E-01	6.14E-06	2.49E-07	NA		9.72E-06
Benzo(a)anthracene	5.50E-01	5.38E-07	NA		9.20E-07	NA		8.18E-11	NA		
Benzo(a)pyrene	5.00E-01	4.89E-07	NA		8.37E-07	NA		7.44E-11	NA		
Benzo(b)fluoranthene	4.20E-01	4.11E-07	NA		7.03E-07	NA		6.25E-11	NA		
Benzo(g,h,i)perylene	4.30E-01	4.21E-07	NA		7.19E-07	NA		6.39E-11	NA		
Benzo(k)fluoranthene	4.30E-01	4.21E-07	NA		7.19E-07	NA		6.39E-11	NA		
Benzyl butyl phthalate	7.60E+00	7.44E-06	2.00E-01	3.72E-05	8.48E-06	2.00E-01	4.24E-05	1.13E-09	NA		7.96E-05

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Biphenyl (diphenyl)	7.10E+00	6.95E-06	5.00E-02	1.39E-04	7.92E-06	5.00E-02	1.58E-04	1.06E-09	NA		2.97E-04
bis(2-Ethylhexyl)phthalate	8.86E+00	8.67E-06	2.00E-02	4.33E-04	9.88E-06	2.00E-02	4.94E-04	1.32E-09	NA		9.28E-04
Caprolactam	9.50E-02	9.30E-08	5.00E-01	1.86E-07	1.06E-07	5.00E-01	2.12E-07	1.41E-11	NA		3.98E-07
Carbazole	1.10E+00	1.08E-06	NA		1.23E-06	NA		1.64E-10	NA		
Chrysene	3.50E+00	3.42E-06	NA		5.86E-06	NA		5.20E-10	NA		
Dibenz(a,h)anthracene	1.20E-01	1.17E-07	NA		2.01E-07	NA		1.78E-11	NA		
Dibenzofuran	4.10E+00	4.01E-06	2.00E-03	2.01E-03	4.57E-06	2.00E-03	2.29E-03	1.45E-06	NA		4.29E-03
Di-n-butyl phthalate	2.90E+00	2.84E-06	1.00E-01	2.84E-05	3.23E-06	1.00E-01	3.23E-05	4.31E-10	NA		6.07E-05
Fluoranthene	5.90E+00	5.77E-06	4.00E-02	1.44E-04	9.87E-06	4.00E-02	2.47E-04	8.77E-10	NA		3.91E-04
Fluorene	8.10E+00	7.93E-06	4.00E-02	1.98E-04	1.36E-05	4.00E-02	3.39E-04	2.82E-06	NA		5.37E-04
Indeno(1,2,3-c,d)pyrene	4.40E-01	4.31E-07	NA		7.36E-07	NA		6.54E-11	NA		
Naphthalene	5.10E+01	4.99E-05	2.00E-02	2.50E-03	8.53E-05	2.00E-02	4.27E-03	1.62E-04	8.57E-04	1.89E-01	1.96E-01
Pentachlorophenol	6.70E+00	6.56E-06	3.00E-02	2.19E-04	1.87E-05	3.00E-02	6.23E-04	9.96E-10	3.00E-02	3.32E-08	8.41E-04
Phenanthrene	1.51E+01	1.48E-05	NA		2.53E-05	NA		2.25E-09	NA		
Pyrene	7.30E+00	7.14E-06	3.00E-02	2.38E-04	1.22E-05	3.00E-02	4.07E-04	3.41E-07	NA		6.45E-04
1,1,1-Trichloroethane	2.31E-02	2.26E-08	2.00E+00	1.13E-08	2.58E-08	2.00E+00	1.29E-08	1.96E-06	1.43E+00	1.37E-06	1.40E-06
1,1-Dichloroethane	7.30E+00	7.14E-06	2.00E-01	3.57E-05	8.14E-06	2.00E-01	4.07E-05	5.90E-04	NA		7.64E-05
1,1-Dichloroethene	5.26E-02	5.15E-08	5.00E-02	1.03E-06	5.87E-08	5.00E-02	1.17E-06	7.24E-06	2.00E-02	3.62E-04	3.64E-04
1,2-Dichloroethane	4.33E-02	4.24E-08	2.00E-02	2.12E-06	4.83E-08	2.00E-02	2.41E-06	2.20E-06	6.86E-01	3.21E-06	7.74E-06
Acetone	2.09E-01	2.05E-07	9.00E-01	2.27E-07	2.33E-07	9.00E-01	2.59E-07	3.78E-06	8.86E+00	4.27E-07	9.13E-07
Benzene	1.42E+00	1.39E-06	4.00E-03	3.47E-04	1.58E-06	4.00E-03	3.96E-04	9.86E-05	8.57E-03	1.15E-02	1.22E-02
Carbon disulfide	6.61E-03	6.47E-09	1.00E-01	6.47E-08	7.37E-09	1.00E-01	7.37E-08	1.11E-06	2.00E-01	5.56E-06	5.70E-06
Chlorobenzene	6.89E+00	6.74E-06	2.00E-02	3.37E-04	7.69E-06	2.00E-02	3.84E-04	1.99E-04	1.43E-02	1.39E-02	1.46E-02
Chloroethane	1.88E-02	1.84E-08	NA		2.10E-08	NA		3.25E-06	2.86E+00	1.14E-06	1.14E-06
Chloromethane	8.80E-02	8.61E-08	NA		9.82E-08	NA		3.21E-06	2.57E-02	1.25E-04	1.25E-04
cis-1,2-Dichloroethene	1.34E+02	1.31E-04	1.00E-02	1.31E-02	1.49E-04	1.00E-02	1.49E-02	8.90E-03	NA		2.81E-02
Cyclohexane	2.38E+00	2.33E-06	NA		2.65E-06	NA		4.45E-04	1.71E+00	2.60E-04	2.60E-04
Ethylbenzene	2.52E+01	2.47E-05	1.00E-01	2.47E-04	2.81E-05	1.00E-01	2.81E-04	8.38E-04	2.86E-01	2.93E-03	3.46E-03
Isopropylbenzene (cumene)	1.47E+01	1.44E-05	1.00E-01	1.44E-04	1.64E-05	1.00E-01	1.64E-04	9.41E-04	1.14E-01	8.23E-03	8.54E-03
Methyl ethyl ketone	2.81E-01	2.75E-07	6.00E-01	4.58E-07	3.13E-07	6.00E-01	5.22E-07	3.32E-06	1.43E+00	2.33E-06	3.31E-06
Methyl isobutyl ketone	4.19E+00	4.10E-06	8.00E-02	5.12E-05	4.67E-06	8.00E-02	5.84E-05	3.83E-05	8.57E-01	4.46E-05	1.54E-04
Methyl tert-butyl ether	4.00E-03	3.91E-09	NA		4.46E-09	NA		1.96E-07	8.57E-01	2.28E-07	2.28E-07
Methylcyclohexane	1.62E+01	1.59E-05	NA		1.81E-05	NA		1.84E-03	8.60E-01	2.13E-03	2.13E-03
Methylene chloride	8.66E-03	8.47E-09	6.00E-02	1.41E-07	9.66E-09	6.00E-02	1.61E-07	7.97E-07	2.86E-01	2.79E-06	3.09E-06
Styrene	1.74E-01	1.70E-07	2.00E-01	8.51E-07	1.94E-07	2.00E-01	9.70E-07	2.98E-06	2.57E-01	1.16E-05	1.34E-05
Tetrachloroethene	5.09E-01	4.98E-07	1.00E-02	4.98E-05	5.68E-07	1.00E-02	5.68E-05	4.58E-05	1.00E-02	4.58E-03	4.68E-03
Toluene	2.88E-03	2.82E-09	8.00E-02	3.52E-08	3.21E-09	8.00E-02	4.02E-08	1.66E-07	8.57E-02	1.94E-06	2.01E-06
trans-1,2-Dichloroethene	5.29E-01	5.18E-07	2.00E-02	2.59E-05	5.90E-07	2.00E-02	2.95E-05	5.18E-05	1.71E-02	3.02E-03	3.08E-03
Trichloroethene	2.63E+00	2.57E-06	3.00E-04	8.58E-03	2.93E-06	3.00E-04	9.78E-03	1.85E-04	1.00E-02	1.85E-02	3.69E-02
Vinyl chloride	8.95E-01	8.76E-07	3.00E-03	2.92E-04	9.98E-07	3.00E-03	3.33E-04	1.97E-04	2.86E-02	6.89E-03	7.51E-03
Xylenes, total	1.40E+02	1.37E-04	2.00E-01	6.85E-04	1.56E-04	2.00E-01	7.81E-04	5.27E-03	2.86E-02	1.84E-01	1.86E-01
Dioxans/Furans											

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
1,2,3,4,6,7,8-HpCDD	9.72E-04	9.51E-10	NA		3.25E-10	NA		1.45E-13	1.14E-08	1.26E-05	1.26E-05
1,2,3,4,6,7,8-HpCDF	1.60E-04	1.57E-10	NA		5.35E-11	NA		2.38E-14	1.14E-08	2.08E-06	2.08E-06
1,2,3,4,7,8,9-HpCDF	7.93E-06	7.76E-12	NA		2.65E-12	NA		1.18E-15	1.14E-08	1.03E-07	1.03E-07
1,2,3,4,7,8-HxCDD	1.64E-05	1.60E-11	NA		5.49E-12	NA		2.44E-15	1.14E-08	2.13E-07	2.13E-07
1,2,3,4,7,8-HxCDF	2.26E-06	2.21E-12	NA		7.56E-13	NA		3.36E-16	1.14E-08	2.94E-08	2.94E-08
1,2,3,6,7,8-HxCDD	7.35E-05	7.19E-11	NA		2.46E-11	NA		1.09E-14	1.14E-08	9.56E-07	9.56E-07
1,2,3,6,7,8-HxCDF	1.50E-05	1.47E-11	NA		5.02E-12	NA		2.23E-15	1.14E-08	1.95E-07	1.95E-07
1,2,3,7,8,9-HxCDD	4.14E-05	4.05E-11	NA		1.39E-11	NA		6.16E-15	1.14E-08	5.39E-07	5.39E-07
1,2,3,7,8,9-HxCDF	8.75E-06	8.56E-12	NA		2.93E-12	NA		1.30E-15	1.14E-08	1.14E-07	1.14E-07
1,2,3,7,8-PeCDD	1.53E-05	1.50E-11	NA		5.12E-12	NA		2.28E-15	1.14E-08	1.99E-07	1.99E-07
2,3,4,6,7,8-HxCDF	1.51E-05	1.48E-11	NA		5.05E-12	NA		2.25E-15	1.14E-08	1.96E-07	1.96E-07
2,3,4,7,8-PeCDF	3.66E-05	3.58E-11	NA		1.22E-11	NA		5.44E-15	1.14E-08	4.76E-07	4.76E-07
2,3,7,8-TCDF	4.63E-06	4.53E-12	NA		1.55E-12	NA		6.89E-16	1.14E-08	6.02E-08	6.02E-08
OCDD	8.20E-03	8.02E-09	NA		2.74E-09	NA		1.22E-12	1.14E-08	1.07E-04	1.07E-04
OCDF	3.25E-04	3.18E-10	NA		1.09E-10	NA		4.83E-14	1.14E-08	4.23E-06	4.23E-06
		Total Risk (Hazard Index):		4.97E-01	Total Risk (Hazard Index):		3.63E-01	Total Risk (Hazard Index):		4.76E-01	**1.34E+00**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 1

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-27
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.25E+04	5.77E-04	NA		7.97E-05	NA		3.49E-05	NA		
Antimony	2.06E+01	9.50E-07	NA		1.31E-07	NA		5.76E-08	NA		
Arsenic	8.10E+00	3.74E-07	1.50E+00	5.60E-07	1.55E-07	1.50E+00	2.32E-07	2.26E-08	1.51E+01	3.41E-07	**1.13E-06**
Barium	5.55E+02	2.56E-05	NA		3.54E-06	NA		1.55E-06	NA		
Beryllium	6.04E-01	2.79E-08	NA		3.85E-09	NA		1.69E-09	8.40E+00	1.42E-08	1.42E-08
Cadmium	1.74E+00	8.03E-08	NA		1.11E-09	NA		4.86E-09	6.30E+00	3.06E-08	3.06E-08
Chromium	4.95E+02	2.28E-05	NA		3.16E-06	NA		1.38E-06	NA		
Cobalt	7.90E+00	3.64E-07	NA		5.04E-08	NA		2.21E-08	3.15E+00	6.96E-08	6.96E-08
Copper	1.45E+02	6.69E-06	NA		9.24E-07	NA		4.05E-07	NA		
Iron	2.34E+04	1.08E-03	NA		1.49E-04	NA		6.54E-05	NA		
Lead	6.05E+02	2.79E-05	NA		3.86E-06	NA		1.69E-06	NA		
Manganese	8.43E+02	3.89E-05	NA		5.37E-06	NA		2.36E-06	NA		
Nickel	3.70E+01	1.71E-06	NA		2.36E-07	NA		1.03E-07	9.10E-01	9.41E-08	9.41E-08
Selenium	3.30E+00	1.52E-07	NA		2.10E-08	NA		9.23E-09	NA		
Silver	7.75E-01	3.57E-08	NA		4.94E-09	NA		2.17E-09	NA		
Thallium	2.88E+00	1.33E-07	NA		1.84E-08	NA		8.05E-09	NA		
Vanadium	4.05E+01	1.87E-06	NA		2.58E-07	NA		1.13E-07	NA		
Zinc	4.41E+02	2.03E-05	NA		2.81E-06	NA		1.23E-06	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	8.40E+00	3.87E-07	2.40E-01	9.30E-08	2.68E-07	2.40E-01	6.43E-08	2.35E-08	2.42E-01	5.67E-09	1.63E-07
4,4'-DDE	5.64E+00	2.60E-07	3.40E-01	8.85E-08	1.80E-07	3.40E-01	6.11E-08	1.58E-08	3.40E-01	5.35E-09	1.55E-07
4,4'-DDT	2.47E-01	1.14E-08	3.40E-01	3.87E-09	7.87E-09	3.40E-01	2.68E-09	6.91E-10	3.40E-01	2.34E-10	6.78E-09
Aldrin	9.24E-01	4.26E-08	1.70E+01	7.25E-07	2.94E-08	1.70E+01	5.01E-07	2.58E-09	1.72E+01	4.43E-08	**1.27E-06**
alpha-BHC	2.60E-02	1.20E-09	6.30E+00	7.56E-09	8.29E-10	6.30E+00	5.22E-09	7.27E-11	6.30E+00	4.58E-10	1.32E-08
alpha-Chlordane	7.04E-02	3.25E-09	1.30E+00	4.22E-09	2.24E-09	1.30E+00	2.92E-09	1.97E-10	3.50E-01	6.89E-11	7.21E-09
beta-BHC	3.50E-02	1.61E-09	1.80E+00	2.91E-09	1.12E-09	1.80E+00	2.01E-09	9.78E-11	1.86E+00	1.82E-10	5.10E-09
delta-BHC	4.10E-03	1.89E-10	NA		1.31E-10	NA		1.15E-11	NA		
Dieldrin	2.08E+00	9.59E-08	1.60E+01	1.54E-06	6.63E-08	1.60E+01	1.06E-06	5.81E-09	1.61E+01	9.36E-08	**2.69E-06**
Endosulfan sulfate	1.60E-03	7.38E-11	NA		5.10E-11	NA		4.47E-12	NA		
Endrin	4.60E-03	2.12E-10	NA		1.47E-10	NA		1.29E-11	NA		
Endrin aldehyde	1.10E-03	5.07E-11	NA		3.51E-11	NA		3.08E-12	NA		
Endrin ketone	1.20E-02	5.54E-10	NA		3.82E-10	NA		3.35E-11	NA		
gamma-BHC	2.50E-03	1.15E-10	1.10E+00	1.27E-10	7.97E-11	1.10E+00	8.76E-11	6.99E-12	1.09E+00	7.58E-12	2.22E-10
gamma-Chlordane	8.75E-02	4.04E-09	1.20E+00	4.84E-09	2.79E-09	1.20E+00	3.35E-09	2.45E-10	3.50E-01	8.56E-11	8.28E-09
Heptachlor	8.80E-03	4.06E-10	4.50E+00	1.83E-09	2.80E-10	4.50E+00	1.26E-09	2.46E-11	4.55E+00	1.12E-10	3.20E-09
Methoxychlor	3.90E-03	1.80E-10	NA		1.24E-10	NA		1.09E-11	NA		
Aroclor-1260	9.80E-01	4.52E-08	2.00E+00	9.04E-08	9.37E-08	2.00E+00	1.87E-07	2.74E-09	2.00E+00	5.48E-09	2.83E-07
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	4.84E-08	2.90E-02	1.40E-09	6.69E-08	2.90E-02	1.94E-09	6.46E-08	NA		3.35E-09
1,2-Dichlorobenzene	4.02E+01	1.85E-06	NA		2.56E-06	NA		7.14E-06	NA		
1,3-Dichlorobenzene	1.38E+00	6.37E-08	NA		8.80E-08	NA		2.45E-07	NA		
1,4-Dichlorobenzene	1.76E+01	8.12E-07	5.40E-03	4.38E-09	1.12E-06	5.40E-03	6.06E-09	3.54E-06	3.85E-02	1.36E-07	1.47E-07
1,4-Dioxane (p-dioxane)	9.12E-01	4.21E-08	2.70E-02	1.14E-09	5.81E-08	2.70E-02	1.57E-09	2.55E-09	2.70E-02	6.87E-11	2.77E-09
2-Methylnaphthalene	4.02E+02	1.85E-05	NA		3.84E-05	NA		1.94E-05	NA		
2-Methylphenol	9.90E-01	4.57E-08	NA		6.31E-08	NA		2.77E-09	NA		
4-Chloro-3-methylphenol	7.20E+00	3.32E-07	NA		4.59E-07	NA		2.01E-08	NA		
4-Methylphenol	3.60E+00	1.66E-07	NA		2.29E-07	NA		1.01E-08	NA		
Acenaphthene	8.32E+00	3.84E-07	NA		7.95E-07	NA		1.20E-07	NA		
Acetophenone	8.73E+00	4.03E-07	NA		5.56E-07	NA		2.44E-08	NA		
Anthracene	1.10E+00	5.07E-08	NA		1.05E-07	NA		6.64E-09	NA		
Benzo(a)anthracene	5.50E-01	2.54E-08	1.20E+00	3.04E-08	5.26E-08	1.20E+00	6.31E-08	1.54E-09	3.85E-01	5.92E-10	9.41E-08
Benzo(a)pyrene	5.00E-01	2.31E-08	1.20E+01	2.77E-07	4.78E-08	1.20E+01	5.74E-07	1.40E-09	3.85E+00	5.38E-09	8.56E-07
Benzo(b)fluoranthene	4.20E-01	1.94E-08	1.20E+00	2.32E-08	4.02E-08	1.20E+00	4.82E-08	1.17E-09	3.85E-01	4.52E-10	7.19E-08
Benzo(g,h,i)perylene	4.30E-01	1.98E-08	NA		4.11E-08	NA		1.20E-09	NA		
Benzo(k)fluoranthene	4.30E-01	1.98E-08	1.20E+00	2.38E-08	4.11E-08	1.20E+00	4.93E-08	1.20E-09	3.85E-01	4.63E-10	7.36E-08
Benzyl butyl phthalate	7.60E+00	3.51E-07	1.90E-03	6.66E-10	4.84E-07	1.90E-03	9.20E-10	2.12E-08	NA		1.59E-09
Biphenyl (diphenyl)	7.10E+00	3.28E-07	NA		4.53E-07	NA		1.98E-08	NA		
bis(2-Ethylhexyl)phthalate	8.86E+00	4.09E-07	1.40E-02	5.72E-09	5.65E-07	1.40E-02	7.91E-09	2.48E-08	8.40E-03	2.08E-10	1.38E-08
Caprolactam	9.50E-02	4.38E-09	NA		6.06E-09	NA		2.66E-10	NA		
Carbazole	1.10E+00	5.07E-08	NA		7.01E-08	NA		3.08E-09	NA		
Chrysene	3.50E+00	1.61E-07	1.20E-01	1.94E-08	3.35E-07	1.20E-01	4.02E-08	9.78E-09	3.85E-02	3.77E-10	5.99E-08
Dibenz(a,h)anthracene	1.20E-01	5.54E-09	7.30E+00	4.04E-08	1.15E-08	7.30E+00	8.38E-08	3.35E-10	4.20E+00	1.41E-09	1.26E-07
Dibenzofuran	4.10E+00	1.89E-07	NA		2.61E-07	NA		3.21E-08	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Di-n-butyl phthalate	2.90E+00	1.34E-07	NA		1.85E-07	NA		8.11E-09	NA		
Fluoranthene	5.90E+00	2.72E-07	NA		5.64E-07	NA		1.65E-08	NA		
Fluorene	8.10E+00	3.74E-07	NA		7.74E-07	NA		6.30E-08	NA		
Indeno(1,2,3-c,d)pyrene	4.40E-01	2.03E-08	1.20E+00	2.44E-08	4.21E-08	1.20E+00	5.05E-08	1.23E-09	3.85E-01	4.74E-10	7.53E-08
Naphthalene	5.10E+01	2.35E-06	1.20E-01	2.82E-07	4.88E-06	1.20E-01	5.85E-07	2.46E-06	1.19E-01	2.93E-07	**1.16E-06**
Pentachlorophenol	6.70E+00	3.09E-07	1.20E-01	3.71E-08	1.07E-06	1.20E-01	1.28E-07	1.87E-08	1.79E-02	3.34E-10	1.66E-07
Phenanthrene	1.51E+01	6.97E-07	NA		1.44E-06	NA		4.22E-08	NA		
Pyrene	7.30E+00	3.37E-07	NA		6.98E-07	NA		2.53E-08	NA		
1,1,1-Trichloroethane	2.31E-02	1.07E-09	NA		1.47E-09	NA		2.80E-08	NA		
1,1-Dichloroethane	7.30E+00	3.37E-07	5.70E-03	1.92E-09	4.65E-07	5.70E-03	2.65E-09	8.45E-06	5.70E-03	4.82E-08	5.27E-08
1,1-Dichloroethene	5.26E-02	2.43E-09	NA		3.35E-09	NA		1.04E-07	9.10E-02	9.43E-09	9.43E-09
1,2-Dichloroethane	4.33E-02	2.00E-09	9.10E-02	1.82E-10	2.76E-09	9.10E-02	2.51E-10	3.16E-08	9.10E-02	2.87E-09	3.31E-09
Acetone	2.09E-01	9.64E-09	NA		1.33E-08	NA		5.46E-08	NA		
Benzene	1.42E+00	6.55E-08	1.00E-01	6.55E-09	9.05E-08	1.00E-01	9.05E-09	1.41E-06	1.02E-01	1.43E-07	1.59E-07
Carbon disulfide	6.61E-03	3.05E-10	NA		4.21E-10	NA		1.59E-08	NA		
Chlorobenzene	6.89E+00	3.18E-07	NA		4.39E-07	NA		2.85E-06	NA		
Chloroethane	1.88E-02	8.67E-10	NA		1.20E-09	NA		4.65E-08	2.90E-03	1.35E-10	1.35E-10
Chloromethane	8.80E-02	4.06E-09	NA		5.61E-09	NA		4.61E-08	NA		
cis-1,2-Dichloroethene	1.34E+02	6.18E-06	NA		8.54E-06	NA		1.28E-04	NA		
Cyclohexane	2.38E+00	1.10E-07	NA		1.52E-07	NA		6.37E-06	NA		
Ethylbenzene	2.52E+01	1.16E-06	1.10E-02	1.28E-08	1.61E-06	1.10E-02	1.77E-08	1.20E-05	8.75E-03	1.05E-07	1.36E-07
Isopropylbenzene (cumene)	1.47E+01	6.78E-07	NA		9.37E-07	NA		1.35E-05	NA		
Methyl ethyl ketone	2.81E-01	1.30E-08	NA		1.79E-08	NA		4.82E-08	NA		
Methyl isobutyl ketone	4.19E+00	1.93E-07	NA		2.67E-07	NA		5.58E-07	NA		
Methyl tert-butyl ether	4.00E-03	1.85E-10	1.80E-03	3.32E-13	2.55E-10	1.80E-03	4.59E-13	2.81E-09	9.10E-04	2.56E-12	3.35E-12
Methylcyclohexane	1.62E+01	7.47E-07	NA		1.03E-06	NA		2.63E-05	NA		
Methylene chloride	8.66E-03	3.99E-10	1.40E-02	5.59E-12	5.52E-10	1.40E-02	7.73E-12	1.14E-08	3.50E-03	3.99E-11	5.33E-11
Styrene	1.74E-01	8.03E-09	NA		1.11E-08	NA		4.30E-08	NA		
Tetrachloroethene	5.09E-01	2.35E-08	5.40E-01	1.27E-08	3.24E-08	5.40E-01	1.75E-08	6.55E-07	2.07E-02	1.35E-08	4.37E-08
Toluene	2.88E-03	1.33E-10	NA		1.84E-10	NA		2.38E-09	NA		
trans-1,2-Dichloroethene	5.29E-01	2.44E-08	NA		3.37E-08	NA		7.42E-07	NA		
Trichloroethene	2.63E+00	1.21E-07	5.90E-03	7.16E-10	1.68E-07	5.90E-03	9.89E-10	2.65E-06	7.00E-03	1.86E-08	2.03E-08
Vinyl chloride	8.95E-01	4.13E-08	7.20E-01	2.97E-08	5.70E-08	7.20E-01	4.11E-08	2.81E-06	2.73E-01	7.68E-07	8.39E-07
Xylenes, total	1.40E+02	6.46E-06	NA		8.92E-06	NA		7.57E-05	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	4.48E-11	1.50E+03	6.73E-08	1.86E-11	1.50E+03	2.79E-08	2.72E-12	1.50E+03	4.08E-09	9.92E-08
1,2,3,4,6,7,8-HpCDF	1.60E-04	7.38E-12	1.50E+03	1.11E-08	3.06E-12	1.50E+03	4.59E-09	4.47E-13	1.50E+03	6.71E-10	1.63E-08
1,2,3,4,7,8,9-HpCDF	7.93E-06	3.66E-13	1.50E+03	5.49E-10	1.52E-13	1.50E+03	2.27E-10	2.22E-14	1.50E+03	3.33E-11	8.09E-10
1,2,3,4,7,8-HxCDD	1.64E-05	7.56E-13	1.50E+04	1.13E-08	3.14E-13	1.50E+04	4.70E-09	4.58E-14	1.50E+04	6.88E-10	1.67E-08
1,2,3,4,7,8-HxCDF	2.26E-06	1.04E-13	1.50E+04	1.56E-09	4.32E-14	1.50E+04	6.48E-10	6.32E-15	1.50E+04	9.48E-11	2.31E-09
1,2,3,6,7,8-HxCDD	7.35E-05	3.39E-12	1.50E+04	5.09E-08	1.41E-12	1.50E+04	2.11E-08	2.05E-13	1.50E+04	3.08E-09	7.50E-08
1,2,3,6,7,8-HxCDF	1.50E-05	6.92E-13	1.50E+04	1.04E-08	2.87E-13	1.50E+04	4.30E-09	4.19E-14	1.50E+04	6.29E-10	1.53E-08
1,2,3,7,8,9-HxCDD	4.14E-05	1.91E-12	1.50E+04	2.86E-08	7.92E-13	1.50E+04	1.19E-08	1.16E-13	1.50E+04	1.74E-09	4.23E-08
1,2,3,7,8,9-HxCDF	8.75E-06	4.04E-13	1.50E+04	6.05E-09	1.67E-13	1.50E+04	2.51E-09	2.45E-14	1.50E+04	3.67E-10	8.93E-09
1,2,3,7,8-PeCDD	1.53E-05	7.06E-13	1.50E+05	1.06E-07	2.93E-13	1.50E+05	4.39E-08	4.28E-14	1.50E+05	6.42E-09	1.56E-07

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
2,3,4,6,7,8-HxCDF	1.51E-05	6.97E-13	1.50E+04	1.04E-08	2.89E-13	1.50E+04	4.33E-09	4.22E-14	1.50E+04	6.33E-10	1.54E-08
2,3,4,7,8-PeCDF	3.66E-05	1.69E-12	7.50E+04	1.27E-07	7.00E-13	7.50E+04	5.25E-08	1.02E-13	7.50E+04	7.67E-09	1.87E-07
2,3,7,8-TCDF	4.63E-06	2.14E-13	1.50E+04	3.20E-09	8.85E-14	1.50E+04	1.33E-09	1.29E-14	1.50E+04	1.94E-10	4.73E-09
OCDD	8.20E-03	3.78E-10	1.50E+01	5.67E-09	1.57E-10	1.50E+01	2.35E-09	2.29E-11	1.50E+01	3.44E-10	8.37E-09
OCDF	3.25E-04	1.50E-11	1.50E+01	2.25E-10	6.21E-12	1.50E+01	9.32E-11	9.09E-13	1.50E+01	1.36E-11	3.32E-10
			Total Risk:	4.39E-06		**Total Risk:**	4.04E-06		**Total Risk:**	2.28E-06	**1.07E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-28
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.25E+04	4.04E-02	1.00E+00	4.04E-02	5.58E-03	1.00E+00	5.58E-03	2.45E-03	1.40E-03	1.75E+00	**1.79E+00**
Antimony	2.06E+01	6.65E-05	4.00E-04	1.66E-01	9.19E-06	4.00E-04	2.30E-02	4.03E-06	NA		**1.89E-01**
Arsenic	8.10E+00	2.62E-05	3.00E-04	8.72E-02	1.08E-05	3.00E-04	3.61E-02	1.59E-06	4.29E-06	3.70E-01	**4.93E-01**
Barium	5.55E+02	1.79E-03	2.00E-01	8.96E-03	2.48E-04	2.00E-01	1.24E-03	1.09E-04	1.43E-04	7.60E-01	**7.70E-01**
Beryllium	6.04E-01	1.95E-06	2.00E-03	9.75E-04	2.69E-07	2.00E-03	1.35E-04	1.18E-07	2.00E-06	5.91E-02	6.02E-02
Cadmium	1.74E+00	5.62E-06	5.00E-04	1.12E-02	7.76E-08	5.00E-04	1.55E-04	3.41E-07	2.86E-06	1.19E-01	**1.31E-01**
Chromium	4.95E+02	1.60E-03	NA		2.21E-04	NA		9.69E-05	NA		
Cobalt	7.90E+00	2.55E-05	3.00E-04	8.50E-02	3.52E-06	3.00E-04	1.17E-02	1.55E-06	1.71E-06	9.02E-01	**9.99E-01**
Copper	1.45E+02	4.68E-04	4.00E-02	1.17E-02	6.47E-05	4.00E-02	1.62E-03	2.84E-05	NA		1.33E-02
Iron	2.34E+04	7.56E-02	7.00E-01	1.08E-01	1.04E-02	7.00E-01	1.49E-02	4.58E-03	NA		**1.23E-01**
Lead	6.05E+02	1.95E-03	NA		2.70E-04	NA		1.18E-04	NA		
Manganese	8.43E+02	2.72E-03	2.40E-02	1.13E-01	3.76E-04	2.40E-02	1.57E-02	1.65E-04	1.43E-05	1.15E+01	**1.17E+01**
Nickel	3.70E+01	1.19E-04	2.00E-02	5.97E-03	1.65E-05	2.00E-02	8.25E-04	7.24E-06	2.57E-05	2.82E-01	**2.88E-01**
Selenium	3.30E+00	1.07E-05	5.00E-03	2.13E-03	1.47E-06	5.00E-03	2.94E-04	6.46E-07	5.71E-03	1.13E-04	2.54E-03
Silver	7.75E-01	2.50E-06	5.00E-03	5.00E-04	3.46E-07	5.00E-03	6.92E-05	1.52E-07	NA		5.70E-04
Thallium	2.88E+00	9.30E-06	6.60E-05	1.41E-01	1.29E-06	6.60E-05	1.95E-02	5.64E-07	NA		**1.60E-01**
Vanadium	4.05E+01	1.31E-04	5.00E-03	2.62E-02	1.81E-05	5.00E-03	3.61E-03	7.93E-06	NA		2.98E-02
Zinc	4.41E+02	1.42E-03	3.00E-01	4.75E-03	1.97E-04	3.00E-01	6.56E-04	8.63E-05	NA		5.40E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	8.40E+00	2.71E-05	NA		1.87E-05	NA		1.64E-06	NA		
4,4'-DDE	5.64E+00	1.82E-05	NA		1.26E-05	NA		1.10E-06	NA		
4,4'-DDT	2.47E-01	7.98E-07	5.00E-04	1.60E-03	5.51E-07	5.00E-04	1.10E-03	4.83E-08	NA		2.70E-03
Aldrin	9.24E-01	2.98E-06	3.00E-05	9.95E-02	2.06E-06	3.00E-05	6.87E-02	1.81E-07	NA		**1.68E-01**
alpha-BHC	2.60E-02	8.40E-08	5.00E-04	1.68E-04	5.80E-08	5.00E-04	1.16E-04	5.09E-09	NA		2.84E-04
alpha-Chlordane	7.04E-02	2.27E-07	5.00E-04	4.55E-04	1.57E-07	5.00E-04	3.14E-04	1.38E-08	2.00E-04	6.89E-05	8.38E-04
beta-BHC	3.50E-02	1.13E-07	NA		7.81E-08	NA		6.85E-09	NA		
delta-BHC	4.10E-03	1.32E-08	NA		9.15E-09	NA		8.02E-10	NA		
Dieldrin	2.08E+00	6.72E-06	5.00E-05	1.34E-01	4.64E-06	5.00E-05	9.28E-02	4.07E-07	NA		**2.27E-01**
Endosulfan sulfate	1.60E-03	5.17E-09	6.00E-03	8.61E-07	3.57E-09	6.00E-03	5.95E-07	3.13E-10	NA		1.46E-06
Endrin	4.60E-03	1.49E-08	3.00E-04	4.95E-05	1.03E-08	3.00E-04	3.42E-05	9.00E-10	NA		8.37E-05
Endrin aldehyde	1.10E-03	3.55E-09	3.00E-04	1.18E-05	2.45E-09	3.00E-04	8.18E-06	2.15E-10	NA		2.00E-05
Endrin ketone	1.20E-02	3.87E-08	3.00E-04	1.29E-04	2.68E-08	3.00E-04	8.92E-05	2.35E-09	NA		2.18E-04
gamma-BHC	2.50E-03	8.07E-09	3.00E-04	2.69E-05	5.58E-09	3.00E-04	1.86E-05	4.89E-10	NA		4.55E-05
gamma-Chlordane	8.75E-02	2.83E-07	5.00E-04	5.65E-04	1.95E-07	5.00E-04	3.90E-04	1.71E-08	2.00E-04	8.56E-05	1.04E-03
Heptachlor	8.80E-03	2.84E-08	3.00E-05	9.47E-04	1.96E-08	3.00E-05	6.54E-04	1.72E-09	NA		1.60E-03
Methoxychlor	3.90E-03	1.26E-08	2.00E-05	6.30E-04	8.70E-09	2.00E-05	4.35E-04	7.63E-10	NA		1.06E-03
Aroclor-1260	9.80E-01	3.16E-06	2.00E-05	1.58E-01	6.56E-06	2.00E-05	3.28E-01	1.92E-07	NA		**4.86E-01**
SVOCs/VOCs											
1,2,4-Trichlorobenzene	1.05E+00	3.39E-06	1.00E-02	3.39E-04	4.68E-06	1.00E-02	4.68E-04	4.53E-06	5.71E-04	7.92E-03	8.73E-03
1,2-Dichlorobenzene	4.02E+01	1.30E-04	9.00E-02	1.44E-03	1.79E-04	9.00E-02	1.99E-03	5.00E-04	5.71E-02	8.74E-03	1.22E-02
1,3-Dichlorobenzene	1.38E+00	4.46E-06	NA		6.16E-06	NA		1.71E-05	NA		
1,4-Dichlorobenzene	1.76E+01	5.68E-05	7.00E-02	8.12E-04	7.85E-05	7.00E-02	1.12E-03	2.48E-04	2.29E-01	1.08E-03	3.02E-03
1,4-Dioxane (p-dioxane)	9.12E-01	2.94E-06	1.00E-01	2.94E-05	4.07E-06	1.00E-01	4.07E-05	1.78E-07	8.57E-01	2.08E-07	7.03E-05
2-Methylnaphthalene	4.02E+02	1.30E-03	4.00E-03	3.25E-01	2.69E-03	4.00E-03	6.73E-01	1.36E-03	NA		**9.97E-01**
2-Methylphenol	9.90E-01	3.20E-06	5.00E-02	6.39E-05	4.42E-06	5.00E-02	8.83E-05	1.94E-07	1.71E-01	1.13E-06	1.53E-04
4-Chloro-3-methylphenol	7.20E+00	2.32E-05	NA		3.21E-05	NA		1.41E-06	NA		
4-Methylphenol	3.60E+00	1.16E-05	5.00E-03	2.32E-03	1.61E-05	5.00E-03	3.21E-03	7.05E-07	1.71E-01	4.11E-06	5.54E-03
Acenaphthene	8.32E+00	2.69E-05	6.00E-02	4.48E-04	5.57E-05	6.00E-02	9.28E-04	8.37E-06	NA		1.38E-03
Acetophenone	8.73E+00	2.82E-05	1.00E-01	2.82E-04	3.90E-05	1.00E-01	3.90E-04	1.71E-06	NA		6.71E-04
Anthracene	1.10E+00	3.55E-06	3.00E-01	1.18E-05	7.36E-06	3.00E-01	2.45E-05	4.64E-07	NA		3.64E-05
Benzo(a)anthracene	5.50E-01	1.78E-06	NA		3.68E-06	NA		1.08E-07	NA		
Benzo(a)pyrene	5.00E-01	1.61E-06	NA		3.35E-06	NA		9.78E-08	NA		
Benzo(b)fluoranthene	4.20E-01	1.36E-06	NA		2.81E-06	NA		8.22E-08	NA		
Benzo(g,h,i)perylene	4.30E-01	1.39E-06	NA		2.88E-06	NA		8.41E-08	NA		
Benzo(k)fluoranthene	4.30E-01	1.39E-06	NA		2.88E-06	NA		8.41E-08	NA		
Benzyl butyl phthalate	7.60E+00	2.45E-05	2.00E-01	1.23E-04	3.39E-05	2.00E-01	1.70E-04	1.49E-06	NA		2.92E-04
Biphenyl (diphenyl)	7.10E+00	2.29E-05	5.00E-02	4.59E-04	3.17E-05	5.00E-02	6.34E-04	1.39E-06	NA		1.09E-03
bis(2-Ethylhexyl)phthalate	8.86E+00	2.86E-05	2.00E-02	1.43E-03	3.95E-05	2.00E-02	1.98E-03	1.73E-06	NA		3.41E-03
Caprolactam	9.50E-02	3.07E-07	5.00E-01	6.14E-07	4.24E-07	5.00E-01	8.48E-07	1.86E-08	NA		1.46E-06
Carbazole	1.10E+00	3.55E-06	NA		4.91E-06	NA		2.15E-07	NA		
Chrysene	3.50E+00	1.13E-05	NA		2.34E-05	NA		6.85E-07	NA		
Dibenz(a,h)anthracene	1.20E-01	3.87E-07	NA		8.03E-07	NA		2.35E-08	NA		
Dibenzofuran	4.10E+00	1.32E-05	2.00E-03	6.62E-03	1.83E-05	2.00E-03	9.15E-03	2.25E-06	NA		1.58E-02
Di-n-butyl phthalate	2.90E+00	9.36E-06	1.00E-01	9.36E-05	1.29E-05	1.00E-01	1.29E-04	5.68E-07	NA		2.23E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Fluoranthene	5.90E+00	1.91E-05	4.00E-02	4.76E-04	3.95E-05	4.00E-02	9.87E-04	1.15E-06	NA		1.46E-03
Fluorene	8.10E+00	2.62E-05	4.00E-02	6.54E-04	5.42E-05	4.00E-02	1.36E-03	4.41E-06	NA		2.01E-03
Indeno(1,2,3-c,d)pyrene	4.40E-01	1.42E-06	NA		2.94E-06	NA		8.61E-08	NA		
Naphthalene	5.10E+01	1.65E-04	2.00E-02	8.23E-03	3.41E-04	2.00E-02	1.71E-02	1.72E-04	8.57E-04	2.01E-01	**2.26E-01**
Pentachlorophenol	6.70E+00	2.16E-05	3.00E-02	7.21E-04	7.47E-05	3.00E-02	2.49E-03	1.31E-06	3.00E-02	4.37E-05	3.26E-03
Phenanthrene	1.51E+01	4.88E-05	NA		1.01E-04	NA		2.95E-06	NA		
Pyrene	7.30E+00	2.36E-05	3.00E-02	7.86E-04	4.89E-05	3.00E-02	1.63E-03	1.77E-06	NA		2.41E-03
1,1,1-Trichloroethane	2.31E-02	7.46E-08	2.00E+00	3.73E-08	1.03E-07	2.00E+00	5.15E-08	1.96E-06	1.43E+00	1.37E-06	1.46E-06
1,1-Dichloroethane	7.30E+00	2.36E-05	2.00E-01	1.18E-04	3.26E-05	2.00E-01	1.63E-04	5.92E-04	NA		2.81E-04
1,1-Dichloroethene	5.26E-02	1.70E-07	5.00E-02	3.40E-06	2.35E-07	5.00E-02	4.69E-06	7.25E-06	2.00E-02	3.63E-04	3.71E-04
1,2-Dichloroethane	4.33E-02	1.40E-07	2.00E-02	6.99E-06	1.93E-07	2.00E-02	9.66E-06	2.21E-06	6.86E-01	3.22E-06	1.99E-05
Acetone	2.09E-01	6.75E-07	9.00E-01	7.50E-07	9.33E-07	9.00E-01	1.04E-06	3.82E-06	8.86E+00	4.31E-07	2.22E-06
Benzene	1.42E+00	4.59E-06	4.00E-03	1.15E-03	6.34E-06	4.00E-03	1.58E-03	9.89E-05	8.57E-03	1.15E-02	1.43E-02
Carbon disulfide	6.61E-03	2.13E-08	1.00E-01	2.13E-07	2.95E-08	1.00E-01	2.95E-07	1.11E-06	2.00E-01	5.57E-06	6.08E-06
Chlorobenzene	6.89E+00	2.22E-05	2.00E-02	1.11E-03	3.07E-05	2.00E-02	1.54E-03	2.00E-04	1.43E-02	1.40E-02	1.66E-02
Chloroethane	1.88E-02	6.07E-08	NA		8.39E-08	NA		3.25E-06	2.86E+00	1.14E-06	1.14E-06
Chloromethane	8.80E-02	2.84E-07	NA		3.93E-07	NA		3.23E-06	2.57E-02	1.26E-04	1.26E-04
cis-1,2-Dichloroethene	1.34E+02	4.33E-04	1.00E-02	4.33E-02	5.98E-04	1.00E-02	5.98E-02	8.93E-03	NA		**1.03E-01**
Cyclohexane	2.38E+00	7.68E-06	NA		1.06E-05	NA		4.46E-04	1.71E+00	2.60E-04	2.60E-04
Ethylbenzene	2.52E+01	8.14E-05	1.00E-01	8.14E-04	1.12E-04	1.00E-01	1.12E-03	8.43E-04	2.86E-01	2.95E-03	4.89E-03
Isopropylbenzene (cumene)	1.47E+01	4.75E-05	1.00E-01	4.75E-04	6.56E-05	1.00E-01	6.56E-04	9.43E-04	1.14E-01	8.25E-03	9.39E-03
Methyl ethyl ketone	2.81E-01	9.07E-07	6.00E-01	1.51E-06	1.25E-06	6.00E-01	2.09E-06	3.38E-06	1.43E+00	2.36E-06	5.97E-06
Methyl isobutyl ketone	4.19E+00	1.35E-05	8.00E-02	1.69E-04	1.87E-05	8.00E-02	2.34E-04	3.91E-05	8.57E-01	4.56E-05	4.48E-04
Methyl tert-butyl ether	4.00E-03	1.29E-08	NA		1.78E-08	NA		1.97E-07	8.57E-01	2.29E-07	2.29E-07
Methylcyclohexane	1.62E+01	5.23E-05	NA		7.23E-05	NA		1.84E-03	8.60E-01	2.14E-03	2.14E-03
Methylene chloride	8.66E-03	2.80E-08	6.00E-02	4.66E-07	3.86E-08	6.00E-02	6.44E-07	7.99E-07	2.86E-01	2.80E-06	3.91E-06
Styrene	1.74E-01	5.62E-07	2.00E-01	2.81E-06	7.76E-07	2.00E-01	3.88E-06	3.01E-06	2.57E-01	1.17E-05	1.84E-05
Tetrachloroethene	5.09E-01	1.64E-06	1.00E-02	1.64E-04	2.27E-06	1.00E-02	2.27E-04	4.59E-05	1.00E-02	4.59E-03	4.98E-03
Toluene	2.88E-03	9.30E-09	8.00E-02	1.16E-07	1.29E-08	8.00E-02	1.61E-07	1.67E-07	8.57E-02	1.95E-06	2.22E-06
trans-1,2-Dichloroethene	5.29E-01	1.71E-06	2.00E-02	8.54E-05	2.36E-06	2.00E-02	1.18E-04	5.19E-05	1.71E-02	3.03E-03	3.23E-03
Trichloroethene	2.63E+00	8.49E-06	3.00E-04	2.83E-02	1.17E-05	3.00E-04	3.91E-02	1.86E-04	1.00E-02	1.86E-02	8.60E-02
Vinyl chloride	8.95E-01	2.89E-06	3.00E-03	9.63E-04	3.99E-06	3.00E-03	1.33E-03	1.97E-04	2.86E-02	6.89E-03	9.19E-03
Xylenes, total	1.40E+02	4.52E-04	2.00E-01	2.26E-03	6.25E-04	2.00E-01	3.12E-03	5.30E-03	2.86E-02	1.85E-01	**1.91E-01**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	9.72E-04	3.14E-09	NA		1.30E-09	NA		1.90E-10	1.14E-08	1.66E-02	1.66E-02
1,2,3,4,6,7,8-HpCDF	1.60E-04	5.17E-10	NA		2.14E-10	NA		3.13E-11	1.14E-08	2.74E-03	2.74E-03
1,2,3,4,7,8,9-HpCDF	7.93E-06	2.56E-11	NA		1.06E-11	NA		1.55E-12	1.14E-08	1.36E-04	1.36E-04
1,2,3,4,7,8-HxCDD	1.64E-05	5.30E-11	NA		2.20E-11	NA		3.21E-12	1.14E-08	2.81E-04	2.81E-04
1,2,3,4,7,8-HxCDF	2.26E-06	7.30E-12	NA		3.03E-12	NA		4.42E-13	1.14E-08	3.87E-05	3.87E-05
1,2,3,6,7,8-HxCDD	7.35E-05	2.37E-10	NA		9.84E-11	NA		1.44E-11	1.14E-08	1.26E-03	1.26E-03
1,2,3,6,7,8-HxCDF	1.50E-05	4.84E-11	NA		2.01E-11	NA		2.94E-12	1.14E-08	2.57E-04	2.57E-04
1,2,3,7,8,9-HxCDD	4.14E-05	1.34E-10	NA		5.54E-11	NA		8.10E-12	1.14E-08	7.09E-04	7.09E-04
1,2,3,7,8,9-HxCDF	8.75E-06	2.83E-11	NA		1.17E-11	NA		1.71E-12	1.14E-08	1.50E-04	1.50E-04
1,2,3,7,8-PeCDD	1.53E-05	4.94E-11	NA		2.05E-11	NA		2.99E-12	1.14E-08	2.62E-04	2.62E-04
2,3,4,6,7,8-HxCDF	1.51E-05	4.88E-11	NA		2.02E-11	NA		2.95E-12	1.14E-08	2.59E-04	2.59E-04
2,3,4,7,8-PeCDF	3.66E-05	1.18E-10	NA		4.90E-11	NA		7.16E-12	1.14E-08	6.27E-04	6.27E-04
2,3,7,8-TCDF	4.63E-06	1.50E-11	NA		6.20E-12	NA		9.06E-13	1.14E-08	7.93E-05	7.93E-05

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
OCDD	8.20E-03	2.65E-08	NA		1.10E-08	NA		1.60E-09	1.14E-08	1.40E-01	**1.40E-01**
OCDF	3.25E-04	1.05E-09	NA		4.35E-10	NA		6.36E-11	1.14E-08	5.57E-03	5.57E-03
		Total Risk (Hazard Index):		1.64E+00	**Total Risk (Hazard Index):**		1.45E+00	**Total Risk (Hazard Index):**		1.64E+01	**2.0E+01**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **20**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-29

Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Former AMCO Chemical Facility

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	**Industrial Worker**					**Future Construction Worker**				
	Reasonable Maximum Exposure									
	Ingestion	**Dermal**	**Inhalation**	**Total**	**% Contribution**	**Ingestion**	**Dermal**	**Inhalation**	**Total**	**% Contribution**
Metals										
Arsenic	**4.2E-06**	**1.5E-06**	6.5E-09	**5.7E-06**	6%	5.6E-07	2.3E-07	3.4E-07	**1.1E-06**	11%
Subtotal Metals	**4.2E-06**	**1.5E-06**	1.0E-08	**5.7E-06**	6%	5.6E-07	2.3E-07	5.5E-07	**1.3E-06**	13%
Pesticides/PCBs										
4,4'-DDD	7.0E-07	4.0E-07	1.1E-10	**1.1E-06**	1.1%	9.3E-08	6.4E-08	5.7E-09	1.6E-07	2%
4,4'-DDE	6.7E-07	3.8E-07	1.0E-10	**1.1E-06**	1.1%	8.8E-08	6.1E-08	5.4E-09	1.5E-07	1%
Aldrin	**5.5E-06**	**3.1E-06**	8.4E-10	**8.6E-06**	9%	7.2E-07	5.0E-07	4.4E-08	**1.3E-06**	12%
Dieldrin	**1.2E-05**	**6.6E-06**	1.8E-09	**1.8E-05**	19%	**1.5E-06**	**1.1E-06**	9.4E-08	**2.7E-06**	25%
Aroclor-1260	6.8E-07	**1.2E-06**	1.0E-10	**1.9E-06**	2%	9.0E-08	1.9E-07	5.5E-09	2.8E-07	3%
Subtotal Pesticides/PCBs	**1.9E-05**	**1.2E-05**	3.0E-09	**3.1E-05**	32%	**2.6E-06**	**1.9E-06**	1.6E-07	**4.6E-06**	43%
SVOCs/VOCs										
1,4-Dichlorobenzene	3.3E-08	3.8E-08	**3.4E-06**	**3.4E-06**	4%	4.4E-09	6.1E-09	1.4E-07	1.5E-07	1%
Benzo(a)pyrene	**2.1E-06**	**3.6E-06**	1.0E-10	**5.7E-06**	6%	2.8E-07	5.7E-07	5.4E-09	8.6E-07	8%
Naphthalene	**2.1E-06**	**3.7E-06**	**6.9E-06**	**1.3E-05**	13%	2.8E-07	5.9E-07	2.9E-07	**1.2E-06**	11%
Pentachlorophenol	2.8E-07	8.0E-07	6.4E-12	**1.1E-06**	1.1%	3.7E-08	1.3E-07	3.3E-10	1.7E-07	2%
1,1-Dichloroethane	1.5E-08	1.7E-08	**1.2E-06**	**1.2E-06**	1.3%	1.9E-09	2.7E-09	4.8E-08	5.3E-08	0.5%
Benzene	5.0E-08	5.7E-08	**3.6E-06**	**3.7E-06**	4%	6.6E-09	9.1E-09	1.4E-07	1.6E-07	1%
Ethylbenzene	9.7E-08	1.1E-07	**2.6E-06**	**2.8E-06**	3%	1.3E-08	1.8E-08	1.1E-07	1.4E-07	1%
Vinyl chloride	2.3E-07	2.6E-07	**1.9E-05**	**2.0E-05**	20%	3.0E-08	4.1E-08	7.7E-07	8.4E-07	8%
Subtotal SVOCs/VOCs	**6.3E-06**	**1.1E-05**	**3.8E-05**	**5.5E-05**	57%	8.4E-07	**1.7E-06**	**1.5E-06**	**4.1E-06**	38%
Dioxans/Furans										
1,2,3,7,8-PeCDD	8.0E-07	2.7E-07	1.2E-10	**1.1E-06**	1.1%	1.1E-07	4.4E-08	6.4E-09	1.6E-07	1%
2,3,4,7,8-PeCDF	9.6E-07	3.3E-07	1.5E-10	**1.3E-06**	1.3%	1.3E-07	5.2E-08	7.7E-09	1.9E-07	2%
Subtotal Dioxans/Furans	**3.3E-06**	**1.1E-06**	5.1E-10	**4.5E-06**	5%	4.4E-07	1.8E-07	2.7E-08	6.5E-07	6%
Total:	**3.3E-05**	**2.5E-05**	**3.8E-05**	**9.65E-05**		**4.4E-06**	**4.0E-06**	**2.3E-06**	**1.07E-05**	

Total Estimated Cancer Risk Across All Exposure Routes:	**1E-04**	**1E-05**

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-30
Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	**Industrial Worker**					**Future Construction Worker**				
	Reasonable Maximum Exposure									
	Ingestion	**Dermal**	**Inhalation**	**Total**	**% Contribution**	**Ingestion**	**Dermal**	**Inhalation**	**Total**	**% Contribution**
Metals										
Aluminum	1.2E-02	1.4E-03	1.3E-03	1.5E-02	1%	4.0E-02	5.6E-03	**1.7E+00**	**1.8E+00**	9%
Antimony	5.0E-02	5.7E-03		5.6E-02	4%	**1.7E-01**	2.3E-02		**1.9E-01**	1%
Arsenic	2.6E-02	9.0E-03	2.8E-04	3.6E-02	3%	8.7E-02	3.6E-02	**3.7E-01**	**4.9E-01**	3%
Barium	2.7E-03	3.1E-04	5.8E-04	3.6E-03	0%	9.0E-03	1.2E-03	**7.6E-01**	**7.7E-01**	4%
Cadmium	3.4E-03	3.9E-05	9.1E-05	3.5E-03	0%	1.1E-02	1.6E-04	**1.2E-01**	**1.3E-01**	1%
Cobalt	2.6E-02	2.9E-03	6.9E-04	2.9E-02	2%	8.5E-02	1.2E-02	**9.0E-01**	**1.0E+00**	5%
Iron	3.3E-02	3.7E-03		3.6E-02	3%	**1.1E-01**	1.5E-02		**1.2E-01**	1%
Manganese	3.4E-02	3.9E-03	8.8E-03	4.7E-02	4%	**1.1E-01**	1.6E-02	**1.2E+01**	**1.2E+01**	60%
Nickel	1.8E-03	2.1E-04	2.1E-04	2.2E-03	0%	6.0E-03	8.3E-04	**2.8E-01**	**2.9E-01**	1%
Thallium	4.3E-02	4.9E-03		4.8E-02	4%	**1.4E-01**	1.9E-02		**1.6E-01**	1%
Subtotal Metals	**2.5E-01**	3.4E-02	1.2E-02	**2.9E-01**	22%	**8.1E-01**	**1.4E-01**	**1.6E+01**	**1.7E+01**	86%
Pesticides/PCBs										
Aldrin	3.0E-02	1.7E-02		4.7E-02	4%	9.9E-02	6.9E-02		**1.7E-01**	1%
Dieldrin	4.1E-02	2.3E-02		6.4E-02	5%	**1.3E-01**	9.3E-02		**2.3E-01**	1%
Subtotal Pesticides/PCBs	**1.2E-01**	**1.2E-01**	1.2E-07	**2.4E-01**	18%	**4.0E-01**	**4.9E-01**	1.5E-04	**8.9E-01**	5%
SVOCs/VOCs										
2-Methylnaphthalene	9.8E-02	**1.7E-01**		**2.7E-01**	20%	**3.2E-01**	**6.7E-01**		**1.0E+00**	5%
Naphthalene	2.5E-03	4.3E-03	**1.9E-01**	**2.0E-01**	15%	8.2E-03	1.7E-02	**2.0E-01**	**2.3E-01**	1%
cis-1,2-Dichloroethene	1.3E-02	1.5E-02		2.8E-02	2%	4.3E-02	6.0E-02		**1.0E-01**	1%
Xylenes, total	6.8E-04	7.8E-04	**1.8E-01**	**1.9E-01**	14%	2.3E-03	3.1E-03	**1.9E-01**	**1.9E-01**	1%
Subtotal SVOCs/VOCs	**1.3E-01**	**2.1E-01**	**4.6E-01**	**8.0E-01**	60%	**4.3E-01**	**8.3E-01**	**4.8E-01**	**1.7E+00**	9%
OCDD			1.1E-04	1.1E-04	0%			**1.4E-01**	**1.4E-01**	1%
Subtotal Dioxans/Furans			1.3E-04	1.3E-04	0%			**1.7E-01**	**1.69E-01**	1%
Total:	**0.5**	**0.4**	**0.5**	**1.3**		**1.6**	**1.5**	**16.4**	**19.5**	

Total Estimated Hazard Index Across All Exposure Routes:	**1**	**20**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-31
Exposure Point Concentrations for Site Risks - Shallow Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	1.35E+04	Maximum Result
Antimony	mg/kg	2.16E+02	Maximum Result
Arsenic	mg/kg	2.00E+01	Maximum Result
Barium	mg/kg	3.80E+03	Maximum Result
Beryllium	mg/kg	9.20E-01	Maximum Result
Cadmium	mg/kg	1.11E+01	Maximum Result
Chromium	mg/kg	1.02E+02	Maximum Result
Cobalt	mg/kg	1.51E+01	Maximum Result
Copper	mg/kg	4.18E+02	Maximum Result
Iron	mg/kg	7.45E+04	Maximum Result
Lead	mg/kg	2.17E+03	Maximum Result
Manganese	mg/kg	1.11E+03	Maximum Result
Nickel	mg/kg	7.21E+01	Maximum Result
Selenium	mg/kg	4.60E+00	Maximum Result
Silver	mg/kg	1.10E+00	Maximum Result
Thallium	mg/kg	4.90E+00	Maximum Result
Vanadium	mg/kg	6.42E+01	Maximum Result
Zinc	mg/kg	8.03E+03	Maximum Result
Pesticides/PCBs			
4,4'-DDD	mg/kg	9.90E-03	Maximum Result
4,4'-DDE	mg/kg	3.50E-03	Maximum Result
4,4'-DDT	mg/kg	9.50E-03	Maximum Result
Endrin	mg/kg	5.50E-03	Maximum Result
Endrin ketone	mg/kg	1.40E-02	Maximum Result
gamma-Chlordane	mg/kg	1.70E-03	Maximum Result
Methoxychlor	mg/kg	9.90E-03	Maximum Result
SVOCs/VOCs			
2-Methylnaphthalene	mg/kg	1.70E-01	Maximum Result
Acenaphthylene	mg/kg	6.90E-01	Maximum Result
Anthracene	mg/kg	8.60E-01	Maximum Result
Benzo(a)anthracene	mg/kg	1.30E+00	Maximum Result
Benzo(a)pyrene	mg/kg	2.60E+00	Maximum Result
Benzo(b)fluoranthene	mg/kg	1.70E+00	Maximum Result
Benzo(g,h,i)perylene	mg/kg	2.30E+00	Maximum Result
Benzo(k)fluoranthene	mg/kg	1.50E+00	Maximum Result
Biphenyl (diphenyl)	mg/kg	1.60E-01	Maximum Result
Chrysene	mg/kg	1.80E+00	Maximum Result
Fluoranthene	mg/kg	3.00E+00	Maximum Result
Fluorene	mg/kg	5.00E-01	Maximum Result
Indeno(1,2,3-c,d)pyrene	mg/kg	2.30E+00	Maximum Result
Naphthalene	mg/kg	1.60E-01	Maximum Result
Phenanthrene	mg/kg	4.40E+00	Maximum Result
Pyrene	mg/kg	4.40E+00	Maximum Result
Acetone	mg/kg	5.00E-02	Maximum Result
cis-1,2-Dichloroethene	mg/kg	2.00E-03	Maximum Result
Methyl ethyl ketone	mg/kg	2.10E-02	Maximum Result

Table 1-31
Exposure Point Concentrations for Site Risks - Shallow Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Methylene chloride	mg/kg	4.00E-03	Maximum Result
Toluene	mg/kg	9.00E-03	Maximum Result
Xylenes, total	mg/kg	5.00E-03	Maximum Result
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/kg	3.51E-05	Maximum Result
1,2,3,4,6,7,8-HpCDF	mg/kg	3.08E-05	Maximum Result
1,2,3,4,7,8,9-HpCDF	mg/kg	2.83E-06	Maximum Result
1,2,3,4,7,8-HxCDD	mg/kg	2.83E-06	Maximum Result
1,2,3,4,7,8-HxCDF	mg/kg	1.74E-05	Maximum Result
1,2,3,6,7,8-HxCDD	mg/kg	5.59E-06	Maximum Result
1,2,3,6,7,8-HxCDF	mg/kg	1.13E-05	Maximum Result
1,2,3,7,8,9-HxCDD	mg/kg	3.75E-06	Maximum Result
1,2,3,7,8,9-HxCDF	mg/kg	3.79E-06	Maximum Result
1,2,3,7,8-PeCDD	mg/kg	3.37E-06	Maximum Result
1,2,3,7,8-PeCDF	mg/kg	3.91E-06	Maximum Result
2,3,4,6,7,8-HxCDF	mg/kg	1.55E-05	Maximum Result
2,3,4,7,8-PeCDF	mg/kg	3.32E-05	Maximum Result
2,3,7,8-TCDD	mg/kg	8.98E-07	Maximum Result
2,3,7,8-TCDF	mg/kg	8.22E-06	Maximum Result
OCDD	mg/kg	3.57E-04	Maximum Result
OCDF	mg/kg	1.88E-05	Maximum Result

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-32
Exposure Point Concentrations for Site Risks - Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	1.30E+04	95% Student's-t UCL
Antimony	mg/kg	2.16E+02	Maximum Result
Arsenic	mg/kg	1.28E+01	95% Student's-t UCL
Barium	mg/kg	3.50E+03	95% Approximate Gamma UCL
Beryllium	mg/kg	6.74E-01	95% Approximate Gamma UCL
Cadmium	mg/kg	1.11E+01	Maximum Result
Chromium	mg/kg	8.01E+01	95% Student's-t UCL
Cobalt	mg/kg	1.19E+01	95% Approximate Gamma UCL
Copper	mg/kg	3.07E+02	95% Student's-t UCL
Iron	mg/kg	5.74E+04	95% Approximate Gamma UCL
Lead	mg/kg	1.45E+03	95% Student's-t UCL
Manganese	mg/kg	8.57E+02	95% Approximate Gamma UCL
Nickel	mg/kg	5.87E+01	95% Student's-t UCL
Selenium	mg/kg	3.53E+00	95% Approximate Gamma UCL
Silver	mg/kg	8.32E-01	95% Student's-t UCL
Thallium	mg/kg	3.81E+00	95% Approximate Gamma UCL
Vanadium	mg/kg	4.95E+01	95% Student's-t UCL
Zinc	mg/kg	8.03E+03	Maximum Result
Pesticides/PCBs			
4,4'-DDD	mg/kg	6.08E-02	95% Approximate Gamma UCL
4,4'-DDE	mg/kg	2.35E-02	95% Chebyshev (Mean, Sd) UCL
4,4'-DDT	mg/kg	8.79E-03	95% Chebyshev (Mean, Sd) UCL
Dieldrin	mg/kg	9.15E-03	95% Chebyshev (Mean, Sd) UCL
Endrin	mg/kg	4.27E-03	95% Approximate Gamma UCL
Endrin ketone	mg/kg	1.32E-02	95% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	mg/kg	1.41E-03	95% Approximate Gamma UCL
Methoxychlor	mg/kg	9.90E-03	Maximum Result
SVOCs/VOCs			
2-Methylnaphthalene	mg/kg	1.91E+00	95% Chebyshev (Mean, Sd) UCL
Acenaphthylene	mg/kg	1.20E+00	Maximum Result
Anthracene	mg/kg	9.40E-01	Maximum Result
Benzo(a)anthracene	mg/kg	4.14E+00	95% Approximate Gamma UCL
Benzo(a)pyrene	mg/kg	8.90E+00	Maximum Result
Benzo(b)fluoranthene	mg/kg	5.60E+00	Maximum Result
Benzo(g,h,i)perylene	mg/kg	9.00E+00	Maximum Result
Benzo(k)fluoranthene	mg/kg	3.40E+00	95% Approximate Gamma UCL
Biphenyl (diphenyl)	mg/kg	1.60E-01	Maximum Result
Chrysene	mg/kg	6.50E+00	Maximum Result
Dibenz(a,h)anthracene	mg/kg	1.02E+00	95% Chebyshev (Mean, Sd) UCL
Fluoranthene	mg/kg	1.20E+01	Maximum Result
Fluorene	mg/kg	4.23E-01	95% Approximate Gamma UCL
Indeno(1,2,3-c,d)pyrene	mg/kg	8.30E+00	Maximum Result
Naphthalene	mg/kg	7.99E-01	95% Chebyshev (Mean, Sd) UCL
Phenanthrene	mg/kg	4.40E+00	Maximum Result
Pyrene	mg/kg	1.60E+01	Maximum Result
Acetone	mg/kg	3.40E-02	95% Student's-t UCL

Table 1-32
Exposure Point Concentrations for Site Risks - Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
cis-1,2-Dichloroethene	mg/kg	2.00E-03	Maximum Result
Methyl ethyl ketone	mg/kg	1.94E-02	95% Chebyshev (Mean, Sd) UCL
Methylene chloride	mg/kg	4.00E-03	Maximum Result
Toluene	mg/kg	7.76E-03	95% Student's-t UCL
Xylenes, total	mg/kg	5.00E-03	Maximum Result
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/kg	3.51E-05	Maximum Result
1,2,3,4,6,7,8-HpCDF	mg/kg	3.08E-05	Maximum Result
1,2,3,4,7,8,9-HpCDF	mg/kg	2.83E-06	Maximum Result
1,2,3,4,7,8-HxCDD	mg/kg	2.83E-06	Maximum Result
1,2,3,4,7,8-HxCDF	mg/kg	1.74E-05	Maximum Result
1,2,3,6,7,8-HxCDD	mg/kg	5.59E-06	Maximum Result
1,2,3,6,7,8-HxCDF	mg/kg	1.13E-05	Maximum Result
1,2,3,7,8,9-HxCDD	mg/kg	3.75E-06	Maximum Result
1,2,3,7,8,9-HxCDF	mg/kg	3.79E-06	Maximum Result
1,2,3,7,8-PeCDD	mg/kg	3.37E-06	Maximum Result
1,2,3,7,8-PeCDF	mg/kg	3.91E-06	Maximum Result
2,3,4,6,7,8-HxCDF	mg/kg	1.55E-05	Maximum Result
2,3,4,7,8-PeCDF	mg/kg	3.32E-05	Maximum Result
2,3,7,8-TCDD	mg/kg	8.98E-07	Maximum Result
2,3,7,8-TCDF	mg/kg	8.22E-06	Maximum Result
OCDD	mg/kg	3.57E-04	Maximum Result
OCDF	mg/kg	1.88E-05	Maximum Result

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-33
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.35E+04	6.34E-03	NA		2.53E-04	NA		9.64E-07	NA		
Antimony	2.16E+02	1.01E-04	NA		4.05E-06	NA		1.54E-08	NA		
Arsenic	2.00E+01	9.39E-06	1.50E+00	1.41E-05	1.12E-06	1.50E+00	1.69E-06	1.43E-09	1.51E+01	2.15E-08	**1.58E-05**
Barium	3.80E+03	1.78E-03	NA		7.12E-05	NA		2.71E-07	NA		
Beryllium	9.20E-01	4.32E-07	NA		1.72E-08	NA		6.57E-11	8.40E+00	5.52E-10	5.52E-10
Cadmium	1.11E+01	5.21E-06	NA		2.08E-08	NA		7.92E-10	6.30E+00	4.99E-09	4.99E-09
Chromium	1.02E+02	4.79E-05	NA		1.91E-06	NA		7.28E-09	NA		
Cobalt	1.51E+01	7.09E-06	NA		2.83E-07	NA		1.08E-09	3.15E+00	3.40E-09	3.40E-09
Copper	4.18E+02	1.96E-04	NA		7.83E-06	NA		2.98E-08	NA		
Iron	7.45E+04	3.50E-02	NA		1.40E-03	NA		5.32E-06	NA		
Lead	2.17E+03	1.02E-03	NA		4.07E-05	NA		1.55E-07	NA		
Manganese	1.11E+03	5.21E-04	NA		2.08E-05	NA		7.92E-08	NA		
Nickel	7.21E+01	3.39E-05	NA		1.35E-06	NA		5.15E-09	9.10E-01	4.68E-09	4.68E-09
Selenium	4.60E+00	2.16E-06	NA		8.62E-08	NA		3.28E-10	NA		
Silver	1.10E+00	5.17E-07	NA		2.06E-08	NA		7.85E-11	NA		
Thallium	4.90E+00	2.30E-06	NA		9.18E-08	NA		3.50E-10	NA		
Vanadium	6.42E+01	3.02E-05	NA		1.20E-06	NA		4.58E-09	NA		
Zinc	8.03E+03	3.77E-03	NA		1.50E-04	NA		5.73E-07	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	9.90E-03	4.65E-09	2.40E-01	1.12E-09	9.28E-10	2.40E-01	2.23E-10	7.07E-13	2.42E-01	1.71E-13	1.34E-09
4,4'-DDE	3.50E-03	1.64E-09	3.40E-01	5.59E-10	3.28E-10	3.40E-01	1.12E-10	2.50E-13	3.40E-01	8.48E-14	6.70E-10
4,4'-DDT	9.50E-03	4.46E-09	3.40E-01	1.52E-09	8.90E-10	3.40E-01	3.03E-10	6.78E-13	3.40E-01	2.30E-13	1.82E-09
Endrin	5.50E-03	2.58E-09	NA		5.15E-10	NA		3.93E-13	NA		
Endrin ketone	1.40E-02	6.58E-09	NA		1.31E-09	NA		9.99E-13	NA		
gamma-Chlordane	1.70E-03	7.98E-10	1.20E+00	9.58E-10	1.59E-10	1.20E+00	1.91E-10	1.21E-13	3.50E-01	4.25E-14	1.15E-09
Methoxychlor	9.90E-03	4.65E-09	NA		9.28E-10	NA		7.07E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	7.98E-08	NA		4.78E-08	NA		1.21E-11	NA		
Acenaphthylene	6.90E-01	3.24E-07	NA		1.94E-07	NA		4.93E-11	NA		
Anthracene	8.60E-01	4.04E-07	NA		2.42E-07	NA		6.14E-11	NA		
Benzo(a)anthracene	1.30E+00	6.11E-07	1.20E+00	7.33E-07	3.65E-07	1.20E+00	4.39E-07	9.28E-11	3.85E-01	3.57E-11	**1.17E-06**
Benzo(a)pyrene	2.60E+00	1.22E-06	1.20E+01	1.47E-05	7.31E-07	1.20E+01	8.77E-06	1.86E-10	3.85E+00	7.14E-10	**2.34E-05**
Benzo(b)fluoranthene	1.70E+00	7.98E-07	1.20E+00	9.58E-07	4.78E-07	1.20E+00	5.73E-07	1.21E-10	3.85E-01	4.67E-11	**1.53E-06**
Benzo(g,h,i)perylene	2.30E+00	1.08E-06	NA		6.47E-07	NA		1.64E-10	NA		
Benzo(k)fluoranthene	1.50E+00	7.05E-07	1.20E+00	8.45E-07	4.22E-07	1.20E+00	5.06E-07	1.07E-10	3.85E-01	4.12E-11	**1.35E-06**
Biphenyl (diphenyl)	1.60E-01	7.51E-08	NA		3.00E-08	NA		1.14E-11	NA		
Chrysene	1.80E+00	8.45E-07	1.20E-01	1.01E-07	5.06E-07	1.20E-01	6.07E-08	1.28E-10	3.85E-02	4.95E-12	1.62E-07
Fluoranthene	3.00E+00	1.41E-06	NA		8.43E-07	NA		2.14E-10	NA		
Fluorene	5.00E-01	2.35E-07	NA		1.41E-07	NA		3.57E-11	NA		
Indeno(1,2,3-c,d)pyrene	2.30E+00	1.08E-06	1.20E+00	1.30E-06	6.47E-07	1.20E+00	7.76E-07	1.64E-10	3.85E-01	6.32E-11	**2.07E-06**
Naphthalene	1.60E-01	7.51E-08	1.20E-01	9.02E-09	4.50E-08	1.20E-01	5.40E-09	1.14E-11	1.19E-01	1.36E-12	1.44E-08
Phenanthrene	4.40E+00	2.07E-06	NA		1.24E-06	NA		3.14E-10	NA		
Pyrene	4.40E+00	2.07E-06	NA		1.24E-06	NA		3.14E-10	NA		
Acetone	5.00E-02	2.35E-08	NA		9.37E-09	NA		3.57E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	9.39E-10	NA		3.75E-10	NA		1.43E-13	NA		
Methyl ethyl ketone	2.10E-02	9.86E-09	NA		3.94E-09	NA		1.50E-12	NA		
Methylene chloride	4.00E-03	1.88E-09	1.40E-02	2.63E-11	7.50E-10	1.40E-02	1.05E-11	2.86E-13	3.50E-03	9.99E-16	3.68E-11
Toluene	9.00E-03	4.23E-09	NA		1.69E-09	NA		6.42E-13	NA		
Xylenes, total	5.00E-03	2.35E-09	NA		9.37E-10	NA		3.57E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.65E-11	1.50E+03	2.47E-08	1.97E-12	1.50E+03	2.96E-09	2.51E-15	1.50E+03	3.76E-12	2.77E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.45E-11	1.50E+03	2.17E-08	1.73E-12	1.50E+03	2.60E-09	2.20E-15	1.50E+03	3.30E-12	2.43E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	1.33E-12	1.50E+03	1.99E-09	1.59E-13	1.50E+03	2.39E-10	2.02E-16	1.50E+03	3.03E-13	2.23E-09
1,2,3,4,7,8-HxCDD	2.83E-06	1.33E-12	1.50E+04	1.99E-08	1.59E-13	1.50E+04	2.39E-09	2.02E-16	1.50E+04	3.03E-12	2.23E-08
1,2,3,4,7,8-HxCDF	1.74E-05	8.17E-12	1.50E+04	1.23E-07	9.78E-13	1.50E+04	1.47E-08	1.24E-15	1.50E+04	1.86E-11	1.37E-07
1,2,3,6,7,8-HxCDD	5.59E-06	2.63E-12	1.50E+04	3.94E-08	3.14E-13	1.50E+04	4.71E-09	3.99E-16	1.50E+04	5.99E-12	4.41E-08
1,2,3,6,7,8-HxCDF	1.13E-05	5.31E-12	1.50E+04	7.96E-08	6.35E-13	1.50E+04	9.53E-09	8.07E-16	1.50E+04	1.21E-11	8.91E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.76E-12	1.50E+04	2.64E-08	2.11E-13	1.50E+04	3.16E-09	2.68E-16	1.50E+04	4.02E-12	2.96E-08
1,2,3,7,8,9-HxCDF	3.79E-06	1.78E-12	1.50E+04	2.67E-08	2.13E-13	1.50E+04	3.20E-09	2.71E-16	1.50E+04	4.06E-12	2.99E-08
1,2,3,7,8-PeCDD	3.37E-06	1.58E-12	1.50E+05	2.37E-07	1.89E-13	1.50E+05	2.84E-08	2.41E-16	1.50E+05	3.61E-11	2.66E-07
1,2,3,7,8-PeCDF	3.91E-06	1.84E-12	7.50E+03	1.38E-08	2.20E-13	7.50E+03	1.65E-09	2.79E-16	7.50E+03	2.09E-12	1.54E-08
2,3,4,6,7,8-HxCDF	1.55E-05	7.28E-12	1.50E+04	1.09E-07	8.71E-13	1.50E+04	1.31E-08	1.11E-15	1.50E+04	1.66E-11	1.22E-07
2,3,4,7,8-PeCDF	3.32E-05	1.56E-11	7.50E+04	1.17E-06	1.87E-12	7.50E+04	1.40E-07	2.37E-15	7.50E+04	1.78E-10	**1.31E-06**
2,3,7,8-TCDD	8.98E-07	4.22E-13	1.50E+05	6.33E-08	5.05E-14	1.50E+05	7.57E-09	6.41E-17	1.50E+05	9.61E-12	7.08E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
2,3,7,8-TCDF	8.22E-06	3.86E-12	1.50E+04	5.79E-08	4.62E-13	1.50E+04	6.93E-09	5.87E-16	1.50E+04	8.80E-12	6.49E-08
OCDD	3.57E-04	1.68E-10	1.50E+01	2.52E-09	2.01E-11	1.50E+01	3.01E-10	2.55E-14	1.50E+01	3.82E-13	2.82E-09
OCDF	1.88E-05	8.83E-12	1.50E+01	1.32E-10	1.06E-12	1.50E+01	1.59E-11	1.34E-15	1.50E+01	2.01E-14	1.48E-10
			Total Risk:	3.47E-05		Total Risk:	1.31E-05		Total Risk:	3.63E-08	**4.78E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : 5E-05

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-34

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.1	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.35E+04	1.85E-02	1.00E+00	1.85E-02	7.38E-04	1.00E+00	7.38E-04	2.81E-06	1.40E-03	2.01E-03	2.12E-02
Antimony	2.16E+02	2.96E-04	4.00E-04	7.40E-01	1.18E-05	4.00E-04	2.95E-02	4.50E-08	NA		**7.69E-01**
Arsenic	2.00E+01	2.74E-05	3.00E-04	9.13E-02	3.28E-06	3.00E-04	1.09E-02	4.16E-09	4.29E-06	9.72E-04	**1.03E-01**
Barium	3.80E+03	5.21E-03	2.00E-01	2.60E-02	2.08E-04	2.00E-01	1.04E-03	7.91E-07	1.43E-04	5.54E-03	3.26E-02
Beryllium	9.20E-01	1.26E-06	2.00E-03	6.30E-04	5.03E-08	2.00E-03	2.51E-05	1.92E-10	2.00E-06	9.58E-05	7.51E-04
Cadmium	1.11E+01	1.52E-05	5.00E-04	3.04E-02	6.07E-08	5.00E-04	1.21E-04	2.31E-09	2.86E-06	8.09E-04	3.13E-02
Chromium	1.02E+02	1.40E-04	NA		5.58E-06	NA		2.12E-08	NA		
Cobalt	1.51E+01	2.07E-05	3.00E-04	6.89E-02	8.25E-07	3.00E-04	2.75E-03	3.14E-09	1.71E-06	1.83E-03	7.35E-02
Copper	4.18E+02	5.73E-04	4.00E-02	1.43E-02	2.28E-05	4.00E-02	5.71E-04	8.70E-08	NA		1.49E-02
Iron	7.45E+04	1.02E-01	7.00E-01	1.46E-01	4.07E-03	7.00E-01	5.82E-03	1.55E-05	NA		**1.52E-01**
Lead	2.17E+03	2.97E-03	NA		1.19E-04	NA		4.52E-07	NA		
Manganese	1.11E+03	1.52E-03	2.40E-02	6.34E-02	6.07E-05	2.40E-02	2.53E-03	2.31E-07	1.43E-05	1.62E-02	8.21E-02
Nickel	7.21E+01	9.88E-05	2.00E-02	4.94E-03	3.94E-06	2.00E-02	1.97E-04	1.50E-08	2.57E-05	5.84E-04	5.72E-03
Selenium	4.60E+00	6.30E-06	5.00E-03	1.26E-03	2.51E-07	5.00E-03	5.03E-05	9.58E-10	5.71E-03	1.68E-07	1.31E-03
Silver	1.10E+00	1.51E-06	5.00E-03	3.01E-04	6.01E-08	5.00E-03	1.20E-05	2.29E-10	NA		3.13E-04
Thallium	4.90E+00	6.71E-06	6.60E-05	1.02E-01	2.68E-07	6.60E-05	4.06E-03	1.02E-09	NA		**1.06E-01**

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Vanadium	6.42E+01	8.79E-05	5.00E-03	1.76E-02	3.51E-06	5.00E-03	7.02E-04	1.34E-08	NA		1.83E-02
Zinc	8.03E+03	1.10E-02	3.00E-01	3.67E-02	4.39E-04	3.00E-01	1.46E-03	1.67E-06	NA		3.81E-02
Pesticides/PCBs											
4,4'-DDD	9.90E-03	1.36E-08	NA		2.71E-09	NA		2.06E-12	NA		
4,4'-DDE	3.50E-03	4.79E-09	NA		9.57E-10	NA		7.29E-13	NA		
4,4'-DDT	9.50E-03	1.30E-08	5.00E-04	2.60E-05	2.60E-09	5.00E-04	5.19E-06	1.98E-12	NA		3.12E-05
Endrin	5.50E-03	7.53E-09	3.00E-04	2.51E-05	1.50E-09	3.00E-04	5.01E-06	1.15E-12	NA		3.01E-05
Endrin ketone	1.40E-02	1.92E-08	3.00E-04	6.39E-05	3.83E-09	3.00E-04	1.28E-05	2.91E-12	NA		7.67E-05
gamma-Chlordane	1.70E-03	2.33E-09	5.00E-04	4.66E-06	4.65E-10	5.00E-04	9.29E-07	3.54E-13	2.00E-04	1.77E-09	5.59E-06
Methoxychlor	9.90E-03	1.36E-08	2.00E-05	6.78E-04	2.71E-09	2.00E-05	1.35E-04	2.06E-12	NA		8.13E-04
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	2.33E-07	4.00E-03	5.82E-05	1.39E-07	4.00E-03	3.48E-05	3.54E-11	NA		9.31E-05
Acenaphthylene	6.90E-01	9.45E-07	NA		5.66E-07	NA		1.44E-10	NA		
Anthracene	8.60E-01	1.18E-06	3.00E-01	3.93E-06	7.05E-07	3.00E-01	2.35E-06	1.79E-10	NA		6.28E-06
Benzo(a)anthracene	1.30E+00	1.78E-06	NA		1.07E-06	NA		2.71E-10	NA		
Benzo(a)pyrene	2.60E+00	3.56E-06	NA		2.13E-06	NA		5.41E-10	NA		
Benzo(b)fluoranthene	1.70E+00	2.33E-06	NA		1.39E-06	NA		3.54E-10	NA		
Benzo(g,h,i)perylene	2.30E+00	3.15E-06	NA		1.89E-06	NA		4.79E-10	NA		
Benzo(k)fluoranthene	1.50E+00	2.05E-06	NA		1.23E-06	NA		3.12E-10	NA		
Biphenyl (diphenyl)	1.60E-01	2.19E-07	5.00E-02	4.38E-06	8.75E-08	5.00E-02	1.75E-06	3.33E-11	NA		6.13E-06
Chrysene	1.80E+00	2.47E-06	NA		1.48E-06	NA		3.75E-10	NA		
Fluoranthene	3.00E+00	4.11E-06	4.00E-02	1.03E-04	2.46E-06	4.00E-02	6.15E-05	6.25E-10	NA		1.64E-04
Fluorene	5.00E-01	6.85E-07	4.00E-02	1.71E-05	4.10E-07	4.00E-02	1.02E-05	1.04E-10	NA		2.74E-05
Indeno(1,2,3-c,d)pyrene	2.30E+00	3.15E-06	NA		1.89E-06	NA		4.79E-10	NA		
Naphthalene	1.60E-01	2.19E-07	2.00E-02	1.10E-05	1.31E-07	2.00E-02	6.56E-06	3.33E-11	8.57E-04	3.89E-08	1.76E-05
Phenanthrene	4.40E+00	6.03E-06	NA		3.61E-06	NA		9.16E-10	NA		
Pyrene	4.40E+00	6.03E-06	3.00E-02	2.01E-04	3.61E-06	3.00E-02	1.20E-04	9.16E-10	NA		3.21E-04
Acetone	5.00E-02	6.85E-08	9.00E-01	7.61E-08	2.73E-08	9.00E-01	3.04E-08	1.04E-11	8.86E+00	1.18E-12	1.06E-07
cis-1,2-Dichloroethene	2.00E-03	2.74E-09	1.00E-02	2.74E-07	1.09E-09	1.00E-02	1.09E-07	4.16E-13	NA		3.83E-07
Methyl ethyl ketone	2.10E-02	2.88E-08	6.00E-01	4.79E-08	1.15E-08	6.00E-01	1.91E-08	4.37E-12	1.43E+00	3.06E-12	6.71E-08
Methylene chloride	4.00E-03	5.48E-09	6.00E-02	9.13E-08	2.19E-09	6.00E-02	3.64E-08	8.33E-13	2.86E-01	2.91E-12	1.28E-07
Toluene	9.00E-03	1.23E-08	8.00E-02	1.54E-07	4.92E-09	8.00E-02	6.15E-08	1.87E-12	8.57E-02	2.19E-11	2.16E-07
Xylenes, total	5.00E-03	6.85E-09	2.00E-01	3.42E-08	2.73E-09	2.00E-01	1.37E-08	1.04E-12	2.86E-02	3.64E-11	4.79E-08
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	4.81E-11	NA		5.76E-12	NA		7.31E-15	1.14E-08	6.39E-07	6.39E-07
1,2,3,4,6,7,8-HpCDF	3.08E-05	4.22E-11	NA		5.05E-12	NA		6.41E-15	1.14E-08	5.61E-07	5.61E-07
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.88E-12	NA		4.64E-13	NA		5.89E-16	1.14E-08	5.16E-08	5.16E-08
1,2,3,4,7,8-HxCDD	2.83E-06	3.88E-12	NA		4.64E-13	NA		5.89E-16	1.14E-08	5.16E-08	5.16E-08
1,2,3,4,7,8-HxCDF	1.74E-05	2.38E-11	NA		2.85E-12	NA		3.62E-15	1.14E-08	3.17E-07	3.17E-07
1,2,3,6,7,8-HxCDD	5.59E-06	7.66E-12	NA		9.17E-13	NA		1.16E-15	1.14E-08	1.02E-07	1.02E-07
1,2,3,6,7,8-HxCDF	1.13E-05	1.55E-11	NA		1.85E-12	NA		2.35E-15	1.14E-08	2.06E-07	2.06E-07
1,2,3,7,8,9-HxCDD	3.75E-06	5.14E-12	NA		6.15E-13	NA		7.81E-16	1.14E-08	6.83E-08	6.83E-08
1,2,3,7,8,9-HxCDF	3.79E-06	5.19E-12	NA		6.21E-13	NA		7.89E-16	1.14E-08	6.90E-08	6.90E-08
1,2,3,7,8-PeCDD	3.37E-06	4.62E-12	NA		5.53E-13	NA		7.02E-16	1.14E-08	6.14E-08	6.14E-08
1,2,3,7,8-PeCDF	3.91E-06	5.36E-12	NA		6.41E-13	NA		8.14E-16	1.14E-08	7.12E-08	7.12E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
2,3,4,6,7,8-HxCDF	1.55E-05	2.12E-11	NA		2.54E-12	NA		3.23E-15	1.14E-08	2.82E-07	2.82E-07
2,3,4,7,8-PeCDF	3.32E-05	4.55E-11	NA		5.44E-12	NA		6.91E-15	1.14E-08	6.05E-07	6.05E-07
2,3,7,8-TCDD	8.98E-07	1.23E-12	NA		1.47E-13	NA		1.87E-16	1.14E-08	1.64E-08	1.64E-08
2,3,7,8-TCDF	8.22E-06	1.13E-11	NA		1.35E-12	NA		1.71E-15	1.14E-08	1.50E-07	1.50E-07
OCDD	3.57E-04	4.89E-10	NA		5.85E-11	NA		7.43E-14	1.14E-08	6.50E-06	6.50E-06
OCDF	1.88E-05	2.58E-11	NA		3.08E-12	NA		3.91E-15	1.14E-08	3.42E-07	3.42E-07
		Total Risk (Hazard Index):		1.36	**Total Risk (Hazard Index):**		0.06	**Total Risk (Hazard Index):**		0.03	**1.45**

Notes:

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-35
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	1.35E+04	1.48E-02	NA		4.29E-04	NA		5.62E-07	NA		
Antimony	2.16E+02	2.37E-04	NA		6.86E-06	NA		8.99E-09	NA		
Arsenic	2.00E+01	2.19E-05	1.50E+00	3.29E-05	1.91E-06	1.50E+00	2.86E-06	8.33E-10	1.51E+01	1.25E-08	**3.57E-05**
Barium	3.80E+03	4.16E-03	NA		1.21E-04	NA		1.58E-07	NA		
Beryllium	9.20E-01	1.01E-06	NA		2.92E-08	NA		3.83E-11	8.40E+00	3.22E-10	3.22E-10
Cadmium	1.11E+01	1.22E-05	NA		3.53E-08	NA		4.62E-10	6.30E+00	2.91E-09	2.91E-09
Chromium	1.02E+02	1.12E-04	NA		3.24E-06	NA		4.25E-09	NA		
Cobalt	1.51E+01	1.65E-05	NA		4.80E-07	NA		6.29E-10	3.15E+00	1.98E-09	1.98E-09
Copper	4.18E+02	4.58E-04	NA		1.33E-05	NA		1.74E-08	NA		
Iron	7.45E+04	8.16E-02	NA		2.37E-03	NA		3.10E-06	NA		
Lead	2.17E+03	2.38E-03	NA		6.90E-05	NA		9.04E-08	NA		
Manganese	1.11E+03	1.22E-03	NA		3.53E-05	NA		4.62E-08	NA		
Nickel	7.21E+01	7.90E-05	NA		2.29E-06	NA		3.00E-09	9.10E-01	2.73E-09	2.73E-09
Selenium	4.60E+00	5.04E-06	NA		1.46E-07	NA		1.92E-10	NA		
Silver	1.10E+00	1.21E-06	NA		3.50E-08	NA		4.58E-11	NA		
Thallium	4.90E+00	5.37E-06	NA		1.56E-07	NA		2.04E-10	NA		
Vanadium	6.42E+01	7.04E-05	NA		2.04E-06	NA		2.67E-09	NA		
Zinc	8.03E+03	8.80E-03	NA		2.55E-04	NA		3.34E-07	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	9.90E-03	1.08E-08	2.40E-01	2.60E-09	1.57E-09	2.40E-01	3.78E-10	4.12E-13	2.42E-01	9.95E-14	2.98E-09
4,4'-DDE	3.50E-03	3.84E-09	3.40E-01	1.30E-09	5.56E-10	3.40E-01	1.89E-10	1.46E-13	3.40E-01	4.95E-14	1.49E-09
4,4'-DDT	9.50E-03	1.04E-08	3.40E-01	3.54E-09	1.51E-09	3.40E-01	5.13E-10	3.96E-13	3.40E-01	1.34E-13	4.05E-09
Endrin	5.50E-03	6.03E-09	NA		8.74E-10	NA		2.29E-13	NA		
Endrin ketone	1.40E-02	1.53E-08	NA		2.22E-09	NA		5.83E-13	NA		
gamma-Chlordane	1.70E-03	1.86E-09	1.20E+00	2.24E-09	2.70E-10	1.20E+00	3.24E-10	7.08E-14	3.50E-01	2.48E-14	2.56E-09
Methoxychlor	9.90E-03	1.08E-08	NA		1.57E-09	NA		4.12E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	1.86E-07	NA		8.10E-08	NA		7.08E-12	NA		
Acenaphthylene	6.90E-01	7.56E-07	NA		3.29E-07	NA		2.87E-11	NA		
Anthracene	8.60E-01	9.42E-07	NA		4.10E-07	NA		3.58E-11	NA		
Benzo(a)anthracene	1.30E+00	1.42E-06	1.20E+00	1.71E-06	6.20E-07	1.20E+00	7.44E-07	5.41E-11	3.85E-01	2.08E-11	**2.45E-06**
Benzo(a)pyrene	2.60E+00	2.85E-06	1.20E+01	3.42E-05	1.24E-06	1.20E+01	1.49E-05	1.08E-10	3.85E+00	4.17E-10	**4.91E-05**
Benzo(b)fluoranthene	1.70E+00	1.86E-06	1.20E+00	2.24E-06	8.10E-07	1.20E+00	9.72E-07	7.08E-11	3.85E-01	2.73E-11	**3.21E-06**
Benzo(g,h,i)perylene	2.30E+00	2.52E-06	NA		1.10E-06	NA		9.58E-11	NA		
Benzo(k)fluoranthene	1.50E+00	1.64E-06	1.20E+00	1.97E-06	7.15E-07	1.20E+00	8.58E-07	6.25E-11	3.85E-01	2.40E-11	**2.83E-06**
Biphenyl (diphenyl)	1.60E-01	1.75E-07	NA		5.08E-08	NA		6.66E-12	NA		
Chrysene	1.80E+00	1.97E-06	1.20E-01	2.37E-07	8.58E-07	1.20E-01	1.03E-07	7.49E-11	3.85E-02	2.89E-12	3.40E-07
Fluoranthene	3.00E+00	3.29E-06	NA		1.43E-06	NA		1.25E-10	NA		
Fluorene	5.00E-01	5.48E-07	NA		2.38E-07	NA		2.08E-11	NA		
Indeno(1,2,3-c,d)pyrene	2.30E+00	2.52E-06	1.20E+00	3.02E-06	1.10E-06	1.20E+00	1.32E-06	9.58E-11	3.85E-01	3.69E-11	**4.34E-06**
Naphthalene	1.60E-01	1.75E-07	1.20E-01	2.10E-08	7.63E-08	1.20E-01	9.15E-09	6.66E-12	1.19E-01	7.93E-13	3.02E-08
Phenanthrene	4.40E+00	4.82E-06	NA		2.10E-06	NA		1.83E-10	NA		
Pyrene	4.40E+00	4.82E-06	NA		2.10E-06	NA		1.83E-10	NA		
Acetone	5.00E-02	5.48E-08	NA		1.59E-08	NA		2.08E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	2.19E-09	NA		6.36E-10	NA		8.33E-14	NA		
Methyl ethyl ketone	2.10E-02	2.30E-08	NA		6.67E-09	NA		8.74E-13	NA		
Methylene chloride	4.00E-03	4.38E-09	1.40E-02	6.14E-11	1.27E-09	1.40E-02	1.78E-11	1.67E-13	3.50E-03	5.83E-16	7.92E-11
Toluene	9.00E-03	9.86E-09	NA		2.86E-09	NA		3.75E-13	NA		
Xylenes, total	5.00E-03	5.48E-09	NA		1.59E-09	NA		2.08E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	3.85E-11	1.50E+03	5.77E-08	3.35E-12	1.50E+03	5.02E-09	1.46E-15	1.50E+03	2.19E-12	6.27E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.38E-11	1.50E+03	5.06E-08	2.94E-12	1.50E+03	4.40E-09	1.28E-15	1.50E+03	1.92E-12	5.50E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.10E-12	1.50E+03	4.65E-09	2.70E-13	1.50E+03	4.05E-10	1.18E-16	1.50E+03	1.77E-13	5.06E-09
1,2,3,4,7,8-HxCDD	2.83E-06	3.10E-12	1.50E+04	4.65E-08	2.70E-13	1.50E+04	4.05E-09	1.18E-16	1.50E+04	1.77E-12	5.06E-08
1,2,3,4,7,8-HxCDF	1.74E-05	1.91E-11	1.50E+04	2.86E-07	1.66E-12	1.50E+04	2.49E-08	7.24E-16	1.50E+04	1.09E-11	3.11E-07
1,2,3,6,7,8-HxCDD	5.59E-06	6.13E-12	1.50E+04	9.19E-08	5.33E-13	1.50E+04	7.99E-09	2.33E-16	1.50E+04	3.49E-12	9.99E-08
1,2,3,6,7,8-HxCDF	1.13E-05	1.24E-11	1.50E+04	1.86E-07	1.08E-12	1.50E+04	1.62E-08	4.71E-16	1.50E+04	7.06E-12	2.02E-07
1,2,3,7,8,9-HxCDD	3.75E-06	4.11E-12	1.50E+04	6.16E-08	3.58E-13	1.50E+04	5.36E-09	1.56E-16	1.50E+04	2.34E-12	6.70E-08
1,2,3,7,8,9-HxCDF	3.79E-06	4.15E-12	1.50E+04	6.23E-08	3.61E-13	1.50E+04	5.42E-09	1.58E-16	1.50E+04	2.37E-12	6.77E-08
1,2,3,7,8-PeCDD	3.37E-06	3.69E-12	1.50E+05	5.54E-07	3.21E-13	1.50E+05	4.82E-08	1.40E-16	1.50E+05	2.10E-11	6.02E-07
1,2,3,7,8-PeCDF	3.91E-06	4.28E-12	7.50E+03	3.21E-08	3.73E-13	7.50E+03	2.80E-09	1.63E-16	7.50E+03	1.22E-12	3.49E-08
2,3,4,6,7,8-HxCDF	1.55E-05	1.70E-11	1.50E+04	2.55E-07	1.48E-12	1.50E+04	2.22E-08	6.45E-16	1.50E+04	9.68E-12	2.77E-07
2,3,4,7,8-PeCDF	3.32E-05	3.64E-11	7.50E+04	2.73E-06	3.17E-12	7.50E+04	2.37E-07	1.38E-15	7.50E+04	1.04E-10	**2.97E-06**
2,3,7,8-TCDD	8.98E-07	9.84E-13	1.50E+05	1.48E-07	8.56E-14	1.50E+05	1.28E-08	3.74E-17	1.50E+05	5.61E-12	1.60E-07
2,3,7,8-TCDF	8.22E-06	9.01E-12	1.50E+04	1.35E-07	7.84E-13	1.50E+04	1.18E-08	3.42E-16	1.50E+04	5.13E-12	1.47E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
OCDD	3.57E-04	3.91E-10	1.50E+01	5.87E-09	3.40E-11	1.50E+01	5.11E-10	1.49E-14	1.50E+01	2.23E-13	6.38E-09
OCDF	1.88E-05	2.06E-11	1.50E+01	3.09E-10	1.79E-12	1.50E+01	2.69E-11	7.83E-16	1.50E+01	1.17E-14	3.36E-10
			Total Risk:	8.10E-05		**Total Risk:**	2.21E-05		**Total Risk:**	2.12E-08	**1.03E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-36
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.35E+04	1.73E-01	1.00E+00	1.73E-01	5.01E-03	1.00E+00	5.01E-03	6.56E-06	1.40E-03	4.68E-03	**1.82E-01**
Antimony	2.16E+02	2.76E-03	4.00E-04	6.90E+00	8.01E-05	4.00E-04	2.00E-01	1.05E-07	NA		**7.10E+00**
Arsenic	2.00E+01	2.56E-04	3.00E-04	8.52E-01	2.22E-05	3.00E-04	7.42E-02	9.72E-09	4.29E-06	2.27E-03	**9.29E-01**
Barium	3.80E+03	4.86E-02	2.00E-01	2.43E-01	1.41E-03	2.00E-01	7.04E-03	1.85E-06	1.43E-04	1.29E-02	**2.63E-01**
Beryllium	9.20E-01	1.18E-05	2.00E-03	5.88E-03	3.41E-07	2.00E-03	1.71E-04	4.47E-10	2.00E-06	2.23E-04	6.28E-03
Cadmium	1.11E+01	1.42E-04	1.10E-05	1.29E+01	4.12E-07	1.10E-05	3.74E-02	5.39E-09	2.86E-06	1.89E-03	**1.29E+01**
Chromium	1.02E+02	1.30E-03	NA		3.78E-05	NA		4.95E-08	NA		
Cobalt	1.51E+01	1.93E-04	3.00E-04	6.44E-01	5.60E-06	3.00E-04	1.87E-02	7.34E-09	1.71E-06	4.28E-03	**6.66E-01**
Copper	4.18E+02	5.34E-03	4.00E-02	1.34E-01	1.55E-04	4.00E-02	3.87E-03	2.03E-07	NA		**1.37E-01**
Iron	7.45E+04	9.53E-01	7.00E-01	1.36E+00	2.76E-02	7.00E-01	3.95E-02	3.62E-05	NA		**1.40E+00**
Lead	2.17E+03	2.77E-02	NA		8.05E-04	NA		1.05E-06	NA		
Manganese	1.11E+03	1.42E-02	2.40E-02	5.91E-01	4.12E-04	2.40E-02	1.71E-02	5.39E-07	1.43E-05	3.77E-02	**6.46E-01**
Nickel	7.21E+01	9.22E-04	1.10E-02	8.38E-02	2.67E-05	1.10E-02	2.43E-03	3.50E-08	2.57E-05	1.36E-03	8.76E-02
Selenium	4.60E+00	5.88E-05	5.00E-03	1.18E-02	1.71E-06	5.00E-03	3.41E-04	2.23E-09	5.71E-03	3.91E-07	1.21E-02
Silver	1.10E+00	1.41E-05	5.00E-03	2.81E-03	4.08E-07	5.00E-03	8.16E-05	5.34E-10	NA		2.89E-03

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Thallium	4.90E+00	6.26E-05	6.60E-05	9.49E-01	1.82E-06	6.60E-05	2.75E-02	2.38E-09	NA		**9.77E-01**
Vanadium	6.42E+01	8.21E-04	5.00E-03	1.64E-01	2.38E-05	5.00E-03	4.76E-03	3.12E-08	NA		**1.69E-01**
Zinc	8.03E+03	1.03E-01	3.00E-01	3.42E-01	2.98E-03	3.00E-01	9.92E-03	3.90E-06	NA		**3.52E-01**
Pesticides/PCBs											
4,4'-DDD	9.90E-03	1.27E-07	NA		1.84E-08	NA		4.81E-12	NA		
4,4'-DDE	3.50E-03	4.47E-08	NA		6.49E-09	NA		1.70E-12	NA		
4,4'-DDT	9.50E-03	1.21E-07	5.00E-04	2.43E-04	1.76E-08	5.00E-04	3.52E-05	4.61E-12	NA		2.78E-04
Endrin	5.50E-03	7.03E-08	3.00E-04	2.34E-04	1.02E-08	3.00E-04	3.40E-05	2.67E-12	NA		2.68E-04
Endrin ketone	1.40E-02	1.79E-07	3.00E-04	5.97E-04	2.60E-08	3.00E-04	8.65E-05	6.80E-12	NA		6.83E-04
gamma-Chlordane	1.70E-03	2.17E-08	3.30E-05	6.59E-04	3.15E-09	3.30E-05	9.55E-05	8.26E-13	2.00E-04	4.13E-09	7.54E-04
Methoxychlor	9.90E-03	1.27E-07	2.00E-05	6.33E-03	1.84E-08	2.00E-05	9.18E-04	4.81E-12	2.00E-05	2.40E-07	7.25E-03
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	2.17E-06	4.00E-03	5.43E-04	9.45E-07	4.00E-03	2.36E-04	8.26E-11	NA		7.80E-04
Acenaphthylene	6.90E-01	8.82E-06	NA		3.84E-06	NA		3.35E-10	NA		
Anthracene	8.60E-01	1.10E-05	3.00E-01	3.67E-05	4.78E-06	3.00E-01	1.59E-05	4.18E-10	NA		5.26E-05
Benzo(a)anthracene	1.30E+00	1.66E-05	NA		7.23E-06	NA		6.31E-10	NA		
Benzo(a)pyrene	2.60E+00	3.32E-05	NA		1.45E-05	NA		1.26E-09	NA		
Benzo(b)fluoranthene	1.70E+00	2.17E-05	NA		9.45E-06	NA		8.26E-10	NA		
Benzo(g,h,i)perylene	2.30E+00	2.94E-05	NA		1.28E-05	NA		1.12E-09	NA		
Benzo(k)fluoranthene	1.50E+00	1.92E-05	NA		8.34E-06	NA		7.29E-10	NA		
Biphenyl (diphenyl)	1.60E-01	2.05E-06	5.00E-02	4.09E-05	5.93E-07	5.00E-02	1.19E-05	7.77E-11	NA		5.28E-05
Chrysene	1.80E+00	2.30E-05	NA		1.00E-05	NA		8.74E-10	NA		
Fluoranthene	3.00E+00	3.84E-05	4.00E-02	9.59E-04	1.67E-05	4.00E-02	4.17E-04	1.46E-09	NA		1.38E-03
Fluorene	5.00E-01	6.39E-06	4.00E-02	1.60E-04	2.78E-06	4.00E-02	6.95E-05	2.43E-10	NA		2.29E-04
Indeno(1,2,3-c,d)pyrene	2.30E+00	2.94E-05	NA		1.28E-05	NA		1.12E-09	NA		
Naphthalene	1.60E-01	2.05E-06	2.00E-02	1.02E-04	8.90E-07	2.00E-02	4.45E-05	7.77E-11	8.57E-04	9.07E-08	1.47E-04
Phenanthrene	4.40E+00	5.63E-05	NA		2.45E-05	NA		2.14E-09	NA		
Pyrene	4.40E+00	5.63E-05	3.00E-02	1.88E-03	2.45E-05	3.00E-02	8.16E-04	2.14E-09	NA		2.69E-03
Acetone	5.00E-02	6.39E-07	9.00E-01	7.10E-07	1.85E-07	9.00E-01	2.06E-07	2.43E-11	8.86E+00	2.74E-12	9.16E-07
cis-1,2-Dichloroethene	2.00E-03	2.56E-08	1.00E-02	2.56E-06	7.42E-09	1.00E-02	7.42E-07	9.72E-13	NA		3.30E-06
Methyl ethyl ketone	2.10E-02	2.68E-07	6.00E-01	4.47E-07	7.79E-08	6.00E-01	1.30E-07	1.02E-11	1.43E+00	7.14E-12	5.77E-07
Methylene chloride	4.00E-03	5.11E-08	6.00E-02	8.52E-07	1.48E-08	6.00E-02	2.47E-07	1.94E-12	2.86E-01	6.80E-12	1.10E-06
Toluene	9.00E-03	1.15E-07	8.00E-02	1.44E-06	3.34E-08	8.00E-02	4.17E-07	4.37E-12	8.57E-02	5.10E-11	1.86E-06
Xylenes, total	5.00E-03	6.39E-08	2.00E-01	3.20E-07	1.85E-08	2.00E-01	9.27E-08	2.43E-12	2.86E-02	8.50E-11	4.12E-07
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	4.49E-10	NA		3.90E-11	NA		1.71E-14	1.14E-08	1.49E-06	1.49E-06
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.94E-10	NA		3.43E-11	NA		1.50E-14	1.14E-08	1.31E-06	1.31E-06
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.62E-11	NA		3.15E-12	NA		1.37E-15	1.14E-08	1.20E-07	1.20E-07
1,2,3,4,7,8-HxCDD	2.83E-06	3.62E-11	NA		3.15E-12	NA		1.37E-15	1.14E-08	1.20E-07	1.20E-07
1,2,3,4,7,8-HxCDF	1.74E-05	2.22E-10	NA		1.94E-11	NA		8.45E-15	1.14E-08	7.40E-07	7.40E-07
1,2,3,6,7,8-HxCDD	5.59E-06	7.15E-11	NA		6.22E-12	NA		2.72E-15	1.14E-08	2.38E-07	2.38E-07
1,2,3,6,7,8-HxCDF	1.13E-05	1.44E-10	NA		1.26E-11	NA		5.49E-15	1.14E-08	4.80E-07	4.80E-07
1,2,3,7,8,9-HxCDD	3.75E-06	4.79E-11	NA		4.17E-12	NA		1.82E-15	1.14E-08	1.59E-07	1.59E-07
1,2,3,7,8,9-HxCDF	3.79E-06	4.85E-11	NA		4.22E-12	NA		1.84E-15	1.14E-08	1.61E-07	1.61E-07
1,2,3,7,8-PeCDD	3.37E-06	4.31E-11	NA		3.75E-12	NA		1.64E-15	1.14E-08	1.43E-07	1.43E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
1,2,3,7,8-PeCDF	3.91E-06	5.00E-11	NA		4.35E-12	NA		1.90E-15	1.14E-08	1.66E-07	1.66E-07
2,3,4,6,7,8-HxCDF	1.55E-05	1.98E-10	NA		1.72E-11	NA		7.53E-15	1.14E-08	6.59E-07	6.59E-07
2,3,4,7,8-PeCDF	3.32E-05	4.24E-10	NA		3.69E-11	NA		1.61E-14	1.14E-08	1.41E-06	1.41E-06
2,3,7,8-TCDD	8.98E-07	1.15E-11	NA		9.99E-13	NA		4.36E-16	1.14E-08	3.82E-08	3.82E-08
2,3,7,8-TCDF	8.22E-06	1.05E-10	NA		9.14E-12	NA		3.99E-15	1.14E-08	3.49E-07	3.49E-07
OCDD	3.57E-04	4.56E-09	NA		3.97E-10	NA		1.73E-13	1.14E-08	1.52E-05	1.52E-05
OCDF	1.88E-05	2.40E-10	NA		2.09E-11	NA		9.13E-15	1.14E-08	7.99E-07	7.99E-07
		Total Risk (Hazard Index):		25	**Total Risk (Hazard Index):**		0.45	**Total Risk (Hazard Index):**		0.07	**25.9**

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **26**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-37
Cancer Risk Results Detailed Summary of Risk Drivers - Shallow Soil - Future Adult/Child Resident - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Adult Resident Ingestion	Adult Resident Dermal	Adult Resident Inhalation	Adult Resident Total	Adult Resident % Contribution	Child Resident Ingestion	Child Resident Dermal	Child Resident Inhalation	Child Resident Total	Child Resident % Contribution
Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates; Future Residential; Reasonable Maximum Exposure										
Metals										
Arsenic	**1.4E-05**	**1.7E-06**	2.1E-08	**1.6E-05**	33%	**3.3E-05**	**2.9E-06**	1.3E-08	**3.6E-05**	35%
Subtotal Metals	**1.4E-05**	**1.7E-06**	3.5E-08	**1.6E-05**	33%	**3.3E-05**	**2.9E-06**	2.0E-08	**3.6E-05**	35%
SVOCs/VOCs										
Benzo(a)anthracene	7.3E-07	4.4E-07	3.6E-11	**1.2E-06**	2.5%	**1.7E-06**	7.4E-07	2.1E-11	**2.5E-06**	2%
Benzo(a)pyrene	**1.5E-05**	**8.8E-06**	7.1E-10	**2.3E-05**	49%	**3.4E-05**	**1.5E-05**	4.2E-10	**4.9E-05**	48%
Benzo(b)fluoranthene	9.6E-07	5.7E-07	4.7E-11	**1.5E-06**	3%	**2.2E-06**	9.7E-07	2.7E-11	**3.2E-06**	3%
Benzo(k)fluoranthene	8.5E-07	5.1E-07	4.1E-11	**1.4E-06**	3%	**2.0E-06**	8.6E-07	2.4E-11	**2.8E-06**	3%
Indeno(1,2,3-c,d)pyrene	**1.3E-06**	7.8E-07	6.3E-11	**2.1E-06**	4.3%	**3.0E-06**	**1.3E-06**	3.7E-11	**4.3E-06**	4%
Subtotal SVOCs/VOCs	**1.9E-05**	**1.1E-05**	9.1E-10	**3.0E-05**	62%	**4.3E-05**	**1.9E-05**	5.3E-10	**6.2E-05**	60%
Dioxans/Furans										
2,3,4,7,8-PeCDF	**1.2E-06**	1.4E-07	1.8E-10	**1.3E-06**	3%	**2.7E-06**	2.4E-07	1.0E-10	**3.0E-06**	3%
Subtotal Dioxans/Furans	**2.0E-06**	2.4E-07	3.1E-10	**2.3E-06**	5%	**4.7E-06**	4.1E-07	1.8E-10	**5.1E-06**	5%
Total:	**3.5E-05**	**1.3E-05**	3.6E-08	**4.8E-05**		**8.1E-05**	**2.2E-05**	2.1E-08	**1.0E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:				**5E-05**					**1E-04**	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**1.2E-04**	**3.5E-05**	**5.8E-08**	**1.51E-04**	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									**2E-04**	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-38
Noncancer Risk Results Detailed Summary of Risk Drivers - Shallow Soil - Future Adult/Child Resident - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.8E-02	7.4E-04	2.0E-03	2.1E-02	1%	**1.7E-01**	5.0E-03	4.7E-03	**1.8E-01**	1%
Antimony	**7.4E-01**	3.0E-02		**7.7E-01**	53%	**6.9E+00**	**2.0E-01**		**7.1E+00**	27%
Arsenic	9.1E-02	1.1E-02	9.7E-04	**1.0E-01**	7%	**8.5E-01**	7.4E-02	2.3E-03	**9.3E-01**	4%
Barium	2.6E-02	1.0E-03	5.5E-03	3.3E-02	2%	**2.4E-01**	7.0E-03	1.3E-02	**2.6E-01**	1%
Cadmium	3.0E-02	1.2E-04	8.1E-04	3.1E-02	2%	**1.3E+01**	3.7E-02	1.9E-03	**1.3E+01**	50%
Cobalt	6.9E-02	2.8E-03	1.8E-03	7.4E-02	5%	**6.4E-01**	1.9E-02	4.3E-03	**6.7E-01**	3%
Copper	1.4E-02	5.7E-04		1.5E-02	1.0%	**1.3E-01**	3.9E-03		**1.4E-01**	0.5%
Iron	**1.5E-01**	5.8E-03		**1.5E-01**	10%	**1.4E+00**	3.9E-02		**1.4E+00**	5%
Manganese	6.3E-02	2.5E-03	1.6E-02	8.2E-02	6%	**5.9E-01**	1.7E-02	3.8E-02	**6.5E-01**	2%
Thallium	**1.0E-01**	4.1E-03		**1.1E-01**	7%	**9.5E-01**	2.8E-02		**9.8E-01**	4%
Vanadium	1.8E-02	7.0E-04		1.8E-02	1%	**1.6E-01**	4.8E-03		**1.7E-01**	1%
Zinc	3.7E-02	1.5E-03		3.8E-02	3%	**3.4E-01**	9.9E-03		**3.5E-01**	1%
Subtotal Metals	**1.4E+00**	6.1E-02	2.8E-02	**1.5E+00**	100%	**2.5E+01**	**4.5E-01**	6.5E-02	**2.6E+01**	100%
Total:	**1.4**	0.1	0.03	**1.5**		**25**	**0.5**	0.1	**25.9**	

Total Estimated Hazard Index Across All Exposure Routes: **1** (Adult Resident) **26** (Child Resident)

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-39
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.35E+04	4.72E-03	NA		5.38E-04	NA		7.17E-07	NA		
Antimony	2.16E+02	7.55E-05	NA		8.60E-06	NA		1.15E-08	NA		
Arsenic	2.00E+01	6.99E-06	1.50E+00	1.05E-05	2.39E-06	1.50E+00	3.59E-06	1.06E-09	1.51E+01	1.60E-08	**1.41E-05**
Barium	3.80E+03	1.33E-03	NA		1.51E-04	NA		2.02E-07	NA		
Beryllium	9.20E-01	3.21E-07	NA		3.67E-08	NA		4.89E-11	8.40E+00	4.10E-10	4.10E-10
Cadmium	1.11E+01	3.88E-06	NA		4.42E-08	NA		5.90E-10	6.30E+00	3.71E-09	3.71E-09
Chromium	1.02E+02	3.56E-05	NA		4.06E-06	NA		5.42E-09	NA		
Cobalt	1.51E+01	5.28E-06	NA		6.02E-07	NA		8.02E-10	3.15E+00	2.53E-09	2.53E-09
Copper	4.18E+02	1.46E-04	NA		1.67E-05	NA		2.22E-08	NA		
Iron	7.45E+04	2.60E-02	NA		2.97E-03	NA		3.96E-06	NA		
Lead	2.17E+03	7.58E-04	NA		8.64E-05	NA		1.15E-07	NA		
Manganese	1.11E+03	3.88E-04	NA		4.42E-05	NA		5.90E-08	NA		
Nickel	7.21E+01	2.52E-05	NA		2.87E-06	NA		3.83E-09	9.10E-01	3.48E-09	3.48E-09
Selenium	4.60E+00	1.61E-06	NA		1.83E-07	NA		2.44E-10	NA		
Silver	1.10E+00	3.84E-07	NA		4.38E-08	NA		5.84E-11	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Thallium	4.90E+00	1.71E-06	NA		1.95E-07	NA		2.60E-10	NA		
Vanadium	6.42E+01	2.24E-05	NA		2.56E-06	NA		3.41E-09	NA		
Zinc	8.03E+03	2.81E-03	NA		3.20E-04	NA		4.26E-07	NA		
Pesticides/PCBs											
4,4'-DDD	9.90E-03	3.46E-09	2.40E-01	8.30E-10	1.97E-09	2.40E-01	4.73E-10	5.26E-13	2.42E-01	1.27E-13	1.30E-09
4,4'-DDE	3.50E-03	1.22E-09	3.40E-01	4.16E-10	6.97E-10	3.40E-01	2.37E-10	1.86E-13	3.40E-01	6.31E-14	6.53E-10
4,4'-DDT	9.50E-03	3.32E-09	3.40E-01	1.13E-09	1.89E-09	3.40E-01	6.43E-10	5.05E-13	3.40E-01	1.71E-13	1.77E-09
Endrin	5.50E-03	1.92E-09	NA		1.10E-09	NA		2.92E-13	NA		
Endrin ketone	1.40E-02	4.89E-09	NA		2.79E-09	NA		7.44E-13	NA		
gamma-Chlordane	1.70E-03	5.94E-10	1.20E+00	7.13E-10	3.39E-10	1.20E+00	4.06E-10	9.03E-14	3.50E-01	3.16E-14	1.12E-09
Methoxychlor	9.90E-03	3.46E-09	NA		1.97E-09	NA		5.26E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	5.94E-08	NA		1.02E-07	NA		9.03E-12	NA		
Acenaphthylene	6.90E-01	2.41E-07	NA		4.12E-07	NA		3.66E-11	NA		
Anthracene	8.60E-01	3.01E-07	NA		5.14E-07	NA		4.57E-11	NA		
Benzo(a)anthracene	1.30E+00	4.54E-07	1.20E+00	5.45E-07	7.77E-07	1.20E+00	9.32E-07	6.90E-11	3.85E-01	2.66E-11	**1.48E-06**
Benzo(a)pyrene	2.60E+00	9.09E-07	1.20E+01	1.09E-05	1.55E-06	1.20E+01	1.86E-05	1.38E-10	3.85E+00	5.32E-10	**2.95E-05**
Benzo(b)fluoranthene	1.70E+00	5.94E-07	1.20E+00	7.13E-07	1.02E-06	1.20E+00	1.22E-06	9.03E-11	3.85E-01	3.48E-11	**1.93E-06**
Benzo(g,h,i)perylene	2.30E+00	8.04E-07	NA		1.37E-06	NA		1.22E-10	NA		
Benzo(k)fluoranthene	1.50E+00	5.24E-07	1.20E+00	6.29E-07	8.96E-07	1.20E+00	1.08E-06	7.97E-11	3.85E-01	3.07E-11	**1.70E-06**
Biphenyl (diphenyl)	1.60E-01	5.59E-08	NA		6.37E-08	NA		8.50E-12	NA		
Chrysene	1.80E+00	6.29E-07	1.20E-01	7.55E-08	1.08E-06	1.20E-01	1.29E-07	9.56E-11	3.85E-02	3.68E-12	2.05E-07
Fluoranthene	3.00E+00	1.05E-06	NA		1.79E-06	NA		1.59E-10	NA		
Fluorene	5.00E-01	1.75E-07	NA		2.99E-07	NA		2.66E-11	NA		
Indeno(1,2,3-c,d)pyrene	2.30E+00	8.04E-07	1.20E+00	9.64E-07	1.37E-06	1.20E+00	1.65E-06	1.22E-10	3.85E-01	4.70E-11	**2.61E-06**
Naphthalene	1.60E-01	5.59E-08	1.20E-01	6.71E-09	9.56E-08	1.20E-01	1.15E-08	8.50E-12	1.19E-01	1.01E-12	1.82E-08
Phenanthrene	4.40E+00	1.54E-06	NA		2.63E-06	NA		2.34E-10	NA		
Pyrene	4.40E+00	1.54E-06	NA		2.63E-06	NA		2.34E-10	NA		
Acetone	5.00E-02	1.75E-08	NA		1.99E-08	NA		2.66E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	6.99E-10	NA		7.97E-10	NA		1.06E-13	NA		
Methyl ethyl ketone	2.10E-02	7.34E-09	NA		8.37E-09	NA		1.12E-12	NA		
Methylene chloride	4.00E-03	1.40E-09	1.40E-02	1.96E-11	1.59E-09	1.40E-02	2.23E-11	2.12E-13	3.50E-03	7.44E-16	4.19E-11
Toluene	9.00E-03	3.15E-09	NA		3.59E-09	NA		4.78E-13	NA		
Xylenes, total	5.00E-03	1.75E-09	NA		1.99E-09	NA		2.66E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.23E-11	1.50E+03	1.84E-08	4.19E-12	1.50E+03	6.29E-09	1.86E-15	1.50E+03	2.80E-12	2.47E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.08E-11	1.50E+03	1.61E-08	3.68E-12	1.50E+03	5.52E-09	1.64E-15	1.50E+03	2.45E-12	2.17E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	9.89E-13	1.50E+03	1.48E-09	3.38E-13	1.50E+03	5.07E-10	1.50E-16	1.50E+03	2.25E-13	1.99E-09
1,2,3,4,7,8-HxCDD	2.83E-06	9.89E-13	1.50E+04	1.48E-08	3.38E-13	1.50E+04	5.07E-09	1.50E-16	1.50E+04	2.25E-12	1.99E-08
1,2,3,4,7,8-HxCDF	1.74E-05	6.08E-12	1.50E+04	9.12E-08	2.08E-12	1.50E+04	3.12E-08	9.24E-16	1.50E+04	1.39E-11	1.22E-07
1,2,3,6,7,8-HxCDD	5.59E-06	1.95E-12	1.50E+04	2.93E-08	6.68E-13	1.50E+04	1.00E-08	2.97E-16	1.50E+04	4.45E-12	3.93E-08
1,2,3,6,7,8-HxCDF	1.13E-05	3.95E-12	1.50E+04	5.92E-08	1.35E-12	1.50E+04	2.03E-08	6.00E-16	1.50E+04	9.00E-12	7.95E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.31E-12	1.50E+04	1.97E-08	4.48E-13	1.50E+04	6.72E-09	1.99E-16	1.50E+04	2.99E-12	2.64E-08
1,2,3,7,8,9-HxCDF	3.79E-06	1.32E-12	1.50E+04	1.99E-08	4.53E-13	1.50E+04	6.79E-09	2.01E-16	1.50E+04	3.02E-12	2.67E-08

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
1,2,3,7,8-PeCDD	3.37E-06	1.18E-12	1.50E+05	1.77E-07	4.03E-13	1.50E+05	6.04E-08	1.79E-16	1.50E+05	2.68E-11	2.37E-07
1,2,3,7,8-PeCDF	3.91E-06	1.37E-12	7.50E+03	1.02E-08	4.67E-13	7.50E+03	3.50E-09	2.08E-16	7.50E+03	1.56E-12	1.38E-08
2,3,4,6,7,8-HxCDF	1.55E-05	5.42E-12	1.50E+04	8.12E-08	1.85E-12	1.50E+04	2.78E-08	8.23E-16	1.50E+04	1.23E-11	1.09E-07
2,3,4,7,8-PeCDF	3.32E-05	1.16E-11	7.50E+04	8.70E-07	3.97E-12	7.50E+04	2.98E-07	1.76E-15	7.50E+04	1.32E-10	**1.17E-06**
2,3,7,8-TCDD	8.98E-07	3.14E-13	1.50E+05	4.71E-08	1.07E-13	1.50E+05	1.61E-08	4.77E-17	1.50E+05	7.15E-12	6.32E-08
2,3,7,8-TCDF	8.22E-06	2.87E-12	1.50E+04	4.31E-08	9.82E-13	1.50E+04	1.47E-08	4.37E-16	1.50E+04	6.55E-12	5.78E-08
OCDD	3.57E-04	1.25E-10	1.50E+01	1.87E-09	4.27E-11	1.50E+01	6.40E-10	1.90E-14	1.50E+01	2.84E-13	2.51E-09
OCDF	1.88E-05	6.57E-12	1.50E+01	9.85E-11	2.25E-12	1.50E+01	3.37E-11	9.98E-16	1.50E+01	1.50E-14	1.32E-10
			Total Risk:	2.58E-05		Total Risk:	2.78E-05		Total Risk:	2.70E-08	**5.36E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : 5E-05

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-40
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.35E+04	1.32E-02	1.00E+00	1.32E-02	1.51E-03	1.00E+00	1.51E-03	2.01E-06	1.40E-03	1.43E-03	1.61E-02
Antimony	2.16E+02	2.11E-04	4.00E-04	5.28E-01	2.41E-05	4.00E-04	6.02E-02	3.21E-08	NA		5.89E-01
Arsenic	2.00E+01	1.96E-05	3.00E-04	6.52E-02	6.69E-06	3.00E-04	2.23E-02	2.97E-09	4.29E-06	6.94E-04	8.82E-02
Barium	3.80E+03	3.72E-03	2.00E-01	1.86E-02	4.24E-04	2.00E-01	2.12E-03	5.65E-07	1.43E-04	3.96E-03	2.47E-02
Beryllium	9.20E-01	9.00E-07	2.00E-03	4.50E-04	1.03E-07	2.00E-03	5.13E-05	1.37E-10	2.00E-06	6.84E-05	5.70E-04
Cadmium	1.11E+01	1.09E-05	5.00E-04	2.17E-02	1.24E-07	5.00E-04	2.48E-04	1.65E-09	2.86E-06	5.78E-04	2.25E-02
Chromium	1.02E+02	9.98E-05	NA		1.14E-05	NA		1.52E-08	NA		
Cobalt	1.51E+01	1.48E-05	3.00E-04	4.92E-02	1.68E-06	3.00E-04	5.61E-03	2.25E-09	1.71E-06	1.31E-03	5.62E-02
Copper	4.18E+02	4.09E-04	4.00E-02	1.02E-02	4.66E-05	4.00E-02	1.17E-03	6.22E-08	NA		1.14E-02
Iron	7.45E+04	7.29E-02	7.00E-01	1.04E-01	8.31E-03	7.00E-01	1.19E-02	1.11E-05	NA		1.16E-01
Lead	2.17E+03	2.12E-03	NA		2.42E-04	NA		3.23E-07	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Manganese	1.11E+03	1.09E-03	2.40E-02	4.53E-02	1.24E-04	2.40E-02	5.16E-03	1.65E-07	1.43E-05	1.16E-02	6.20E-02
Nickel	7.21E+01	7.05E-05	2.00E-02	3.53E-03	8.04E-06	2.00E-02	4.02E-04	1.07E-08	2.57E-05	4.17E-04	4.35E-03
Selenium	4.60E+00	4.50E-06	5.00E-03	9.00E-04	5.13E-07	5.00E-03	1.03E-04	6.84E-10	5.71E-03	1.20E-07	1.00E-03
Silver	1.10E+00	1.08E-06	5.00E-03	2.15E-04	1.23E-07	5.00E-03	2.45E-05	1.64E-10	NA		2.40E-04
Thallium	4.90E+00	4.79E-06	6.60E-05	7.26E-02	5.47E-07	6.60E-05	8.28E-03	7.29E-10	NA		8.09E-02
Vanadium	6.42E+01	6.28E-05	5.00E-03	1.26E-02	7.16E-06	5.00E-03	1.43E-03	9.55E-09	NA		1.40E-02
Zinc	8.03E+03	7.86E-03	3.00E-01	2.62E-02	8.96E-04	3.00E-01	2.99E-03	1.19E-06	NA		2.92E-02
Pesticides/PCBs											
4,4'-DDD	9.90E-03	9.69E-09	NA		5.52E-09	NA		1.47E-12	NA		
4,4'-DDE	3.50E-03	3.42E-09	NA		1.95E-09	NA		5.20E-13	NA		
4,4'-DDT	9.50E-03	9.30E-09	5.00E-04	1.86E-05	5.30E-09	5.00E-04	1.06E-05	1.41E-12	NA		2.92E-05
Endrin	5.50E-03	5.38E-09	3.00E-04	1.79E-05	3.07E-09	3.00E-04	1.02E-05	8.18E-13	NA		2.82E-05
Endrin ketone	1.40E-02	1.37E-08	3.00E-04	4.57E-05	7.81E-09	3.00E-04	2.60E-05	2.08E-12	NA		7.17E-05
gamma-Chlordane	1.70E-03	1.66E-09	5.00E-04	3.33E-06	9.48E-10	5.00E-04	1.90E-06	2.53E-13	2.00E-04	1.26E-09	5.22E-06
Methoxychlor	9.90E-03	9.69E-09	2.00E-05	4.84E-04	5.52E-09	2.00E-05	2.76E-04	1.47E-12	NA		7.60E-04
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	1.66E-07	4.00E-03	4.16E-05	2.84E-07	4.00E-03	7.11E-05	2.53E-11	NA		1.13E-04
Acenaphthylene	6.90E-01	6.75E-07	NA		1.15E-06	NA		1.03E-10	NA		
Anthracene	8.60E-01	8.41E-07	3.00E-01	2.80E-06	1.44E-06	3.00E-01	4.80E-06	1.28E-10	NA		7.60E-06
Benzo(a)anthracene	1.30E+00	1.27E-06	NA		2.18E-06	NA		1.93E-10	NA		
Benzo(a)pyrene	2.60E+00	2.54E-06	NA		4.35E-06	NA		3.87E-10	NA		
Benzo(b)fluoranthene	1.70E+00	1.66E-06	NA		2.84E-06	NA		2.53E-10	NA		
Benzo(g,h,i)perylene	2.30E+00	2.25E-06	NA		3.85E-06	NA		3.42E-10	NA		
Benzo(k)fluoranthene	1.50E+00	1.47E-06	NA		2.51E-06	NA		2.23E-10	NA		
Biphenyl (diphenyl)	1.60E-01	1.57E-07	5.00E-02	3.13E-06	1.78E-07	5.00E-02	3.57E-06	2.38E-11	NA		6.70E-06
Chrysene	1.80E+00	1.76E-06	NA		3.01E-06	NA		2.68E-10	NA		
Fluoranthene	3.00E+00	2.94E-06	4.00E-02	7.34E-05	5.02E-06	4.00E-02	1.25E-04	4.46E-10	NA		1.99E-04
Fluorene	5.00E-01	4.89E-07	4.00E-02	1.22E-05	8.37E-07	4.00E-02	2.09E-05	7.44E-11	NA		3.31E-05
Indeno(1,2,3-c,d)pyrene	2.30E+00	2.25E-06	NA		3.85E-06	NA		3.42E-10	NA		
Naphthalene	1.60E-01	1.57E-07	2.00E-02	7.83E-06	2.68E-07	2.00E-02	1.34E-05	2.38E-11	8.57E-04	2.78E-08	2.12E-05
Phenanthrene	4.40E+00	4.31E-06	NA		7.36E-06	NA		6.54E-10	NA		
Pyrene	4.40E+00	4.31E-06	3.00E-02	1.44E-04	7.36E-06	3.00E-02	2.45E-04	6.54E-10	NA		3.89E-04
Acetone	5.00E-02	4.89E-08	9.00E-01	5.44E-08	5.58E-08	9.00E-01	6.20E-08	7.44E-12	8.86E+00	8.39E-13	1.16E-07
cis-1,2-Dichloroethene	2.00E-03	1.96E-09	1.00E-02	1.96E-07	2.23E-09	1.00E-02	2.23E-07	2.97E-13	NA		4.19E-07
Methyl ethyl ketone	2.10E-02	2.05E-08	6.00E-01	3.42E-08	2.34E-08	6.00E-01	3.90E-08	3.12E-12	1.43E+00	2.19E-12	7.33E-08
Methylene chloride	4.00E-03	3.91E-09	6.00E-02	6.52E-08	4.46E-09	6.00E-02	7.44E-08	5.95E-13	2.86E-01	2.08E-12	1.40E-07
Toluene	9.00E-03	8.81E-09	8.00E-02	1.10E-07	1.00E-08	8.00E-02	1.25E-07	1.34E-12	8.57E-02	1.56E-11	2.36E-07
Xylenes, total	5.00E-03	4.89E-09	2.00E-01	2.45E-08	5.58E-09	2.00E-01	2.79E-08	7.44E-13	2.86E-02	2.60E-11	5.24E-08
Dioxans/Furans											

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
1,2,3,4,6,7,8-HpCDD	3.51E-05	3.43E-11	NA		1.17E-11	NA		5.22E-15	1.14E-08	4.57E-07	4.57E-07
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.01E-11	NA		1.03E-11	NA		4.58E-15	1.14E-08	4.01E-07	4.01E-07
1,2,3,4,7,8,9-HpCDF	2.83E-06	2.77E-12	NA		9.47E-13	NA		4.21E-16	1.14E-08	3.68E-08	3.68E-08
1,2,3,4,7,8-HxCDD	2.83E-06	2.77E-12	NA		9.47E-13	NA		4.21E-16	1.14E-08	3.68E-08	3.68E-08
1,2,3,4,7,8-HxCDF	1.74E-05	1.70E-11	NA		5.82E-12	NA		2.59E-15	1.14E-08	2.26E-07	2.26E-07
1,2,3,6,7,8-HxCDD	5.59E-06	5.47E-12	NA		1.87E-12	NA		8.31E-16	1.14E-08	7.27E-08	7.27E-08
1,2,3,6,7,8-HxCDF	1.13E-05	1.11E-11	NA		3.78E-12	NA		1.68E-15	1.14E-08	1.47E-07	1.47E-07
1,2,3,7,8,9-HxCDD	3.75E-06	3.67E-12	NA		1.25E-12	NA		5.58E-16	1.14E-08	4.88E-08	4.88E-08
1,2,3,7,8,9-HxCDF	3.79E-06	3.71E-12	NA		1.27E-12	NA		5.64E-16	1.14E-08	4.93E-08	4.93E-08
1,2,3,7,8-PeCDD	3.37E-06	3.30E-12	NA		1.13E-12	NA		5.01E-16	1.14E-08	4.38E-08	4.38E-08
1,2,3,7,8-PeCDF	3.91E-06	3.83E-12	NA		1.31E-12	NA		5.81E-16	1.14E-08	5.09E-08	5.09E-08
2,3,4,6,7,8-HxCDF	1.55E-05	1.52E-11	NA		5.19E-12	NA		2.30E-15	1.14E-08	2.02E-07	2.02E-07
2,3,4,7,8-PeCDF	3.32E-05	3.25E-11	NA		1.11E-11	NA		4.94E-15	1.14E-08	4.32E-07	4.32E-07
2,3,7,8-TCDD	8.98E-07	8.79E-13	NA		3.01E-13	NA		1.34E-16	1.14E-08	1.17E-08	1.17E-08
2,3,7,8-TCDF	8.22E-06	8.04E-12	NA		2.75E-12	NA		1.22E-15	1.14E-08	1.07E-07	1.07E-07
OCDD	3.57E-04	3.49E-10	NA		1.19E-10	NA		5.31E-14	1.14E-08	4.65E-06	4.65E-06
OCDF	1.88E-05	1.84E-11	NA		6.29E-12	NA		2.80E-15	1.14E-08	2.45E-07	2.45E-07
		Total Risk (Hazard Index):		9.73E-01	Total Risk (Hazard Index):		1.24E-01	Total Risk (Hazard Index):		2.00E-02	**1.12E+00**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-41
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.35E+04	6.23E-04	NA		8.60E-05	NA		3.77E-05	NA		
Antimony	2.16E+02	9.96E-06	NA		1.38E-06	NA		6.04E-07	NA		
Arsenic	2.00E+01	9.23E-07	1.50E+00	1.38E-06	3.82E-07	1.50E+00	5.74E-07	5.59E-08	1.51E+01	8.41E-07	**2.80E-06**
Barium	3.80E+03	1.75E-04	NA		2.42E-05	NA		1.06E-05	NA		
Beryllium	9.20E-01	4.24E-08	NA		5.86E-09	NA		2.57E-09	8.40E+00	2.16E-08	2.16E-08
Cadmium	1.11E+01	5.12E-07	NA		7.08E-09	NA		3.10E-08	6.30E+00	1.95E-07	1.95E-07
Chromium	1.02E+02	4.71E-06	NA		6.50E-07	NA		2.85E-07	NA		
Cobalt	1.51E+01	6.97E-07	NA		9.62E-08	NA		4.22E-08	3.15E+00	1.33E-07	1.33E-07
Copper	4.18E+02	1.93E-05	NA		2.66E-06	NA		1.17E-06	NA		
Iron	7.45E+04	3.44E-03	NA		4.75E-04	NA		2.08E-04	NA		
Lead	2.17E+03	1.00E-04	NA		1.38E-05	NA		6.07E-06	NA		
Manganese	1.11E+03	5.12E-05	NA		7.08E-06	NA		3.10E-06	NA		
Nickel	7.21E+01	3.33E-06	NA		4.60E-07	NA		2.02E-07	9.10E-01	1.83E-07	1.83E-07
Selenium	4.60E+00	2.12E-07	NA		2.93E-08	NA		1.29E-08	NA		
Silver	1.10E+00	5.07E-08	NA		7.01E-09	NA		3.08E-09	NA		
Thallium	4.90E+00	2.26E-07	NA		3.12E-08	NA		1.37E-08	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	6.42E+01	2.96E-06	NA		4.09E-07	NA		1.79E-07	NA		
Zinc	8.03E+03	3.70E-04	NA		5.12E-05	NA		2.24E-05	NA		
Pesticides/PCBs											
4,4'-DDD	9.90E-03	4.57E-10	2.40E-01	1.10E-10	3.16E-10	2.40E-01	7.57E-11	2.77E-11	2.42E-01	6.68E-12	1.92E-10
4,4'-DDE	3.50E-03	1.61E-10	3.40E-01	5.49E-11	1.12E-10	3.40E-01	3.79E-11	9.78E-12	3.40E-01	3.32E-12	9.61E-11
4,4'-DDT	9.50E-03	4.38E-10	3.40E-01	1.49E-10	3.03E-10	3.40E-01	1.03E-10	2.66E-11	3.40E-01	9.02E-12	2.61E-10
Endrin	5.50E-03	2.54E-10	NA		1.75E-10	NA		1.54E-11	NA		
Endrin ketone	1.40E-02	6.46E-10	NA		4.46E-10	NA		3.91E-11	NA		
gamma-Chlordane	1.70E-03	7.84E-11	1.20E+00	9.41E-11	5.42E-11	1.20E+00	6.50E-11	4.75E-12	3.50E-01	1.66E-12	1.61E-10
Methoxychlor	9.90E-03	4.57E-10	NA		3.16E-10	NA		2.77E-11	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	7.84E-09	NA		1.63E-08	NA		4.75E-10	NA		
Acenaphthylene	6.90E-01	3.18E-08	NA		6.60E-08	NA		1.93E-09	NA		
Anthracene	8.60E-01	3.97E-08	NA		8.22E-08	NA		2.40E-09	NA		
Benzo(a)anthracene	1.30E+00	6.00E-08	1.20E+00	7.20E-08	1.24E-07	1.20E+00	1.49E-07	3.63E-09	3.85E-01	1.40E-09	2.23E-07
Benzo(a)pyrene	2.60E+00	1.20E-07	1.20E+01	1.44E-06	2.49E-07	1.20E+01	2.98E-06	7.27E-09	3.85E+00	2.80E-08	**4.45E-06**
Benzo(b)fluoranthene	1.70E+00	7.84E-08	1.20E+00	9.41E-08	1.63E-07	1.20E+00	1.95E-07	4.75E-09	3.85E-01	1.83E-09	2.91E-07
Benzo(g,h,i)perylene	2.30E+00	1.06E-07	NA		2.20E-07	NA		6.43E-09	NA		
Benzo(k)fluoranthene	1.50E+00	6.92E-08	1.20E+00	8.30E-08	1.43E-07	1.20E+00	1.72E-07	4.19E-09	3.85E-01	1.61E-09	2.57E-07
Biphenyl (diphenyl)	1.60E-01	7.38E-09	NA		1.02E-08	NA		4.47E-10	NA		
Chrysene	1.80E+00	8.30E-08	1.20E-01	9.96E-09	1.72E-07	1.20E-01	2.07E-08	5.03E-09	3.85E-02	1.94E-10	3.08E-08
Fluoranthene	3.00E+00	1.38E-07	NA		2.87E-07	NA		8.39E-09	NA		
Fluorene	5.00E-01	2.31E-08	NA		4.78E-08	NA		1.40E-09	NA		
Indeno(1,2,3-c,d)pyrene	2.30E+00	1.06E-07	1.20E+00	1.27E-07	2.20E-07	1.20E+00	2.64E-07	6.43E-09	3.85E-01	2.48E-09	3.94E-07
Naphthalene	1.60E-01	7.38E-09	1.20E-01	8.86E-10	1.53E-08	1.20E-01	1.84E-09	4.47E-10	1.19E-01	5.32E-11	2.77E-09
Phenanthrene	4.40E+00	2.03E-07	NA		4.21E-07	NA		1.23E-08	NA		
Pyrene	4.40E+00	2.03E-07	NA		4.21E-07	NA		1.23E-08	NA		
Acetone	5.00E-02	2.31E-09	NA		3.19E-09	NA		1.40E-10	NA		
cis-1,2-Dichloroethene	2.00E-03	9.23E-11	NA		1.27E-10	NA		5.59E-12	NA		
Methyl ethyl ketone	2.10E-02	9.69E-10	NA		1.34E-09	NA		5.87E-11	NA		
Methylene chloride	4.00E-03	1.85E-10	1.40E-02	2.58E-12	2.55E-10	1.40E-02	3.57E-12	1.12E-11	3.50E-03	3.91E-14	6.19E-12
Toluene	9.00E-03	4.15E-10	NA		5.74E-10	NA		2.52E-11	NA		
Xylenes, total	5.00E-03	2.31E-10	NA		3.19E-10	NA		1.40E-11	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.62E-12	1.50E+03	2.43E-09	6.71E-13	1.50E+03	1.01E-09	9.81E-14	1.50E+03	1.47E-10	3.58E-09
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.42E-12	1.50E+03	2.13E-09	5.89E-13	1.50E+03	8.83E-10	8.61E-14	1.50E+03	1.29E-10	3.14E-09
1,2,3,4,7,8,9-HpCDF	2.83E-06	1.31E-13	1.50E+03	1.96E-10	5.41E-14	1.50E+03	8.12E-11	7.91E-15	1.50E+03	1.19E-11	2.89E-10
1,2,3,4,7,8-HxCDD	2.83E-06	1.31E-13	1.50E+04	1.96E-09	5.41E-14	1.50E+04	8.12E-10	7.91E-15	1.50E+04	1.19E-10	2.89E-09
1,2,3,4,7,8-HxCDF	1.74E-05	8.03E-13	1.50E+04	1.20E-08	3.33E-13	1.50E+04	4.99E-09	4.86E-14	1.50E+04	7.30E-10	1.78E-08
1,2,3,6,7,8-HxCDD	5.59E-06	2.58E-13	1.50E+04	3.87E-09	1.07E-13	1.50E+04	1.60E-09	1.56E-14	1.50E+04	2.34E-10	5.71E-09
1,2,3,6,7,8-HxCDF	1.13E-05	5.21E-13	1.50E+04	7.82E-09	2.16E-13	1.50E+04	3.24E-09	3.16E-14	1.50E+04	4.74E-10	1.15E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.73E-13	1.50E+04	2.59E-09	7.17E-14	1.50E+04	1.08E-09	1.05E-14	1.50E+04	1.57E-10	3.83E-09
1,2,3,7,8,9-HxCDF	3.79E-06	1.75E-13	1.50E+04	2.62E-09	7.25E-14	1.50E+04	1.09E-09	1.06E-14	1.50E+04	1.59E-10	3.87E-09
1,2,3,7,8-PeCDD	3.37E-06	1.55E-13	1.50E+05	2.33E-08	6.44E-14	1.50E+05	9.67E-09	9.42E-15	1.50E+05	1.41E-09	3.44E-08
1,2,3,7,8-PeCDF	3.91E-06	1.80E-13	7.50E+03	1.35E-09	7.48E-14	7.50E+03	5.61E-10	1.09E-14	7.50E+03	8.20E-11	2.00E-09

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
2,3,4,6,7,8-HxCDF	1.55E-05	7.15E-13	1.50E+04	1.07E-08	2.96E-13	1.50E+04	4.45E-09	4.33E-14	1.50E+04	6.50E-10	1.58E-08
2,3,4,7,8-PeCDF	3.32E-05	1.53E-12	7.50E+04	1.15E-07	6.35E-13	7.50E+04	4.76E-08	9.28E-14	7.50E+04	6.96E-09	1.69E-07
2,3,7,8-TCDD	8.98E-07	4.14E-14	1.50E+05	6.21E-09	1.72E-14	1.50E+05	2.58E-09	2.51E-15	1.50E+05	3.77E-10	9.17E-09
2,3,7,8-TCDF	8.22E-06	3.79E-13	1.50E+04	5.69E-09	1.57E-13	1.50E+04	2.36E-09	2.30E-14	1.50E+04	3.45E-10	8.39E-09
OCDD	3.57E-04	1.65E-11	1.50E+01	2.47E-10	6.83E-12	1.50E+01	1.02E-10	9.98E-13	1.50E+01	1.50E-11	3.64E-10
OCDF	1.88E-05	8.67E-13	1.50E+01	1.30E-11	3.59E-13	1.50E+01	5.39E-12	5.26E-14	1.50E+01	7.88E-13	1.92E-11
			Total Risk:	3.41E-06		**Total Risk:**	4.44E-06		**Total Risk:**	1.42E-06	**9.27E-06**

Total Estimated Carcinogenic Risk Across All Exposure Routes : 9E-06

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-42
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.35E+04	4.36E-02	1.00E+00	4.36E-02	6.02E-03	1.00E+00	6.02E-03	2.64E-03	1.40E-03	1.89E+00	**1.94E+00**
Antimony	2.16E+02	6.97E-04	4.00E-04	1.74E+00	9.64E-05	4.00E-04	2.41E-01	4.23E-05	NA		**1.98E+00**
Arsenic	2.00E+01	6.46E-05	3.00E-04	2.15E-01	2.68E-05	3.00E-04	8.92E-02	3.91E-06	4.29E-06	9.13E-01	**1.22E+00**
Barium	3.80E+03	1.23E-02	2.00E-01	6.14E-02	1.70E-03	2.00E-01	8.48E-03	7.44E-04	1.43E-04	5.21E+00	**5.28E+00**
Beryllium	9.20E-01	2.97E-06	2.00E-03	1.49E-03	4.10E-07	2.00E-03	2.05E-04	1.80E-07	2.00E-06	9.00E-02	9.17E-02
Cadmium	1.11E+01	3.58E-05	5.00E-04	7.17E-02	4.95E-07	5.00E-04	9.91E-04	2.17E-06	2.86E-06	7.60E-01	8.33E-01
Chromium	1.02E+02	3.29E-04	NA		4.55E-05	NA		2.00E-05	NA		
Cobalt	1.51E+01	4.88E-05	3.00E-04	1.63E-01	6.74E-06	3.00E-04	2.25E-02	2.95E-06	1.71E-06	1.72E+00	**1.91E+00**
Copper	4.18E+02	1.35E-03	4.00E-02	3.37E-02	1.87E-04	4.00E-02	4.66E-03	8.18E-05	NA		3.84E-02
Iron	7.45E+04	2.41E-01	7.00E-01	3.44E-01	3.32E-02	7.00E-01	4.75E-02	1.46E-02	NA		3.91E-01
Lead	2.17E+03	7.01E-03	NA		9.68E-04	NA		4.25E-04	NA		
Manganese	1.11E+03	3.58E-03	2.40E-02	1.49E-01	4.95E-04	2.40E-02	2.06E-02	2.17E-04	1.43E-05	1.52E+01	**1.54E+01**
Nickel	7.21E+01	2.33E-04	2.00E-02	1.16E-02	3.22E-05	2.00E-02	1.61E-03	1.41E-05	2.57E-05	5.49E-01	5.62E-01
Selenium	4.60E+00	1.49E-05	5.00E-03	2.97E-03	2.05E-06	5.00E-03	4.10E-04	9.00E-07	5.71E-03	1.58E-04	3.54E-03
Silver	1.10E+00	3.55E-06	5.00E-03	7.10E-04	4.91E-07	5.00E-03	9.82E-05	2.15E-07	NA		8.09E-04
Thallium	4.90E+00	1.58E-05	6.60E-05	2.40E-01	2.19E-06	6.60E-05	3.31E-02	9.59E-07	NA		2.73E-01
Vanadium	6.42E+01	2.07E-04	5.00E-03	4.15E-02	2.86E-05	5.00E-03	5.73E-03	1.26E-05	NA		4.72E-02
Zinc	8.03E+03	2.59E-02	3.00E-01	8.64E-02	3.58E-03	3.00E-01	1.19E-02	1.57E-03	NA		9.84E-02

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	9.90E-03	3.20E-08	NA		2.21E-08	NA		1.94E-09	NA		
4,4'-DDE	3.50E-03	1.13E-08	NA		7.81E-09	NA		6.85E-10	NA		
4,4'-DDT	9.50E-03	3.07E-08	5.00E-04	6.14E-05	2.12E-08	5.00E-04	4.24E-05	1.86E-09	NA		1.04E-04
Endrin	5.50E-03	1.78E-08	3.00E-04	5.92E-05	1.23E-08	3.00E-04	4.09E-05	1.08E-09	NA		1.00E-04
Endrin ketone	1.40E-02	4.52E-08	3.00E-04	1.51E-04	3.12E-08	3.00E-04	1.04E-04	2.74E-09	NA		2.55E-04
gamma-Chlordane	1.70E-03	5.49E-09	5.00E-04	1.10E-05	3.79E-09	5.00E-04	7.59E-06	3.33E-10	2.00E-04	1.66E-06	2.02E-05
Methoxychlor	9.90E-03	3.20E-08	2.00E-05	1.60E-03	2.21E-08	2.00E-05	1.10E-03	1.94E-09	NA		2.70E-03
SVOCs/VOCs											
2-Methylnaphthalene	1.70E-01	5.49E-07	4.00E-03	1.37E-04	1.14E-06	4.00E-03	2.84E-04	3.33E-08	NA		4.22E-04
Acenaphthylene	6.90E-01	2.23E-06	NA		4.62E-06	NA		1.35E-07	NA		
Anthracene	8.60E-01	2.78E-06	3.00E-01	9.26E-06	5.76E-06	3.00E-01	1.92E-05	1.68E-07	NA		2.84E-05
Benzo(a)anthracene	1.30E+00	4.20E-06	NA		8.70E-06	NA		2.54E-07	NA		
Benzo(a)pyrene	2.60E+00	8.40E-06	NA		1.74E-05	NA		5.09E-07	NA		
Benzo(b)fluoranthene	1.70E+00	5.49E-06	NA		1.14E-05	NA		3.33E-07	NA		
Benzo(g,h,i)perylene	2.30E+00	7.43E-06	NA		1.54E-05	NA		4.50E-07	NA		
Benzo(k)fluoranthene	1.50E+00	4.84E-06	NA		1.00E-05	NA		2.94E-07	NA		
Biphenyl (diphenyl)	1.60E-01	5.17E-07	5.00E-02	1.03E-05	7.14E-07	5.00E-02	1.43E-05	3.13E-08	NA		2.46E-05
Chrysene	1.80E+00	5.81E-06	NA		1.20E-05	NA		3.52E-07	NA		
Fluoranthene	3.00E+00	9.69E-06	4.00E-02	2.42E-04	2.01E-05	4.00E-02	5.02E-04	5.87E-07	NA		7.44E-04
Fluorene	5.00E-01	1.61E-06	4.00E-02	4.04E-05	3.35E-06	4.00E-02	8.37E-05	9.78E-08	NA		1.24E-04
Indeno(1,2,3-c,d)pyrene	2.30E+00	7.43E-06	NA		1.54E-05	NA		4.50E-07	NA		
Naphthalene	1.60E-01	5.17E-07	2.00E-02	2.58E-05	1.07E-06	2.00E-02	5.35E-05	3.13E-08	8.57E-04	3.65E-05	1.16E-04
Phenanthrene	4.40E+00	1.42E-05	NA		2.94E-05	NA		8.61E-07	NA		
Pyrene	4.40E+00	1.42E-05	3.00E-02	4.74E-04	2.94E-05	3.00E-02	9.82E-04	8.61E-07	NA		1.46E-03
Acetone	5.00E-02	1.61E-07	9.00E-01	1.79E-07	2.23E-07	9.00E-01	2.48E-07	9.78E-09	8.86E+00	1.10E-09	4.28E-07
cis-1,2-Dichloroethene	2.00E-03	6.46E-09	1.00E-02	6.46E-07	8.92E-09	1.00E-02	8.92E-07	3.91E-10	NA		1.54E-06
Methyl ethyl ketone	2.10E-02	6.78E-08	6.00E-01	1.13E-07	9.37E-08	6.00E-01	1.56E-07	4.11E-09	1.43E+00	2.88E-09	2.72E-07
Methylene chloride	4.00E-03	1.29E-08	6.00E-02	2.15E-07	1.78E-08	6.00E-02	2.97E-07	7.83E-10	2.86E-01	2.74E-09	5.15E-07
Toluene	9.00E-03	2.91E-08	8.00E-02	3.63E-07	4.02E-08	8.00E-02	5.02E-07	1.76E-09	8.57E-02	2.05E-08	8.86E-07
Xylenes, total	5.00E-03	1.61E-08	2.00E-01	8.07E-08	2.23E-08	2.00E-01	1.12E-07	9.78E-10	2.86E-02	3.42E-08	2.27E-07
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.13E-10	NA		4.70E-11	NA		6.87E-12	1.14E-08	6.01E-04	6.01E-04
1,2,3,4,6,7,8-HpCDF	3.08E-05	9.95E-11	NA		4.12E-11	NA		6.03E-12	1.14E-08	5.27E-04	5.27E-04
1,2,3,4,7,8,9-HpCDF	2.83E-06	9.14E-12	NA		3.79E-12	NA		5.54E-13	1.14E-08	4.85E-05	4.85E-05
1,2,3,4,7,8-HxCDD	2.83E-06	9.14E-12	NA		3.79E-12	NA		5.54E-13	1.14E-08	4.85E-05	4.85E-05
1,2,3,4,7,8-HxCDF	1.74E-05	5.62E-11	NA		2.33E-11	NA		3.41E-12	1.14E-08	2.98E-04	2.98E-04
1,2,3,6,7,8-HxCDD	5.59E-06	1.80E-11	NA		7.48E-12	NA		1.09E-12	1.14E-08	9.57E-05	9.57E-05
1,2,3,6,7,8-HxCDF	1.13E-05	3.65E-11	NA		1.51E-11	NA		2.21E-12	1.14E-08	1.93E-04	1.93E-04
1,2,3,7,8,9-HxCDD	3.75E-06	1.21E-11	NA		5.02E-12	NA		7.34E-13	1.14E-08	6.42E-05	6.42E-05
1,2,3,7,8,9-HxCDF	3.79E-06	1.22E-11	NA		5.07E-12	NA		7.42E-13	1.14E-08	6.49E-05	6.49E-05
1,2,3,7,8-PeCDD	3.37E-06	1.09E-11	NA		4.51E-12	NA		6.59E-13	1.14E-08	5.77E-05	5.77E-05
1,2,3,7,8-PeCDF	3.91E-06	1.26E-11	NA		5.23E-12	NA		7.65E-13	1.14E-08	6.70E-05	6.70E-05
2,3,4,6,7,8-HxCDF	1.55E-05	5.00E-11	NA		2.07E-11	NA		3.03E-12	1.14E-08	2.65E-04	2.65E-04
2,3,4,7,8-PeCDF	3.32E-05	1.07E-10	NA		4.44E-11	NA		6.50E-12	1.14E-08	5.68E-04	5.68E-04
2,3,7,8-TCDD	8.98E-07	2.90E-12	NA		1.20E-12	NA		1.76E-13	1.14E-08	1.54E-05	1.54E-05
2,3,7,8-TCDF	8.22E-06	2.65E-11	NA		1.10E-11	NA		1.61E-12	1.14E-08	1.41E-04	1.41E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
OCDD	3.57E-04	1.15E-09	NA		4.78E-10	NA		6.99E-11	1.14E-08	6.11E-03	6.11E-03
OCDF	1.88E-05	6.07E-11	NA		2.52E-11	NA		3.68E-12	1.14E-08	3.22E-04	3.22E-04
		Total Risk (Hazard Index):		3.2	Total Risk (Hazard Index):		0.5	Total Risk (Hazard Index):		26.34	**30.05**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 30

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-43
Cancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**1.0E-05**	**3.6E-06**	1.6E-08	**1.4E-05**	26%	**1.4E-06**	5.7E-07	8.4E-07	**2.8E-06**	30%
Subtotal Metals	**1.0E-05**	**3.6E-06**	2.6E-08	**1.4E-05**	26%	**1.4E-06**	5.7E-07	**1.4E-06**	**3.3E-06**	36%
SVOCs/VOCs										
Benzo(a)anthracene	5.5E-07	9.3E-07	2.7E-11	**1.5E-06**	3%	7.2E-08	1.5E-07	1.4E-09	2.2E-07	2%
Benzo(a)pyrene	**1.1E-05**	**1.9E-05**	5.3E-10	**3.0E-05**	55%	**1.4E-06**	**3.0E-06**	2.8E-08	**4.5E-06**	48%
Benzo(b)fluoranthene	7.1E-07	**1.2E-06**	3.5E-11	**1.9E-06**	4%	9.4E-08	2.0E-07	1.8E-09	2.9E-07	3%
Benzo(k)fluoranthene	6.3E-07	**1.1E-06**	3.1E-11	**1.7E-06**	3%	8.3E-08	1.7E-07	1.6E-09	2.6E-07	3%
Indeno(1,2,3-c,d)pyrene	9.6E-07	**1.6E-06**	4.7E-11	**2.6E-06**	5%	1.3E-07	2.6E-07	2.5E-09	3.9E-07	4%
Subtotal SVOCs/VOCs	**1.4E-05**	**2.4E-05**	6.8E-10	**3.7E-05**	70%	**1.8E-06**	**3.8E-06**	3.6E-08	**5.6E-06**	61%
Dioxans/Furans										
2,3,4,7,8-PeCDF	8.7E-07	3.0E-07	1.3E-10	**1.2E-06**	2.2%	1.1E-07	4.8E-08	7.0E-09	1.7E-07	1.8%
Subtotal Dioxans/Furans	**1.5E-06**	5.1E-07	2.3E-10	**2.0E-06**	4%	2.0E-07	8.2E-08	1.2E-08	2.9E-07	3%
Total:	**2.6E-05**	**2.8E-05**	2.7E-08	**5.36E-05**		**3.4E-06**	**4.4E-06**	**1.4E-06**	**9.27E-06**	

Total Estimated Cancer Risk Across All Exposure Routes:	**5E-05**	**9E-06**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-44
Noncancer Risk Results Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.3E-02	1.5E-03	1.4E-03	1.6E-02	1%	4.4E-02	6.0E-03	**1.9E+00**	**1.9E+00**	6%
Antimony	**5.3E-01**	6.0E-02		**5.9E-01**	53%	**1.7E+00**	**2.4E-01**		**2.0E+00**	7%
Arsenic	6.5E-02	2.2E-02	6.9E-04	8.8E-02	8%	**2.2E-01**	8.9E-02	**9.1E-01**	**1.2E+00**	4%
Barium	1.9E-02	2.1E-03	4.0E-03	2.5E-02	2%	6.1E-02	8.5E-03	**5.2E+00**	**5.3E+00**	18%
Cadmium	2.2E-02	2.5E-04	5.8E-04	2.3E-02	2%	7.2E-02	9.9E-04	**7.6E-01**	**8.3E-01**	3%
Cobalt	4.9E-02	5.6E-03	1.3E-03	5.6E-02	5%	**1.6E-01**	2.2E-02	**1.7E+00**	**1.9E+00**	6%
Iron	**1.0E-01**	1.2E-02		**1.2E-01**	10%	**3.4E-01**	4.7E-02		**3.9E-01**	1%
Manganese	4.5E-02	5.2E-03	1.2E-02	6.2E-02	6%	**1.5E-01**	2.1E-02	**1.5E+01**	**1.5E+01**	51%
Nickel	3.5E-03	4.0E-04	4.2E-04	4.3E-03	0%	1.2E-02	1.6E-03	**5.5E-01**	**5.6E-01**	2%
Thallium	7.3E-02	8.3E-03		8.1E-02	7%	**2.4E-01**	3.3E-02		**2.7E-01**	1%
Subtotal Metals	**9.7E-01**	**1.2E-01**	2.0E-02	**1.1E+00**	100%	**3.2E+00**	**4.9E-01**	**2.6E+01**	**3.0E+01**	100%
Total:	**1.0**	**0.1**	0.02	**1.1**		**3.2**	**0.5**	**26.34**	**30.0**	

Total Estimated Hazard Index Across All Exposure Routes:	Industrial Worker	Future Construction Worker
	1	**30**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-45
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.30E+04	6.11E-03	NA		2.44E-04	NA		9.28E-07	NA		
Antimony	2.16E+02	1.01E-04	NA		4.05E-06	NA		1.54E-08	NA		
Arsenic	1.28E+01	6.01E-06	1.50E+00	9.02E-06	7.20E-07	1.50E+00	1.08E-06	9.14E-10	1.51E+01	1.38E-08	**1.01E-05**
Barium	3.50E+03	1.64E-03	NA		6.56E-05	NA		2.50E-07	NA		
Beryllium	6.74E-01	3.17E-07	NA		1.26E-08	NA		4.81E-11	8.40E+00	4.04E-10	4.04E-10
Cadmium	1.11E+01	5.21E-06	NA		2.08E-08	NA		7.92E-10	6.30E+00	4.99E-09	4.99E-09
Chromium	8.01E+01	3.76E-05	NA		1.50E-06	NA		5.72E-09	NA		
Cobalt	1.19E+01	5.59E-06	NA		2.23E-07	NA		8.49E-10	3.15E+00	2.68E-09	2.68E-09
Copper	3.07E+02	1.44E-04	NA		5.75E-06	NA		2.19E-08	NA		
Iron	5.74E+04	2.70E-02	NA		1.08E-03	NA		4.10E-06	NA		
Lead	1.45E+03	6.81E-04	NA		2.72E-05	NA		1.03E-07	NA		
Manganese	8.57E+02	4.03E-04	NA		1.61E-05	NA		6.12E-08	NA		
Nickel	5.87E+01	2.76E-05	NA		1.10E-06	NA		4.19E-09	9.10E-01	3.81E-09	3.81E-09
Selenium	3.53E+00	1.66E-06	NA		6.62E-08	NA		2.52E-10	NA		
Silver	8.32E-01	3.91E-07	NA		1.56E-08	NA		5.94E-11	NA		
Thallium	3.81E+00	1.79E-06	NA		7.14E-08	NA		2.72E-10	NA		
Vanadium	4.95E+01	2.32E-05	NA		9.28E-07	NA		3.53E-09	NA		
Zinc	8.03E+03	3.77E-03	NA		1.50E-04	NA		5.73E-07	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	6.08E-02	2.86E-08	2.40E-01	6.85E-09	5.70E-09	2.40E-01	1.37E-09	4.34E-12	2.42E-01	1.05E-12	8.22E-09
4,4'-DDE	2.35E-02	1.10E-08	3.40E-01	3.75E-09	2.20E-09	3.40E-01	7.49E-10	1.68E-12	3.40E-01	5.69E-13	4.50E-09
4,4'-DDT	8.79E-03	4.13E-09	3.40E-01	1.40E-09	8.24E-10	3.40E-01	2.80E-10	6.27E-13	3.40E-01	2.13E-13	1.68E-09
Dieldrin	9.15E-03	4.30E-09	1.60E+01	6.88E-08	8.57E-10	1.60E+01	1.37E-08	6.53E-13	1.61E+01	1.05E-11	8.25E-08
Endrin	4.27E-03	2.01E-09	NA		4.00E-10	NA		3.05E-13	NA		
Endrin ketone	1.32E-02	6.20E-09	NA		1.24E-09	NA		9.42E-13	NA		
gamma-Chlordane	1.41E-03	6.62E-10	1.20E+00	7.95E-10	1.32E-10	1.20E+00	1.59E-10	1.01E-13	3.50E-01	3.52E-14	9.53E-10
Methoxychlor	9.90E-03	4.65E-09	NA		9.28E-10	NA		7.07E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	8.97E-07	NA		5.37E-07	NA		1.36E-10	NA		
Acenaphthylene	1.20E+00	5.64E-07	NA		3.37E-07	NA		8.57E-11	NA		
Anthracene	9.40E-01	4.41E-07	NA		2.64E-07	NA		6.71E-11	NA		
Benzo(a)anthracene	4.14E+00	1.94E-06	1.20E+00	2.33E-06	1.16E-06	1.20E+00	1.40E-06	2.96E-10	3.85E-01	1.14E-10	**3.73E-06**
Benzo(a)pyrene	8.90E+00	4.18E-06	1.20E+01	5.02E-05	2.50E-06	1.20E+01	3.00E-05	6.35E-10	3.85E+00	2.45E-09	**8.02E-05**
Benzo(b)fluoranthene	5.60E+00	2.63E-06	1.20E+00	3.16E-06	1.57E-06	1.20E+00	1.89E-06	4.00E-10	3.85E-01	1.54E-10	**5.05E-06**
Benzo(g,h,i)perylene	9.00E+00	4.23E-06	NA		2.53E-06	NA		6.42E-10	NA		
Benzo(k)fluoranthene	3.40E+00	1.60E-06	1.20E+00	1.92E-06	9.56E-07	1.20E+00	1.15E-06	2.43E-10	3.85E-01	9.34E-11	**3.06E-06**
Biphenyl (diphenyl)	1.60E-01	7.51E-08	NA		3.00E-08	NA		1.14E-11	NA		
Chrysene	6.50E+00	3.05E-06	1.20E-01	3.66E-07	1.83E-06	1.20E-01	2.19E-07	4.64E-10	3.85E-02	1.79E-11	5.86E-07
Dibenz(a,h)anthracene	1.02E+00	4.79E-07	7.30E+00	3.50E-06	2.87E-07	7.30E+00	2.09E-06	7.28E-11	4.20E+00	3.06E-10	**5.59E-06**
Fluoranthene	1.20E+01	5.64E-06	NA		3.37E-06	NA		8.57E-10	NA		
Fluorene	4.23E-01	1.99E-07	NA		1.19E-07	NA		3.02E-11	NA		
Indeno(1,2,3-c,d)pyrene	8.30E+00	3.90E-06	1.20E+00	4.68E-06	2.33E-06	1.20E+00	2.80E-06	5.92E-10	3.85E-01	2.28E-10	**7.48E-06**
Naphthalene	7.99E-01	3.75E-07	1.20E-01	4.50E-08	2.25E-07	1.20E-01	2.70E-08	5.70E-11	1.19E-01	6.79E-12	7.20E-08
Phenanthrene	4.40E+00	2.07E-06	NA		1.24E-06	NA		3.14E-10	NA		
Pyrene	1.60E+01	7.51E-06	NA		4.50E-06	NA		1.14E-09	NA		
Acetone	3.40E-02	1.60E-08	NA		6.37E-09	NA		2.43E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	9.39E-10	NA		3.75E-10	NA		1.43E-13	NA		
Methyl ethyl ketone	1.94E-02	9.11E-09	NA		3.64E-09	NA		1.38E-12	NA		
Methylene chloride	4.00E-03	1.88E-09	1.40E-02	2.63E-11	7.50E-10	1.40E-02	1.05E-11	2.86E-13	3.50E-03	9.99E-16	3.68E-11
Toluene	7.76E-03	3.64E-09	NA		1.45E-09	NA		5.54E-13	NA		
Xylenes, total	5.00E-03	2.35E-09	NA		9.37E-10	NA		3.57E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.65E-11	1.50E+03	2.47E-08	1.97E-12	1.50E+03	2.96E-09	2.51E-15	1.50E+03	3.76E-12	2.77E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.45E-11	1.50E+03	2.17E-08	1.73E-12	1.50E+03	2.60E-09	2.20E-15	1.50E+03	3.30E-12	2.43E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	1.33E-12	1.50E+03	1.99E-09	1.59E-13	1.50E+03	2.39E-10	2.02E-16	1.50E+03	3.03E-13	2.23E-09
1,2,3,4,7,8-HxCDD	2.83E-06	1.33E-12	1.50E+04	1.99E-08	1.59E-13	1.50E+04	2.39E-09	2.02E-16	1.50E+04	3.03E-12	2.23E-08
1,2,3,4,7,8-HxCDF	1.74E-05	8.17E-12	1.50E+04	1.23E-07	9.78E-13	1.50E+04	1.47E-08	1.24E-15	1.50E+04	1.86E-11	1.37E-07
1,2,3,6,7,8-HxCDD	5.59E-06	2.63E-12	1.50E+04	3.94E-08	3.14E-13	1.50E+04	4.71E-09	3.99E-16	1.50E+04	5.99E-12	4.41E-08
1,2,3,6,7,8-HxCDF	1.13E-05	5.31E-12	1.50E+04	7.96E-08	6.35E-13	1.50E+04	9.53E-09	8.07E-16	1.50E+04	1.21E-11	8.91E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.76E-12	1.50E+04	2.64E-08	2.11E-13	1.50E+04	3.16E-09	2.68E-16	1.50E+04	4.02E-12	2.96E-08
1,2,3,7,8,9-HxCDF	3.79E-06	1.78E-12	1.50E+04	2.67E-08	2.13E-13	1.50E+04	3.20E-09	2.71E-16	1.50E+04	4.06E-12	2.99E-08
1,2,3,7,8-PeCDD	3.37E-06	1.58E-12	1.50E+05	2.37E-07	1.89E-13	1.50E+05	2.84E-08	2.41E-16	1.50E+05	3.61E-11	2.66E-07
1,2,3,7,8-PeCDF	3.91E-06	1.84E-12	7.50E+03	1.38E-08	2.20E-13	7.50E+03	1.65E-09	2.79E-16	7.50E+03	2.09E-12	1.54E-08
2,3,4,6,7,8-HxCDF	1.55E-05	7.28E-12	1.50E+04	1.09E-07	8.71E-13	1.50E+04	1.31E-08	1.11E-15	1.50E+04	1.66E-11	1.22E-07
2,3,4,7,8-PeCDF	3.32E-05	1.56E-11	7.50E+04	1.17E-06	1.87E-12	7.50E+04	1.40E-07	2.37E-15	7.50E+04	1.78E-10	**1.31E-06**
2,3,7,8-TCDD	8.98E-07	4.22E-13	1.50E+05	6.33E-08	5.05E-14	1.50E+05	7.57E-09	6.41E-17	1.50E+05	9.61E-12	7.08E-08
2,3,7,8-TCDF	8.22E-06	3.86E-12	1.50E+04	5.79E-08	4.62E-13	1.50E+04	6.93E-09	5.87E-16	1.50E+04	8.80E-12	6.49E-08
OCDD	3.57E-04	1.68E-10	1.50E+01	2.52E-09	6.69E-11	1.50E+01	1.00E-09	2.55E-14	1.50E+01	3.82E-13	3.52E-09

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
OCDF	1.88E-05	8.83E-12	1.50E+01	1.32E-10	3.52E-12	1.50E+01	5.28E-11	1.34E-15	1.50E+01	2.01E-14	1.85E-10
			Total Risk:	7.73E-05		**Total Risk:**	4.09E-05		**Total Risk:**	2.93E-08	**1.18E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-46
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.30E+04	1.78E-02	1.00E+00	1.78E-02	7.11E-04	1.00E+00	7.11E-04	2.71E-06	1.40E-03	1.93E-03	2.05E-02
Antimony	2.16E+02	2.96E-04	4.00E-04	7.40E-01	1.18E-05	4.00E-04	2.95E-02	4.50E-08	NA		7.69E-01
Arsenic	1.28E+01	1.75E-05	3.00E-04	5.84E-02	2.10E-06	3.00E-04	7.00E-03	2.66E-09	4.29E-06	6.22E-04	6.61E-02
Barium	3.50E+03	4.79E-03	2.00E-01	2.40E-02	1.91E-04	2.00E-01	9.57E-04	7.29E-07	1.43E-04	5.10E-03	3.00E-02
Beryllium	6.74E-01	9.23E-07	2.00E-03	4.62E-04	3.68E-08	2.00E-03	1.84E-05	1.40E-10	2.00E-06	7.02E-05	5.50E-04
Cadmium	1.11E+01	1.52E-05	5.00E-04	3.04E-02	6.07E-08	5.00E-04	1.21E-04	2.31E-09	2.86E-06	8.09E-04	3.13E-02
Chromium	8.01E+01	1.10E-04	NA		4.38E-06	NA		1.67E-08	NA		
Cobalt	1.19E+01	1.63E-05	3.00E-04	5.43E-02	6.50E-07	3.00E-04	2.17E-03	2.48E-09	1.71E-06	1.45E-03	5.80E-02
Copper	3.07E+02	4.21E-04	4.00E-02	1.05E-02	1.68E-05	4.00E-02	4.19E-04	6.39E-08	NA		1.09E-02
Iron	5.74E+04	7.86E-02	7.00E-01	1.12E-01	3.14E-03	7.00E-01	4.48E-03	1.19E-05	NA		1.17E-01
Lead	1.45E+03	1.99E-03	NA		7.93E-05	NA		3.02E-07	NA		
Manganese	8.57E+02	1.17E-03	2.40E-02	4.89E-02	4.68E-05	2.40E-02	1.95E-03	1.78E-07	1.43E-05	1.25E-02	6.34E-02
Nickel	5.87E+01	8.04E-05	2.00E-02	4.02E-03	3.21E-06	2.00E-02	1.60E-04	1.22E-08	2.57E-05	4.75E-04	4.66E-03
Selenium	3.53E+00	4.84E-06	5.00E-03	9.67E-04	1.93E-07	5.00E-03	3.86E-05	7.35E-10	5.71E-03	1.29E-07	1.01E-03
Silver	8.32E-01	1.14E-06	5.00E-03	2.28E-04	4.55E-08	5.00E-03	9.10E-06	1.73E-10	NA		2.37E-04
Thallium	3.81E+00	5.22E-06	6.60E-05	7.91E-02	2.08E-07	6.60E-05	3.16E-03	7.93E-10	NA		8.22E-02
Vanadium	4.95E+01	6.78E-05	5.00E-03	1.36E-02	2.71E-06	5.00E-03	5.41E-04	1.03E-08	NA		1.41E-02
Zinc	8.03E+03	1.10E-02	3.00E-01	3.67E-02	4.39E-04	3.00E-01	1.46E-03	1.67E-06	NA		3.81E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	6.08E-02	8.33E-08	NA		1.66E-08	NA		1.27E-11	NA		
4,4'-DDE	2.35E-02	3.22E-08	NA		6.42E-09	NA		4.89E-12	NA		
4,4'-DDT	8.79E-03	1.20E-08	5.00E-04	2.41E-05	2.40E-09	5.00E-04	4.80E-06	1.83E-12	NA		2.89E-05
Dieldrin	9.15E-03	1.25E-08	5.00E-05	2.51E-04	2.50E-09	5.00E-05	5.00E-05	1.90E-12	NA		3.01E-04
Endrin	4.27E-03	5.85E-09	3.00E-04	1.95E-05	1.17E-09	3.00E-04	3.89E-06	8.89E-13	NA		2.34E-05
Endrin ketone	1.32E-02	1.81E-08	3.00E-04	6.03E-05	3.61E-09	3.00E-04	1.20E-05	2.75E-12	NA		7.23E-05
gamma-Chlordane	1.41E-03	1.93E-09	5.00E-04	3.86E-06	3.85E-10	5.00E-04	7.71E-07	2.94E-13	2.00E-04	1.47E-09	4.64E-06
Methoxychlor	9.90E-03	1.36E-08	2.00E-05	6.78E-04	2.71E-09	2.00E-05	1.35E-04	2.06E-12	NA		8.13E-04
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	2.62E-06	4.00E-03	6.54E-04	1.57E-06	4.00E-03	3.91E-04	3.98E-10	NA		1.05E-03
Acenaphthylene	1.20E+00	1.64E-06	NA		9.84E-07	NA		2.50E-10	NA		
Anthracene	9.40E-01	1.29E-06	3.00E-01	4.29E-06	7.71E-07	3.00E-01	2.57E-06	1.96E-10	NA		6.86E-06
Benzo(a)anthracene	4.14E+00	5.67E-06	NA		3.39E-06	NA		8.62E-10	NA		
Benzo(a)pyrene	8.90E+00	1.22E-05	NA		7.30E-06	NA		1.85E-09	NA		
Benzo(b)fluoranthene	5.60E+00	7.67E-06	NA		4.59E-06	NA		1.17E-09	NA		
Benzo(g,h,i)perylene	9.00E+00	1.23E-05	NA		7.38E-06	NA		1.87E-09	NA		
Benzo(k)fluoranthene	3.40E+00	4.66E-06	NA		2.79E-06	NA		7.08E-10	NA		
Biphenyl (diphenyl)	1.60E-01	2.19E-07	5.00E-02	4.38E-06	8.75E-08	5.00E-02	1.75E-06	3.33E-11	NA		6.13E-06
Chrysene	6.50E+00	8.90E-06	NA		5.33E-06	NA		1.35E-09	NA		
Dibenz(a,h)anthracene	1.02E+00	1.40E-06	NA		8.36E-07	NA		2.12E-10	NA		
Fluoranthene	1.20E+01	1.64E-05	4.00E-02	4.11E-04	9.84E-06	4.00E-02	2.46E-04	2.50E-09	NA		6.57E-04
Fluorene	4.23E-01	5.79E-07	4.00E-02	1.45E-05	3.47E-07	4.00E-02	8.67E-06	8.81E-11	NA		2.32E-05
Indeno(1,2,3-c,d)pyrene	8.30E+00	1.14E-05	NA		6.80E-06	NA		1.73E-09	NA		
Naphthalene	7.99E-01	1.09E-06	2.00E-02	5.47E-05	6.55E-07	2.00E-02	3.28E-05	1.66E-10	8.57E-04	1.94E-07	8.77E-05
Phenanthrene	4.40E+00	6.03E-06	NA		3.61E-06	NA		9.16E-10	NA		
Pyrene	1.60E+01	2.19E-05	3.00E-02	7.31E-04	1.31E-05	3.00E-02	4.37E-04	3.33E-09	NA		1.17E-03
Acetone	3.40E-02	4.66E-08	9.00E-01	5.18E-08	1.86E-08	9.00E-01	2.06E-08	7.08E-12	8.86E+00	7.99E-13	7.24E-08
cis-1,2-Dichloroethene	2.00E-03	2.74E-09	1.00E-02	2.74E-07	1.09E-09	1.00E-02	1.09E-07	4.16E-13	NA		3.83E-07
Methyl ethyl ketone	1.94E-02	2.66E-08	6.00E-01	4.43E-08	1.06E-08	6.00E-01	1.77E-08	4.04E-12	1.43E+00	2.83E-12	6.20E-08
Methylene chloride	4.00E-03	5.48E-09	6.00E-02	9.13E-08	2.19E-09	6.00E-02	3.64E-08	8.33E-13	2.86E-01	2.91E-12	1.28E-07
Toluene	7.76E-03	1.06E-08	8.00E-02	1.33E-07	4.24E-09	8.00E-02	5.30E-08	1.62E-12	8.57E-02	1.88E-11	1.86E-07
Xylenes, total	5.00E-03	6.85E-09	2.00E-01	3.42E-08	2.73E-09	2.00E-01	1.37E-08	1.04E-12	2.86E-02	3.64E-11	4.79E-08
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	4.81E-11	NA		5.76E-12	NA		7.31E-15	1.14E-08	6.39E-07	6.39E-07
1,2,3,4,6,7,8-HpCDF	3.08E-05	4.22E-11	NA		5.05E-12	NA		6.41E-15	1.14E-08	5.61E-07	5.61E-07
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.88E-12	NA		4.64E-13	NA		5.89E-16	1.14E-08	5.16E-08	5.16E-08
1,2,3,4,7,8-HxCDD	2.83E-06	3.88E-12	NA		4.64E-13	NA		5.89E-16	1.14E-08	5.16E-08	5.16E-08
1,2,3,4,7,8-HxCDF	1.74E-05	2.38E-11	NA		2.85E-12	NA		3.62E-15	1.14E-08	3.17E-07	3.17E-07
1,2,3,6,7,8-HxCDD	5.59E-06	7.66E-12	NA		9.17E-13	NA		1.16E-15	1.14E-08	1.02E-07	1.02E-07
1,2,3,6,7,8-HxCDF	1.13E-05	1.55E-11	NA		1.85E-12	NA		2.35E-15	1.14E-08	2.06E-07	2.06E-07
1,2,3,7,8,9-HxCDD	3.75E-06	5.14E-12	NA		6.15E-13	NA		7.81E-16	1.14E-08	6.83E-08	6.83E-08
1,2,3,7,8,9-HxCDF	3.79E-06	5.19E-12	NA		6.21E-13	NA		7.89E-16	1.14E-08	6.90E-08	6.90E-08
1,2,3,7,8-PeCDD	3.37E-06	4.62E-12	NA		5.53E-13	NA		7.02E-16	1.14E-08	6.14E-08	6.14E-08
1,2,3,7,8-PeCDF	3.91E-06	5.36E-12	NA		6.41E-13	NA		8.14E-16	1.14E-08	7.12E-08	7.12E-08
2,3,4,6,7,8-HxCDF	1.55E-05	2.12E-11	NA		2.54E-12	NA		3.23E-15	1.14E-08	2.82E-07	2.82E-07
2,3,4,7,8-PeCDF	3.32E-05	4.55E-11	NA		5.44E-12	NA		6.91E-15	1.14E-08	6.05E-07	6.05E-07
2,3,7,8-TCDD	8.98E-07	1.23E-12	NA		1.47E-13	NA		1.87E-16	1.14E-08	1.64E-08	1.64E-08

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
2,3,7,8-TCDF	8.22E-06	1.13E-11	NA		1.35E-12	NA		1.71E-15	1.14E-08	1.50E-07	1.50E-07
OCDD	3.57E-04	4.89E-10	NA		5.85E-11	NA		7.43E-14	1.14E-08	6.50E-06	6.50E-06
OCDF	1.88E-05	2.58E-11	NA		3.08E-12	NA		3.91E-15	1.14E-08	3.42E-07	3.42E-07
		Total Risk (Hazard Index):		1.23	Total Risk (Hazard Index):		0.05	Total Risk (Hazard Index):		0.02	**1.31**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-47
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.20	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.30E+04	1.42E-02	NA		4.13E-04	NA		5.41E-07	NA		
Antimony	2.16E+02	2.37E-04	NA		6.86E-06	NA		8.99E-09	NA		
Arsenic	1.28E+01	1.40E-05	1.50E+00	2.10E-05	1.22E-06	1.50E+00	1.83E-06	5.33E-10	1.51E+01	8.02E-09	**2.29E-05**
Barium	3.50E+03	3.84E-03	NA		1.11E-04	NA		1.46E-07	NA		
Beryllium	6.74E-01	7.39E-07	NA		2.14E-08	NA		2.81E-11	8.40E+00	2.36E-10	2.36E-10
Cadmium	1.11E+01	1.22E-05	NA		3.53E-08	NA		4.62E-10	6.30E+00	2.91E-09	2.91E-09
Chromium	8.01E+01	8.78E-05	NA		2.55E-06	NA		3.34E-09	NA		
Cobalt	1.19E+01	1.30E-05	NA		3.78E-07	NA		4.95E-10	3.15E+00	1.56E-09	1.56E-09
Copper	3.07E+02	3.36E-04	NA		9.76E-06	NA		1.28E-08	NA		
Iron	5.74E+04	6.29E-02	NA		1.82E-03	NA		2.39E-06	NA		
Lead	1.45E+03	1.59E-03	NA		4.61E-05	NA		6.04E-08	NA		
Manganese	8.57E+02	9.39E-04	NA		2.72E-05	NA		3.57E-08	NA		
Nickel	5.87E+01	6.43E-05	NA		1.87E-06	NA		2.44E-09	9.10E-01	2.22E-09	2.22E-09
Selenium	3.53E+00	3.87E-06	NA		1.12E-07	NA		1.47E-10	NA		
Silver	8.32E-01	9.12E-07	NA		2.64E-08	NA		3.46E-11	NA		
Thallium	3.81E+00	4.18E-06	NA		1.21E-07	NA		1.59E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	4.95E+01	5.42E-05	NA		1.57E-06	NA		2.06E-09	NA		
Zinc	8.03E+03	8.80E-03	NA		2.55E-04	NA		3.34E-07	NA		
Pesticides/PCBs											
4,4'-DDD	6.08E-02	6.66E-08	2.40E-01	1.60E-08	9.66E-09	2.40E-01	2.32E-09	2.53E-12	2.42E-01	6.11E-13	1.83E-08
4,4'-DDE	2.35E-02	2.58E-08	3.40E-01	8.76E-09	3.73E-09	3.40E-01	1.27E-09	9.78E-13	3.40E-01	3.32E-13	1.00E-08
4,4'-DDT	8.79E-03	9.63E-09	3.40E-01	3.28E-09	1.40E-09	3.40E-01	4.75E-10	3.66E-13	3.40E-01	1.24E-13	3.75E-09
Dieldrin	9.15E-03	1.00E-08	1.60E+01	1.60E-07	1.45E-09	1.60E+01	2.33E-08	3.81E-13	1.61E+01	6.13E-12	1.84E-07
Endrin	4.27E-03	4.68E-09	NA		6.79E-10	NA		1.78E-13	NA		
Endrin ketone	1.32E-02	1.45E-08	NA		2.10E-09	NA		5.50E-13	NA		
gamma-Chlordane	1.41E-03	1.55E-09	1.20E+00	1.85E-09	2.24E-10	1.20E+00	2.69E-10	5.87E-14	3.50E-01	2.05E-14	2.12E-09
Methoxychlor	9.90E-03	1.08E-08	NA		1.57E-09	NA		4.12E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	2.09E-06	NA		9.11E-07	NA		7.95E-11	NA		
Acenaphthylene	1.20E+00	1.32E-06	NA		5.72E-07	NA		5.00E-11	NA		
Anthracene	9.40E-01	1.03E-06	NA		4.48E-07	NA		3.91E-11	NA		
Benzo(a)anthracene	4.14E+00	4.54E-06	1.20E+00	5.44E-06	1.97E-06	1.20E+00	2.37E-06	1.72E-10	3.85E-01	6.64E-11	**7.81E-06**
Benzo(a)pyrene	8.90E+00	9.75E-06	1.20E+01	1.17E-04	4.24E-06	1.20E+01	5.09E-05	3.71E-10	3.85E+00	1.43E-09	**1.68E-04**
Benzo(b)fluoranthene	5.60E+00	6.14E-06	1.20E+00	7.36E-06	2.67E-06	1.20E+00	3.20E-06	2.33E-10	3.85E-01	8.98E-11	**1.06E-05**
Benzo(g,h,i)perylene	9.00E+00	9.86E-06	NA		4.29E-06	NA		3.75E-10	NA		
Benzo(k)fluoranthene	3.40E+00	3.73E-06	1.20E+00	4.47E-06	1.62E-06	1.20E+00	1.94E-06	1.42E-10	3.85E-01	5.45E-11	**6.42E-06**
Biphenyl (diphenyl)	1.60E-01	1.75E-07	NA		5.08E-08	NA		6.66E-12	NA		
Chrysene	6.50E+00	7.12E-06	1.20E-01	8.55E-07	3.10E-06	1.20E-01	3.72E-07	2.71E-10	3.85E-02	1.04E-11	**1.23E-06**
Dibenz(a,h)anthracene	1.02E+00	1.12E-06	7.30E+00	8.16E-06	4.86E-07	7.30E+00	3.55E-06	4.25E-11	4.20E+00	1.78E-10	**1.17E-05**
Fluoranthene	1.20E+01	1.32E-05	NA		5.72E-06	NA		5.00E-10	NA		
Fluorene	4.23E-01	4.64E-07	NA		2.02E-07	NA		1.76E-11	NA		
Indeno(1,2,3-c,d)pyrene	8.30E+00	9.10E-06	1.20E+00	1.09E-05	3.96E-06	1.20E+00	4.75E-06	3.46E-10	3.85E-01	1.33E-10	**1.57E-05**
Naphthalene	7.99E-01	8.76E-07	1.20E-01	1.05E-07	3.81E-07	1.20E-01	4.57E-08	3.33E-11	1.19E-01	3.96E-12	1.51E-07
Phenanthrene	4.40E+00	4.82E-06	NA		2.10E-06	NA		1.83E-10	NA		
Pyrene	1.60E+01	1.75E-05	NA		7.63E-06	NA		6.66E-10	NA		
Acetone	3.40E-02	3.73E-08	NA		1.08E-08	NA		1.42E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	2.19E-09	NA		6.36E-10	NA		8.33E-14	NA		
Methyl ethyl ketone	1.94E-02	2.13E-08	NA		6.17E-09	NA		8.08E-13	NA		
Methylene chloride	4.00E-03	4.38E-09	1.40E-02	6.14E-11	1.27E-09	1.40E-02	1.78E-11	1.67E-13	3.50E-03	5.83E-16	7.92E-11
Toluene	7.76E-03	8.50E-09	NA		2.47E-09	NA		3.23E-13	NA		
Xylenes, total	5.00E-03	5.48E-09	NA		1.59E-09	NA		2.08E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	3.85E-11	1.50E+03	5.77E-08	3.35E-12	1.50E+03	5.02E-09	1.46E-15	1.50E+03	2.19E-12	6.27E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.38E-11	1.50E+03	5.06E-08	2.94E-12	1.50E+03	4.40E-09	1.28E-15	1.50E+03	1.92E-12	5.50E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.10E-12	1.50E+03	4.65E-09	2.70E-13	1.50E+03	4.05E-10	1.18E-16	1.50E+03	1.77E-13	5.06E-09
1,2,3,4,7,8-HxCDD	2.83E-06	3.10E-12	1.50E+04	4.65E-08	2.70E-13	1.50E+04	4.05E-09	1.18E-16	1.50E+04	1.77E-12	5.06E-08
1,2,3,4,7,8-HxCDF	1.74E-05	1.91E-11	1.50E+04	2.86E-07	1.66E-12	1.50E+04	2.49E-08	7.24E-16	1.50E+04	1.09E-11	3.11E-07
1,2,3,6,7,8-HxCDD	5.59E-06	6.13E-12	1.50E+04	9.19E-08	5.33E-13	1.50E+04	7.99E-09	2.33E-16	1.50E+04	3.49E-12	9.99E-08
1,2,3,6,7,8-HxCDF	1.13E-05	1.24E-11	1.50E+04	1.86E-07	1.08E-12	1.50E+04	1.62E-08	4.71E-16	1.50E+04	7.06E-12	2.02E-07
1,2,3,7,8,9-HxCDD	3.75E-06	4.11E-12	1.50E+04	6.16E-08	3.58E-13	1.50E+04	5.36E-09	1.56E-16	1.50E+04	2.34E-12	6.70E-08

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
1,2,3,7,8,9-HxCDF	3.79E-06	4.15E-12	1.50E+04	6.23E-08	3.61E-13	1.50E+04	5.42E-09	1.58E-16	1.50E+04	2.37E-12	6.77E-08
1,2,3,7,8-PeCDD	3.37E-06	3.69E-12	1.50E+05	5.54E-07	3.21E-13	1.50E+05	4.82E-08	1.40E-16	1.50E+05	2.10E-11	6.02E-07
1,2,3,7,8-PeCDF	3.91E-06	4.28E-12	7.50E+03	3.21E-08	3.73E-13	7.50E+03	2.80E-09	1.63E-16	7.50E+03	1.22E-12	3.49E-08
2,3,4,6,7,8-HxCDF	1.55E-05	1.70E-11	1.50E+04	2.55E-07	1.48E-12	1.50E+04	2.22E-08	6.45E-16	1.50E+04	9.68E-12	2.77E-07
2,3,4,7,8-PeCDF	3.32E-05	3.64E-11	7.50E+04	2.73E-06	3.17E-12	7.50E+04	2.37E-07	1.38E-15	7.50E+04	1.04E-10	**2.97E-06**
2,3,7,8-TCDD	8.98E-07	9.84E-13	1.50E+05	1.48E-07	8.56E-14	1.50E+05	1.28E-08	3.74E-17	1.50E+05	5.61E-12	1.60E-07
2,3,7,8-TCDF	8.22E-06	9.01E-12	1.50E+04	1.35E-07	7.84E-13	1.50E+04	1.18E-08	3.42E-16	1.50E+04	5.13E-12	1.47E-07
OCDD	3.57E-04	3.91E-10	1.50E+01	5.87E-09	3.40E-11	1.50E+01	5.11E-10	1.49E-14	1.50E+01	2.23E-13	6.38E-09
OCDF	1.88E-05	2.06E-11	1.50E+01	3.09E-10	1.79E-12	1.50E+01	2.69E-11	7.83E-16	1.50E+01	1.17E-14	3.36E-10
			Total Risk:	1.80E-04		**Total Risk:**	6.94E-05		**Total Risk:**	1.71E-08	**2.50E-04**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2E-04**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-48
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2900	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.20	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.30E+04	1.66E-01	1.00E+00	1.66E-01	4.82E-03	1.00E+00	4.82E-03	6.31E-06	1.40E-03	4.51E-03	1.76E-01
Antimony	2.16E+02	2.76E-03	4.00E-04	6.90E+00	8.01E-05	4.00E-04	2.00E-01	1.05E-07	NA		**7.10E+00**
Arsenic	1.28E+01	1.64E-04	3.00E-04	5.46E-01	1.42E-05	3.00E-04	4.75E-02	6.22E-09	4.29E-06	1.45E-03	5.94E-01
Barium	3.50E+03	4.47E-02	2.00E-01	2.24E-01	1.30E-03	2.00E-01	6.49E-03	1.70E-06	1.43E-04	1.19E-02	2.42E-01
Beryllium	6.74E-01	8.62E-06	2.00E-03	4.31E-03	2.50E-07	2.00E-03	1.25E-04	3.27E-10	2.00E-06	1.64E-04	4.60E-03
Cadmium	1.11E+01	1.42E-04	1.10E-05	1.29E+01	4.12E-07	1.10E-05	3.74E-02	5.39E-09	2.86E-06	1.89E-03	**1.29E+01**
Chromium	8.01E+01	1.02E-03	NA		2.97E-05	NA		3.89E-08	NA		
Cobalt	1.19E+01	1.52E-04	3.00E-04	5.07E-01	4.41E-06	3.00E-04	1.47E-02	5.78E-09	1.71E-06	3.37E-03	5.25E-01
Copper	3.07E+02	3.93E-03	4.00E-02	9.81E-02	1.14E-04	4.00E-02	2.85E-03	1.49E-07	NA		1.01E-01
Iron	5.74E+04	7.34E-01	7.00E-01	1.05E+00	2.13E-02	7.00E-01	3.04E-02	2.79E-05	NA		**1.08E+00**
Lead	1.45E+03	1.85E-02	NA		5.38E-04	NA		7.04E-07	NA		
Manganese	8.57E+02	1.10E-02	2.40E-02	4.57E-01	3.18E-04	2.40E-02	1.32E-02	4.16E-07	1.43E-05	2.91E-02	4.99E-01
Nickel	5.87E+01	7.51E-04	1.10E-02	6.82E-02	2.18E-05	1.10E-02	1.98E-03	2.85E-08	2.57E-05	1.11E-03	7.13E-02
Selenium	3.53E+00	4.51E-05	5.00E-03	9.03E-03	1.31E-06	5.00E-03	2.62E-04	1.71E-09	5.71E-03	3.00E-07	9.29E-03
Silver	8.32E-01	1.06E-05	5.00E-03	2.13E-03	3.08E-07	5.00E-03	6.17E-05	4.04E-10	NA		2.19E-03
Thallium	3.81E+00	4.87E-05	6.60E-05	7.38E-01	1.41E-06	6.60E-05	2.14E-02	1.85E-09	NA		7.59E-01
Vanadium	4.95E+01	6.33E-04	5.00E-03	1.27E-01	1.84E-05	5.00E-03	3.67E-03	2.40E-08	NA		1.30E-01

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Zinc	8.03E+03	1.03E-01	3.00E-01	3.42E-01	2.98E-03	3.00E-01	9.92E-03	3.90E-06	NA		3.52E-01
Pesticides/PCBs											
4,4'-DDD	6.08E-02	7.77E-07	NA		1.13E-07	NA		2.95E-11	NA		
4,4'-DDE	2.35E-02	3.00E-07	NA		4.36E-08	NA		1.14E-11	NA		
4,4'-DDT	8.79E-03	1.12E-07	5.00E-04	2.25E-04	1.63E-08	5.00E-04	3.26E-05	4.27E-12	NA		2.57E-04
Dieldrin	9.15E-03	1.17E-07	5.00E-05	2.34E-03	1.70E-08	5.00E-05	3.39E-04	4.44E-12	NA		2.68E-03
Endrin	4.27E-03	5.46E-08	3.00E-04	1.82E-04	7.92E-09	3.00E-04	2.64E-05	2.07E-12	NA		2.08E-04
Endrin ketone	1.32E-02	1.69E-07	3.00E-04	5.63E-04	2.45E-08	3.00E-04	8.16E-05	6.41E-12	NA		6.44E-04
gamma-Chlordane	1.41E-03	1.80E-08	3.30E-05	5.46E-04	2.61E-09	3.30E-05	7.92E-05	6.85E-13	2.00E-04	3.42E-09	6.25E-04
Methoxychlor	9.90E-03	1.27E-07	2.00E-05	6.33E-03	1.84E-08	2.00E-05	9.18E-04	4.81E-12	2.00E-05	2.40E-07	7.25E-03
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	2.44E-05	4.00E-03	6.11E-03	1.06E-05	4.00E-03	2.66E-03	9.28E-10	NA		8.76E-03
Acenaphthylene	1.20E+00	1.53E-05	NA		6.67E-06	NA		5.83E-10	NA		
Anthracene	9.40E-01	1.20E-05	3.00E-01	4.01E-05	5.23E-06	3.00E-01	1.74E-05	4.57E-10	NA		5.75E-05
Benzo(a)anthracene	4.14E+00	5.29E-05	NA		2.30E-05	NA		2.01E-09	NA		
Benzo(a)pyrene	8.90E+00	1.14E-04	NA		4.95E-05	NA		4.32E-09	NA		
Benzo(b)fluoranthene	5.60E+00	7.16E-05	NA		3.11E-05	NA		2.72E-09	NA		
Benzo(g,h,i)perylene	9.00E+00	1.15E-04	NA		5.01E-05	NA		4.37E-09	NA		
Benzo(k)fluoranthene	3.40E+00	4.35E-05	NA		1.89E-05	NA		1.65E-09	NA		
Biphenyl (diphenyl)	1.60E-01	2.05E-06	5.00E-02	4.09E-05	5.93E-07	5.00E-02	1.19E-05	7.77E-11	NA		5.28E-05
Chrysene	6.50E+00	8.31E-05	NA		3.62E-05	NA		3.16E-09	NA		
Dibenz(a,h)anthracene	1.02E+00	1.30E-05	NA		5.67E-06	NA		4.95E-10	NA		
Fluoranthene	1.20E+01	1.53E-04	4.00E-02	3.84E-03	6.67E-05	4.00E-02	1.67E-03	5.83E-09	NA		5.50E-03
Fluorene	4.23E-01	5.41E-06	4.00E-02	1.35E-04	2.35E-06	4.00E-02	5.88E-05	2.05E-10	NA		1.94E-04
Indeno(1,2,3-c,d)pyrene	8.30E+00	1.06E-04	NA		4.62E-05	NA		4.03E-09	NA		
Naphthalene	7.99E-01	1.02E-05	2.00E-02	5.11E-04	4.44E-06	2.00E-02	2.22E-04	3.88E-10	8.57E-04	4.53E-07	7.33E-04
Phenanthrene	4.40E+00	5.63E-05	NA		2.45E-05	NA		2.14E-09	NA		
Pyrene	1.60E+01	2.05E-04	3.00E-02	6.82E-03	8.90E-05	3.00E-02	2.97E-03	7.77E-09	NA		9.79E-03
Acetone	3.40E-02	4.35E-07	9.00E-01	4.83E-07	1.26E-07	9.00E-01	1.40E-07	1.65E-11	8.86E+00	1.86E-12	6.23E-07
cis-1,2-Dichloroethene	2.00E-03	2.56E-08	1.00E-02	2.56E-06	7.42E-09	1.00E-02	7.42E-07	9.72E-13	NA		3.30E-06
Methyl ethyl ketone	1.94E-02	2.48E-07	6.00E-01	4.13E-07	7.19E-08	6.00E-01	1.20E-07	9.42E-12	1.43E+00	6.60E-12	5.33E-07
Methylene chloride	4.00E-03	5.11E-08	6.00E-02	8.52E-07	1.48E-08	6.00E-02	2.47E-07	1.94E-12	2.86E-01	6.80E-12	1.10E-06
Toluene	7.76E-03	9.92E-08	8.00E-02	1.24E-06	2.88E-08	8.00E-02	3.60E-07	3.77E-12	8.57E-02	4.40E-11	1.60E-06
Xylenes, total	5.00E-03	6.39E-08	2.00E-01	3.20E-07	1.85E-08	2.00E-01	9.27E-08	2.43E-12	2.86E-02	8.50E-11	4.12E-07
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	4.49E-10	NA		3.90E-11	NA		1.71E-14	1.14E-08	1.49E-06	1.49E-06
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.94E-10	NA		3.43E-11	NA		1.50E-14	1.14E-08	1.31E-06	1.31E-06
1,2,3,4,7,8,9-HpCDF	2.83E-06	3.62E-11	NA		3.15E-12	NA		1.37E-15	1.14E-08	1.20E-07	1.20E-07
1,2,3,4,7,8-HxCDD	2.83E-06	3.62E-11	NA		3.15E-12	NA		1.37E-15	1.14E-08	1.20E-07	1.20E-07
1,2,3,4,7,8-HxCDF	1.74E-05	2.22E-10	NA		1.94E-11	NA		8.45E-15	1.14E-08	7.40E-07	7.40E-07
1,2,3,6,7,8-HxCDD	5.59E-06	7.15E-11	NA		6.22E-12	NA		2.72E-15	1.14E-08	2.38E-07	2.38E-07
1,2,3,6,7,8-HxCDF	1.13E-05	1.44E-10	NA		1.26E-11	NA		5.49E-15	1.14E-08	4.80E-07	4.80E-07
1,2,3,7,8,9-HxCDD	3.75E-06	4.79E-11	NA		4.17E-12	NA		1.82E-15	1.14E-08	1.59E-07	1.59E-07
1,2,3,7,8,9-HxCDF	3.79E-06	4.85E-11	NA		4.22E-12	NA		1.84E-15	1.14E-08	1.61E-07	1.61E-07
1,2,3,7,8-PeCDD	3.37E-06	4.31E-11	NA		3.75E-12	NA		1.64E-15	1.14E-08	1.43E-07	1.43E-07
1,2,3,7,8-PeCDF	3.91E-06	5.00E-11	NA		4.35E-12	NA		1.90E-15	1.14E-08	1.66E-07	1.66E-07
2,3,4,6,7,8-HxCDF	1.55E-05	1.98E-10	NA		1.72E-11	NA		7.53E-15	1.14E-08	6.59E-07	6.59E-07
2,3,4,7,8-PeCDF	3.32E-05	4.24E-10	NA		3.69E-11	NA		1.61E-14	1.14E-08	1.41E-06	1.41E-06
2,3,7,8-TCDD	8.98E-07	1.15E-11	NA		9.99E-13	NA		4.36E-16	1.14E-08	3.82E-08	3.82E-08

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
2,3,7,8-TCDF	8.22E-06	1.05E-10	NA		9.14E-12	NA		3.99E-15	1.14E-08	3.49E-07	3.49E-07
OCDD	3.57E-04	4.56E-09	NA		3.97E-10	NA		1.73E-13	1.14E-08	1.52E-05	1.52E-05
OCDF	1.88E-05	2.40E-10	NA		2.09E-11	NA		9.13E-15	1.14E-08	7.99E-07	7.99E-07
		Total Risk (Hazard Index):		24.2	**Total Risk (Hazard Index):**		0.4	**Total Risk (Hazard Index):**		0.1	**24.6**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **25**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-49
Cancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Adult/Child Resident - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**9.0E-06**	**1.1E-06**	1.4E-08	**1.0E-05**	9%	**2.1E-05**	**1.8E-06**	8.0E-09	**2.3E-05**	9%
Subtotal Metals	**9.0E-06**	**1.1E-06**	2.6E-08	**1.0E-05**	9%	**2.1E-05**	**1.8E-06**	1.5E-08	**2.3E-05**	9%
SVOCs/VOCs										
Benzo(a)anthracene	**2.3E-06**	**1.4E-06**	1.1E-10	**3.7E-06**	3%	**5.4E-06**	**2.4E-06**	6.6E-11	**7.8E-06**	3%
Benzo(a)pyrene	**5.0E-05**	**3.0E-05**	2.4E-09	**8.0E-05**	68%	**1.2E-04**	**5.1E-05**	1.4E-09	**1.7E-04**	67%
Benzo(b)fluoranthene	**3.2E-06**	**1.9E-06**	1.5E-10	**5.0E-06**	4%	**7.4E-06**	**3.2E-06**	9.0E-11	**1.1E-05**	4%
Benzo(k)fluoranthene	**1.9E-06**	**1.1E-06**	9.3E-11	**3.1E-06**	3%	**4.5E-06**	**1.9E-06**	5.5E-11	**6.4E-06**	3%
Chrysene	3.7E-07	2.2E-07	1.8E-11	5.9E-07	0.5%	8.5E-07	3.7E-07	1.0E-11	**1.2E-06**	0.5%
Dibenz(a,h)anthracene	**3.5E-06**	**2.1E-06**	3.1E-10	**5.6E-06**	5%	**8.2E-06**	**3.5E-06**	1.8E-10	**1.2E-05**	5%
Indeno(1,2,3-c,d)pyrene	**4.7E-06**	**2.8E-06**	2.3E-10	**7.5E-06**	6%	**1.1E-05**	**4.7E-06**	1.3E-10	**1.6E-05**	6%
Subtotal SVOCs/VOCs	**6.6E-05**	**4.0E-05**	3.4E-09	**1.1E-04**	89%	**1.5E-04**	**6.7E-05**	2.0E-09	**2.2E-04**	89%
Dioxans/Furans										
2,3,4,7,8-PeCDF	**1.2E-06**	1.4E-07	1.8E-10	**1.3E-06**	1.1%	**2.7E-06**	2.4E-07	1.0E-10	**3.0E-06**	1.2%
Subtotal Dioxans/Furans	**2.0E-06**	2.4E-07	3.1E-10	**2.3E-06**	2%	**4.7E-06**	4.1E-07	1.8E-10	**5.1E-06**	2%
Total:	**7.7E-05**	**4.1E-05**	2.9E-08	**1.2E-04**		**1.8E-04**	**6.9E-05**	1.7E-08	**2.5E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:				**1E-04**					**2E-04**	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**2.6E-04**	**1.1E-04**	**4.6E-08**	**3.68E-04**	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									**4E-04**	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-50
Noncancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Adult/Child Resident - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.8E-02	7.1E-04	1.9E-03	2.0E-02	2%	**1.7E-01**	4.8E-03	4.5E-03	**1.8E-01**	1%
Antimony	**7.4E-01**	3.0E-02		**7.7E-01**	59%	**6.9E+00**	**2.0E-01**		**7.1E+00**	29%
Arsenic	5.8E-02	7.0E-03	6.2E-04	6.6E-02	5%	**5.5E-01**	4.7E-02	1.5E-03	**5.9E-01**	2%
Barium	2.4E-02	9.6E-04	5.1E-03	3.0E-02	2%	**2.2E-01**	6.5E-03	1.2E-02	**2.4E-01**	1%
Cadmium	3.0E-02	1.2E-04	8.1E-04	3.1E-02	2%	**1.3E+01**	3.7E-02	1.9E-03	**1.3E+01**	53%
Cobalt	5.4E-02	2.2E-03	1.4E-03	5.8E-02	4%	**5.1E-01**	1.5E-02	3.4E-03	**5.3E-01**	2%
Copper	1.1E-02	4.2E-04		1.1E-02	0.8%	9.8E-02	2.8E-03		**1.0E-01**	0.4%
Iron	**1.1E-01**	4.5E-03		**1.2E-01**	9%	**1.0E+00**	3.0E-02		**1.1E+00**	4%
Manganese	4.9E-02	2.0E-03	1.2E-02	6.3E-02	5%	**4.6E-01**	1.3E-02	2.9E-02	**5.0E-01**	2%
Thallium	7.9E-02	3.2E-03		8.2E-02	6%	**7.4E-01**	2.1E-02		**7.6E-01**	3%
Vanadium	1.4E-02	5.4E-04		1.4E-02	1%	**1.3E-01**	3.7E-03		**1.3E-01**	1%
Zinc	3.7E-02	1.5E-03		3.8E-02	3%	**3.4E-01**	9.9E-03		**3.5E-01**	1%
Subtotal Metals	**1.2E+00**	5.3E-02	2.3E-02	**1.3E+00**	100%	**2.4E+01**	**4.0E-01**	5.4E-02	**2.5E+01**	100%
Total:	**1.2**	0.1	0.02	**1.3**		**24**	**0.4**	0.1	**24.6**	

Total Estimated Hazard Index Across All Exposure Routes: Adult Resident: **1** Child Resident: **25**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-51
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.30E+04	4.54E-03	NA		5.18E-04	NA		6.90E-07	NA		
Antimony	2.16E+02	7.55E-05	NA		8.60E-06	NA		1.15E-08	NA		
Arsenic	1.28E+01	4.47E-06	1.50E+00	6.71E-06	1.53E-06	1.50E+00	2.29E-06	6.80E-10	1.51E+01	1.02E-08	**9.01E-06**
Barium	3.50E+03	1.22E-03	NA		1.39E-04	NA		1.86E-07	NA		
Beryllium	6.74E-01	2.36E-07	NA		2.69E-08	NA		3.58E-11	8.40E+00	3.01E-10	3.01E-10
Cadmium	1.11E+01	3.88E-06	NA		4.42E-08	NA		5.90E-10	6.30E+00	3.71E-09	3.71E-09
Chromium	8.01E+01	2.80E-05	NA		3.19E-06	NA		4.25E-09	NA		
Cobalt	1.19E+01	4.16E-06	NA		4.74E-07	NA		6.32E-10	3.15E+00	1.99E-09	1.99E-09
Copper	3.07E+02	1.07E-04	NA		1.22E-05	NA		1.63E-08	NA		
Iron	5.74E+04	2.01E-02	NA		2.29E-03	NA		3.05E-06	NA		
Lead	1.45E+03	5.07E-04	NA		5.78E-05	NA		7.70E-08	NA		
Manganese	8.57E+02	2.99E-04	NA		3.41E-05	NA		4.55E-08	NA		
Nickel	5.87E+01	2.05E-05	NA		2.34E-06	NA		3.12E-09	9.10E-01	2.84E-09	2.84E-09
Selenium	3.53E+00	1.23E-06	NA		1.41E-07	NA		1.87E-10	NA		
Silver	8.32E-01	2.91E-07	NA		3.31E-08	NA		4.42E-11	NA		
Thallium	3.81E+00	1.33E-06	NA		1.52E-07	NA		2.02E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	4.95E+01	1.73E-05	NA		1.97E-06	NA		2.63E-09	NA		
Zinc	8.03E+03	2.81E-03	NA		3.20E-04	NA		4.26E-07	NA		
Pesticides/PCBs											
4,4'-DDD	6.08E-02	2.12E-08	2.40E-01	5.10E-09	1.21E-08	2.40E-01	2.91E-09	3.23E-12	2.42E-01	7.80E-13	8.01E-09
4,4'-DDE	2.35E-02	8.21E-09	3.40E-01	2.79E-09	4.68E-09	3.40E-01	1.59E-09	1.25E-12	3.40E-01	4.24E-13	4.38E-09
4,4'-DDT	8.79E-03	3.07E-09	3.40E-01	1.04E-09	1.75E-09	3.40E-01	5.95E-10	4.67E-13	3.40E-01	1.58E-13	1.64E-09
Dieldrin	9.15E-03	3.20E-09	1.60E+01	5.12E-08	1.82E-09	1.60E+01	2.92E-08	4.86E-13	1.61E+01	7.82E-12	8.03E-08
Endrin	4.27E-03	1.49E-09	NA		8.51E-10	NA		2.27E-13	NA		
Endrin ketone	1.32E-02	4.61E-09	NA		2.63E-09	NA		7.01E-13	NA		
gamma-Chlordane	1.41E-03	4.93E-10	1.20E+00	5.91E-10	2.81E-10	1.20E+00	3.37E-10	7.49E-14	3.50E-01	2.62E-14	9.28E-10
Methoxychlor	9.90E-03	3.46E-09	NA		1.97E-09	NA		5.26E-13	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	6.67E-07	NA		1.14E-06	NA		1.01E-10	NA		
Acenaphthylene	1.20E+00	4.19E-07	NA		7.17E-07	NA		6.37E-11	NA		
Anthracene	9.40E-01	3.28E-07	NA		5.62E-07	NA		4.99E-11	NA		
Benzo(a)anthracene	4.14E+00	1.45E-06	1.20E+00	1.74E-06	2.47E-06	1.20E+00	2.97E-06	2.20E-10	3.85E-01	8.46E-11	**4.70E-06**
Benzo(a)pyrene	8.90E+00	3.11E-06	1.20E+01	3.73E-05	5.32E-06	1.20E+01	6.38E-05	4.73E-10	3.85E+00	1.82E-09	**1.01E-04**
Benzo(b)fluoranthene	5.60E+00	1.96E-06	1.20E+00	2.35E-06	3.35E-06	1.20E+00	4.02E-06	2.97E-10	3.85E-01	1.15E-10	**6.36E-06**
Benzo(g,h,i)perylene	9.00E+00	3.15E-06	NA		5.38E-06	NA		4.78E-10	NA		
Benzo(k)fluoranthene	3.40E+00	1.19E-06	1.20E+00	1.43E-06	2.03E-06	1.20E+00	2.44E-06	1.81E-10	3.85E-01	6.95E-11	**3.86E-06**
Biphenyl (diphenyl)	1.60E-01	5.59E-08	NA		6.37E-08	NA		8.50E-12	NA		
Chrysene	6.50E+00	2.27E-06	1.20E-01	2.73E-07	3.88E-06	1.20E-01	4.66E-07	3.45E-10	3.85E-02	1.33E-11	7.39E-07
Dibenz(a,h)anthracene	1.02E+00	3.56E-07	7.30E+00	2.60E-06	6.10E-07	7.30E+00	4.45E-06	5.42E-11	4.20E+00	2.28E-10	**7.05E-06**
Fluoranthene	1.20E+01	4.19E-06	NA		7.17E-06	NA		6.37E-10	NA		
Fluorene	4.23E-01	1.48E-07	NA		2.53E-07	NA		2.25E-11	NA		
Indeno(1,2,3-c,d)pyrene	8.30E+00	2.90E-06	1.20E+00	3.48E-06	4.96E-06	1.20E+00	5.95E-06	4.41E-10	3.85E-01	1.70E-10	**9.43E-06**
Naphthalene	7.99E-01	2.79E-07	1.20E-01	3.35E-08	4.77E-07	1.20E-01	5.73E-08	4.24E-11	1.19E-01	5.05E-12	9.08E-08
Phenanthrene	4.40E+00	1.54E-06	NA		2.63E-06	NA		2.34E-10	NA		
Pyrene	1.60E+01	5.59E-06	NA		9.56E-06	NA		8.50E-10	NA		
Acetone	3.40E-02	1.19E-08	NA		1.35E-08	NA		1.81E-12	NA		
cis-1,2-Dichloroethene	2.00E-03	6.99E-10	NA		7.97E-10	NA		1.06E-13	NA		
Methyl ethyl ketone	1.94E-02	6.78E-09	NA		7.73E-09	NA		1.03E-12	NA		
Methylene chloride	4.00E-03	1.40E-09	1.40E-02	1.96E-11	1.59E-09	1.40E-02	2.23E-11	2.12E-13	3.50E-03	7.44E-16	4.19E-11
Toluene	7.76E-03	2.71E-09	NA		3.09E-09	NA		4.12E-13	NA		
Xylenes, total	5.00E-03	1.75E-09	NA		1.99E-09	NA		2.66E-13	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.23E-11	1.50E+03	1.84E-08	4.19E-12	1.50E+03	6.29E-09	1.86E-15	1.50E+03	2.80E-12	2.47E-08
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.08E-11	1.50E+03	1.61E-08	3.68E-12	1.50E+03	5.52E-09	1.64E-15	1.50E+03	2.45E-12	2.17E-08
1,2,3,4,7,8,9-HpCDF	2.83E-06	9.89E-13	1.50E+03	1.48E-09	3.38E-13	1.50E+03	5.07E-10	1.50E-16	1.50E+03	2.25E-13	1.99E-09
1,2,3,4,7,8-HxCDD	2.83E-06	9.89E-13	1.50E+04	1.48E-08	3.38E-13	1.50E+04	5.07E-09	1.50E-16	1.50E+04	2.25E-12	1.99E-08
1,2,3,4,7,8-HxCDF	1.74E-05	6.08E-12	1.50E+04	9.12E-08	2.08E-12	1.50E+04	3.12E-08	9.24E-16	1.50E+04	1.39E-11	1.22E-07
1,2,3,6,7,8-HxCDD	5.59E-06	1.95E-12	1.50E+04	2.93E-08	6.68E-13	1.50E+04	1.00E-08	2.97E-16	1.50E+04	4.45E-12	3.93E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
1,2,3,6,7,8-HxCDF	1.13E-05	3.95E-12	1.50E+04	5.92E-08	1.35E-12	1.50E+04	2.03E-08	6.00E-16	1.50E+04	9.00E-12	7.95E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.31E-12	1.50E+04	1.97E-08	4.48E-13	1.50E+04	6.72E-09	1.99E-16	1.50E+04	2.99E-12	2.64E-08
1,2,3,7,8,9-HxCDF	3.79E-06	1.32E-12	1.50E+04	1.99E-08	4.53E-13	1.50E+04	6.79E-09	2.01E-16	1.50E+04	3.02E-12	2.67E-08
1,2,3,7,8-PeCDD	3.37E-06	1.18E-12	1.50E+05	1.77E-07	4.03E-13	1.50E+05	6.04E-08	1.79E-16	1.50E+05	2.68E-11	2.37E-07
1,2,3,7,8-PeCDF	3.91E-06	1.37E-12	7.50E+03	1.02E-08	4.67E-13	7.50E+03	3.50E-09	2.08E-16	7.50E+03	1.56E-12	1.38E-08
2,3,4,6,7,8-HxCDF	1.55E-05	5.42E-12	1.50E+04	8.12E-08	1.85E-12	1.50E+04	2.78E-08	8.23E-16	1.50E+04	1.23E-11	1.09E-07
2,3,4,7,8-PeCDF	3.32E-05	1.16E-11	7.50E+04	8.70E-07	3.97E-12	7.50E+04	2.98E-07	1.76E-15	7.50E+04	1.32E-10	**1.17E-06**
2,3,7,8-TCDD	8.98E-07	3.14E-13	1.50E+05	4.71E-08	1.07E-13	1.50E+05	1.61E-08	4.77E-17	1.50E+05	7.15E-12	6.32E-08
2,3,7,8-TCDF	8.22E-06	2.87E-12	1.50E+04	4.31E-08	9.82E-13	1.50E+04	1.47E-08	4.37E-16	1.50E+04	6.55E-12	5.78E-08
OCDD	3.57E-04	1.25E-10	1.50E+01	1.87E-09	4.27E-11	1.50E+01	6.40E-10	1.90E-14	1.50E+01	2.84E-13	2.51E-09
OCDF	1.88E-05	6.57E-12	1.50E+01	9.85E-11	2.25E-12	1.50E+01	3.37E-11	9.98E-16	1.50E+01	1.50E-14	1.32E-10
			Total Risk:	**5.75E-05**		Total Risk:	**8.70E-05**		Total Risk:	2.18E-08	**1.45E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-52
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Industrial Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.30E+04	1.27E-02	1.00E+00	1.27E-02	1.45E-03	1.00E+00	1.45E-03	1.93E-06	1.40E-03	1.38E-03	1.56E-02
Antimony	2.16E+02	2.11E-04	4.00E-04	5.28E-01	2.41E-05	4.00E-04	6.02E-02	3.21E-08	NA		**5.89E-01**
Arsenic	1.28E+01	1.25E-05	3.00E-04	4.17E-02	4.28E-06	3.00E-04	1.43E-02	1.90E-09	4.29E-06	4.44E-04	5.65E-02
Barium	3.50E+03	3.42E-03	2.00E-01	1.71E-02	3.90E-04	2.00E-01	1.95E-03	5.20E-07	1.43E-04	3.64E-03	2.27E-02
Beryllium	6.74E-01	6.59E-07	2.00E-03	3.30E-04	7.52E-08	2.00E-03	3.76E-05	1.00E-10	2.00E-06	5.01E-05	4.17E-04
Cadmium	1.11E+01	1.09E-05	5.00E-04	2.17E-02	1.24E-07	5.00E-04	2.48E-04	1.65E-09	2.86E-06	5.78E-04	2.25E-02
Chromium	8.01E+01	7.84E-05	NA		8.93E-06	NA		1.19E-08	NA		
Cobalt	1.19E+01	1.16E-05	3.00E-04	3.88E-02	1.33E-06	3.00E-04	4.42E-03	1.77E-09	1.71E-06	1.03E-03	4.43E-02
Copper	3.07E+02	3.00E-04	4.00E-02	7.51E-03	3.42E-05	4.00E-02	8.56E-04	4.57E-08	NA		8.37E-03
Iron	5.74E+04	5.62E-02	7.00E-01	8.02E-02	6.40E-03	7.00E-01	9.15E-03	8.54E-06	NA		8.94E-02
Lead	1.45E+03	1.42E-03	NA		1.62E-04	NA		2.16E-07	NA		
Manganese	8.57E+02	8.39E-04	2.40E-02	3.49E-02	9.56E-05	2.40E-02	3.98E-03	1.27E-07	1.43E-05	8.92E-03	4.78E-02
Nickel	5.87E+01	5.74E-05	2.00E-02	2.87E-03	6.55E-06	2.00E-02	3.27E-04	8.73E-09	2.57E-05	3.39E-04	3.54E-03
Selenium	3.53E+00	3.45E-06	5.00E-03	6.91E-04	3.94E-07	5.00E-03	7.88E-05	5.25E-10	5.71E-03	9.19E-08	7.70E-04
Silver	8.32E-01	8.14E-07	5.00E-03	1.63E-04	9.28E-08	5.00E-03	1.86E-05	1.24E-10	NA		1.81E-04
Thallium	3.81E+00	3.73E-06	6.60E-05	5.65E-02	4.25E-07	6.60E-05	6.44E-03	5.67E-10	NA		6.29E-02
Vanadium	4.95E+01	4.84E-05	5.00E-03	9.69E-03	5.52E-06	5.00E-03	1.10E-03	7.36E-09	NA		1.08E-02
Zinc	8.03E+03	7.86E-03	3.00E-01	2.62E-02	8.96E-04	3.00E-01	2.99E-03	1.19E-06	NA		2.92E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	6.08E-02	5.95E-08	NA		3.39E-08	NA		9.04E-12	NA		
4,4'-DDE	2.35E-02	2.30E-08	NA		1.31E-08	NA		3.49E-12	NA		
4,4'-DDT	8.79E-03	8.60E-09	5.00E-04	1.72E-05	4.90E-09	5.00E-04	9.80E-06	1.31E-12	NA		2.70E-05
Dieldrin	9.15E-03	8.95E-09	5.00E-05	1.79E-04	5.10E-09	5.00E-05	1.02E-04	1.36E-12	NA		2.81E-04
Endrin	4.27E-03	4.18E-09	3.00E-04	1.39E-05	2.38E-09	3.00E-04	7.94E-06	6.35E-13	NA		2.19E-05
Endrin ketone	1.32E-02	1.29E-08	3.00E-04	4.31E-05	7.36E-09	3.00E-04	2.45E-05	1.96E-12	NA		6.76E-05
gamma-Chlordane	1.41E-03	1.38E-09	5.00E-04	2.76E-06	7.86E-10	5.00E-04	1.57E-06	2.10E-13	2.00E-04	1.05E-09	4.33E-06
Methoxychlor	9.90E-03	9.69E-09	2.00E-05	4.84E-04	5.52E-09	2.00E-05	2.76E-04	1.47E-12	NA		7.60E-04
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	1.87E-06	4.00E-03	4.67E-04	3.20E-06	4.00E-03	7.99E-04	2.84E-10	NA		1.27E-03
Acenaphthylene	1.20E+00	1.17E-06	NA		2.01E-06	NA		1.78E-10	NA		
Anthracene	9.40E-01	9.20E-07	3.00E-01	3.07E-06	1.57E-06	3.00E-01	5.24E-06	1.40E-10	NA		8.31E-06
Benzo(a)anthracene	4.14E+00	4.05E-06	NA		6.93E-06	NA		6.16E-10	NA		
Benzo(a)pyrene	8.90E+00	8.71E-06	NA		1.49E-05	NA		1.32E-09	NA		
Benzo(b)fluoranthene	5.60E+00	5.48E-06	NA		9.37E-06	NA		8.33E-10	NA		
Benzo(g,h,i)perylene	9.00E+00	8.81E-06	NA		1.51E-05	NA		1.34E-09	NA		
Benzo(k)fluoranthene	3.40E+00	3.33E-06	NA		5.69E-06	NA		5.06E-10	NA		
Biphenyl (diphenyl)	1.60E-01	1.57E-07	5.00E-02	3.13E-06	1.78E-07	5.00E-02	3.57E-06	2.38E-11	NA		6.70E-06
Chrysene	6.50E+00	6.36E-06	NA		1.09E-05	NA		9.67E-10	NA		
Dibenz(a,h)anthracene	1.02E+00	9.98E-07	NA		1.71E-06	NA		1.52E-10	NA		
Fluoranthene	1.20E+01	1.17E-05	4.00E-02	2.94E-04	2.01E-05	4.00E-02	5.02E-04	1.78E-09	NA		7.95E-04
Fluorene	4.23E-01	4.14E-07	4.00E-02	1.03E-05	7.08E-07	4.00E-02	1.77E-05	6.29E-11	NA		2.80E-05
Indeno(1,2,3-c,d)pyrene	8.30E+00	8.12E-06	NA		1.39E-05	NA		1.23E-09	NA		
Naphthalene	7.99E-01	7.82E-07	2.00E-02	3.91E-05	1.34E-06	2.00E-02	6.68E-05	1.19E-10	8.57E-04	1.39E-07	1.06E-04
Phenanthrene	4.40E+00	4.31E-06	NA		7.36E-06	NA		6.54E-10	NA		
Pyrene	1.60E+01	1.57E-05	3.00E-02	5.22E-04	2.68E-05	3.00E-02	8.92E-04	2.38E-09	NA		1.41E-03
Acetone	3.40E-02	3.33E-08	9.00E-01	3.70E-08	3.79E-08	9.00E-01	4.21E-08	5.06E-12	8.86E+00	5.71E-13	7.91E-08
cis-1,2-Dichloroethene	2.00E-03	1.96E-09	1.00E-02	1.96E-07	2.23E-09	1.00E-02	2.23E-07	2.97E-13	NA		4.19E-07
Methyl ethyl ketone	1.94E-02	1.90E-08	6.00E-01	3.16E-08	2.16E-08	6.00E-01	3.61E-08	2.88E-12	1.43E+00	2.02E-12	6.77E-08
Methylene chloride	4.00E-03	3.91E-09	6.00E-02	6.52E-08	4.46E-09	6.00E-02	7.44E-08	5.95E-13	2.86E-01	2.08E-12	1.40E-07
Toluene	7.76E-03	7.59E-09	8.00E-02	9.49E-08	8.66E-09	8.00E-02	1.08E-07	1.15E-12	8.57E-02	1.35E-11	2.03E-07
Xylenes, total	5.00E-03	4.89E-09	2.00E-01	2.45E-08	5.58E-09	2.00E-01	2.79E-08	7.44E-13	2.86E-02	2.60E-11	5.24E-08
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	3.43E-11	NA		1.17E-11	NA		5.22E-15	1.14E-08	4.57E-07	4.57E-07
1,2,3,4,6,7,8-HpCDF	3.08E-05	3.01E-11	NA		1.03E-11	NA		4.58E-15	1.14E-08	4.01E-07	4.01E-07
1,2,3,4,7,8,9-HpCDF	2.83E-06	2.77E-12	NA		9.47E-13	NA		4.21E-16	1.14E-08	3.68E-08	3.68E-08
1,2,3,4,7,8-HxCDD	2.83E-06	2.77E-12	NA		9.47E-13	NA		4.21E-16	1.14E-08	3.68E-08	3.68E-08
1,2,3,4,7,8-HxCDF	1.74E-05	1.70E-11	NA		5.82E-12	NA		2.59E-15	1.14E-08	2.26E-07	2.26E-07
1,2,3,6,7,8-HxCDD	5.59E-06	5.47E-12	NA		1.87E-12	NA		8.31E-16	1.14E-08	7.27E-08	7.27E-08
1,2,3,6,7,8-HxCDF	1.13E-05	1.11E-11	NA		3.78E-12	NA		1.68E-15	1.14E-08	1.47E-07	1.47E-07
1,2,3,7,8,9-HxCDD	3.75E-06	3.67E-12	NA		1.25E-12	NA		5.58E-16	1.14E-08	4.88E-08	4.88E-08
1,2,3,7,8,9-HxCDF	3.79E-06	3.71E-12	NA		1.27E-12	NA		5.64E-16	1.14E-08	4.93E-08	4.93E-08
1,2,3,7,8-PeCDD	3.37E-06	3.30E-12	NA		1.13E-12	NA		5.01E-16	1.14E-08	4.38E-08	4.38E-08
1,2,3,7,8-PeCDF	3.91E-06	3.83E-12	NA		1.31E-12	NA		5.81E-16	1.14E-08	5.09E-08	5.09E-08
2,3,4,6,7,8-HxCDF	1.55E-05	1.52E-11	NA		5.19E-12	NA		2.30E-15	1.14E-08	2.02E-07	2.02E-07
2,3,4,7,8-PeCDF	3.32E-05	3.25E-11	NA		1.11E-11	NA		4.94E-15	1.14E-08	4.32E-07	4.32E-07
2,3,7,8-TCDD	8.98E-07	8.79E-13	NA		3.01E-13	NA		1.34E-16	1.14E-08	1.17E-08	1.17E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
2,3,7,8-TCDF	8.22E-06	8.04E-12	NA		2.75E-12	NA		1.22E-15	1.14E-08	1.07E-07	1.07E-07
OCDD	3.57E-04	3.49E-10	NA		1.19E-10	NA		5.31E-14	1.14E-08	4.65E-06	4.65E-06
OCDF	1.88E-05	1.84E-11	NA		6.29E-12	NA		2.80E-15	1.14E-08	2.45E-07	2.45E-07
		Total Risk (Hazard Index):		0.9	Total Risk (Hazard Index):		0.1	Total Risk (Hazard Index):		0.016	1.01

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-53
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	1.30E+04	6.00E-04	NA		8.29E-05	NA		3.63E-05	NA		
Antimony	2.16E+02	9.96E-06	NA		1.38E-06	NA		6.04E-07	NA		
Arsenic	1.28E+01	5.90E-07	1.50E+00	8.86E-07	2.45E-07	1.50E+00	3.67E-07	3.58E-08	1.51E+01	5.39E-07	**1.79E-06**
Barium	3.50E+03	1.61E-04	NA		2.23E-05	NA		9.78E-06	NA		
Beryllium	6.74E-01	3.11E-08	NA		4.30E-09	NA		1.88E-09	8.40E+00	1.58E-08	1.58E-08
Cadmium	1.11E+01	5.12E-07	NA		7.08E-09	NA		3.10E-08	6.30E+00	1.95E-07	1.95E-07
Chromium	8.01E+01	3.69E-06	NA		5.11E-07	NA		2.24E-07	NA		
Cobalt	1.19E+01	5.49E-07	NA		7.59E-08	NA		3.33E-08	3.15E+00	1.05E-07	1.05E-07
Copper	3.07E+02	1.42E-05	NA		1.96E-06	NA		8.58E-07	NA		
Iron	5.74E+04	2.65E-03	NA		3.66E-04	NA		1.60E-04	NA		
Lead	1.45E+03	6.69E-05	NA		9.24E-06	NA		4.05E-06	NA		
Manganese	8.57E+02	3.95E-05	NA		5.46E-06	NA		2.40E-06	NA		
Nickel	5.87E+01	2.71E-06	NA		3.74E-07	NA		1.64E-07	9.10E-01	1.49E-07	1.49E-07
Selenium	3.53E+00	1.63E-07	NA		2.25E-08	NA		9.87E-09	NA		
Silver	8.32E-01	3.84E-08	NA		5.30E-09	NA		2.33E-09	NA		
Thallium	3.81E+00	1.76E-07	NA		2.43E-08	NA		1.07E-08	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	4.95E+01	2.28E-06	NA		3.16E-07	NA		1.38E-07	NA		
Zinc	8.03E+03	3.70E-04	NA		5.12E-05	NA		2.24E-05	NA		
Pesticides/PCBs											
4,4'-DDD	6.08E-02	2.80E-09	2.40E-01	6.73E-10	1.94E-09	2.40E-01	4.65E-10	1.70E-10	2.42E-01	4.10E-11	1.18E-09
4,4'-DDE	2.35E-02	1.08E-09	3.40E-01	3.69E-10	7.49E-10	3.40E-01	2.55E-10	6.57E-11	3.40E-01	2.23E-11	6.46E-10
4,4'-DDT	8.79E-03	4.05E-10	3.40E-01	1.38E-10	2.80E-10	3.40E-01	9.52E-11	2.46E-11	3.40E-01	8.34E-12	2.41E-10
Dieldrin	9.15E-03	4.22E-10	1.60E+01	6.75E-09	2.92E-10	1.60E+01	4.67E-09	2.56E-11	1.61E+01	4.12E-10	1.18E-08
Endrin	4.27E-03	1.97E-10	NA		1.36E-10	NA		1.19E-11	NA		
Endrin ketone	1.32E-02	6.09E-10	NA		4.21E-10	NA		3.69E-11	NA		
gamma-Chlordane	1.41E-03	6.50E-11	1.20E+00	7.80E-11	4.49E-11	1.20E+00	5.39E-11	3.94E-12	3.50E-01	1.38E-12	1.33E-10
Methoxychlor	9.90E-03	4.57E-10	NA		3.16E-10	NA		2.77E-11	NA		
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	8.81E-08	NA		1.83E-07	NA		5.34E-09	NA		
Acenaphthylene	1.20E+00	5.54E-08	NA		1.15E-07	NA		3.35E-09	NA		
Anthracene	9.40E-01	4.34E-08	NA		8.99E-08	NA		2.63E-09	NA		
Benzo(a)anthracene	4.14E+00	1.91E-07	1.20E+00	2.29E-07	3.96E-07	1.20E+00	4.75E-07	1.16E-08	3.85E-01	4.46E-09	7.09E-07
Benzo(a)pyrene	8.90E+00	4.11E-07	1.20E+01	**4.93E-06**	8.51E-07	1.20E+01	**1.02E-05**	2.49E-08	3.85E+00	9.58E-08	**1.52E-05**
Benzo(b)fluoranthene	5.60E+00	2.58E-07	1.20E+00	3.10E-07	5.35E-07	1.20E+00	6.43E-07	1.57E-08	3.85E-01	6.03E-09	9.59E-07
Benzo(g,h,i)perylene	9.00E+00	4.15E-07	NA		8.60E-07	NA		2.52E-08	NA		
Benzo(k)fluoranthene	3.40E+00	1.57E-07	1.20E+00	1.88E-07	3.25E-07	1.20E+00	3.90E-07	9.51E-09	3.85E-01	3.66E-09	5.82E-07
Biphenyl (diphenyl)	1.60E-01	7.38E-09	NA		1.02E-08	NA		4.47E-10	NA		
Chrysene	6.50E+00	3.00E-07	1.20E-01	3.60E-08	6.21E-07	1.20E-01	7.46E-08	1.82E-08	3.85E-02	7.00E-10	1.11E-07
Dibenz(a,h)anthracene	1.02E+00	4.71E-08	7.30E+00	3.43E-07	9.75E-08	7.30E+00	7.12E-07	2.85E-09	4.20E+00	1.20E-08	**1.07E-06**
Fluoranthene	1.20E+01	5.54E-07	NA		1.15E-06	NA		3.35E-08	NA		
Fluorene	4.23E-01	1.95E-08	NA		4.04E-08	NA		1.18E-09	NA		
Indeno(1,2,3-c,d)pyrene	8.30E+00	3.83E-07	1.20E+00	4.59E-07	7.94E-07	1.20E+00	9.52E-07	2.32E-08	3.85E-01	8.93E-09	**1.42E-06**
Naphthalene	7.99E-01	3.69E-08	1.20E-01	4.42E-09	7.64E-08	1.20E-01	9.17E-09	2.23E-09	1.19E-01	2.66E-10	1.39E-08
Phenanthrene	4.40E+00	2.03E-07	NA		4.21E-07	NA		1.23E-08	NA		
Pyrene	1.60E+01	7.38E-07	NA		1.53E-06	NA		4.47E-08	NA		
Acetone	3.40E-02	1.57E-09	NA		2.17E-09	NA		9.51E-11	NA		
cis-1,2-Dichloroethene	2.00E-03	9.23E-11	NA		1.27E-10	NA		5.59E-12	NA		
Methyl ethyl ketone	1.94E-02	8.95E-10	NA		1.24E-09	NA		5.42E-11	NA		
Methylene chloride	4.00E-03	1.85E-10	1.40E-02	2.58E-12	2.55E-10	1.40E-02	3.57E-12	1.12E-11	3.50E-03	3.91E-14	6.19E-12
Toluene	7.76E-03	3.58E-10	NA		4.95E-10	NA		2.17E-11	NA		
Xylenes, total	5.00E-03	2.31E-10	NA		3.19E-10	NA		1.40E-11	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.62E-12	1.50E+03	2.43E-09	6.71E-13	1.50E+03	1.01E-09	9.81E-14	1.50E+03	1.47E-10	3.58E-09
1,2,3,4,6,7,8-HpCDF	3.08E-05	1.42E-12	1.50E+03	2.13E-09	5.89E-13	1.50E+03	8.83E-10	8.61E-14	1.50E+03	1.29E-10	3.14E-09
1,2,3,4,7,8,9-HpCDF	2.83E-06	1.31E-13	1.50E+03	1.96E-10	5.41E-14	1.50E+03	8.12E-11	7.91E-15	1.50E+03	1.19E-11	2.89E-10
1,2,3,4,7,8-HxCDD	2.83E-06	1.31E-13	1.50E+04	1.96E-09	5.41E-14	1.50E+04	8.12E-10	7.91E-15	1.50E+04	1.19E-10	2.89E-09
1,2,3,4,7,8-HxCDF	1.74E-05	8.03E-13	1.50E+04	1.20E-08	3.33E-13	1.50E+04	4.99E-09	4.86E-14	1.50E+04	7.30E-10	1.78E-08
1,2,3,6,7,8-HxCDD	5.59E-06	2.58E-13	1.50E+04	3.87E-09	1.07E-13	1.50E+04	1.60E-09	1.56E-14	1.50E+04	2.34E-10	5.71E-09

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
1,2,3,6,7,8-HxCDF	1.13E-05	5.21E-13	1.50E+04	7.82E-09	2.16E-13	1.50E+04	3.24E-09	3.16E-14	1.50E+04	4.74E-10	1.15E-08
1,2,3,7,8,9-HxCDD	3.75E-06	1.73E-13	1.50E+04	2.59E-09	7.17E-14	1.50E+04	1.08E-09	1.05E-14	1.50E+04	1.57E-10	3.83E-09
1,2,3,7,8,9-HxCDF	3.79E-06	1.75E-13	1.50E+04	2.62E-09	7.25E-14	1.50E+04	1.09E-09	1.06E-14	1.50E+04	1.59E-10	3.87E-09
1,2,3,7,8-PeCDD	3.37E-06	1.55E-13	1.50E+05	2.33E-08	6.44E-14	1.50E+05	9.67E-09	9.42E-15	1.50E+05	1.41E-09	3.44E-08
1,2,3,7,8-PeCDF	3.91E-06	1.80E-13	7.50E+03	1.35E-09	7.48E-14	7.50E+03	5.61E-10	1.09E-14	7.50E+03	8.20E-11	2.00E-09
2,3,4,6,7,8-HxCDF	1.55E-05	7.15E-13	1.50E+04	1.07E-08	2.96E-13	1.50E+04	4.45E-09	4.33E-14	1.50E+04	6.50E-10	1.58E-08
2,3,4,7,8-PeCDF	3.32E-05	1.53E-12	7.50E+04	1.15E-07	6.35E-13	7.50E+04	4.76E-08	9.28E-14	7.50E+04	6.96E-09	1.69E-07
2,3,7,8-TCDD	8.98E-07	4.14E-14	1.50E+05	6.21E-09	1.72E-14	1.50E+05	2.58E-09	2.51E-15	1.50E+05	3.77E-10	9.17E-09
2,3,7,8-TCDF	8.22E-06	3.79E-13	1.50E+04	5.69E-09	1.57E-13	1.50E+04	2.36E-09	2.30E-14	1.50E+04	3.45E-10	8.39E-09
OCDD	3.57E-04	1.65E-11	1.50E+01	2.47E-10	6.83E-12	1.50E+01	1.02E-10	9.98E-13	1.50E+01	1.50E-11	3.64E-10
OCDF	1.88E-05	8.67E-13	1.50E+01	1.30E-11	3.59E-13	1.50E+01	5.39E-12	5.26E-14	1.50E+01	7.88E-13	1.92E-11
			Total Risk:	**7.59E-06**		**Total Risk:**	**1.39E-05**		**Total Risk:**	**1.15E-06**	**2.27E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-54
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5700	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		day/yr
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	1.30E+04	4.20E-02	1.00E+00	4.20E-02	5.80E-03	1.00E+00	5.80E-03	2.54E-03	1.40E-03	1.82E+00	**1.86E+00**
Antimony	2.16E+02	6.97E-04	4.00E-04	1.74E+00	9.64E-05	4.00E-04	2.41E-01	4.23E-05	NA		**1.98E+00**
Arsenic	1.28E+01	4.13E-05	3.00E-04	1.38E-01	1.71E-05	3.00E-04	5.71E-02	2.50E-06	4.29E-06	5.84E-01	**7.79E-01**
Barium	3.50E+03	1.13E-02	2.00E-01	5.65E-02	1.56E-03	2.00E-01	7.81E-03	6.85E-04	1.43E-04	4.79E+00	**4.86E+00**
Beryllium	6.74E-01	2.18E-06	2.00E-03	1.09E-03	3.01E-07	2.00E-03	1.50E-04	1.32E-07	2.00E-06	6.59E-02	6.72E-02
Cadmium	1.11E+01	3.58E-05	5.00E-04	7.17E-02	4.95E-07	5.00E-04	9.91E-04	2.17E-06	2.86E-06	7.60E-01	**8.33E-01**
Chromium	8.01E+01	2.59E-04	NA		3.57E-05	NA		1.57E-05	NA		
Cobalt	1.19E+01	3.84E-05	3.00E-04	1.28E-01	5.31E-06	3.00E-04	1.77E-02	2.33E-06	1.71E-06	1.36E+00	**1.50E+00**
Copper	3.07E+02	9.91E-04	4.00E-02	2.48E-02	1.37E-04	4.00E-02	3.42E-03	6.01E-05	NA		2.82E-02
Iron	5.74E+04	1.85E-01	7.00E-01	2.65E-01	2.56E-02	7.00E-01	3.66E-02	1.12E-02	NA		**3.01E-01**
Lead	1.45E+03	4.68E-03	NA		6.47E-04	NA		2.84E-04	NA		
Manganese	8.57E+02	2.77E-03	2.40E-02	1.15E-01	3.82E-04	2.40E-02	1.59E-02	1.68E-04	1.43E-05	1.17E+01	**1.19E+01**
Nickel	5.87E+01	1.90E-04	2.00E-02	9.48E-03	2.62E-05	2.00E-02	1.31E-03	1.15E-05	2.57E-05	4.47E-01	**4.58E-01**
Selenium	3.53E+00	1.14E-05	5.00E-03	2.28E-03	1.58E-06	5.00E-03	3.15E-04	6.91E-07	5.71E-03	1.21E-04	2.72E-03
Silver	8.32E-01	2.69E-06	5.00E-03	5.37E-04	3.71E-07	5.00E-03	7.42E-05	1.63E-07	NA		6.12E-04
Thallium	3.81E+00	1.23E-05	6.60E-05	1.86E-01	1.70E-06	6.60E-05	2.58E-02	7.46E-07	NA		**2.12E-01**
Vanadium	4.95E+01	1.60E-04	5.00E-03	3.20E-02	2.21E-05	5.00E-03	4.42E-03	9.69E-06	NA		3.64E-02
Zinc	8.03E+03	2.59E-02	3.00E-01	8.64E-02	3.58E-03	3.00E-01	1.19E-02	1.57E-03	NA		9.84E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	6.08E-02	1.96E-07	NA		1.36E-07	NA		1.19E-08	NA		
4,4'-DDE	2.35E-02	7.59E-08	NA		5.24E-08	NA		4.60E-09	NA		
4,4'-DDT	8.79E-03	2.84E-08	5.00E-04	5.68E-05	1.96E-08	5.00E-04	3.92E-05	1.72E-09	NA		9.60E-05
Dieldrin	9.15E-03	2.95E-08	5.00E-05	5.91E-04	2.04E-08	5.00E-05	4.08E-04	1.79E-09	NA		9.99E-04
Endrin	4.27E-03	1.38E-08	3.00E-04	4.60E-05	9.53E-09	3.00E-04	3.18E-05	8.36E-10	NA		7.77E-05
Endrin ketone	1.32E-02	4.26E-08	3.00E-04	1.42E-04	2.94E-08	3.00E-04	9.82E-05	2.58E-09	NA		2.40E-04
gamma-Chlordane	1.41E-03	4.55E-09	5.00E-04	9.11E-06	3.15E-09	5.00E-04	6.29E-06	2.76E-10	2.00E-04	1.38E-06	1.68E-05
Methoxychlor	9.90E-03	3.20E-08	2.00E-05	1.60E-03	2.21E-08	2.00E-05	1.10E-03	1.94E-09	NA		2.70E-03
SVOCs/VOCs											
2-Methylnaphthalene	1.91E+00	6.17E-06	4.00E-03	1.54E-03	1.28E-05	4.00E-03	3.20E-03	3.74E-07	NA		4.74E-03
Acenaphthylene	1.20E+00	3.87E-06	NA		8.03E-06	NA		2.35E-07	NA		
Anthracene	9.40E-01	3.04E-06	3.00E-01	1.01E-05	6.29E-06	3.00E-01	2.10E-05	1.84E-07	NA		3.11E-05
Benzo(a)anthracene	4.14E+00	1.34E-05	NA		2.77E-05	NA		8.10E-07	NA		
Benzo(a)pyrene	8.90E+00	2.87E-05	NA		5.96E-05	NA		1.74E-06	NA		
Benzo(b)fluoranthene	5.60E+00	1.81E-05	NA		3.75E-05	NA		1.10E-06	NA		
Benzo(g,h,i)perylene	9.00E+00	2.91E-05	NA		6.02E-05	NA		1.76E-06	NA		
Benzo(k)fluoranthene	3.40E+00	1.10E-05	NA		2.28E-05	NA		6.65E-07	NA		
Biphenyl (diphenyl)	1.60E-01	5.17E-07	5.00E-02	1.03E-05	7.14E-07	5.00E-02	1.43E-05	3.13E-08	NA		2.46E-05
Chrysene	6.50E+00	2.10E-05	NA		4.35E-05	NA		1.27E-06	NA		
Dibenz(a,h)anthracene	1.02E+00	3.29E-06	NA		6.83E-06	NA		2.00E-07	NA		
Fluoranthene	1.20E+01	3.87E-05	4.00E-02	9.69E-04	8.03E-05	4.00E-02	2.01E-03	2.35E-06	NA		2.98E-03
Fluorene	4.23E-01	1.37E-06	4.00E-02	3.41E-05	2.83E-06	4.00E-02	7.08E-05	8.28E-08	NA		1.05E-04
Indeno(1,2,3-c,d)pyrene	8.30E+00	2.68E-05	NA		5.55E-05	NA		1.62E-06	NA		
Naphthalene	7.99E-01	2.58E-06	2.00E-02	1.29E-04	5.35E-06	2.00E-02	2.67E-04	1.56E-07	8.57E-04	1.82E-04	5.79E-04
Phenanthrene	4.40E+00	1.42E-05	NA		2.94E-05	NA		8.61E-07	NA		
Pyrene	1.60E+01	5.17E-05	3.00E-02	1.72E-03	1.07E-04	3.00E-02	3.57E-03	3.13E-06	NA		5.29E-03
Acetone	3.40E-02	1.10E-07	9.00E-01	1.22E-07	1.52E-07	9.00E-01	1.69E-07	6.65E-09	8.86E+00	7.51E-10	2.91E-07
cis-1,2-Dichloroethene	2.00E-03	6.46E-09	1.00E-02	6.46E-07	8.92E-09	1.00E-02	8.92E-07	3.91E-10	NA		1.54E-06
Methyl ethyl ketone	1.94E-02	6.26E-08	6.00E-01	1.04E-07	8.66E-08	6.00E-01	1.44E-07	3.80E-09	1.43E+00	2.66E-09	2.51E-07
Methylene chloride	4.00E-03	1.29E-08	6.00E-02	2.15E-07	1.78E-08	6.00E-02	2.97E-07	7.83E-10	2.86E-01	2.74E-09	5.15E-07
Toluene	7.76E-03	2.51E-08	8.00E-02	3.13E-07	3.46E-08	8.00E-02	4.33E-07	1.52E-09	8.57E-02	1.77E-08	7.64E-07
Xylenes, total	5.00E-03	1.61E-08	2.00E-01	8.07E-08	2.23E-08	2.00E-01	1.12E-07	9.78E-10	2.86E-02	3.42E-08	2.27E-07
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	3.51E-05	1.13E-10	NA		4.70E-11	NA		6.87E-12	1.14E-08	6.01E-04	6.01E-04
1,2,3,4,6,7,8-HpCDF	3.08E-05	9.95E-11	NA		4.12E-11	NA		6.03E-12	1.14E-08	5.27E-04	5.27E-04
1,2,3,4,7,8,9-HpCDF	2.83E-06	9.14E-12	NA		3.79E-12	NA		5.54E-13	1.14E-08	4.85E-05	4.85E-05
1,2,3,4,7,8-HxCDD	2.83E-06	9.14E-12	NA		3.79E-12	NA		5.54E-13	1.14E-08	4.85E-05	4.85E-05
1,2,3,4,7,8-HxCDF	1.74E-05	5.62E-11	NA		2.33E-11	NA		3.41E-12	1.14E-08	2.98E-04	2.98E-04
1,2,3,6,7,8-HxCDD	5.59E-06	1.80E-11	NA		7.48E-12	NA		1.09E-12	1.14E-08	9.57E-05	9.57E-05
1,2,3,6,7,8-HxCDF	1.13E-05	3.65E-11	NA		1.51E-11	NA		2.21E-12	1.14E-08	1.93E-04	1.93E-04
1,2,3,7,8,9-HxCDD	3.75E-06	1.21E-11	NA		5.02E-12	NA		7.34E-13	1.14E-08	6.42E-05	6.42E-05
1,2,3,7,8,9-HxCDF	3.79E-06	1.22E-11	NA		5.07E-12	NA		7.42E-13	1.14E-08	6.49E-05	6.49E-05
1,2,3,7,8-PeCDD	3.37E-06	1.09E-11	NA		4.51E-12	NA		6.59E-13	1.14E-08	5.77E-05	5.77E-05
1,2,3,7,8-PeCDF	3.91E-06	1.26E-11	NA		5.23E-12	NA		7.65E-13	1.14E-08	6.70E-05	6.70E-05
2,3,4,6,7,8-HxCDF	1.55E-05	5.00E-11	NA		2.07E-11	NA		3.03E-12	1.14E-08	2.65E-04	2.65E-04
2,3,4,7,8-PeCDF	3.32E-05	1.07E-10	NA		4.44E-11	NA		6.50E-12	1.14E-08	5.68E-04	5.68E-04
2,3,7,8-TCDD	8.98E-07	2.90E-12	NA		1.20E-12	NA		1.76E-13	1.14E-08	1.54E-05	1.54E-05

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
2,3,7,8-TCDF	8.22E-06	2.65E-11	NA		1.10E-11	NA		1.61E-12	1.14E-08	1.41E-04	1.41E-04
OCDD	3.57E-04	1.15E-09	NA		4.78E-10	NA		6.99E-11	1.14E-08	6.11E-03	6.11E-03
OCDF	1.88E-05	6.07E-11	NA		2.52E-11	NA		3.68E-12	1.14E-08	3.22E-04	3.22E-04
		Total Risk (Hazard Index):		2.9	Total Risk (Hazard Index):		0.4	Total Risk (Hazard Index):		22	25

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 25

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-55
Cancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Industrial/Construction Worker - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**6.7E-06**	**2.3E-06**	1.0E-08	**9.0E-06**	6%	8.9E-07	3.7E-07	5.4E-07	**1.8E-06**	8%
Subtotal Metals	**6.7E-06**	**2.3E-06**	1.9E-08	**9.0E-06**	6%	8.9E-07	3.7E-07	**1.0E-06**	**2.3E-06**	10%
SVOCs/VOCs										
Benzo(a)anthracene	**1.7E-06**	**3.0E-06**	8.5E-11	**4.7E-06**	3%	2.3E-07	4.7E-07	4.5E-09	7.1E-07	3%
Benzo(a)pyrene	**3.7E-05**	**6.4E-05**	1.8E-09	**1.0E-04**	70%	**4.9E-06**	**1.0E-05**	9.6E-08	**1.5E-05**	67%
Benzo(b)fluoranthene	**2.3E-06**	**4.0E-06**	1.1E-10	**6.4E-06**	4%	3.1E-07	6.4E-07	6.0E-09	9.6E-07	4%
Benzo(k)fluoranthene	**1.4E-06**	**2.4E-06**	7.0E-11	**3.9E-06**	3%	1.9E-07	3.9E-07	3.7E-09	5.8E-07	3%
Dibenz(a,h)anthracene	**2.6E-06**	**4.4E-06**	2.3E-10	**7.1E-06**	5%	3.4E-07	7.1E-07	1.2E-08	**1.1E-06**	5%
Indeno(1,2,3-c,d)pyrene	**3.5E-06**	**6.0E-06**	1.7E-10	**9.4E-06**	7%	4.6E-07	9.5E-07	8.9E-09	**1.4E-06**	6%
Subtotal SVOCs/VOCs	**4.9E-05**	**8.4E-05**	2.5E-09	**1.3E-04**	92%	**6.5E-06**	**1.3E-05**	1.3E-07	**2.0E-05**	89%
Dioxans/Furans										
2,3,4,7,8-PeCDF	8.7E-07	3.0E-07	1.3E-10	**1.2E-06**	1%	1.1E-07	4.8E-08	7.0E-09	1.7E-07	1%
Subtotal Dioxans/Furans	**1.5E-06**	5.1E-07	2.3E-10	**2.0E-06**	1%	2.0E-07	8.2E-08	1.2E-08	2.9E-07	1%
Total:	**5.7E-05**	**8.7E-05**	2.2E-08	**1.45E-04**		**7.6E-06**	**1.4E-05**	**1.1E-06**	**2.27E-05**	

Total Estimated Cancer Risk Across All Exposure Routes:	**1E-04**	**2E-05**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-56
Noncancer Risk Results Detailed Summary of Risk Drivers - Deep Soil - Future Industrial/Construction Worker - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.3E-02	1.5E-03	1.4E-03	1.6E-02	2%	4.2E-02	5.8E-03	**1.8E+00**	**1.9E+00**	7%
Antimony	**5.3E-01**	6.0E-02		**5.9E-01**	59%	**1.7E+00**	**2.4E-01**		**2.0E+00**	8%
Arsenic	4.2E-02	1.4E-02	4.4E-04	5.6E-02	6%	**1.4E-01**	5.7E-02	**5.8E-01**	**7.8E-01**	3%
Barium	1.7E-02	2.0E-03	3.6E-03	2.3E-02	2%	5.7E-02	7.8E-03	**4.8E+00**	**4.9E+00**	20%
Cadmium	2.2E-02	2.5E-04	5.8E-04	2.3E-02	2%	7.2E-02	9.9E-04	**7.6E-01**	**8.3E-01**	3%
Cobalt	3.9E-02	4.4E-03	1.0E-03	4.4E-02	4%	**1.3E-01**	1.8E-02	**1.4E+00**	**1.5E+00**	6%
Iron	8.0E-02	9.1E-03		8.9E-02	9%	**2.6E-01**	3.7E-02		**3.0E-01**	1%
Manganese	3.5E-02	4.0E-03	8.9E-03	4.8E-02	5%	**1.2E-01**	1.6E-02	**1.2E+01**	**1.2E+01**	48%
Nickel	2.9E-03	3.3E-04	3.4E-04	3.5E-03	0%	9.5E-03	1.3E-03	**4.5E-01**	**4.6E-01**	2%
Thallium	5.6E-02	6.4E-03		6.3E-02	6%	**1.9E-01**	2.6E-02		**2.1E-01**	1%
Subtotal Metals	**8.8E-01**	**1.1E-01**	1.6E-02	**1.0E+00**	100%	**2.9E+00**	**4.3E-01**	**2.2E+01**	**2.5E+01**	100%
Total:	**0.9**	**0.1**	0.02	**1.0**		**2.9**	**0.4**	**21.6**	**24.9**	

Total Estimated Hazard Index Across All Exposure Routes: Industrial Worker: **1** Future Construction Worker: **25**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

Table 1-57
Exposure Point Concentrations - Shallow Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	9.21E+03	95% Approximate Gamma UCL
Antimony	mg/kg	3.50E+00	95% Approximate Gamma UCL
Arsenic	mg/kg	2.69E+01	95% Approximate Gamma UCL
Barium	mg/kg	9.37E+02	95% Chebyshev (Mean, Sd) UCL
Beryllium	mg/kg	3.03E-01	95% Student's-t UCL
Cadmium	mg/kg	2.45E+00	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	1.54E+02	95% Approximate Gamma UCL
Cobalt	mg/kg	7.06E+00	95% Student's-t UCL
Copper	mg/kg	1.49E+02	95% Approximate Gamma UCL
Iron	mg/kg	2.49E+04	95% Approximate Gamma UCL
Lead	mg/kg	4.36E+03	99% Chebyshev (Mean, Sd) UCL
Manganese	mg/kg	3.60E+02	95% Student's-t UCL
Nickel	mg/kg	2.58E+01	95% Student's-t UCL
Selenium	mg/kg	3.00E+00	Maximum Result
Silver	mg/kg	5.12E-01	95% Approximate Gamma UCL
Thallium	mg/kg	2.60E+00	Maximum Result
Vanadium	mg/kg	3.26E+01	95% Approximate Gamma UCL
Zinc	mg/kg	4.53E+02	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	mg/kg	9.09E+00	95% Adjusted Gamma UCL
4,4'-DDE	mg/kg	5.26E+00	95% Adjusted Gamma UCL
4,4'-DDT	mg/kg	1.21E+02	95% Hall's Bootstrap UCL
alpha-BHC	mg/kg	6.00E-03	Maximum Result
alpha-Chlordane	mg/kg	8.10E-02	Maximum Result
beta-BHC	mg/kg	2.40E-02	Maximum Result
gamma-BHC	mg/kg	3.47E-01	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	mg/kg	8.30E-02	Maximum Result
Dieldrin	mg/kg	8.60E-02	Maximum Result
Endosulfan sulfate	mg/kg	4.40E-03	Maximum Result
Endrin	mg/kg	1.40E-02	Maximum Result
Endrin aldehyde	mg/kg	4.90E-03	Maximum Result
Endrin ketone	mg/kg	6.90E-03	Maximum Result
Heptachlor	mg/kg	6.50E-04	Maximum Result
Heptachlor epoxide	mg/kg	2.80E-03	Maximum Result
Methoxychlor	mg/kg	7.00E-03	Maximum Result
Aroclor-1260	mg/kg	3.30E-02	Maximum Result
SVOCs/VOCs			
1,2-Dichlorobenzene	mg/kg	8.25E-03	95% Student's-t UCL
1,4-Dichlorobenzene	mg/kg	2.00E-03	Maximum Result
2-Methylnaphthalene	mg/kg	3.87E+00	99% Chebyshev (Mean, Sd) UCL
bis(2-Ethylhexyl)phthalate	mg/kg	1.07E+00	95% Chebyshev (Mean, Sd) UCL
Acetophenone	mg/kg	2.60E-01	95% Student's-t UCL
Benzo(a)anthracene	mg/kg	4.88E-01	95% H-UCL
Benzo(a)pyrene	mg/kg	6.51E-01	95% H-UCL
Benzo(b)fluoranthene	mg/kg	6.40E-01	95% Chebyshev (Mean, Sd) UCL
Benzo(g,h,i)perylene	mg/kg	6.60E-01	95% H-UCL
Benzo(k)fluoranthene	mg/kg	6.23E-01	95% Chebyshev (Mean, Sd) UCL

Table 1-57
Exposure Point Concentrations - Shallow Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Caprolactam	mg/kg	2.30E-01	Maximum Result
Chrysene	mg/kg	7.97E-01	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	mg/kg	3.13E-01	95% Student's-t UCL
Fluoranthene	mg/kg	6.68E-01	95% H-UCL
Indeno(1,2,3-c,d)pyrene	mg/kg	6.94E-01	95% H-UCL
Naphthalene	mg/kg	2.83E-01	95% Student's-t UCL
Phenanthrene	mg/kg	3.78E-01	95% H-UCL
Pyrene	mg/kg	1.35E+00	95% Chebyshev (Mean, Sd) UCL
Acetone	mg/kg	1.50E-01	Maximum Result
Chlorobenzene	mg/kg	2.22E-02	95% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	mg/kg	2.05E-02	95% Chebyshev (Mean, Sd) UCL
Ethylbenzene	mg/kg	2.05E-02	95% Chebyshev (Mean, Sd) UCL
Isopropylbenzene (cumene)	mg/kg	3.38E-01	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	mg/kg	2.38E-02	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/kg	6.85E-03	95% Student's-t UCL
Methylcyclohexane	mg/kg	3.46E-01	99% Chebyshev (Mean, Sd) UCL
Methylene chloride	mg/kg	6.66E-03	95% Student's-t UCL
Tetrachloroethene	mg/kg	6.66E-03	95% Student's-t UCL
Toluene	mg/kg	6.85E-02	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	mg/kg	4.00E-03	Maximum Result
Xylenes, total	mg/kg	2.91E-01	99% Chebyshev (Mean, Sd) UCL

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-58
Exposure Point Concentrations - Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	8.24E+03	95% Student's-t UCL
Antimony	mg/kg	3.48E+00	95% H-UCL
Arsenic	mg/kg	1.81E+01	95% Approximate Gamma UCL
Barium	mg/kg	6.52E+02	95% Chebyshev (Mean, Sd) UCL
Beryllium	mg/kg	2.81E-01	95% Approximate Gamma UCL
Cadmium	mg/kg	1.71E+00	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/kg	1.66E+02	95% Chebyshev (Mean, Sd) UCL
Cobalt	mg/kg	6.47E+00	95% Student's-t UCL
Copper	mg/kg	1.14E+02	95% Approximate Gamma UCL
Iron	mg/kg	2.14E+04	95% Approximate Gamma UCL
Lead	mg/kg	2.75E+03	99% Chebyshev (Mean, Sd) UCL
Manganese	mg/kg	3.24E+02	95% Student's-t UCL
Nickel	mg/kg	2.45E+01	95% Student's-t UCL
Selenium	mg/kg	3.50E+00	Maximum Result
Silver	mg/kg	4.95E-01	95% H-UCL
Thallium	mg/kg	2.60E+00	Maximum Result
Vanadium	mg/kg	2.89E+01	95% Approximate Gamma UCL
Zinc	mg/kg	3.21E+02	95% Approximate Gamma UCL
Pesticides/PCBs			
4,4'-DDD	mg/kg	3.79E+00	95% Adjusted Gamma UCL
4,4'-DDE	mg/kg	2.10E+00	95% Adjusted Gamma UCL
4,4'-DDT	mg/kg	8.05E+01	99% Chebyshev (MVUE) UCL
alpha-BHC	mg/kg	6.00E-03	Maximum Result
alpha-Chlordane	mg/kg	8.10E-02	Maximum Result
beta-BHC	mg/kg	2.40E-02	Maximum Result
Dieldrin	mg/kg	8.60E-02	Maximum Result
Endosulfan I	mg/kg	7.40E-04	Maximum Result
Endosulfan sulfate	mg/kg	4.40E-03	Maximum Result
Endrin	mg/kg	1.40E-02	Maximum Result
Endrin aldehyde	mg/kg	4.90E-03	Maximum Result
Endrin ketone	mg/kg	6.90E-03	Maximum Result
gamma-BHC	mg/kg	2.16E-01	99% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	mg/kg	8.30E-02	Maximum Result
Heptachlor	mg/kg	6.50E-04	Maximum Result
Heptachlor epoxide	mg/kg	2.80E-03	Maximum Result
Methoxychlor	mg/kg	7.00E-03	Maximum Result
Aroclor-1260	mg/kg	3.30E-02	Maximum Result
SVOCs/VOCs			
1,2-Dichlorobenzene	mg/kg	1.05E+00	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	mg/kg	2.00E-03	Maximum Result
1,4-Dioxane (p-dioxane)	mg/kg	7.42E-02	95% Chebyshev (Mean, Sd) UCL
2-Methylnaphthalene	mg/kg	1.36E+00	95% Chebyshev (Mean, Sd) UCL
Acetophenone	mg/kg	2.36E-01	95% Student's-t UCL
Anthracene	mg/kg	8.10E-02	Maximum Result
Benzo(a)anthracene	mg/kg	4.95E-01	95% Chebyshev (Mean, Sd) UCL
Benzo(a)pyrene	mg/kg	6.17E-01	95% Chebyshev (Mean, Sd) UCL
Benzo(b)fluoranthene	mg/kg	5.01E-01	95% Chebyshev (Mean, Sd) UCL

Table 1-58
Exposure Point Concentrations - Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Benzo(g,h,i)perylene	mg/kg	5.81E-01	95% Chebyshev (Mean, Sd) UCL
Benzo(k)fluoranthene	mg/kg	4.95E-01	95% Chebyshev (Mean, Sd) UCL
Benzyl butyl phthalate	mg/kg	2.70E-01	Maximum Result
bis(2-Ethylhexyl)phthalate	mg/kg	9.04E-01	95% Chebyshev (Mean, Sd) UCL
Caprolactam	mg/kg	2.30E-01	Maximum Result
Chrysene	mg/kg	5.97E-01	95% Chebyshev (Mean, Sd) UCL
Dibenz(a,h)anthracene	mg/kg	2.67E-01	95% Student's-t UCL
Fluoranthene	mg/kg	7.35E-01	95% Chebyshev (Mean, Sd) UCL
Indeno(1,2,3-c,d)pyrene	mg/kg	6.00E-01	95% Chebyshev (Mean, Sd) UCL
Naphthalene	mg/kg	2.49E-01	95% Student's-t UCL
Phenanthrene	mg/kg	3.08E-01	95% Student's-t UCL
Pyrene	mg/kg	1.02E+00	95% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	mg/kg	6.83E-03	95% Student's-t UCL
Acetone	mg/kg	6.05E-02	95% Approximate Gamma UCL
Chlorobenzene	mg/kg	2.24E+00	99% Chebyshev (Mean, Sd) UCL
cis-1,2-Dichloroethene	mg/kg	1.80E-02	95% Chebyshev (Mean, Sd) UCL
Ethylbenzene	mg/kg	1.01E-02	95% Student's-t UCL
Isopropylbenzene (cumene)	mg/kg	1.05E-01	95% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	mg/kg	1.79E-02	95% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/kg	6.50E-03	95% Student's-t UCL
Methylcyclohexane	mg/kg	1.07E-01	95% Chebyshev (Mean, Sd) UCL
Methylene chloride	mg/kg	6.31E-03	95% Student's-t UCL
Tetrachloroethene	mg/kg	6.38E-03	95% Student's-t UCL
Toluene	mg/kg	4.40E-02	95% Chebyshev (Mean, Sd) UCL
Trichloroethene	mg/kg	4.00E-03	Maximum Result
Vinyl chloride	mg/kg	1.00E-03	Maximum Result
Xylenes, total	mg/kg	9.09E-02	95% Chebyshev (Mean, Sd) UCL

Notes:
EPC summary statistics are presented in Table 1-1.

Table 1-59
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Total Cancer Risk
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
Metals											
Aluminum	9.21E+03	4.33E-03	NA		1.73E-04	NA		6.57E-07	NA		
Antimony	3.50E+00	1.64E-06	NA		6.56E-08	NA		2.50E-10	NA		
Arsenic	2.69E+01	1.26E-05	1.50E+00	1.90E-05	1.51E-06	1.50E+00	2.27E-06	1.92E-09	1.51E+01	2.89E-08	**2.12E-05**
Barium	9.37E+02	4.40E-04	NA		1.76E-05	NA		6.69E-08	NA		
Beryllium	3.03E-01	1.42E-07	NA		5.68E-09	NA		2.16E-11	8.40E+00	1.82E-10	1.82E-10
Cadmium	2.45E+00	1.15E-06	NA		4.59E-09	NA		1.75E-10	6.30E+00	1.10E-09	1.10E-09
Chromium	1.54E+02	7.23E-05	NA		2.89E-06	NA		1.10E-08	NA		
Cobalt	7.06E+00	3.32E-06	NA		1.32E-07	NA		5.04E-10	3.15E+00	1.59E-09	1.59E-09
Copper	1.49E+02	7.00E-05	NA		2.79E-06	NA		1.06E-08	NA		
Iron	2.49E+04	1.17E-02	NA		4.67E-04	NA		1.78E-06	NA		
Lead	4.36E+03	2.05E-03	NA		8.17E-05	NA		3.11E-07	NA		
Manganese	3.60E+02	1.69E-04	NA		6.75E-06	NA		2.57E-08	NA		
Nickel	2.58E+01	1.21E-05	NA		4.83E-07	NA		1.84E-09	9.10E-01	1.68E-09	1.68E-09
Selenium	3.00E+00	1.41E-06	NA		5.62E-08	NA		2.14E-10	NA		
Silver	5.12E-01	2.40E-07	NA		9.59E-09	NA		3.65E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs	Exposure Route = Oral: Chronic Daily Intake	Exposure Route = Oral: Cancer Slope Factor, SF	Exposure Route = Oral: Cancer Risk	Exposure Route = Dermal: Chronic Daily Intake	Exposure Route = Dermal: Cancer Slope Factor, SF	Exposure Route = Dermal: Cancer Risk	Exposure Route = Inhalation: Chronic Daily Intake	Exposure Route = Inhalation: Cancer Slope Factor, SF	Exposure Route = Inhalation: Cancer Risk	Total Cancer Risk
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
Thallium	2.60E+00	1.22E-06	NA		4.87E-08	NA		1.86E-10	NA		
Vanadium	3.26E+01	1.53E-05	NA		6.11E-07	NA		2.33E-09	NA		
Zinc	4.53E+02	2.13E-04	NA		8.49E-06	NA		3.23E-08	NA		
Pesticides/PCBs											
4,4'-DDD	9.09E+00	4.27E-06	2.40E-01	1.02E-06	8.52E-07	2.40E-01	2.04E-07	6.49E-10	2.42E-01	1.57E-10	**1.23E-06**
4,4'-DDE	5.26E+00	2.47E-06	3.40E-01	8.40E-07	4.93E-07	3.40E-01	1.68E-07	3.75E-10	3.40E-01	1.27E-10	**1.01E-06**
4,4'-DDT	1.21E+02	5.68E-05	3.40E-01	1.93E-05	1.13E-05	3.40E-01	3.85E-06	8.64E-09	3.40E-01	2.93E-09	**2.32E-05**
alpha-BHC	6.00E-03	2.82E-09	6.30E+00	1.78E-08	5.62E-10	6.30E+00	3.54E-09	4.28E-13	6.30E+00	2.70E-12	2.13E-08
alpha-Chlordane	8.10E-02	3.80E-08	1.30E+00	4.95E-08	7.59E-09	1.30E+00	9.87E-09	5.78E-12	3.50E-01	2.02E-12	5.93E-08
beta-BHC	2.40E-02	1.13E-08	1.80E+00	2.03E-08	2.25E-09	1.80E+00	4.05E-09	1.71E-12	1.86E+00	3.18E-12	2.43E-08
gamma-BHC	3.47E-01	1.63E-07	1.10E+00	1.79E-07	3.25E-08	1.10E+00	3.58E-08	2.48E-11	1.09E+00	2.69E-11	2.15E-07
gamma-Chlordane	8.30E-02	3.90E-08	1.20E+00	4.68E-08	7.78E-09	1.20E+00	9.33E-09	5.92E-12	3.50E-01	2.07E-12	5.61E-08
Dieldrin	8.60E-02	4.04E-08	1.60E+01	6.46E-07	8.06E-09	1.60E+01	1.29E-07	6.14E-12	1.61E+01	9.88E-11	7.75E-07
Endosulfan sulfate	4.40E-03	2.07E-09	NA		4.12E-10	NA		3.14E-13	NA		
Endrin	1.40E-02	6.58E-09	NA		1.31E-09	NA		9.99E-13	NA		
Endrin aldehyde	4.90E-03	2.30E-09	NA		4.59E-10	NA		3.50E-13	NA		
Endrin ketone	6.90E-03	3.24E-09	NA		6.47E-10	NA		4.93E-13	NA		
Heptachlor	6.50E-04	3.05E-10	4.50E+00	1.37E-09	6.09E-11	4.50E+00	2.74E-10	4.64E-14	4.55E+00	2.11E-13	1.65E-09
Heptachlor epoxide	2.80E-03	1.32E-09	9.10E+00	1.20E-08	2.62E-10	9.10E+00	2.39E-09	2.00E-13	9.10E+00	1.82E-12	1.44E-08
Methoxychlor	7.00E-03	3.29E-09	NA		6.56E-10	NA		5.00E-13	NA		
Aroclor-1260	3.30E-02	1.55E-08	2.00E+00	3.10E-08	9.28E-09	2.00E+00	1.86E-08	2.36E-12	2.00E+00	4.71E-12	4.96E-08
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	3.87E-09	NA		1.55E-09	NA		5.89E-13	NA		
1,4-Dichlorobenzene	2.00E-03	9.39E-10	5.40E-03	5.07E-12	3.75E-10	5.40E-03	2.02E-12	1.43E-13	3.85E-02	5.50E-15	7.10E-12
2-Methylnaphthalene	3.87E+00	1.82E-06	NA		1.09E-06	NA		2.76E-10	NA		
bis(2-Ethylhexyl)phthalate	1.07E+00	5.03E-07	1.40E-02	7.04E-09	2.01E-07	1.40E-02	2.81E-09	7.64E-11	8.40E-03	6.42E-13	9.84E-09
Acetophenone	2.60E-01	1.22E-07	NA		4.87E-08	NA		1.86E-11	NA		
Benzo(a)anthracene	4.88E-01	2.29E-07	1.20E+00	2.75E-07	1.37E-07	1.20E+00	1.65E-07	3.48E-11	3.85E-01	1.34E-11	4.40E-07
Benzo(a)pyrene	6.51E-01	3.06E-07	1.20E+01	3.67E-06	1.83E-07	1.20E+01	2.20E-06	4.65E-11	3.85E+00	1.79E-10	**5.87E-06**
Benzo(b)fluoranthene	6.40E-01	3.01E-07	1.20E+00	3.61E-07	1.80E-07	1.20E+00	2.16E-07	4.57E-11	3.85E-01	1.76E-11	5.77E-07
Benzo(g,h,i)perylene	6.60E-01	3.10E-07	NA		1.86E-07	NA		4.71E-11	NA		
Benzo(k)fluoranthene	6.23E-01	2.93E-07	1.20E+00	3.51E-07	1.75E-07	1.20E+00	2.10E-07	4.45E-11	3.85E-01	1.71E-11	5.61E-07
Caprolactam	2.30E-01	1.08E-07	NA		4.31E-08	NA		1.64E-11	NA		
Chrysene	7.97E-01	3.74E-07	1.20E-01	4.49E-08	2.24E-07	1.20E-01	2.69E-08	5.69E-11	3.85E-02	2.19E-12	7.18E-08
Dibenz(a,h)anthracene	3.13E-01	1.47E-07	7.30E+00	1.07E-06	8.80E-08	7.30E+00	6.42E-07	2.23E-11	4.20E+00	9.38E-11	**1.72E-06**
Fluoranthene	6.68E-01	3.14E-07	NA		1.88E-07	NA		4.77E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.94E-01	3.26E-07	1.20E+00	3.91E-07	1.95E-07	1.20E+00	2.34E-07	4.95E-11	3.85E-01	1.91E-11	6.25E-07
Naphthalene	2.83E-01	1.33E-07	1.20E-01	1.59E-08	7.96E-08	1.20E-01	9.55E-09	2.02E-11	1.19E-01	2.40E-12	2.55E-08
Phenanthrene	3.78E-01	1.78E-07	NA		1.06E-07	NA		2.70E-11	NA		
Pyrene	1.35E+00	6.34E-07	NA		3.79E-07	NA		9.64E-11	NA		
Acetone	1.50E-01	7.05E-08	NA		2.81E-08	NA		1.07E-11	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Chronic Daily Intake	Cancer Slope Factor, SF	Cancer Risk	Total Cancer Risk
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
Chlorobenzene	2.22E-02	1.04E-08	NA		4.16E-09	NA		1.58E-12	NA		
cis-1,2-Dichloroethene	2.05E-02	9.63E-09	NA		3.84E-09	NA		1.46E-12	NA		
Ethylbenzene	2.05E-02	9.63E-09	1.10E-02	1.06E-10	3.84E-09	1.10E-02	4.23E-11	1.46E-12	8.75E-03	1.28E-14	1.48E-10
Isopropylbenzene (cumene)	3.38E-01	1.59E-07	NA		6.33E-08	NA		2.41E-11	NA		
Methyl ethyl ketone	2.38E-02	1.12E-08	NA		4.46E-09	NA		1.70E-12	NA		
Methyl isobutyl ketone	6.85E-03	3.22E-09	NA		1.28E-09	NA		4.89E-13	NA		
Methylcyclohexane	3.46E-01	1.63E-07	NA		6.48E-08	NA		2.47E-11	NA		
Methylene chloride	6.66E-03	3.13E-09	1.40E-02	4.38E-11	1.25E-09	1.40E-02	1.75E-11	4.75E-13	3.50E-03	1.66E-15	6.13E-11
Tetrachloroethene	6.66E-03	3.13E-09	5.40E-01	1.69E-09	1.25E-09	5.40E-01	6.74E-10	4.75E-13	2.07E-02	9.82E-15	2.36E-09
Toluene	6.85E-02	3.22E-08	NA		1.28E-08	NA		4.89E-12	NA		
Trichloroethene	4.00E-03	1.88E-09	5.90E-03	1.11E-11	7.50E-10	5.90E-03	4.42E-12	2.86E-13	7.00E-03	2.00E-15	1.55E-11
Xylenes, total	2.91E-01	1.37E-07	NA		5.45E-08	NA		2.08E-11	NA		
			Total Risk:	4.73E-05		Total Risk:	1.04E-05		Total Risk:	3.71E-08	**5.78E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : 6E-05

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-60
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult/Child

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.21E+03	1.26E-02	1.00E+00	1.26E-02	5.03E-04	1.00E+00	5.03E-04	1.92E-06	1.40E-03	1.37E-03	1.45E-02
Antimony	3.50E+00	4.79E-06	4.00E-04	1.20E-02	1.91E-07	4.00E-04	4.78E-04	7.29E-10	NA		1.25E-02
Arsenic	2.69E+01	3.68E-05	3.00E-04	1.23E-01	4.41E-06	3.00E-04	1.47E-02	5.60E-09	4.29E-06	1.31E-03	1.39E-01
Barium	9.37E+02	1.28E-03	2.00E-01	6.42E-03	5.12E-05	2.00E-01	2.56E-04	1.95E-07	1.43E-04	1.37E-03	8.04E-03
Beryllium	3.03E-01	4.15E-07	2.00E-03	2.08E-04	1.66E-08	2.00E-03	8.28E-06	6.31E-11	2.00E-06	3.15E-05	2.47E-04
Cadmium	2.45E+00	3.36E-06	5.00E-04	6.71E-03	1.34E-08	5.00E-04	2.68E-05	5.10E-10	2.86E-06	1.79E-04	6.92E-03
Chromium	1.54E+02	2.11E-04	NA		8.42E-06	NA		3.21E-08	NA		
Cobalt	7.06E+00	9.67E-06	3.00E-04	3.22E-02	3.86E-07	3.00E-04	1.29E-03	1.47E-09	1.71E-06	8.57E-04	3.44E-02
Copper	1.49E+02	2.04E-04	4.00E-02	5.10E-03	8.14E-06	4.00E-02	2.04E-04	3.10E-08	NA		5.31E-03
Iron	2.49E+04	3.41E-02	7.00E-01	4.87E-02	1.36E-03	7.00E-01	1.94E-03	5.18E-06	NA		5.07E-02
Lead	4.36E+03	5.97E-03	NA		2.38E-04	NA		9.08E-07	NA		
Manganese	3.60E+02	4.93E-04	2.40E-02	2.05E-02	1.97E-05	2.40E-02	8.20E-04	7.49E-08	1.43E-05	5.25E-03	2.66E-02
Nickel	2.58E+01	3.53E-05	2.00E-02	1.77E-03	1.41E-06	2.00E-02	7.05E-05	5.37E-09	2.57E-05	2.09E-04	2.05E-03
Selenium	3.00E+00	4.11E-06	5.00E-03	8.22E-04	1.64E-07	5.00E-03	3.28E-05	6.25E-10	5.71E-03	1.09E-07	8.55E-04
Silver	5.12E-01	7.01E-07	5.00E-03	1.40E-04	2.80E-08	5.00E-03	5.60E-06	1.07E-10	NA		1.46E-04

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Thallium	2.60E+00	3.56E-06	6.60E-05	5.40E-02	1.42E-07	6.60E-05	2.15E-03	5.41E-10	NA		5.61E-02
Vanadium	3.26E+01	4.47E-05	5.00E-03	8.93E-03	1.78E-06	5.00E-03	3.56E-04	6.79E-09	NA		9.29E-03
Zinc	4.53E+02	6.21E-04	3.00E-01	2.07E-03	2.48E-05	3.00E-01	8.25E-05	9.43E-08	NA		2.15E-03
Pesticides/PCBs											
4,4'-DDD	9.09E+00	1.25E-05	NA		2.48E-06	NA		1.89E-09	NA		
4,4'-DDE	5.26E+00	7.21E-06	NA		1.44E-06	NA		1.10E-09	NA		
4,4'-DDT	1.21E+02	1.66E-04	5.00E-04	3.32E-01	3.31E-05	5.00E-04	6.61E-02	2.52E-08	NA		3.98E-01
alpha-BHC	6.00E-03	8.22E-09	5.00E-04	1.64E-05	1.64E-09	5.00E-04	3.28E-06	1.25E-12	NA		1.97E-05
alpha-Chlordane	8.10E-02	1.11E-07	5.00E-04	2.22E-04	2.21E-08	5.00E-04	4.43E-05	1.69E-11	2.00E-04	8.43E-08	2.66E-04
beta-BHC	2.40E-02	3.29E-08	NA		6.56E-09	NA		5.00E-12	NA		
gamma-BHC	3.47E-01	4.75E-07	3.00E-04	1.58E-03	9.48E-08	3.00E-04	3.16E-04	7.22E-11	NA		1.90E-03
gamma-Chlordane	8.30E-02	1.14E-07	5.00E-04	2.27E-04	2.27E-08	5.00E-04	4.54E-05	1.73E-11	2.00E-04	8.64E-08	2.73E-04
Dieldrin	8.60E-02	1.18E-07	5.00E-05	2.36E-03	2.35E-08	5.00E-05	4.70E-04	1.79E-11	NA		2.83E-03
Endosulfan sulfate	4.40E-03	6.03E-09	6.00E-03	1.00E-06	1.20E-09	6.00E-03	2.00E-07	9.16E-13	NA		1.20E-06
Endrin	1.40E-02	1.92E-08	3.00E-04	6.39E-05	3.83E-09	3.00E-04	1.28E-05	2.91E-12	NA		7.67E-05
Endrin aldehyde	4.90E-03	6.71E-09	3.00E-04	2.24E-05	1.34E-09	3.00E-04	4.46E-06	1.02E-12	NA		2.68E-05
Endrin ketone	6.90E-03	9.45E-09	3.00E-04	3.15E-05	1.89E-09	3.00E-04	6.29E-06	1.44E-12	NA		3.78E-05
Heptachlor	6.50E-04	8.90E-10	3.00E-05	2.97E-05	1.78E-10	3.00E-05	5.92E-06	1.35E-13	NA		3.56E-05
Heptachlor epoxide	2.80E-03	3.84E-09	1.30E-05	2.95E-04	7.65E-10	1.30E-05	5.89E-05	5.83E-13	NA		3.54E-04
Methoxychlor	7.00E-03	9.59E-09	2.00E-05	4.79E-04	1.91E-09	2.00E-05	9.57E-05	1.46E-12	NA		5.75E-04
Aroclor-1260	3.30E-02	4.52E-08	2.00E-05	2.26E-03	2.71E-08	2.00E-05	1.35E-03	6.87E-12	NA		3.61E-03
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	1.13E-08	9.00E-02	1.26E-07	4.51E-09	9.00E-02	5.01E-08	1.72E-12	5.71E-02	3.01E-11	1.76E-07
1,4-Dichlorobenzene	2.00E-03	2.74E-09	7.00E-02	3.91E-08	1.09E-09	7.00E-02	1.56E-08	4.16E-13	2.29E-01	1.82E-12	5.48E-08
2-Methylnaphthalene	3.87E+00	5.30E-06	4.00E-03	1.33E-03	3.17E-06	4.00E-03	7.93E-04	8.06E-10	NA		2.12E-03
bis(2-Ethylhexyl)phthalate	1.07E+00	1.47E-06	2.00E-02	7.33E-05	5.85E-07	2.00E-02	2.92E-05	2.23E-10	NA		1.03E-04
Acetophenone	2.60E-01	3.56E-07	1.00E-01	3.56E-06	1.42E-07	1.00E-01	1.42E-06	5.41E-11	NA		4.98E-06
Benzo(a)anthracene	4.88E-01	6.68E-07	NA		4.00E-07	NA		1.02E-10	NA		
Benzo(a)pyrene	6.51E-01	8.92E-07	NA		5.34E-07	NA		1.36E-10	NA		
Benzo(b)fluoranthene	6.40E-01	8.77E-07	NA		5.25E-07	NA		1.33E-10	NA		
Benzo(g,h,i)perylene	6.60E-01	9.04E-07	NA		5.41E-07	NA		1.37E-10	NA		
Benzo(k)fluoranthene	6.23E-01	8.53E-07	NA		5.11E-07	NA		1.30E-10	NA		
Caprolactam	2.30E-01	3.15E-07	5.00E-01	6.30E-07	1.26E-07	5.00E-01	2.51E-07	4.79E-11	NA		8.82E-07
Chrysene	7.97E-01	1.09E-06	NA		6.53E-07	NA		1.66E-10	NA		
Dibenz(a,h)anthracene	3.13E-01	4.29E-07	NA		2.57E-07	NA		6.52E-11	NA		
Fluoranthene	6.68E-01	9.15E-07	4.00E-02	2.29E-05	5.48E-07	4.00E-02	1.37E-05	1.39E-10	NA		3.66E-05
Indeno(1,2,3-c,d)pyrene	6.94E-01	9.51E-07	NA		5.69E-07	NA		1.44E-10	NA		
Naphthalene	2.83E-01	3.88E-07	2.00E-02	1.94E-05	2.32E-07	2.00E-02	1.16E-05	5.89E-11	8.57E-04	6.87E-08	3.11E-05
Phenanthrene	3.78E-01	5.18E-07	NA		3.10E-07	NA		7.87E-11	NA		
Pyrene	1.35E+00	1.85E-06	3.00E-02	6.16E-05	1.11E-06	3.00E-02	3.69E-05	2.81E-10	NA		9.85E-05
Acetone	1.50E-01	2.05E-07	9.00E-01	2.28E-07	8.20E-08	9.00E-01	9.11E-08	3.12E-11	8.86E+00	3.53E-12	3.19E-07
Chlorobenzene	2.22E-02	3.04E-08	2.00E-02	1.52E-06	1.21E-08	2.00E-02	6.07E-07	4.62E-12	1.43E-02	3.24E-10	2.13E-06

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
cis-1,2-Dichloroethene	2.05E-02	2.81E-08	1.00E-02	2.81E-06	1.12E-08	1.00E-02	1.12E-06	4.27E-12	NA		3.93E-06
Ethylbenzene	2.05E-02	2.81E-08	1.00E-01	2.81E-07	1.12E-08	1.00E-01	1.12E-07	4.27E-12	2.86E-01	1.49E-11	3.93E-07
Isopropylbenzene (cumene)	3.38E-01	4.63E-07	1.00E-01	4.63E-06	1.85E-07	1.00E-01	1.85E-06	7.04E-11	1.14E-01	6.16E-10	6.48E-06
Methyl ethyl ketone	2.38E-02	3.26E-08	6.00E-01	5.43E-08	1.30E-08	6.00E-01	2.17E-08	4.95E-12	1.43E+00	3.47E-12	7.60E-08
Methyl isobutyl ketone	6.85E-03	9.38E-09	8.00E-02	1.17E-07	3.74E-09	8.00E-02	4.68E-08	1.43E-12	8.57E-01	1.66E-12	1.64E-07
Methylcyclohexane	3.46E-01	4.74E-07	NA		1.89E-07	NA		7.20E-11	8.60E-01	8.38E-11	8.38E-11
Methylene chloride	6.66E-03	9.12E-09	6.00E-02	1.52E-07	3.64E-09	6.00E-02	6.07E-08	1.39E-12	2.86E-01	4.85E-12	2.13E-07
Tetrachloroethene	6.66E-03	9.12E-09	1.00E-02	9.12E-07	3.64E-09	1.00E-02	3.64E-07	1.39E-12	1.00E-02	1.39E-10	1.28E-06
Toluene	6.85E-02	9.38E-08	8.00E-02	1.17E-06	3.74E-08	8.00E-02	4.68E-07	1.43E-11	8.57E-02	1.66E-10	1.64E-06
Trichloroethene	4.00E-03	5.48E-09	3.00E-04	1.83E-05	2.19E-09	3.00E-04	7.29E-06	8.33E-13	1.00E-02	8.33E-11	2.56E-05
Xylenes, total	2.91E-01	3.99E-07	2.00E-01	1.99E-06	1.59E-07	2.00E-01	7.95E-07	6.06E-11	2.86E-02	2.12E-09	2.79E-06
			Total Risk (Hazard Index):	0.68		**Total Risk (Hazard Index):**	0.09		**Total Risk (Hazard Index):**	0.011	0.78

Notes:

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : 0.8

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-61
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	1.50E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	9.21E+03	1.01E-02	NA		2.93E-04	NA		3.83E-07	NA		
Antimony	3.50E+00	3.84E-06	NA		1.11E-07	NA		1.46E-10	NA		
Arsenic	2.69E+01	2.95E-05	1.50E+00	4.42E-05	2.56E-06	1.50E+00	3.85E-06	1.12E-09	1.51E+01	1.69E-08	**4.81E-05**
Barium	9.37E+02	1.03E-03	NA		2.98E-05	NA		3.90E-08	NA		
Beryllium	3.03E-01	3.32E-07	NA		9.63E-09	NA		1.26E-11	8.40E+00	1.06E-10	1.06E-10
Cadmium	2.45E+00	2.68E-06	NA		7.79E-09	NA		1.02E-10	6.30E+00	6.43E-10	6.43E-10
Chromium	1.54E+02	1.69E-04	NA		4.89E-06	NA		6.41E-09	NA		
Cobalt	7.06E+00	7.74E-06	NA		2.24E-07	NA		2.94E-10	3.15E+00	9.26E-10	9.26E-10
Copper	1.49E+02	1.63E-04	NA		4.74E-06	NA		6.20E-09	NA		
Iron	2.49E+04	2.73E-02	NA		7.91E-04	NA		1.04E-06	NA		
Lead	4.36E+03	4.78E-03	NA		1.39E-04	NA		1.82E-07	NA		
Manganese	3.60E+02	3.95E-04	NA		1.14E-05	NA		1.50E-08	NA		
Nickel	2.58E+01	2.83E-05	NA		8.20E-07	NA		1.07E-09	9.10E-01	9.78E-10	9.78E-10
Selenium	3.00E+00	3.29E-06	NA		9.53E-08	NA		1.25E-10	NA		
Silver	5.12E-01	5.61E-07	NA		1.63E-08	NA		2.13E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs	Oral: Chronic Daily Intake	Oral: Cancer Slope Factor, SF	Oral: Cancer Risk	Dermal: Chronic Daily Intake	Dermal: Cancer Slope Factor, SF	Dermal: Cancer Risk	Inhalation: Chronic Daily Intake	Inhalation: Cancer Slope Factor, SF	Inhalation: Cancer Risk	Total Cancer Risk
	[mg/kg]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[mg/kg/day]	[mg/kg/day]-1	[-]	[-]
Thallium	2.60E+00	2.85E-06	NA		8.26E-08	NA		1.08E-10	NA		
Vanadium	3.26E+01	3.57E-05	NA		1.04E-06	NA		1.36E-09	NA		
Zinc	4.53E+02	4.96E-04	NA		1.44E-05	NA		1.89E-08	NA		
Pesticides/PCBs											
4,4'-DDD	9.09E+00	9.96E-06	2.40E-01	2.39E-06	1.44E-06	2.40E-01	3.47E-07	3.78E-10	2.42E-01	9.14E-11	**2.74E-06**
4,4'-DDE	5.26E+00	5.76E-06	3.40E-01	1.96E-06	8.36E-07	3.40E-01	2.84E-07	2.19E-10	3.40E-01	7.44E-11	**2.24E-06**
4,4'-DDT	1.21E+02	1.33E-04	3.40E-01	4.51E-05	1.92E-05	3.40E-01	6.54E-06	5.04E-09	3.40E-01	1.71E-09	**5.16E-05**
alpha-BHC	6.00E-03	6.58E-09	6.30E+00	4.14E-08	9.53E-10	6.30E+00	6.01E-09	2.50E-13	6.30E+00	1.57E-12	4.74E-08
alpha-Chlordane	8.10E-02	8.88E-08	1.30E+00	1.15E-07	1.29E-08	1.30E+00	1.67E-08	3.37E-12	3.50E-01	1.18E-12	1.32E-07
beta-BHC	2.40E-02	2.63E-08	1.80E+00	4.73E-08	3.81E-09	1.80E+00	6.86E-09	9.99E-13	1.86E+00	1.85E-12	5.42E-08
gamma-BHC	3.47E-01	3.80E-07	1.10E+00	4.18E-07	5.51E-08	1.10E+00	6.07E-08	1.44E-11	1.09E+00	1.57E-11	4.79E-07
gamma-Chlordane	8.30E-02	9.10E-08	1.20E+00	1.09E-07	1.32E-08	1.20E+00	1.58E-08	3.46E-12	3.50E-01	1.21E-12	1.25E-07
Dieldrin	8.60E-02	9.42E-08	1.60E+01	1.51E-06	1.37E-08	1.60E+01	2.19E-07	3.58E-12	1.61E+01	5.77E-11	**1.73E-06**
Endosulfan sulfate	4.40E-03	4.82E-09	NA		6.99E-10	NA		1.83E-13	NA		
Endrin	1.40E-02	1.53E-08	NA		2.22E-09	NA		5.83E-13	NA		
Endrin aldehyde	4.90E-03	5.37E-09	NA		7.79E-10	NA		2.04E-13	NA		
Endrin ketone	6.90E-03	7.56E-09	NA		1.10E-09	NA		2.87E-13	NA		
Heptachlor	6.50E-04	7.12E-10	4.50E+00	3.21E-09	1.03E-10	4.50E+00	4.65E-10	2.71E-14	4.55E+00	1.23E-13	3.67E-09
Heptachlor epoxide	2.80E-03	3.07E-09	9.10E+00	2.79E-08	4.45E-10	9.10E+00	4.05E-09	1.17E-13	9.10E+00	1.06E-12	3.20E-08
Methoxychlor	7.00E-03	7.67E-09	NA		1.11E-09	NA		2.91E-13	NA		
Aroclor-1260	3.30E-02	3.62E-08	2.00E+00	7.23E-08	1.57E-08	2.00E+00	3.15E-08	1.37E-12	2.00E+00	2.75E-12	1.04E-07
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	9.04E-09	NA		2.62E-09	NA		3.44E-13	NA		
1,4-Dichlorobenzene	2.00E-03	2.19E-09	5.40E-03	1.18E-11	6.36E-10	5.40E-03	3.43E-12	8.33E-14	3.85E-02	3.21E-15	1.53E-11
2-Methylnaphthalene	3.87E+00	4.24E-06	NA		1.84E-06	NA		1.61E-10	NA		
bis(2-Ethylhexyl)phthalate	1.07E+00	1.17E-06	1.40E-02	1.64E-08	3.40E-07	1.40E-02	4.76E-09	4.46E-11	8.40E-03	3.74E-13	2.12E-08
Acetophenone	2.60E-01	2.85E-07	NA		8.26E-08	NA		1.08E-11	NA		
Benzo(a)anthracene	4.88E-01	5.35E-07	1.20E+00	6.42E-07	2.33E-07	1.20E+00	2.79E-07	2.03E-11	3.85E-01	7.82E-12	9.21E-07
Benzo(a)pyrene	6.51E-01	7.13E-07	1.20E+01	8.56E-06	3.10E-07	1.20E+01	3.72E-06	2.71E-11	3.85E+00	1.04E-10	**1.23E-05**
Benzo(b)fluoranthene	6.40E-01	7.01E-07	1.20E+00	8.42E-07	3.05E-07	1.20E+00	3.66E-07	2.66E-11	3.85E-01	1.03E-11	**1.21E-06**
Benzo(g,h,i)perylene	6.60E-01	7.23E-07	NA		3.15E-07	NA		2.75E-11	NA		
Benzo(k)fluoranthene	6.23E-01	6.83E-07	1.20E+00	8.19E-07	2.97E-07	1.20E+00	3.56E-07	2.59E-11	3.85E-01	9.99E-12	**1.18E-06**
Caprolactam	2.30E-01	2.52E-07	NA		7.31E-08	NA		9.58E-12	NA		
Chrysene	7.97E-01	8.73E-07	1.20E-01	1.05E-07	3.80E-07	1.20E-01	4.56E-08	3.32E-11	3.85E-02	1.28E-12	1.50E-07
Dibenz(a,h)anthracene	3.13E-01	3.43E-07	7.30E+00	2.50E-06	1.49E-07	7.30E+00	1.09E-06	1.30E-11	4.20E+00	5.47E-11	**3.59E-06**
Fluoranthene	6.68E-01	7.32E-07	NA		3.18E-07	NA		2.78E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.94E-01	7.61E-07	1.20E+00	9.13E-07	3.31E-07	1.20E+00	3.97E-07	2.89E-11	3.85E-01	1.11E-11	**1.31E-06**
Naphthalene	2.83E-01	3.10E-07	1.20E-01	3.72E-08	1.35E-07	1.20E-01	1.62E-08	1.18E-11	1.19E-01	1.40E-12	5.34E-08
Phenanthrene	3.78E-01	4.14E-07	NA		1.80E-07	NA		1.57E-11	NA		
Pyrene	1.35E+00	1.48E-06	NA		6.44E-07	NA		5.62E-11	NA		
Acetone	1.50E-01	1.64E-07	NA		4.77E-08	NA		6.25E-12	NA		
Chlorobenzene	2.22E-02	2.43E-08	NA		7.06E-09	NA		9.24E-13	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
cis-1,2-Dichloroethene	2.05E-02	2.25E-08	NA		6.52E-09	NA		8.54E-13	NA		
Ethylbenzene	2.05E-02	2.25E-08	1.10E-02	2.47E-10	6.52E-09	1.10E-02	7.17E-11	8.54E-13	8.75E-03	7.47E-15	3.19E-10
Isopropylbenzene (cumene)	3.38E-01	3.70E-07	NA		1.07E-07	NA		1.41E-11	NA		
Methyl ethyl ketone	2.38E-02	2.61E-08	NA		7.56E-09	NA		9.91E-13	NA		
Methyl isobutyl ketone	6.85E-03	7.51E-09	NA		2.18E-09	NA		2.85E-13	NA		
Methylcyclohexane	3.46E-01	3.79E-07	NA		1.10E-07	NA		1.44E-11	NA		
Methylene chloride	6.66E-03	7.30E-09	1.40E-02	1.02E-10	2.12E-09	1.40E-02	2.96E-11	2.77E-13	3.50E-03	9.71E-16	1.32E-10
Tetrachloroethene	6.66E-03	7.30E-09	5.40E-01	3.94E-09	2.12E-09	5.40E-01	1.14E-09	2.77E-13	2.07E-02	5.73E-15	5.08E-09
Toluene	6.85E-02	7.51E-08	NA		2.18E-08	NA		2.85E-12	NA		
Trichloroethene	4.00E-03	4.38E-09	5.90E-03	2.59E-11	1.27E-09	5.90E-03	7.50E-12	1.67E-13	7.00E-03	1.17E-15	3.34E-11
Xylenes, total	2.91E-01	3.19E-07	NA		9.25E-08	NA		1.21E-11	NA		
			Total Risk:	1.10E-04		**Total Risk:**	1.77E-05		**Total Risk:**	2.17E-08	**1.28E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-62
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	1.50E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.21E+03	1.18E-01	1.00E+00	1.18E-01	3.41E-03	1.00E+00	3.41E-03	4.47E-06	1.40E-03	3.20E-03	1.24E-01
Antimony	3.50E+00	4.47E-05	4.00E-04	1.12E-01	1.30E-06	4.00E-04	3.24E-03	1.70E-09	NA		1.15E-01
Arsenic	2.69E+01	3.44E-04	3.00E-04	1.15E+00	2.99E-05	3.00E-04	9.97E-02	1.31E-08	4.29E-06	3.05E-03	**1.25E+00**
Barium	9.37E+02	1.20E-02	2.00E-01	5.99E-02	3.47E-04	2.00E-01	1.74E-03	4.55E-07	1.43E-04	3.19E-03	6.48E-02
Beryllium	3.03E-01	3.87E-06	2.00E-03	1.94E-03	1.12E-07	2.00E-03	5.62E-05	1.47E-10	2.00E-06	7.36E-05	2.07E-03
Cadmium	2.45E+00	3.13E-05	1.10E-05	2.85E+00	9.08E-08	1.10E-05	8.26E-03	1.19E-09	2.86E-06	4.17E-04	**2.86E+00**
Chromium	1.54E+02	1.97E-03	NA		5.71E-05	NA		7.48E-08	NA		
Cobalt	7.06E+00	9.03E-05	3.00E-04	3.01E-01	2.62E-06	3.00E-04	8.73E-03	3.43E-09	1.71E-06	2.00E-03	3.12E-01
Copper	1.49E+02	1.91E-03	4.00E-02	4.76E-02	5.52E-05	4.00E-02	1.38E-03	7.24E-08	NA		4.90E-02
Iron	2.49E+04	3.18E-01	7.00E-01	4.55E-01	9.23E-03	7.00E-01	1.32E-02	1.21E-05	NA		4.68E-01
Lead	4.36E+03	5.57E-02	NA		1.62E-03	NA		2.12E-06	NA		
Manganese	3.60E+02	4.60E-03	2.40E-02	1.92E-01	1.33E-04	2.40E-02	5.56E-03	1.75E-07	1.43E-05	1.22E-02	2.10E-01
Nickel	2.58E+01	3.30E-04	1.10E-02	3.00E-02	9.57E-06	1.10E-02	8.70E-04	1.25E-08	2.57E-05	4.87E-04	3.13E-02
Selenium	3.00E+00	3.84E-05	5.00E-03	7.67E-03	1.11E-06	5.00E-03	2.22E-04	1.46E-09	5.71E-03	2.55E-07	7.89E-03
Silver	5.12E-01	6.55E-06	5.00E-03	1.31E-03	1.90E-07	5.00E-03	3.80E-05	2.49E-10	NA		1.35E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Thallium	2.60E+00	3.32E-05	6.60E-05	5.04E-01	9.64E-07	6.60E-05	1.46E-02	1.26E-09	NA		5.18E-01
Vanadium	3.26E+01	4.17E-04	5.00E-03	8.34E-02	1.21E-05	5.00E-03	2.42E-03	1.58E-08	NA		8.58E-02
Zinc	4.53E+02	5.79E-03	3.00E-01	1.93E-02	1.68E-04	3.00E-01	5.60E-04	2.20E-07	NA		1.99E-02
Pesticides/PCBs											
4,4'-DDD	9.09E+00	1.16E-04	NA		1.69E-05	NA		4.42E-09	NA		
4,4'-DDE	5.26E+00	6.73E-05	NA		9.75E-06	NA		2.56E-09	NA		
4,4'-DDT	1.21E+02	1.55E-03	5.00E-04	3.09E+00	2.24E-04	5.00E-04	4.49E-01	5.88E-08	NA		**3.54E+00**
alpha-BHC	6.00E-03	7.67E-08	5.00E-04	1.53E-04	1.11E-08	5.00E-04	2.22E-05	2.91E-12	NA		1.76E-04
alpha-Chlordane	8.10E-02	1.04E-06	3.30E-05	3.14E-02	1.50E-07	3.30E-05	4.55E-03	3.93E-11	2.00E-04	1.97E-07	3.59E-02
beta-BHC	2.40E-02	3.07E-07	NA		4.45E-08	NA		1.17E-11	NA		
gamma-BHC	3.47E-01	4.44E-06	3.00E-04	1.48E-02	6.43E-07	3.00E-04	2.14E-03	1.69E-10	NA		1.69E-02
gamma-Chlordane	8.30E-02	1.06E-06	3.30E-05	3.22E-02	1.54E-07	3.30E-05	4.66E-03	4.03E-11	2.00E-04	2.02E-07	3.68E-02
Dieldrin	8.60E-02	1.10E-06	5.00E-05	2.20E-02	1.59E-07	5.00E-05	3.19E-03	4.18E-11	NA		2.52E-02
Endosulfan sulfate	4.40E-03	5.63E-08	6.00E-03	9.38E-06	8.16E-09	6.00E-03	1.36E-06	2.14E-12	NA		1.07E-05
Endrin	1.40E-02	1.79E-07	3.00E-04	5.97E-04	2.60E-08	3.00E-04	8.65E-05	6.80E-12	NA		6.83E-04
Endrin aldehyde	4.90E-03	6.26E-08	3.00E-04	2.09E-04	9.08E-09	3.00E-04	3.03E-05	2.38E-12	NA		2.39E-04
Endrin ketone	6.90E-03	8.82E-08	3.00E-04	2.94E-04	1.28E-08	3.00E-04	4.26E-05	3.35E-12	NA		3.37E-04
Heptachlor	6.50E-04	8.31E-09	3.00E-05	2.77E-04	1.21E-09	3.00E-05	4.02E-05	3.16E-13	3.00E-05	1.05E-08	3.17E-04
Heptachlor epoxide	2.80E-03	3.58E-08	1.30E-05	2.75E-03	5.19E-09	1.30E-05	3.99E-04	1.36E-12	NA		3.15E-03
Methoxychlor	7.00E-03	8.95E-08	2.00E-05	4.47E-03	1.30E-08	2.00E-05	6.49E-04	3.40E-12	2.00E-05	1.70E-07	5.12E-03
Aroclor-1260	3.30E-02	4.22E-07	2.00E-05	2.11E-02	1.84E-07	2.00E-05	9.18E-03	1.60E-11	NA		3.03E-02
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	1.05E-07	9.00E-02	1.17E-06	3.06E-08	9.00E-02	3.40E-07	4.01E-12	5.71E-02	7.01E-11	1.51E-06
1,4-Dichlorobenzene	2.00E-03	2.56E-08	7.00E-02	3.65E-07	7.42E-09	7.00E-02	1.06E-07	9.72E-13	2.29E-01	4.25E-12	4.71E-07
2-Methylnaphthalene	3.87E+00	4.95E-05	4.00E-03	1.24E-02	2.15E-05	4.00E-03	5.38E-03	1.88E-09	NA		1.78E-02
bis(2-Ethylhexyl)phthalate	1.07E+00	1.37E-05	2.00E-02	6.84E-04	3.97E-06	2.00E-02	1.98E-04	5.20E-10	NA		8.82E-04
Acetophenone	2.60E-01	3.32E-06	1.00E-01	3.32E-05	9.64E-07	1.00E-01	9.64E-06	1.26E-10	NA		4.29E-05
Benzo(a)anthracene	4.88E-01	6.24E-06	NA		2.71E-06	NA		2.37E-10	NA		
Benzo(a)pyrene	6.51E-01	8.32E-06	NA		3.62E-06	NA		3.16E-10	NA		
Benzo(b)fluoranthene	6.40E-01	8.18E-06	NA		3.56E-06	NA		3.11E-10	NA		
Benzo(g,h,i)perylene	6.60E-01	8.44E-06	NA		3.67E-06	NA		3.21E-10	NA		
Benzo(k)fluoranthene	6.23E-01	7.97E-06	NA		3.46E-06	NA		3.03E-10	NA		
Caprolactam	2.30E-01	2.94E-06	5.00E-01	5.88E-06	8.53E-07	5.00E-01	1.71E-06	1.12E-10	NA		7.59E-06
Chrysene	7.97E-01	1.02E-05	NA		4.43E-06	NA		3.87E-10	NA		
Dibenz(a,h)anthracene	3.13E-01	4.00E-06	NA		1.74E-06	NA		1.52E-10	NA		
Fluoranthene	6.68E-01	8.54E-06	4.00E-02	2.14E-04	3.72E-06	4.00E-02	9.29E-05	3.24E-10	NA		3.06E-04
Indeno(1,2,3-c,d)pyrene	6.94E-01	8.87E-06	NA		3.86E-06	NA		3.37E-10	NA		
Naphthalene	2.83E-01	3.62E-06	2.00E-02	1.81E-04	1.57E-06	2.00E-02	7.87E-05	1.37E-10	8.57E-04	1.60E-07	2.60E-04
Phenanthrene	3.78E-01	4.83E-06	NA		2.10E-06	NA		1.84E-10	NA		
Pyrene	1.35E+00	1.73E-05	3.00E-02	5.75E-04	7.51E-06	3.00E-02	2.50E-04	6.56E-10	NA		8.26E-04
Acetone	1.50E-01	1.92E-06	9.00E-01	2.13E-06	5.56E-07	9.00E-01	6.18E-07	7.29E-11	8.86E+00	8.23E-12	2.75E-06
Chlorobenzene	2.22E-02	2.84E-07	2.00E-02	1.42E-05	8.23E-08	2.00E-02	4.12E-06	1.08E-11	1.43E-02	7.55E-10	1.83E-05

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
cis-1,2-Dichloroethene	2.05E-02	2.62E-07	1.00E-02	2.62E-05	7.60E-08	1.00E-02	7.60E-06	9.96E-12	NA		3.38E-05
Ethylbenzene	2.05E-02	2.62E-07	1.00E-01	2.62E-06	7.60E-08	1.00E-01	7.60E-07	9.96E-12	2.86E-01	3.49E-11	3.38E-06
Isopropylbenzene (cumene)	3.38E-01	4.32E-06	1.00E-01	4.32E-05	1.25E-06	1.00E-01	1.25E-05	1.64E-10	1.14E-01	1.44E-09	5.57E-05
Methyl ethyl ketone	2.38E-02	3.04E-07	6.00E-01	5.07E-07	8.82E-08	6.00E-01	1.47E-07	1.16E-11	1.43E+00	8.09E-12	6.54E-07
Methyl isobutyl ketone	6.85E-03	8.76E-08	8.00E-02	1.09E-06	2.54E-08	8.00E-02	3.17E-07	3.33E-12	8.57E-01	3.88E-12	1.41E-06
Methylcyclohexane	3.46E-01	4.42E-06	NA		1.28E-06	NA		1.68E-10	8.60E-01	1.95E-10	1.95E-10
Methylene chloride	6.66E-03	8.52E-08	6.00E-02	1.42E-06	2.47E-08	6.00E-02	4.12E-07	3.24E-12	2.86E-01	1.13E-11	1.83E-06
Tetrachloroethene	6.66E-03	8.52E-08	1.00E-02	8.52E-06	2.47E-08	1.00E-02	2.47E-06	3.24E-12	1.00E-02	3.24E-10	1.10E-05
Toluene	6.85E-02	8.76E-07	8.00E-02	1.09E-05	2.54E-07	8.00E-02	3.17E-06	3.33E-11	8.57E-02	3.88E-10	1.41E-05
Trichloroethene	4.00E-03	5.11E-08	3.00E-04	1.70E-04	1.48E-08	3.00E-04	4.94E-05	1.94E-12	1.00E-02	1.94E-10	2.20E-04
Xylenes, total	2.91E-01	3.72E-06	2.00E-01	1.86E-05	1.08E-06	2.00E-01	5.39E-06	1.41E-10	2.86E-02	4.95E-09	2.40E-05
		Total Risk (Hazard Index):		9.16	Total Risk (Hazard Index):		0.64	Total Risk (Hazard Index):		0.02	9.83

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : 10

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-63
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
Chemical of Potential Concern	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**1.9E-05**	**2.3E-06**	2.9E-08	**2.1E-05**	38%	**4.4E-05**	**3.8E-06**	1.7E-08	**4.8E-05**	38%
Subtotal Metals	**1.9E-05**	**2.3E-06**	3.3E-08	**2.1E-05**	38%	**4.4E-05**	**3.8E-06**	2.0E-08	**4.8E-05**	38%
Pesticides/PCBs										
4,4'-DDE	8.4E-07	1.7E-07	1.3E-10	**1.0E-06**	1.8%	**2.0E-06**	2.8E-07	7.4E-11	**2.2E-06**	1.8%
4,4'-DDT	**1.9E-05**	**3.9E-06**	2.9E-09	**2.3E-05**	41%	**4.5E-05**	**6.5E-06**	1.7E-09	**5.2E-05**	41%
Dieldrin	6.5E-07	1.3E-07	9.9E-11	7.8E-07	1.4%	**1.5E-06**	2.2E-07	5.8E-11	**1.7E-06**	1.4%
Subtotal Pesticides/PCBs	**2.1E-05**	**4.2E-06**	3.2E-09	**2.5E-05**	45%	**4.9E-05**	**7.2E-06**	1.9E-09	**5.7E-05**	45%
SVOCs/VOCs										
Benzo(a)pyrene	**3.7E-06**	**2.2E-06**	1.8E-10	**5.9E-06**	10%	**8.6E-06**	**3.7E-06**	1.0E-10	**1.2E-05**	10%
Benzo(b)fluoranthene	3.6E-07	2.2E-07	1.8E-11	5.8E-07	1.0%	8.4E-07	3.7E-07	1.0E-11	**1.2E-06**	1.0%
Benzo(k)fluoranthene	3.5E-07	2.1E-07	1.7E-11	5.6E-07	1.0%	8.2E-07	3.6E-07	1.0E-11	**1.2E-06**	0.9%
Dibenz(a,h)anthracene	**1.1E-06**	6.4E-07	9.4E-11	**1.7E-06**	3%	**2.5E-06**	**1.1E-06**	5.5E-11	**3.6E-06**	2.9%
Indeno(1,2,3-c,d)pyrene	3.9E-07	2.3E-07	1.9E-11	6.3E-07	1%	9.1E-07	4.0E-07	1.1E-11	**1.3E-06**	1%
Subtotal SVOCs/VOCs	**6.2E-06**	**3.7E-06**	3.5E-10	**9.9E-06**	17%	**1.4E-05**	**6.3E-06**	2.0E-10	**2.1E-05**	17%
Total:	**4.6E-05**	**1.0E-05**	3.7E-08	**5.7E-05**		**1.1E-04**	**1.7E-05**	2.2E-08	**1.3E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:				**6E-05**					**1E-04**	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**1.5E-04**	**2.8E-05**	**5.9E-08**	**1.82E-04**	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									**2E-04**	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-64
Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Noncarcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.3E-02	5.0E-04	1.4E-03	1.4E-02	2%	**1.2E-01**	3.4E-03	3.2E-03	**1.2E-01**	1%
Antimony	1.2E-02	4.8E-04		1.2E-02	2%	**1.1E-01**	3.2E-03		**1.2E-01**	1%
Arsenic	**1.2E-01**	1.5E-02	1.3E-03	**1.4E-01**	18%	**1.1E+00**	1.0E-01	3.0E-03	**1.2E+00**	13%
Cadmium	6.7E-03	2.7E-05	1.8E-04	6.9E-03	1%	**2.8E+00**	8.3E-03	4.2E-04	**2.9E+00**	29%
Cobalt	3.2E-02	1.3E-03	8.6E-04	3.4E-02	4%	**3.0E-01**	8.7E-03	2.0E-03	**3.1E-01**	3%
Iron	4.9E-02	1.9E-03		5.1E-02	7%	**4.5E-01**	1.3E-02		**4.7E-01**	5%
Manganese	2.1E-02	8.2E-04	5.2E-03	2.7E-02	3%	**1.9E-01**	5.6E-03	1.2E-02	**2.1E-01**	2%
Thallium	5.4E-02	2.2E-03		5.6E-02	7%	**5.0E-01**	1.5E-02		**5.2E-01**	5%
Subtotal Metals	**3.4E-01**	2.3E-02	1.1E-02	**3.7E-01**	47%	**5.9E+00**	**1.6E-01**	2.5E-02	**6.1E+00**	62%
Pesticides/PCBs										
4,4'-DDT	**3.3E-01**	6.6E-02		**4.0E-01**	51%	**3.1E+00**	**4.5E-01**		**3.5E+00**	36%
Subtotal Pesticides/PCBs	**3.4E-01**	6.9E-02	1.7E-07	**4.1E-01**	52%	**3.2E+00**	**4.7E-01**	5.8E-07	**3.7E+00**	38%
Total:	**0.7**	0.1	0.01	**0.8**		**9.2**	**0.6**	0.02	**9.8**	

Total Estimated Hazard Index Across All Exposure Routes: Adult Resident: **0.8** Child Resident: **10**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-65

Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	9.21E+03	3.22E-03	NA		3.67E-04	NA		4.89E-07	NA		
Antimony	3.50E+00	1.22E-06	NA		1.39E-07	NA		1.86E-10	NA		
Arsenic	2.69E+01	9.40E-06	1.50E+00	1.41E-05	3.21E-06	1.50E+00	4.82E-06	1.43E-09	1.51E+01	2.15E-08	**1.89E-05**
Barium	9.37E+02	3.27E-04	NA		3.73E-05	NA		4.98E-08	NA		
Beryllium	3.03E-01	1.06E-07	NA		1.21E-08	NA		1.61E-11	8.40E+00	1.35E-10	1.35E-10
Cadmium	2.45E+00	8.56E-07	NA		9.76E-09	NA		1.30E-10	6.30E+00	8.20E-10	8.20E-10
Chromium	1.54E+02	5.38E-05	NA		6.14E-06	NA		8.18E-09	NA		
Cobalt	7.06E+00	2.47E-06	NA		2.81E-07	NA		3.75E-10	3.15E+00	1.18E-09	1.18E-09
Copper	1.49E+02	5.21E-05	NA		5.94E-06	NA		7.91E-09	NA		
Iron	2.49E+04	8.70E-03	NA		9.92E-04	NA		1.32E-06	NA		
Lead	4.36E+03	1.52E-03	NA		1.74E-04	NA		2.32E-07	NA		
Manganese	3.60E+02	1.26E-04	NA		1.43E-05	NA		1.91E-08	NA		
Nickel	2.58E+01	9.02E-06	NA		1.03E-06	NA		1.37E-09	9.10E-01	1.25E-09	1.25E-09
Selenium	3.00E+00	1.05E-06	NA		1.20E-07	NA		1.59E-10	NA		
Silver	5.12E-01	1.79E-07	NA		2.04E-08	NA		2.72E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Thallium	2.60E+00	9.09E-07	NA		1.04E-07	NA		1.38E-10	NA		
Vanadium	3.26E+01	1.14E-05	NA		1.30E-06	NA		1.73E-09	NA		
Zinc	4.53E+02	1.58E-04	NA		1.80E-05	NA		2.41E-08	NA		
Pesticides/PCBs											
4,4'-DDD	9.09E+00	3.18E-06	2.40E-01	7.62E-07	1.81E-06	2.40E-01	4.35E-07	4.83E-10	2.42E-01	1.17E-10	**1.20E-06**
4,4'-DDE	5.26E+00	1.84E-06	3.40E-01	6.25E-07	1.05E-06	3.40E-01	3.56E-07	2.79E-10	3.40E-01	9.48E-11	9.81E-07
4,4'-DDT	1.21E+02	4.23E-05	3.40E-01	1.44E-05	2.41E-05	3.40E-01	8.19E-06	6.43E-09	3.40E-01	2.18E-09	**2.26E-05**
alpha-BHC	6.00E-03	2.10E-09	6.30E+00	1.32E-08	1.20E-09	6.30E+00	7.53E-09	3.19E-13	6.30E+00	2.01E-12	2.07E-08
alpha-Chlordane	8.10E-02	2.83E-08	1.30E+00	3.68E-08	1.61E-08	1.30E+00	2.10E-08	4.30E-12	3.50E-01	1.51E-12	5.78E-08
beta-BHC	2.40E-02	8.39E-09	1.80E+00	1.51E-08	4.78E-09	1.80E+00	8.60E-09	1.27E-12	1.86E+00	2.36E-12	2.37E-08
gamma-BHC	3.47E-01	1.21E-07	1.10E+00	1.33E-07	6.91E-08	1.10E+00	7.60E-08	1.84E-11	1.09E+00	2.00E-11	2.09E-07
gamma-Chlordane	8.30E-02	2.90E-08	1.20E+00	3.48E-08	1.65E-08	1.20E+00	1.98E-08	4.41E-12	3.50E-01	1.54E-12	5.46E-08
Dieldrin	8.60E-02	3.01E-08	1.60E+01	4.81E-07	1.71E-08	1.60E+01	2.74E-07	4.57E-12	1.61E+01	7.35E-11	7.55E-07
Endosulfan sulfate	4.40E-03	1.54E-09	NA		8.76E-10	NA		2.34E-13	NA		
Endrin	1.40E-02	4.89E-09	NA		2.79E-09	NA		7.44E-13	NA		
Endrin aldehyde	4.90E-03	1.71E-09	NA		9.76E-10	NA		2.60E-13	NA		
Endrin ketone	6.90E-03	2.41E-09	NA		1.37E-09	NA		3.66E-13	NA		
Heptachlor	6.50E-04	2.27E-10	4.50E+00	1.02E-09	1.29E-10	4.50E+00	5.83E-10	3.45E-14	4.55E+00	1.57E-13	1.60E-09
Heptachlor epoxide	2.80E-03	9.78E-10	9.10E+00	8.90E-09	5.58E-10	9.10E+00	5.08E-09	1.49E-13	9.10E+00	1.35E-12	1.40E-08
Methoxychlor	7.00E-03	2.45E-09	NA		1.39E-09	NA		3.72E-13	NA		
Aroclor-1260	3.30E-02	1.15E-08	2.00E+00	2.31E-08	1.97E-08	2.00E+00	3.94E-08	1.75E-12	2.00E+00	3.51E-12	6.25E-08
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	2.88E-09	NA		3.29E-09	NA		4.38E-13	NA		
1,4-Dichlorobenzene	2.00E-03	6.99E-10	5.40E-03	3.77E-12	7.97E-10	5.40E-03	4.30E-12	1.06E-13	3.85E-02	4.09E-15	8.08E-12
2-Methylnaphthalene	3.87E+00	1.35E-06	NA		2.31E-06	NA		2.06E-10	NA		
bis(2-Ethylhexyl)phthalate	1.07E+00	3.74E-07	1.40E-02	5.23E-09	4.26E-07	1.40E-02	5.97E-09	5.68E-11	8.40E-03	4.77E-13	1.12E-08
Acetophenone	2.60E-01	9.09E-08	NA		1.04E-07	NA		1.38E-11	NA		
Benzo(a)anthracene	4.88E-01	1.71E-07	1.20E+00	2.05E-07	2.92E-07	1.20E+00	3.50E-07	2.59E-11	3.85E-01	9.98E-12	5.55E-07
Benzo(a)pyrene	6.51E-01	2.27E-07	1.20E+01	2.73E-06	3.89E-07	1.20E+01	4.67E-06	3.46E-11	3.85E+00	1.33E-10	**7.40E-06**
Benzo(b)fluoranthene	6.40E-01	2.24E-07	1.20E+00	2.68E-07	3.82E-07	1.20E+00	4.59E-07	3.40E-11	3.85E-01	1.31E-11	7.27E-07
Benzo(g,h,i)perylene	6.60E-01	2.31E-07	NA		3.94E-07	NA		3.51E-11	NA		
Benzo(k)fluoranthene	6.23E-01	2.18E-07	1.20E+00	2.61E-07	3.72E-07	1.20E+00	4.47E-07	3.31E-11	3.85E-01	1.27E-11	7.08E-07
Caprolactam	2.30E-01	8.04E-08	NA		9.16E-08	NA		1.22E-11	NA		
Chrysene	7.97E-01	2.79E-07	1.20E-01	3.34E-08	4.76E-07	1.20E-01	5.72E-08	4.23E-11	3.85E-02	1.63E-12	9.06E-08
Dibenz(a,h)anthracene	3.13E-01	1.09E-07	7.30E+00	7.98E-07	1.87E-07	7.30E+00	1.37E-06	1.66E-11	4.20E+00	6.98E-11	**2.16E-06**
Fluoranthene	6.68E-01	2.33E-07	NA		3.99E-07	NA		3.55E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.94E-01	2.43E-07	1.20E+00	2.91E-07	4.15E-07	1.20E+00	4.98E-07	3.69E-11	3.85E-01	1.42E-11	7.89E-07
Naphthalene	2.83E-01	9.89E-08	1.20E-01	1.19E-08	1.69E-07	1.20E-01	2.03E-08	1.50E-11	1.19E-01	1.79E-12	3.22E-08
Phenanthrene	3.78E-01	1.32E-07	NA		2.26E-07	NA		2.01E-11	NA		
Pyrene	1.35E+00	4.72E-07	NA		8.07E-07	NA		7.17E-11	NA		
Acetone	1.50E-01	5.24E-08	NA		5.98E-08	NA		7.97E-12	NA		
Chlorobenzene	2.22E-02	7.76E-09	NA		8.84E-09	NA		1.18E-12	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
cis-1,2-Dichloroethene	2.05E-02	7.16E-09	NA		8.17E-09	NA		1.09E-12	NA		
Ethylbenzene	2.05E-02	7.16E-09	1.10E-02	7.88E-11	8.17E-09	1.10E-02	8.98E-11	1.09E-12	8.75E-03	9.53E-15	1.69E-10
Isopropylbenzene (cumene)	3.38E-01	1.18E-07	NA		1.35E-07	NA		1.80E-11	NA		
Methyl ethyl ketone	2.38E-02	8.32E-09	NA		9.48E-09	NA		1.26E-12	NA		
Methyl isobutyl ketone	6.85E-03	2.39E-09	NA		2.73E-09	NA		3.64E-13	NA		
Methylcyclohexane	3.46E-01	1.21E-07	NA		1.38E-07	NA		1.84E-11	NA		
Methylene chloride	6.66E-03	2.33E-09	1.40E-02	3.26E-11	2.65E-09	1.40E-02	3.71E-11	3.54E-13	3.50E-03	1.24E-15	6.97E-11
Tetrachloroethene	6.66E-03	2.33E-09	5.40E-01	1.26E-09	2.65E-09	5.40E-01	1.43E-09	3.54E-13	2.07E-02	7.30E-15	2.69E-09
Toluene	6.85E-02	2.39E-08	NA		2.73E-08	NA		3.64E-12	NA		
Trichloroethene	4.00E-03	1.40E-09	5.90E-03	8.25E-12	1.59E-09	5.90E-03	9.40E-12	2.12E-13	7.00E-03	1.49E-15	1.77E-11
Xylenes, total	2.91E-01	1.02E-07	NA		1.16E-07	NA		1.55E-11	NA		
			Total Risk:	3.52E-05		Total Risk:	2.21E-05		Total Risk:	2.76E-08	**5.74E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **6E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-66
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.21E+03	9.01E-03	1.00E+00	9.01E-03	1.03E-03	1.00E+00	1.03E-03	1.37E-06	1.40E-03	9.78E-04	1.10E-02
Antimony	3.50E+00	3.42E-06	4.00E-04	8.56E-03	3.90E-07	4.00E-04	9.76E-04	5.20E-10	NA		9.54E-03
Arsenic	2.69E+01	2.63E-05	3.00E-04	8.77E-02	9.00E-06	3.00E-04	3.00E-02	4.00E-09	4.29E-06	9.33E-04	1.19E-01
Barium	9.37E+02	9.17E-04	2.00E-01	4.58E-03	1.05E-04	2.00E-01	5.23E-04	1.39E-07	1.43E-04	9.75E-04	6.08E-03
Beryllium	3.03E-01	2.96E-07	2.00E-03	1.48E-04	3.38E-08	2.00E-03	1.69E-05	4.51E-11	2.00E-06	2.25E-05	1.88E-04
Cadmium	2.45E+00	2.40E-06	5.00E-04	4.79E-03	2.73E-08	5.00E-04	5.47E-05	3.64E-10	2.86E-06	1.28E-04	4.98E-03
Chromium	1.54E+02	1.51E-04	NA		1.72E-05	NA		2.29E-08	NA		
Cobalt	7.06E+00	6.91E-06	3.00E-04	2.30E-02	7.88E-07	3.00E-04	2.63E-03	1.05E-09	1.71E-06	6.12E-04	2.63E-02
Copper	1.49E+02	1.46E-04	4.00E-02	3.64E-03	1.66E-05	4.00E-02	4.16E-04	2.22E-08	NA		4.06E-03
Iron	2.49E+04	2.44E-02	7.00E-01	3.48E-02	2.78E-03	7.00E-01	3.97E-03	3.70E-06	NA		3.88E-02
Lead	4.36E+03	4.27E-03	NA		4.86E-04	NA		6.48E-07	NA		
Manganese	3.60E+02	3.52E-04	2.40E-02	1.47E-02	4.02E-05	2.40E-02	1.67E-03	5.35E-08	1.43E-05	3.75E-03	2.01E-02
Nickel	2.58E+01	2.52E-05	2.00E-02	1.26E-03	2.88E-06	2.00E-02	1.44E-04	3.84E-09	2.57E-05	1.49E-04	1.56E-03
Selenium	3.00E+00	2.94E-06	5.00E-03	5.87E-04	3.35E-07	5.00E-03	6.69E-05	4.46E-10	5.71E-03	7.81E-08	6.54E-04
Silver	5.12E-01	5.01E-07	5.00E-03	1.00E-04	5.71E-08	5.00E-03	1.14E-05	7.61E-11	NA		1.12E-04

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Thallium	2.60E+00	2.54E-06	6.60E-05	3.85E-02	2.90E-07	6.60E-05	4.39E-03	3.87E-10	NA		4.29E-02
Vanadium	3.26E+01	3.19E-05	5.00E-03	6.38E-03	3.64E-06	5.00E-03	7.27E-04	4.85E-09	NA		7.11E-03
Zinc	4.53E+02	4.43E-04	3.00E-01	1.48E-03	5.05E-05	3.00E-01	1.68E-04	6.74E-08	NA		1.65E-03
Pesticides/PCBs											
4,4'-DDD	9.09E+00	8.89E-06	NA		5.07E-06	NA		1.35E-09	NA		
4,4'-DDE	5.26E+00	5.15E-06	NA		2.93E-06	NA		7.82E-10	NA		
4,4'-DDT	1.21E+02	1.18E-04	5.00E-04	2.37E-01	6.75E-05	5.00E-04	1.35E-01	1.80E-08	NA		3.72E-01
alpha-BHC	6.00E-03	5.87E-09	5.00E-04	1.17E-05	3.35E-09	5.00E-04	6.69E-06	8.92E-13	NA		1.84E-05
alpha-Chlordane	8.10E-02	7.93E-08	5.00E-04	1.59E-04	4.52E-08	5.00E-04	9.04E-05	1.20E-11	2.00E-04	6.02E-08	2.49E-04
beta-BHC	2.40E-02	2.35E-08	NA		1.34E-08	NA		3.57E-12	NA		
gamma-BHC	3.47E-01	3.40E-07	3.00E-04	1.13E-03	1.94E-07	3.00E-04	6.45E-04	5.16E-11	NA		1.78E-03
gamma-Chlordane	8.30E-02	8.12E-08	5.00E-04	1.62E-04	4.63E-08	5.00E-04	9.26E-05	1.23E-11	2.00E-04	6.17E-08	2.55E-04
Dieldrin	8.60E-02	8.41E-08	5.00E-05	1.68E-03	4.80E-08	5.00E-05	9.59E-04	1.28E-11	NA		2.64E-03
Endosulfan sulfate	4.40E-03	4.31E-09	6.00E-03	7.18E-07	2.45E-09	6.00E-03	4.09E-07	6.54E-13	NA		1.13E-06
Endrin	1.40E-02	1.37E-08	3.00E-04	4.57E-05	7.81E-09	3.00E-04	2.60E-05	2.08E-12	NA		7.17E-05
Endrin aldehyde	4.90E-03	4.79E-09	3.00E-04	1.60E-05	2.73E-09	3.00E-04	9.11E-06	7.29E-13	NA		2.51E-05
Endrin ketone	6.90E-03	6.75E-09	3.00E-04	2.25E-05	3.85E-09	3.00E-04	1.28E-05	1.03E-12	NA		3.53E-05
Heptachlor	6.50E-04	6.36E-10	3.00E-05	2.12E-05	3.63E-10	3.00E-05	1.21E-05	9.67E-14	NA		3.33E-05
Heptachlor epoxide	2.80E-03	2.74E-09	1.30E-05	2.11E-04	1.56E-09	1.30E-05	1.20E-04	4.16E-13	NA		3.31E-04
Methoxychlor	7.00E-03	6.85E-09	2.00E-05	3.42E-04	3.90E-09	2.00E-05	1.95E-04	1.04E-12	NA		5.38E-04
Aroclor-1260	3.30E-02	3.23E-08	2.00E-05	1.61E-03	5.52E-08	2.00E-05	2.76E-03	4.91E-12	NA		4.38E-03
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	8.07E-09	9.00E-02	8.97E-08	9.20E-09	9.00E-02	1.02E-07	1.23E-12	5.71E-02	2.15E-11	1.92E-07
1,4-Dichlorobenzene	2.00E-03	1.96E-09	7.00E-02	2.80E-08	2.23E-09	7.00E-02	3.19E-08	2.97E-13	2.29E-01	1.30E-12	5.98E-08
2-Methylnaphthalene	3.87E+00	3.79E-06	4.00E-03	9.47E-04	6.48E-06	4.00E-03	1.62E-03	5.75E-10	NA		2.57E-03
bis(2-Ethylhexyl)phthalate	1.07E+00	1.05E-06	2.00E-02	5.23E-05	1.19E-06	2.00E-02	5.97E-05	1.59E-10	NA		1.12E-04
Acetophenone	2.60E-01	2.54E-07	1.00E-01	2.54E-06	2.90E-07	1.00E-01	2.90E-06	3.87E-11	NA		5.44E-06
Benzo(a)anthracene	4.88E-01	4.77E-07	NA		8.17E-07	NA		7.26E-11	NA		
Benzo(a)pyrene	6.51E-01	6.37E-07	NA		1.09E-06	NA		9.68E-11	NA		
Benzo(b)fluoranthene	6.40E-01	6.26E-07	NA		1.07E-06	NA		9.52E-11	NA		
Benzo(g,h,i)perylene	6.60E-01	6.46E-07	NA		1.10E-06	NA		9.81E-11	NA		
Benzo(k)fluoranthene	6.23E-01	6.10E-07	NA		1.04E-06	NA		9.26E-11	NA		
Caprolactam	2.30E-01	2.25E-07	5.00E-01	4.50E-07	2.57E-07	5.00E-01	5.13E-07	3.42E-11	NA		9.63E-07
Chrysene	7.97E-01	7.80E-07	NA		1.33E-06	NA		1.19E-10	NA		
Dibenz(a,h)anthracene	3.13E-01	3.06E-07	NA		5.24E-07	NA		4.65E-11	NA		
Fluoranthene	6.68E-01	6.54E-07	4.00E-02	1.63E-05	1.12E-06	4.00E-02	2.79E-05	9.93E-11	NA		4.43E-05
Indeno(1,2,3-c,d)pyrene	6.94E-01	6.79E-07	NA		1.16E-06	NA		1.03E-10	NA		
Naphthalene	2.83E-01	2.77E-07	2.00E-02	1.38E-05	4.74E-07	2.00E-02	2.37E-05	4.21E-11	8.57E-04	4.91E-08	3.76E-05
Phenanthrene	3.78E-01	3.70E-07	NA		6.32E-07	NA		5.62E-11	NA		
Pyrene	1.35E+00	1.32E-06	3.00E-02	4.40E-05	2.26E-06	3.00E-02	7.53E-05	2.01E-10	NA		1.19E-04
Acetone	1.50E-01	1.47E-07	9.00E-01	1.63E-07	1.67E-07	9.00E-01	1.86E-07	2.23E-11	8.86E+00	2.52E-12	3.49E-07
Chlorobenzene	2.22E-02	2.17E-08	2.00E-02	1.09E-06	2.48E-08	2.00E-02	1.24E-06	3.30E-12	1.43E-02	2.31E-10	2.32E-06

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
cis-1,2-Dichloroethene	2.05E-02	2.01E-08	1.00E-02	2.01E-06	2.29E-08	1.00E-02	2.29E-06	3.05E-12	NA		4.29E-06
Ethylbenzene	2.05E-02	2.01E-08	1.00E-01	2.01E-07	2.29E-08	1.00E-01	2.29E-07	3.05E-12	2.86E-01	1.07E-11	4.29E-07
Isopropylbenzene (cumene)	3.38E-01	3.31E-07	1.00E-01	3.31E-06	3.77E-07	1.00E-01	3.77E-06	5.03E-11	1.14E-01	4.40E-10	7.08E-06
Methyl ethyl ketone	2.38E-02	2.33E-08	6.00E-01	3.88E-08	2.65E-08	6.00E-01	4.42E-08	3.54E-12	1.43E+00	2.48E-12	8.31E-08
Methyl isobutyl ketone	6.85E-03	6.70E-09	8.00E-02	8.38E-08	7.64E-09	8.00E-02	9.55E-08	1.02E-12	8.57E-01	1.19E-12	1.79E-07
Methylcyclohexane	3.46E-01	3.39E-07	NA		3.86E-07	NA		5.15E-11	8.60E-01	5.98E-11	5.98E-11
Methylene chloride	6.66E-03	6.52E-09	6.00E-02	1.09E-07	7.43E-09	6.00E-02	1.24E-07	9.90E-13	2.86E-01	3.47E-12	2.32E-07
Tetrachloroethene	6.66E-03	6.52E-09	1.00E-02	6.52E-07	7.43E-09	1.00E-02	7.43E-07	9.90E-13	1.00E-02	9.90E-11	1.39E-06
Toluene	6.85E-02	6.70E-08	8.00E-02	8.38E-07	7.64E-08	8.00E-02	9.55E-07	1.02E-11	8.57E-02	1.19E-10	1.79E-06
Trichloroethene	4.00E-03	3.91E-09	3.00E-04	1.30E-05	4.46E-09	3.00E-04	1.49E-05	5.95E-13	1.00E-02	5.95E-11	2.79E-05
Xylenes, total	2.91E-01	2.85E-07	2.00E-01	1.42E-06	3.25E-07	2.00E-01	1.62E-06	4.33E-11	2.86E-02	1.51E-09	3.05E-06
		Total Risk (Hazard Index):		4.83E-01	Total Risk (Hazard Index):		1.89E-01	Total Risk (Hazard Index):		7.55E-03	6.79E-01

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 0.7

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-67
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	9.21E+03	4.25E-04	NA		5.87E-05	NA		2.57E-05	NA		
Antimony	3.50E+00	1.61E-07	NA		2.23E-08	NA		9.78E-09	NA		
Arsenic	2.69E+01	1.24E-06	1.50E+00	1.86E-06	5.14E-07	1.50E+00	7.72E-07	7.52E-08	1.51E+01	1.13E-06	**3.76E-06**
Barium	9.37E+02	4.32E-05	NA		5.97E-06	NA		2.62E-06	NA		
Beryllium	3.03E-01	1.40E-08	NA		1.93E-09	NA		8.47E-10	8.40E+00	7.12E-09	7.12E-09
Cadmium	2.45E+00	1.13E-07	NA		1.56E-09	NA		6.85E-09	6.30E+00	4.32E-08	4.32E-08
Chromium	1.54E+02	7.10E-06	NA		9.82E-07	NA		4.31E-07	NA		
Cobalt	7.06E+00	3.26E-07	NA		4.50E-08	NA		1.97E-08	3.15E+00	6.22E-08	6.22E-08
Copper	1.49E+02	6.87E-06	NA		9.50E-07	NA		4.17E-07	NA		
Iron	2.49E+04	1.15E-03	NA		1.59E-04	NA		6.96E-05	NA		
Lead	4.36E+03	2.01E-04	NA		2.78E-05	NA		1.22E-05	NA		
Manganese	3.60E+02	1.66E-05	NA		2.29E-06	NA		1.01E-06	NA		
Nickel	2.58E+01	1.19E-06	NA		1.64E-07	NA		7.21E-08	9.10E-01	6.56E-08	6.56E-08
Selenium	3.00E+00	1.38E-07	NA		1.91E-08	NA		8.39E-09	NA		
Silver	5.12E-01	2.36E-08	NA		3.26E-09	NA		1.43E-09	NA		
Thallium	2.60E+00	1.20E-07	NA		1.66E-08	NA		7.27E-09	NA		
Vanadium	3.26E+01	1.50E-06	NA		2.08E-07	NA		9.11E-08	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Zinc	4.53E+02	2.09E-05	NA		2.89E-06	NA		1.27E-06	NA		
Pesticides/PCBs											
4,4'-DDD	9.09E+00	4.19E-07	2.40E-01	1.01E-07	2.90E-07	2.40E-01	6.95E-08	2.54E-08	2.42E-01	6.14E-09	1.76E-07
4,4'-DDE	5.26E+00	2.43E-07	3.40E-01	8.25E-08	1.68E-07	3.40E-01	5.70E-08	1.47E-08	3.40E-01	4.99E-09	1.44E-07
4,4'-DDT	1.21E+02	5.58E-06	3.40E-01	1.90E-06	3.86E-06	3.40E-01	1.31E-06	3.38E-07	3.40E-01	1.15E-07	**3.32E-06**
alpha-BHC	6.00E-03	2.77E-10	6.30E+00	1.74E-09	1.91E-10	6.30E+00	1.20E-09	1.68E-11	6.30E+00	1.06E-10	3.05E-09
alpha-Chlordane	8.10E-02	3.74E-09	1.30E+00	4.86E-09	2.58E-09	1.30E+00	3.36E-09	2.26E-10	3.50E-01	7.93E-11	8.29E-09
beta-BHC	2.40E-02	1.11E-09	1.80E+00	1.99E-09	7.65E-10	1.80E+00	1.38E-09	6.71E-11	1.86E+00	1.24E-10	3.49E-09
gamma-BHC	3.47E-01	1.60E-08	1.10E+00	1.76E-08	1.11E-08	1.10E+00	1.22E-08	9.70E-10	1.09E+00	1.05E-09	3.08E-08
gamma-Chlordane	8.30E-02	3.83E-09	1.20E+00	4.59E-09	2.65E-09	1.20E+00	3.17E-09	2.32E-10	3.50E-01	8.12E-11	7.85E-09
Dieldrin	8.60E-02	3.97E-09	1.60E+01	6.35E-08	2.74E-09	1.60E+01	4.39E-08	2.40E-10	1.61E+01	3.87E-09	1.11E-07
Endosulfan sulfate	4.40E-03	2.03E-10	NA		1.40E-10	NA		1.23E-11	NA		
Endrin	1.40E-02	6.46E-10	NA		4.46E-10	NA		3.91E-11	NA		
Endrin aldehyde	4.90E-03	2.26E-10	NA		1.56E-10	NA		1.37E-11	NA		
Endrin ketone	6.90E-03	3.18E-10	NA		2.20E-10	NA		1.93E-11	NA		
Heptachlor	6.50E-04	3.00E-11	4.50E+00	1.35E-10	2.07E-11	4.50E+00	9.32E-11	1.82E-12	4.55E+00	8.27E-12	2.36E-10
Heptachlor epoxide	2.80E-03	1.29E-10	9.10E+00	1.18E-09	8.92E-11	9.10E+00	8.12E-10	7.83E-12	9.10E+00	7.12E-11	2.06E-09
Methoxychlor	7.00E-03	3.23E-10	NA		2.23E-10	NA		1.96E-11	NA		
Aroclor-1260	3.30E-02	1.52E-09	2.00E+00	3.04E-09	3.16E-09	2.00E+00	6.31E-09	9.23E-11	2.00E+00	1.85E-10	9.54E-09
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	3.81E-10	NA		5.26E-10	NA		2.31E-11	NA		
1,4-Dichlorobenzene	2.00E-03	9.23E-11	5.40E-03	4.98E-13	1.27E-10	5.40E-03	6.88E-13	5.59E-12	3.85E-02	2.15E-13	1.40E-12
2-Methylnaphthalene	3.87E+00	1.79E-07	NA		3.70E-07	NA		1.08E-08	NA		
bis(2-Ethylhexyl)phthalate	1.07E+00	4.94E-08	1.40E-02	6.91E-10	6.82E-08	1.40E-02	9.55E-10	2.99E-09	8.40E-03	2.51E-11	1.67E-09
Acetophenone	2.60E-01	1.20E-08	NA		1.66E-08	NA		7.27E-10	NA		
Benzo(a)anthracene	4.88E-01	2.25E-08	1.20E+00	2.70E-08	4.67E-08	1.20E+00	5.60E-08	1.36E-09	3.85E-01	5.25E-10	8.35E-08
Benzo(a)pyrene	6.51E-01	3.00E-08	1.20E+01	3.60E-07	6.22E-08	1.20E+01	7.47E-07	1.82E-09	3.85E+00	7.01E-09	**1.11E-06**
Benzo(b)fluoranthene	6.40E-01	2.95E-08	1.20E+00	3.54E-08	6.12E-08	1.20E+00	7.34E-08	1.79E-09	3.85E-01	6.89E-10	1.10E-07
Benzo(g,h,i)perylene	6.60E-01	3.04E-08	NA		6.31E-08	NA		1.85E-09	NA		
Benzo(k)fluoranthene	6.23E-01	2.87E-08	1.20E+00	3.45E-08	5.96E-08	1.20E+00	7.15E-08	1.74E-09	3.85E-01	6.71E-10	1.07E-07
Caprolactam	2.30E-01	1.06E-08	NA		1.47E-08	NA		6.43E-10	NA		
Chrysene	7.97E-01	3.68E-08	1.20E-01	4.41E-09	7.62E-08	1.20E-01	9.14E-09	2.23E-09	3.85E-02	8.58E-11	1.36E-08
Dibenz(a,h)anthracene	3.13E-01	1.44E-08	7.30E+00	1.05E-07	2.99E-08	7.30E+00	2.18E-07	8.75E-10	4.20E+00	3.68E-09	3.28E-07
Fluoranthene	6.68E-01	3.08E-08	NA		6.39E-08	NA		1.87E-09	NA		
Indeno(1,2,3-c,d)pyrene	6.94E-01	3.20E-08	1.20E+00	3.84E-08	6.64E-08	1.20E+00	7.96E-08	1.94E-09	3.85E-01	7.47E-10	1.19E-07
Naphthalene	2.83E-01	1.31E-08	1.20E-01	1.57E-09	2.71E-08	1.20E-01	3.25E-09	7.91E-10	1.19E-01	9.41E-11	4.91E-09
Phenanthrene	3.78E-01	1.74E-08	NA		3.61E-08	NA		1.06E-09	NA		
Pyrene	1.35E+00	6.23E-08	NA		1.29E-07	NA		3.77E-09	NA		
Acetone	1.50E-01	6.92E-09	NA		9.56E-09	NA		4.19E-10	NA		
Chlorobenzene	2.22E-02	1.02E-09	NA		1.42E-09	NA		6.21E-11	NA		
cis-1,2-Dichloroethene	2.05E-02	9.46E-10	NA		1.31E-09	NA		5.73E-11	NA		
Ethylbenzene	2.05E-02	9.46E-10	1.10E-02	1.04E-11	1.31E-09	1.10E-02	1.44E-11	5.73E-11	8.75E-03	5.01E-13	2.53E-11
Isopropylbenzene (cumene)	3.38E-01	1.56E-08	NA		2.15E-08	NA		9.45E-10	NA		
Methyl ethyl ketone	2.38E-02	1.10E-09	NA		1.52E-09	NA		6.65E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Methyl isobutyl ketone	6.85E-03	3.16E-10	NA		4.37E-10	NA		1.92E-11	NA		
Methylcyclohexane	3.46E-01	1.60E-08	NA		2.21E-08	NA		9.67E-10	NA		
Methylene chloride	6.66E-03	3.07E-10	1.40E-02	4.30E-12	4.25E-10	1.40E-02	5.94E-12	1.86E-11	3.50E-03	6.52E-14	1.03E-11
Tetrachloroethene	6.66E-03	3.07E-10	5.40E-01	1.66E-10	4.25E-10	5.40E-01	2.29E-10	1.86E-11	2.07E-02	3.84E-13	3.96E-10
Toluene	6.85E-02	3.16E-09	NA		4.37E-09	NA		1.92E-10	NA		
Trichloroethene	4.00E-03	1.85E-10	5.90E-03	1.09E-12	2.55E-10	5.90E-03	1.50E-12	1.12E-11	7.00E-03	7.83E-14	2.67E-12
Xylenes, total	2.91E-01	1.34E-08	NA		1.85E-08	NA		8.14E-10	NA		
			Total Risk:	4.65E-06		**Total Risk:**	3.54E-06		**Total Risk:**	1.45E-06	**9.64E-06**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-05**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-68

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.21E+03	2.97E-02	1.00E+00	2.97E-02	4.11E-03	1.00E+00	4.11E-03	1.80E-03	1.40E-03	1.29E+00	**1.32E+00**
Antimony	3.50E+00	1.13E-05	4.00E-04	2.83E-02	1.56E-06	4.00E-04	3.90E-03	6.85E-07	NA		3.22E-02
Arsenic	2.69E+01	8.69E-05	3.00E-04	2.90E-01	3.60E-05	3.00E-04	1.20E-01	5.26E-06	4.29E-06	1.23E+00	**1.64E+00**
Barium	9.37E+02	3.03E-03	2.00E-01	1.51E-02	4.18E-04	2.00E-01	2.09E-03	1.83E-04	1.43E-04	1.28E+00	**1.30E+00**
Beryllium	3.03E-01	9.78E-07	2.00E-03	4.89E-04	1.35E-07	2.00E-03	6.76E-05	5.93E-08	2.00E-06	2.96E-02	3.02E-02
Cadmium	2.45E+00	7.91E-06	5.00E-04	1.58E-02	1.09E-07	5.00E-04	2.19E-04	4.79E-07	2.86E-06	1.68E-01	1.84E-01
Chromium	1.54E+02	4.97E-04	NA		6.87E-05	NA		3.01E-05	NA		
Cobalt	7.06E+00	2.28E-05	3.00E-04	7.60E-02	3.15E-06	3.00E-04	1.05E-02	1.38E-06	1.71E-06	8.06E-01	8.92E-01
Copper	1.49E+02	4.81E-04	4.00E-02	1.20E-02	6.65E-05	4.00E-02	1.66E-03	2.92E-05	NA		1.37E-02
Iron	2.49E+04	8.04E-02	7.00E-01	1.15E-01	1.11E-02	7.00E-01	1.59E-02	4.87E-03	NA		1.31E-01
Lead	4.36E+03	1.41E-02	NA		1.95E-03	NA		8.53E-04	NA		
Manganese	3.60E+02	1.16E-03	2.40E-02	4.84E-02	1.61E-04	2.40E-02	6.69E-03	7.05E-05	1.43E-05	4.93E+00	**4.99E+00**
Nickel	2.58E+01	8.33E-05	2.00E-02	4.17E-03	1.15E-05	2.00E-02	5.76E-04	5.05E-06	2.57E-05	1.96E-01	2.01E-01
Selenium	3.00E+00	9.69E-06	5.00E-03	1.94E-03	1.34E-06	5.00E-03	2.68E-04	5.87E-07	5.71E-03	1.03E-04	2.31E-03
Silver	5.12E-01	1.65E-06	5.00E-03	3.31E-04	2.28E-07	5.00E-03	4.57E-05	1.00E-07	NA		3.76E-04
Thallium	2.60E+00	8.40E-06	6.60E-05	1.27E-01	1.16E-06	6.60E-05	1.76E-02	5.09E-07	NA		1.45E-01
Vanadium	3.26E+01	1.05E-04	5.00E-03	2.11E-02	1.45E-05	5.00E-03	2.91E-03	6.38E-06	NA		2.40E-02
Zinc	4.53E+02	1.46E-03	3.00E-01	4.88E-03	2.02E-04	3.00E-01	6.74E-04	8.86E-05	NA		5.55E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	9.09E+00	2.94E-05	NA		2.03E-05	NA		1.78E-06	NA		
4,4'-DDE	5.26E+00	1.70E-05	NA		1.17E-05	NA		1.03E-06	NA		
4,4'-DDT	1.21E+02	3.91E-04	5.00E-04	7.81E-01	2.70E-04	5.00E-04	5.40E-01	2.37E-05	NA		**1.32E+00**
alpha-BHC	6.00E-03	1.94E-08	5.00E-04	3.87E-05	1.34E-08	5.00E-04	2.68E-05	1.17E-09	NA		6.55E-05
alpha-Chlordane	8.10E-02	2.62E-07	5.00E-04	5.23E-04	1.81E-07	5.00E-04	3.61E-04	1.59E-08	2.00E-04	7.93E-05	9.64E-04
beta-BHC	2.40E-02	7.75E-08	NA		5.35E-08	NA		4.70E-09	NA		
gamma-BHC	3.47E-01	1.12E-06	3.00E-04	3.73E-03	7.74E-07	3.00E-04	2.58E-03	6.79E-08	NA		6.32E-03
gamma-Chlordane	8.30E-02	2.68E-07	5.00E-04	5.36E-04	1.85E-07	5.00E-04	3.70E-04	1.62E-08	2.00E-04	8.12E-05	9.88E-04
Dieldrin	8.60E-02	2.78E-07	5.00E-05	5.55E-03	1.92E-07	5.00E-05	3.84E-03	1.68E-08	NA		9.39E-03
Endosulfan sulfate	4.40E-03	1.42E-08	6.00E-03	2.37E-06	9.82E-09	6.00E-03	1.64E-06	8.61E-10	NA		4.00E-06
Endrin	1.40E-02	4.52E-08	3.00E-04	1.51E-04	3.12E-08	3.00E-04	1.04E-04	2.74E-09	NA		2.55E-04
Endrin aldehyde	4.90E-03	1.58E-08	3.00E-04	5.27E-05	1.09E-08	3.00E-04	3.64E-05	9.59E-10	NA		8.92E-05
Endrin ketone	6.90E-03	2.23E-08	3.00E-04	7.43E-05	1.54E-08	3.00E-04	5.13E-05	1.35E-09	NA		1.26E-04
Heptachlor	6.50E-04	2.10E-09	3.00E-05	7.00E-05	1.45E-09	3.00E-05	4.83E-05	1.27E-10	NA		1.18E-04
Heptachlor epoxide	2.80E-03	9.04E-09	1.30E-05	6.95E-04	6.25E-09	1.30E-05	4.81E-04	5.48E-10	NA		1.18E-03
Methoxychlor	7.00E-03	2.26E-08	2.00E-05	1.13E-03	1.56E-08	2.00E-05	7.81E-04	1.37E-09	NA		1.91E-03
Aroclor-1260	3.30E-02	1.07E-07	2.00E-05	5.33E-03	2.21E-07	2.00E-05	1.10E-02	6.46E-09	NA		1.64E-02
SVOCs/VOCs											
1,2-Dichlorobenzene	8.25E-03	2.66E-08	9.00E-02	2.96E-07	3.68E-08	9.00E-02	4.09E-07	1.61E-09	5.71E-02	2.83E-08	7.33E-07
1,4-Dichlorobenzene	2.00E-03	6.46E-09	7.00E-02	9.23E-08	8.92E-09	7.00E-02	1.27E-07	3.91E-10	2.29E-01	1.71E-09	2.21E-07
2-Methylnaphthalene	3.87E+00	1.25E-05	4.00E-03	3.12E-03	2.59E-05	4.00E-03	6.48E-03	7.57E-07	NA		9.60E-03
bis(2-Ethylhexyl)phthalate	1.07E+00	3.45E-06	2.00E-02	1.73E-04	4.77E-06	2.00E-02	2.39E-04	2.09E-07	NA		4.11E-04
Acetophenone	2.60E-01	8.40E-07	1.00E-01	8.40E-06	1.16E-06	1.00E-01	1.16E-05	5.09E-08	NA		2.00E-05
Benzo(a)anthracene	4.88E-01	1.58E-06	NA		3.27E-06	NA		9.55E-08	NA		
Benzo(a)pyrene	6.51E-01	2.10E-06	NA		4.36E-06	NA		1.27E-07	NA		
Benzo(b)fluoranthene	6.40E-01	2.07E-06	NA		4.28E-06	NA		1.25E-07	NA		
Benzo(g,h,i)perylene	6.60E-01	2.13E-06	NA		4.42E-06	NA		1.29E-07	NA		
Benzo(k)fluoranthene	6.23E-01	2.01E-06	NA		4.17E-06	NA		1.22E-07	NA		
Caprolactam	2.30E-01	7.43E-07	5.00E-01	1.49E-06	1.03E-06	5.00E-01	2.05E-06	4.50E-08	NA		3.54E-06
Chrysene	7.97E-01	2.57E-06	NA		5.33E-06	NA		1.56E-07	NA		
Dibenz(a,h)anthracene	3.13E-01	1.01E-06	NA		2.09E-06	NA		6.13E-08	NA		
Fluoranthene	6.68E-01	2.16E-06	4.00E-02	5.39E-05	4.47E-06	4.00E-02	1.12E-04	1.31E-07	NA		1.66E-04
Indeno(1,2,3-c,d)pyrene	6.94E-01	2.24E-06	NA		4.64E-06	NA		1.36E-07	NA		
Naphthalene	2.83E-01	9.14E-07	2.00E-02	4.57E-05	1.89E-06	2.00E-02	9.47E-05	5.54E-08	8.57E-04	6.46E-05	2.05E-04
Phenanthrene	3.78E-01	1.22E-06	NA		2.53E-06	NA		7.40E-08	NA		
Pyrene	1.35E+00	4.36E-06	3.00E-02	1.45E-04	9.04E-06	3.00E-02	3.01E-04	2.64E-07	NA		4.46E-04
Acetone	1.50E-01	4.84E-07	9.00E-01	5.38E-07	6.69E-07	9.00E-01	7.44E-07	2.94E-08	8.86E+00	3.31E-09	1.29E-06
Chlorobenzene	2.22E-02	7.17E-08	2.00E-02	3.58E-06	9.91E-08	2.00E-02	4.95E-06	4.34E-09	1.43E-02	3.04E-07	8.84E-06
cis-1,2-Dichloroethene	2.05E-02	6.62E-08	1.00E-02	6.62E-06	9.15E-08	1.00E-02	9.15E-06	4.01E-09	NA		1.58E-05
Ethylbenzene	2.05E-02	6.62E-08	1.00E-01	6.62E-07	9.15E-08	1.00E-01	9.15E-07	4.01E-09	2.86E-01	1.40E-08	1.59E-06
Isopropylbenzene (cumene)	3.38E-01	1.09E-06	1.00E-01	1.09E-05	1.51E-06	1.00E-01	1.51E-05	6.61E-08	1.14E-01	5.79E-07	2.66E-05
Methyl ethyl ketone	2.38E-02	7.68E-08	6.00E-01	1.28E-07	1.06E-07	6.00E-01	1.77E-07	4.66E-09	1.43E+00	3.26E-09	3.08E-07
Methyl isobutyl ketone	6.85E-03	2.21E-08	8.00E-02	2.76E-07	3.06E-08	8.00E-02	3.82E-07	1.34E-09	8.57E-01	1.56E-09	6.60E-07
Methylcyclohexane	3.46E-01	1.12E-06	NA		1.54E-06	NA		6.77E-08	8.60E-01	7.87E-08	7.87E-08

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Methylene chloride	6.66E-03	2.15E-08	6.00E-02	3.58E-07	2.97E-08	6.00E-02	4.95E-07	1.30E-09	2.86E-01	4.56E-09	8.58E-07
Tetrachloroethene	6.66E-03	2.15E-08	1.00E-02	2.15E-06	2.97E-08	1.00E-02	2.97E-06	1.30E-09	1.00E-02	1.30E-07	5.25E-06
Toluene	6.85E-02	2.21E-07	8.00E-02	2.76E-06	3.06E-07	8.00E-02	3.82E-06	1.34E-08	8.57E-02	1.56E-07	6.74E-06
Trichloroethene	4.00E-03	1.29E-08	3.00E-04	4.31E-05	1.78E-08	3.00E-04	5.95E-05	7.83E-10	1.00E-02	7.83E-08	1.03E-04
Xylenes, total	2.91E-01	9.40E-07	2.00E-01	4.70E-06	1.30E-06	2.00E-01	6.49E-06	5.69E-08	2.86E-02	1.99E-06	1.32E-05
		Total Risk (Hazard Index):		1.59E+00	Total Risk (Hazard Index):		7.54E-01	Total Risk (Hazard Index):		9.931E+00	**1.23E+01**

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 12

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-69

Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Large Vacant Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**1.4E-05**	**4.8E-06**	2.2E-08	**1.9E-05**	33%	**1.9E-06**	7.7E-07	**1.1E-06**	**3.8E-06**	39%
Subtotal Metals	**1.4E-05**	**4.8E-06**	2.5E-08	**1.9E-05**	33%	**1.9E-06**	7.7E-07	**1.3E-06**	**3.9E-06**	41%
Pesticides/PCBs										
4,4'-DDD	7.6E-07	4.3E-07	1.2E-10	**1.2E-06**	2%	1.0E-07	7.0E-08	6.1E-09	1.8E-07	2%
4,4'-DDT	**1.4E-05**	**8.2E-06**	2.2E-09	**2.3E-05**	39%	**1.9E-06**	**1.3E-06**	1.1E-07	**3.3E-06**	34%
Subtotal Pesticides/PCBs	**1.7E-05**	**9.4E-06**	2.5E-09	**2.6E-05**	45%	**2.2E-06**	**1.5E-06**	1.3E-07	**3.8E-06**	40%
SVOCs/VOCs										
Benzo(a)pyrene	**2.7E-06**	**4.7E-06**	1.3E-10	**7.4E-06**	13%	3.6E-07	7.5E-07	7.0E-09	**1.1E-06**	12%
Dibenz(a,h)anthracene	8.0E-07	**1.4E-06**	7.0E-11	**2.2E-06**	4%	1.1E-07	2.2E-07	3.7E-09	3.3E-07	3%
Subtotal SVOCs/VOCs	**4.6E-06**	**7.9E-06**	2.6E-10	**1.2E-05**	22%	6.1E-07	**1.3E-06**	1.4E-08	**1.9E-06**	20%
Total:	**3.5E-05**	**2.2E-05**	2.8E-08	**5.74E-05**		**4.6E-06**	**3.5E-06**	**1.5E-06**	**9.64E-06**	

	Future Industrial Worker	Future Construction Worker
Total Estimated Cancer Risk Across All Exposure Routes:	**6E-05**	**1E-05**

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-70
Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	9.0E-03	1.0E-03	9.8E-04	1.1E-02	2%	3.0E-02	4.1E-03	**1.3E+00**	**1.3E+00**	11%
Arsenic	8.8E-02	3.0E-02	9.3E-04	**1.2E-01**	17%	**2.9E-01**	**1.2E-01**	**1.2E+00**	**1.6E+00**	13%
Barium	4.6E-03	5.2E-04	9.8E-04	6.1E-03	1%	1.5E-02	2.1E-03	**1.3E+00**	**1.3E+00**	11%
Cadmium	4.8E-03	5.5E-05	1.3E-04	5.0E-03	1%	1.6E-02	2.2E-04	**1.7E-01**	**1.8E-01**	1%
Cobalt	2.3E-02	2.6E-03	6.1E-04	2.6E-02	4%	7.6E-02	1.1E-02	**8.1E-01**	**8.9E-01**	7%
Iron	3.5E-02	4.0E-03		3.9E-02	6%	**1.1E-01**	1.6E-02		**1.3E-01**	1%
Manganese	1.5E-02	1.7E-03	3.7E-03	2.0E-02	3%	4.8E-02	6.7E-03	**4.9E+00**	**5.0E+00**	41%
Nickel	1.3E-03	1.4E-04	1.5E-04	1.6E-03	0%	4.2E-03	5.8E-04	**2.0E-01**	**2.0E-01**	2%
Thallium	3.9E-02	4.4E-03		4.3E-02	6%	**1.3E-01**	1.8E-02		**1.4E-01**	1%
Subtotal Metals	**2.4E-01**	4.7E-02	7.5E-03	**2.9E-01**	43%	**7.9E-01**	**1.9E-01**	**9.9E+00**	**1.1E+01**	89%
Pesticides/PCBs										
4,4'-DDT	**2.4E-01**	**1.3E-01**		**3.7E-01**	55%	**7.8E-01**	**5.4E-01**		**1.3E+00**	11%
Subtotal Pesticides/PCBs	**2.4E-01**	**1.4E-01**	1.2E-07	**3.8E-01**	56%	**8.0E-01**	**5.6E-01**	1.6E-04	**1.4E+00**	11%
Total:	**0.5**	**0.2**	0.008	**0.7**		**1.6**	**0.8**	**9.931**	**12.3**	

Total Estimated Hazard Index Across All Exposure Routes: Future Industrial Worker: **0.7**; Future Construction Worker: **12**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-71
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.24E+03	3.87E-03	NA		1.54E-04	NA		5.88E-07	NA		
Antimony	3.48E+00	1.63E-06	NA		6.52E-08	NA		2.48E-10	NA		
Arsenic	1.81E+01	8.50E-06	1.50E+00	1.28E-05	1.02E-06	1.50E+00	1.53E-06	1.29E-09	1.51E+01	1.94E-08	**1.43E-05**
Barium	6.52E+02	3.06E-04	NA		1.22E-05	NA		4.65E-08	NA		
Beryllium	2.81E-01	1.32E-07	NA		5.27E-09	NA		2.01E-11	8.40E+00	1.68E-10	1.68E-10
Cadmium	1.71E+00	8.03E-07	NA		3.20E-09	NA		1.22E-10	6.30E+00	7.69E-10	7.69E-10
Chromium	1.66E+02	7.80E-05	NA		3.11E-06	NA		1.18E-08	NA		
Cobalt	6.47E+00	3.04E-06	NA		1.21E-07	NA		4.62E-10	3.15E+00	1.45E-09	1.45E-09
Copper	1.14E+02	5.35E-05	NA		2.14E-06	NA		8.14E-09	NA		
Iron	2.14E+04	1.01E-02	NA		4.01E-04	NA		1.53E-06	NA		
Lead	2.75E+03	1.29E-03	NA		5.15E-05	NA		1.96E-07	NA		
Manganese	3.24E+02	1.52E-04	NA		6.07E-06	NA		2.31E-08	NA		
Nickel	2.45E+01	1.15E-05	NA		4.59E-07	NA		1.75E-09	9.10E-01	1.59E-09	1.59E-09
Selenium	3.50E+00	1.64E-06	NA		6.56E-08	NA		2.50E-10	NA		
Silver	4.95E-01	2.32E-07	NA		9.28E-09	NA		3.53E-11	NA		
Thallium	2.60E+00	1.22E-06	NA		4.87E-08	NA		1.86E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	2.89E+01	1.36E-05	NA		5.42E-07	NA		2.06E-09	NA		
Zinc	3.21E+02	1.51E-04	NA		6.02E-06	NA		2.29E-08	NA		
Pesticides/PCBs											
4,4'-DDD	3.79E+00	1.78E-06	2.40E-01	4.27E-07	3.55E-07	2.40E-01	8.52E-08	2.71E-10	2.42E-01	6.53E-11	5.13E-07
4,4'-DDE	2.10E+00	9.86E-07	3.40E-01	3.35E-07	1.97E-07	3.40E-01	6.69E-08	1.50E-10	3.40E-01	5.09E-11	4.02E-07
4,4'-DDT	8.05E+01	3.78E-05	3.40E-01	1.29E-05	7.54E-06	3.40E-01	2.56E-06	5.75E-09	3.40E-01	1.95E-09	**1.54E-05**
alpha-BHC	6.00E-03	2.82E-09	6.30E+00	1.78E-08	5.62E-10	6.30E+00	3.54E-09	4.28E-13	6.30E+00	2.70E-12	2.13E-08
alpha-Chlordane	8.10E-02	3.80E-08	1.30E+00	4.95E-08	7.59E-09	1.30E+00	9.87E-09	5.78E-12	3.50E-01	2.02E-12	5.93E-08
beta-BHC	2.40E-02	1.13E-08	1.80E+00	2.03E-08	2.25E-09	1.80E+00	4.05E-09	1.71E-12	1.86E+00	3.18E-12	2.43E-08
Dieldrin	8.60E-02	4.04E-08	1.60E+01	6.46E-07	8.06E-09	1.60E+01	1.29E-07	6.14E-12	1.61E+01	9.88E-11	7.75E-07
Endosulfan I	7.40E-04	3.48E-10	NA		6.93E-11	NA		5.28E-14	NA		
Endosulfan sulfate	4.40E-03	2.07E-09	NA		4.12E-10	NA		3.14E-13	NA		
Endrin	1.40E-02	6.58E-09	NA		1.31E-09	NA		9.99E-13	NA		
Endrin aldehyde	4.90E-03	2.30E-09	NA		4.59E-10	NA		3.50E-13	NA		
Endrin ketone	6.90E-03	3.24E-09	NA		6.47E-10	NA		4.93E-13	NA		
gamma-BHC	2.16E-01	1.01E-07	1.10E+00	1.12E-07	2.02E-08	1.10E+00	2.23E-08	1.54E-11	1.09E+00	1.67E-11	1.34E-07
gamma-Chlordane	8.30E-02	3.90E-08	1.20E+00	4.68E-08	7.78E-09	1.20E+00	9.33E-09	5.92E-12	3.50E-01	2.07E-12	5.61E-08
Heptachlor	6.50E-04	3.05E-10	4.50E+00	1.37E-09	6.09E-11	4.50E+00	2.74E-10	4.64E-14	4.55E+00	2.11E-13	1.65E-09
Heptachlor epoxide	2.80E-03	1.32E-09	9.10E+00	1.20E-08	2.62E-10	9.10E+00	2.39E-09	2.00E-13	9.10E+00	1.82E-12	1.44E-08
Methoxychlor	7.00E-03	3.29E-09	NA		6.56E-10	NA		5.00E-13	NA		
Aroclor-1260	3.30E-02	1.55E-08	2.00E+00	3.10E-08	9.28E-09	2.00E+00	1.86E-08	2.36E-12	2.00E+00	4.71E-12	4.96E-08
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	4.93E-07	NA		1.97E-07	NA		7.49E-11	NA		
1,4-Dichlorobenzene	2.00E-03	9.39E-10	5.40E-03	5.07E-12	3.75E-10	5.40E-03	2.02E-12	1.43E-13	3.85E-02	5.50E-15	7.10E-12
1,4-Dioxane (p-dioxane)	7.42E-02	3.48E-08	2.70E-02	9.41E-10	1.39E-08	2.70E-02	3.75E-10	5.30E-12	2.70E-02	1.43E-13	1.32E-09
2-Methylnaphthalene	1.36E+00	6.39E-07	NA		3.82E-07	NA		9.71E-11	NA		
Acetophenone	2.36E-01	1.11E-07	NA		4.42E-08	NA		1.68E-11	NA		
Anthracene	8.10E-02	3.80E-08	NA		2.28E-08	NA		5.78E-12	NA		
Benzo(a)anthracene	4.95E-01	2.32E-07	1.20E+00	2.79E-07	1.39E-07	1.20E+00	1.67E-07	3.53E-11	3.85E-01	1.36E-11	4.46E-07
Benzo(a)pyrene	6.17E-01	2.90E-07	1.20E+01	3.48E-06	1.73E-07	1.20E+01	2.08E-06	4.40E-11	3.85E+00	1.70E-10	**5.56E-06**
Benzo(b)fluoranthene	5.01E-01	2.35E-07	1.20E+00	2.82E-07	1.41E-07	1.20E+00	1.69E-07	3.58E-11	3.85E-01	1.38E-11	4.51E-07
Benzo(g,h,i)perylene	5.81E-01	2.73E-07	NA		1.63E-07	NA		4.15E-11	NA		
Benzo(k)fluoranthene	4.95E-01	2.32E-07	1.20E+00	2.79E-07	1.39E-07	1.20E+00	1.67E-07	3.53E-11	3.85E-01	1.36E-11	4.46E-07
Benzyl butyl phthalate	2.70E-01	1.27E-07	1.90E-03	2.41E-10	5.06E-08	1.90E-03	9.61E-11	1.93E-11	NA		3.37E-10
bis(2-Ethylhexyl)phthalate	9.04E-01	4.25E-07	1.40E-02	5.94E-09	1.69E-07	1.40E-02	2.37E-09	6.45E-11	8.40E-03	5.42E-13	8.32E-09
Caprolactam	2.30E-01	1.08E-07	NA		4.31E-08	NA		1.64E-11	NA		
Chrysene	5.97E-01	2.80E-07	1.20E-01	3.36E-08	1.68E-07	1.20E-01	2.01E-08	4.26E-11	3.85E-02	1.64E-12	5.38E-08
Dibenz(a,h)anthracene	2.67E-01	1.25E-07	7.30E+00	9.15E-07	7.51E-08	7.30E+00	5.48E-07	1.91E-11	4.20E+00	8.00E-11	**1.46E-06**
Fluoranthene	7.35E-01	3.45E-07	NA		2.07E-07	NA		5.25E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.00E-01	2.82E-07	1.20E+00	3.38E-07	1.69E-07	1.20E+00	2.02E-07	4.28E-11	3.85E-01	1.65E-11	5.41E-07
Naphthalene	2.49E-01	1.17E-07	1.20E-01	1.40E-08	7.00E-08	1.20E-01	8.40E-09	1.78E-11	1.19E-01	2.12E-12	2.24E-08
Phenanthrene	3.08E-01	1.45E-07	NA		8.66E-08	NA		2.20E-11	NA		
Pyrene	1.02E+00	4.79E-07	NA		2.87E-07	NA		7.28E-11	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
1,1-Dichloroethane	6.83E-03	3.21E-09	5.70E-03	1.83E-11	1.28E-09	5.70E-03	7.30E-12	4.88E-13	5.70E-03	2.78E-15	2.56E-11
Acetone	6.05E-02	2.84E-08	NA		1.13E-08	NA		4.32E-12	NA		
Chlorobenzene	2.24E+00	1.05E-06	NA		4.20E-07	NA		1.60E-10	NA		
cis-1,2-Dichloroethene	1.80E-02	8.45E-09	NA		3.37E-09	NA		1.28E-12	NA		
Ethylbenzene	1.01E-02	4.74E-09	1.10E-02	5.22E-11	1.89E-09	1.10E-02	2.08E-11	7.21E-13	8.75E-03	6.31E-15	7.30E-11
Isopropylbenzene (cumene)	1.05E-01	4.93E-08	NA		1.97E-08	NA		7.49E-12	NA		
Methyl ethyl ketone	1.79E-02	8.41E-09	NA		3.35E-09	NA		1.28E-12	NA		
Methyl isobutyl ketone	6.50E-03	3.05E-09	NA		1.22E-09	NA		4.64E-13	NA		
Methylcyclohexane	1.07E-01	5.03E-08	NA		2.01E-08	NA		7.64E-12	NA		
Methylene chloride	6.31E-03	2.96E-09	1.40E-02	4.15E-11	1.18E-09	1.40E-02	1.66E-11	4.50E-13	3.50E-03	1.58E-15	5.80E-11
Tetrachloroethene	6.38E-03	3.00E-09	5.40E-01	1.62E-09	1.20E-09	5.40E-01	6.46E-10	4.55E-13	2.07E-02	9.40E-15	2.26E-09
Toluene	4.40E-02	2.07E-08	NA		8.25E-09	NA		3.14E-12	NA		
Trichloroethene	4.00E-03	1.88E-09	5.90E-03	1.11E-11	7.50E-10	5.90E-03	4.42E-12	2.86E-13	7.00E-03	2.00E-15	1.55E-11
Vinyl chloride	1.00E-03	4.70E-10	7.20E-01	3.38E-10	1.87E-10	7.20E-01	1.35E-10	7.14E-14	2.73E-01	1.95E-14	4.73E-10
Xylenes, total	9.09E-02	4.27E-08	NA		1.70E-08	NA		6.49E-12	NA		
			Total Risk:	3.29E-05		**Total Risk:**	7.81E-06		**Total Risk:**	2.59E-08	**4.08E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **4E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-72
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	7.00E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.24E+03	1.13E-02	1.00E+00	1.13E-02	4.50E-04	1.00E+00	4.50E-04	1.72E-06	1.40E-03	1.23E-03	1.30E-02
Antimony	3.48E+00	4.77E-06	4.00E-04	1.19E-02	1.90E-07	4.00E-04	4.76E-04	7.24E-10	NA		1.24E-02
Arsenic	1.81E+01	2.48E-05	3.00E-04	8.26E-02	2.97E-06	3.00E-04	9.89E-03	3.77E-09	4.29E-06	8.79E-04	9.34E-02
Barium	6.52E+02	8.93E-04	2.00E-01	4.47E-03	3.56E-05	2.00E-01	1.78E-04	1.36E-07	1.43E-04	9.50E-04	5.59E-03
Beryllium	2.81E-01	3.85E-07	2.00E-03	1.92E-04	1.54E-08	2.00E-03	7.68E-06	5.85E-11	2.00E-06	2.93E-05	2.29E-04
Cadmium	1.71E+00	2.34E-06	5.00E-04	4.68E-03	9.35E-09	5.00E-04	1.87E-05	3.56E-10	2.86E-06	1.25E-04	4.83E-03
Chromium	1.66E+02	2.27E-04	NA		9.07E-06	NA		3.46E-08	NA		
Cobalt	6.47E+00	8.86E-06	3.00E-04	2.95E-02	3.54E-07	3.00E-04	1.18E-03	1.35E-09	1.71E-06	7.86E-04	3.15E-02
Copper	1.14E+02	1.56E-04	4.00E-02	3.90E-03	6.23E-06	4.00E-02	1.56E-04	2.37E-08	NA		4.06E-03
Iron	2.14E+04	2.93E-02	7.00E-01	4.19E-02	1.17E-03	7.00E-01	1.67E-03	4.46E-06	NA		4.35E-02
Lead	2.75E+03	3.77E-03	NA		1.50E-04	NA		5.73E-07	NA		
Manganese	3.24E+02	4.44E-04	2.40E-02	1.85E-02	1.77E-05	2.40E-02	7.38E-04	6.75E-08	1.43E-05	4.72E-03	2.40E-02
Nickel	2.45E+01	3.36E-05	2.00E-02	1.68E-03	1.34E-06	2.00E-02	6.70E-05	5.10E-09	2.57E-05	1.98E-04	1.94E-03
Selenium	3.50E+00	4.79E-06	5.00E-03	9.59E-04	1.91E-07	5.00E-03	3.83E-05	7.29E-10	5.71E-03	1.28E-07	9.97E-04
Silver	4.95E-01	6.78E-07	5.00E-03	1.36E-04	2.71E-08	5.00E-03	5.41E-06	1.03E-10	NA		1.41E-04
Thallium	2.60E+00	3.56E-06	6.60E-05	5.40E-02	1.42E-07	6.60E-05	2.15E-03	5.41E-10	NA		5.61E-02
Vanadium	2.89E+01	3.96E-05	5.00E-03	7.92E-03	1.58E-06	5.00E-03	3.16E-04	6.02E-09	NA		8.23E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Zinc	3.21E+02	4.40E-04	3.00E-01	1.47E-03	1.75E-05	3.00E-01	5.85E-05	6.68E-08	NA		1.52E-03
Pesticides/PCBs											
4,4'-DDD	3.79E+00	5.19E-06	NA		1.04E-06	NA		7.89E-10	NA		
4,4'-DDE	2.10E+00	2.88E-06	NA		5.74E-07	NA		4.37E-10	NA		
4,4'-DDT	8.05E+01	1.10E-04	5.00E-04	2.21E-01	2.20E-05	5.00E-04	4.40E-02	1.68E-08	NA		2.65E-01
alpha-BHC	6.00E-03	8.22E-09	5.00E-04	1.64E-05	1.64E-09	5.00E-04	3.28E-06	1.25E-12	NA		1.97E-05
alpha-Chlordane	8.10E-02	1.11E-07	5.00E-04	2.22E-04	2.21E-08	5.00E-04	4.43E-05	1.69E-11	2.00E-04	8.43E-08	2.66E-04
beta-BHC	2.40E-02	3.29E-08	NA		6.56E-09	NA		5.00E-12	NA		
Dieldrin	8.60E-02	1.18E-07	5.00E-05	2.36E-03	2.35E-08	5.00E-05	4.70E-04	1.79E-11	NA		2.83E-03
Endosulfan I	7.40E-04	1.01E-09	6.00E-03	1.69E-07	2.02E-10	6.00E-03	3.37E-08	1.54E-13	NA		2.03E-07
Endosulfan sulfate	4.40E-03	6.03E-09	6.00E-03	1.00E-06	1.20E-09	6.00E-03	2.00E-07	9.16E-13	NA		1.20E-06
Endrin	1.40E-02	1.92E-08	3.00E-04	6.39E-05	3.83E-09	3.00E-04	1.28E-05	2.91E-12	NA		7.67E-05
Endrin aldehyde	4.90E-03	6.71E-09	3.00E-04	2.24E-05	1.34E-09	3.00E-04	4.46E-06	1.02E-12	NA		2.68E-05
Endrin ketone	6.90E-03	9.45E-09	3.00E-04	3.15E-05	1.89E-09	3.00E-04	6.29E-06	1.44E-12	NA		3.78E-05
gamma-BHC	2.16E-01	2.96E-07	3.00E-04	9.86E-04	5.90E-08	3.00E-04	1.97E-04	4.50E-11	NA		1.18E-03
gamma-Chlordane	8.30E-02	1.14E-07	5.00E-04	2.27E-04	2.27E-08	5.00E-04	4.54E-05	1.73E-11	2.00E-04	8.64E-08	2.73E-04
Heptachlor	6.50E-04	8.90E-10	3.00E-05	2.97E-05	1.78E-10	3.00E-05	5.92E-06	1.35E-13	NA		3.56E-05
Heptachlor epoxide	2.80E-03	3.84E-09	1.30E-05	2.95E-04	7.65E-10	1.30E-05	5.89E-05	5.83E-13	NA		3.54E-04
Methoxychlor	7.00E-03	9.59E-09	2.00E-05	4.79E-04	1.91E-09	2.00E-05	9.57E-05	1.46E-12	NA		5.75E-04
Aroclor-1260	3.30E-02	4.52E-08	2.00E-05	2.26E-03	2.71E-08	2.00E-05	1.35E-03	6.87E-12	NA		3.61E-03
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	1.44E-06	9.00E-02	1.60E-05	5.74E-07	9.00E-02	6.38E-06	2.19E-10	5.71E-02	3.83E-09	2.24E-05
1,4-Dichlorobenzene	2.00E-03	2.74E-09	7.00E-02	3.91E-08	1.09E-09	7.00E-02	1.56E-08	4.16E-13	2.29E-01	1.82E-12	5.48E-08
1,4-Dioxane (p-dioxane)	7.42E-02	1.02E-07	1.00E-01	1.02E-06	4.06E-08	1.00E-01	4.06E-07	1.54E-11	8.57E-01	1.80E-11	1.42E-06
2-Methylnaphthalene	1.36E+00	1.86E-06	4.00E-03	4.66E-04	1.12E-06	4.00E-03	2.79E-04	2.83E-10	NA		7.45E-04
Acetophenone	2.36E-01	3.23E-07	1.00E-01	3.23E-06	1.29E-07	1.00E-01	1.29E-06	4.91E-11	NA		4.52E-06
Anthracene	8.10E-02	1.11E-07	3.00E-01	3.70E-07	6.64E-08	3.00E-01	2.21E-07	1.69E-11	NA		5.91E-07
Benzo(a)anthracene	4.95E-01	6.78E-07	NA		4.06E-07	NA		1.03E-10	NA		
Benzo(a)pyrene	6.17E-01	8.45E-07	NA		5.06E-07	NA		1.28E-10	NA		
Benzo(b)fluoranthene	5.01E-01	6.86E-07	NA		4.11E-07	NA		1.04E-10	NA		
Benzo(g,h,i)perylene	5.81E-01	7.96E-07	NA		4.76E-07	NA		1.21E-10	NA		
Benzo(k)fluoranthene	4.95E-01	6.78E-07	NA		4.06E-07	NA		1.03E-10	NA		
Benzyl butyl phthalate	2.70E-01	3.70E-07	2.00E-01	1.85E-06	1.48E-07	2.00E-01	7.38E-07	5.62E-11	NA		2.59E-06
bis(2-Ethylhexyl)phthalate	9.04E-01	1.24E-06	2.00E-02	6.19E-05	4.94E-07	2.00E-02	2.47E-05	1.88E-10	NA		8.66E-05
Caprolactam	2.30E-01	3.15E-07	5.00E-01	6.30E-07	1.26E-07	5.00E-01	2.51E-07	4.79E-11	NA		8.82E-07
Chrysene	5.97E-01	8.18E-07	NA		4.89E-07	NA		1.24E-10	NA		
Dibenz(a,h)anthracene	2.67E-01	3.66E-07	NA		2.19E-07	NA		5.56E-11	NA		
Fluoranthene	7.35E-01	1.01E-06	4.00E-02	2.52E-05	6.03E-07	4.00E-02	1.51E-05	1.53E-10	NA		4.02E-05
Indeno(1,2,3-c,d)pyrene	6.00E-01	8.22E-07	NA		4.92E-07	NA		1.25E-10	NA		
Naphthalene	2.49E-01	3.41E-07	2.00E-02	1.71E-05	2.04E-07	2.00E-02	1.02E-05	5.18E-11	8.57E-04	6.05E-08	2.73E-05
Phenanthrene	3.08E-01	4.22E-07	NA		2.53E-07	NA		6.41E-11	NA		
Pyrene	1.02E+00	1.40E-06	3.00E-02	4.66E-05	8.36E-07	3.00E-02	2.79E-05	2.12E-10	NA		7.45E-05
1,1-Dichloroethane	6.83E-03	9.36E-09	2.00E-01	4.68E-08	3.73E-09	2.00E-01	1.87E-08	1.42E-12	NA		6.54E-08
Acetone	6.05E-02	8.29E-08	9.00E-01	9.21E-08	3.31E-08	9.00E-01	3.67E-08	1.26E-11	8.86E+00	1.42E-12	1.29E-07

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Chlorobenzene	2.24E+00	3.07E-06	2.00E-02	1.53E-04	1.22E-06	2.00E-02	6.12E-05	4.66E-10	1.43E-02	3.26E-08	2.15E-04
cis-1,2-Dichloroethene	1.80E-02	2.47E-08	1.00E-02	2.47E-06	9.84E-09	1.00E-02	9.84E-07	3.75E-12	NA		3.45E-06
Ethylbenzene	1.01E-02	1.38E-08	1.00E-01	1.38E-07	5.52E-09	1.00E-01	5.52E-08	2.10E-12	2.86E-01	7.36E-12	1.94E-07
Isopropylbenzene (cumene)	1.05E-01	1.44E-07	1.00E-01	1.44E-06	5.74E-08	1.00E-01	5.74E-07	2.19E-11	1.14E-01	1.91E-10	2.01E-06
Methyl ethyl ketone	1.79E-02	2.45E-08	6.00E-01	4.09E-08	9.78E-09	6.00E-01	1.63E-08	3.73E-12	1.43E+00	2.61E-12	5.72E-08
Methyl isobutyl ketone	6.50E-03	8.90E-09	8.00E-02	1.11E-07	3.55E-09	8.00E-02	4.44E-08	1.35E-12	8.57E-01	1.58E-12	1.56E-07
Methylcyclohexane	1.07E-01	1.47E-07	NA		5.85E-08	NA		2.23E-11	8.60E-01	2.59E-11	2.59E-11
Methylene chloride	6.31E-03	8.64E-09	6.00E-02	1.44E-07	3.45E-09	6.00E-02	5.75E-08	1.31E-12	2.86E-01	4.60E-12	2.02E-07
Tetrachloroethene	6.38E-03	8.74E-09	1.00E-02	8.74E-07	3.49E-09	1.00E-02	3.49E-07	1.33E-12	1.00E-02	1.33E-10	1.22E-06
Toluene	4.40E-02	6.03E-08	8.00E-02	7.53E-07	2.40E-08	8.00E-02	3.01E-07	9.16E-12	8.57E-02	1.07E-10	1.05E-06
Trichloroethene	4.00E-03	5.48E-09	3.00E-04	1.83E-05	2.19E-09	3.00E-04	7.29E-06	8.33E-13	1.00E-02	8.33E-11	2.56E-05
Vinyl chloride	1.00E-03	1.37E-09	3.00E-03	4.57E-07	5.47E-10	3.00E-03	1.82E-07	2.08E-13	2.86E-02	7.29E-12	6.39E-07
Xylenes, total	9.09E-02	1.25E-07	2.00E-01	6.23E-07	4.97E-08	2.00E-01	2.48E-07	1.89E-11	2.86E-02	6.62E-10	8.72E-07
		Total Risk (Hazard Index):		5.03E-01	Total Risk (Hazard Index):		6.41E-02	Total Risk (Hazard Index):		8.91E-03	5.77E-01

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : 0.6

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-73
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	1.50E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.24E+03	9.03E-03	NA		2.62E-04	NA		3.43E-07	NA		
Antimony	3.48E+00	3.81E-06	NA		1.11E-07	NA		1.45E-10	NA		
Arsenic	1.81E+01	1.98E-05	1.50E+00	2.98E-05	1.73E-06	1.50E+00	2.59E-06	7.54E-10	1.51E+01	1.13E-08	**3.24E-05**
Barium	6.52E+02	7.15E-04	NA		2.07E-05	NA		2.71E-08	NA		
Beryllium	2.81E-01	3.08E-07	NA		8.93E-09	NA		1.17E-11	8.40E+00	9.83E-11	9.83E-11
Cadmium	1.71E+00	1.87E-06	NA		5.43E-09	NA		7.12E-11	6.30E+00	4.49E-10	4.49E-10
Chromium	1.66E+02	1.82E-04	NA		5.28E-06	NA		6.91E-09	NA		
Cobalt	6.47E+00	7.09E-06	NA		2.06E-07	NA		2.69E-10	3.15E+00	8.49E-10	8.49E-10
Copper	1.14E+02	1.25E-04	NA		3.62E-06	NA		4.75E-09	NA		
Iron	2.14E+04	2.35E-02	NA		6.80E-04	NA		8.91E-07	NA		
Lead	2.75E+03	3.01E-03	NA		8.74E-05	NA		1.15E-07	NA		
Manganese	3.24E+02	3.55E-04	NA		1.03E-05	NA		1.35E-08	NA		
Nickel	2.45E+01	2.68E-05	NA		7.79E-07	NA		1.02E-09	9.10E-01	9.28E-10	9.28E-10
Selenium	3.50E+00	3.84E-06	NA		1.11E-07	NA		1.46E-10	NA		
Silver	4.95E-01	5.42E-07	NA		1.57E-08	NA		2.06E-11	NA		
Thallium	2.60E+00	2.85E-06	NA		8.26E-08	NA		1.08E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Vanadium	2.89E+01	3.17E-05	NA		9.18E-07	NA		1.20E-09	NA		
Zinc	3.21E+02	3.52E-04	NA		1.02E-05	NA		1.34E-08	NA		
Pesticides/PCBs											
4,4'-DDD	3.79E+00	4.15E-06	2.40E-01	9.97E-07	6.02E-07	2.40E-01	1.45E-07	1.58E-10	2.42E-01	3.81E-11	**1.14E-06**
4,4'-DDE	2.10E+00	2.30E-06	3.40E-01	7.82E-07	3.34E-07	3.40E-01	1.13E-07	8.74E-11	3.40E-01	2.97E-11	8.96E-07
4,4'-DDT	8.05E+01	8.82E-05	3.40E-01	3.00E-05	1.28E-05	3.40E-01	4.35E-06	3.35E-09	3.40E-01	1.14E-09	**3.43E-05**
alpha-BHC	6.00E-03	6.58E-09	6.30E+00	4.14E-08	9.53E-10	6.30E+00	6.01E-09	2.50E-13	6.30E+00	1.57E-12	4.74E-08
alpha-Chlordane	8.10E-02	8.88E-08	1.30E+00	1.15E-07	1.29E-08	1.30E+00	1.67E-08	3.37E-12	3.50E-01	1.18E-12	1.32E-07
beta-BHC	2.40E-02	2.63E-08	1.80E+00	4.73E-08	3.81E-09	1.80E+00	6.86E-09	9.99E-13	1.86E+00	1.85E-12	5.42E-08
Dieldrin	8.60E-02	9.42E-08	1.60E+01	1.51E-06	1.37E-08	1.60E+01	2.19E-07	3.58E-12	1.61E+01	5.77E-11	**1.73E-06**
Endosulfan I	7.40E-04	8.11E-10	NA		1.18E-10	NA		3.08E-14	NA		
Endosulfan sulfate	4.40E-03	4.82E-09	NA		6.99E-10	NA		1.83E-13	NA		
Endrin	1.40E-02	1.53E-08	NA		2.22E-09	NA		5.83E-13	NA		
Endrin aldehyde	4.90E-03	5.37E-09	NA		7.79E-10	NA		2.04E-13	NA		
Endrin ketone	6.90E-03	7.56E-09	NA		1.10E-09	NA		2.87E-13	NA		
gamma-BHC	2.16E-01	2.37E-07	1.10E+00	2.60E-07	3.43E-08	1.10E+00	3.78E-08	8.99E-12	1.09E+00	9.76E-12	2.98E-07
gamma-Chlordane	8.30E-02	9.10E-08	1.20E+00	1.09E-07	1.32E-08	1.20E+00	1.58E-08	3.46E-12	3.50E-01	1.21E-12	1.25E-07
Heptachlor	6.50E-04	7.12E-10	4.50E+00	3.21E-09	1.03E-10	4.50E+00	4.65E-10	2.71E-14	4.55E+00	1.23E-13	3.67E-09
Heptachlor epoxide	2.80E-03	3.07E-09	9.10E+00	2.79E-08	4.45E-10	9.10E+00	4.05E-09	1.17E-13	9.10E+00	1.06E-12	3.20E-08
Methoxychlor	7.00E-03	7.67E-09	NA		1.11E-09	NA		2.91E-13	NA		
Aroclor-1260	3.30E-02	3.62E-08	2.00E+00	7.23E-08	1.57E-08	2.00E+00	3.15E-08	1.37E-12	2.00E+00	2.75E-12	1.04E-07
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	1.15E-06	NA		3.34E-07	NA		4.37E-11	NA		
1,4-Dichlorobenzene	2.00E-03	2.19E-09	5.40E-03	1.18E-11	6.36E-10	5.40E-03	3.43E-12	8.33E-14	3.85E-02	3.21E-15	1.53E-11
1,4-Dioxane (p-dioxane)	7.42E-02	8.13E-08	2.70E-02	2.20E-09	2.36E-08	2.70E-02	6.37E-10	3.09E-12	2.70E-02	8.33E-14	2.83E-09
2-Methylnaphthalene	1.36E+00	1.49E-06	NA		6.48E-07	NA		5.66E-11	NA		
Acetophenone	2.36E-01	2.59E-07	NA		7.50E-08	NA		9.83E-12	NA		
Anthracene	8.10E-02	8.88E-08	NA		3.86E-08	NA		3.37E-12	NA		
Benzo(a)anthracene	4.95E-01	5.42E-07	1.20E+00	6.51E-07	2.36E-07	1.20E+00	2.83E-07	2.06E-11	3.85E-01	7.94E-12	9.34E-07
Benzo(a)pyrene	6.17E-01	6.76E-07	1.20E+01	8.11E-06	2.94E-07	1.20E+01	3.53E-06	2.57E-11	3.85E+00	9.89E-11	**1.16E-05**
Benzo(b)fluoranthene	5.01E-01	5.49E-07	1.20E+00	6.59E-07	2.39E-07	1.20E+00	2.87E-07	2.09E-11	3.85E-01	8.03E-12	9.45E-07
Benzo(g,h,i)perylene	5.81E-01	6.37E-07	NA		2.77E-07	NA		2.42E-11	NA		
Benzo(k)fluoranthene	4.95E-01	5.42E-07	1.20E+00	6.51E-07	2.36E-07	1.20E+00	2.83E-07	2.06E-11	3.85E-01	7.94E-12	9.34E-07
Benzyl butyl phthalate	2.70E-01	2.96E-07	1.90E-03	5.62E-10	8.58E-08	1.90E-03	1.63E-10	1.12E-11	NA		7.25E-10
bis(2-Ethylhexyl)phthalate	9.04E-01	9.91E-07	1.40E-02	1.39E-08	2.87E-07	1.40E-02	4.02E-09	3.76E-11	8.40E-03	3.16E-13	1.79E-08
Caprolactam	2.30E-01	2.52E-07	NA		7.31E-08	NA		9.58E-12	NA		
Chrysene	5.97E-01	6.54E-07	1.20E-01	7.85E-08	2.85E-07	1.20E-01	3.42E-08	2.49E-11	3.85E-02	9.57E-13	1.13E-07
Dibenz(a,h)anthracene	2.67E-01	2.93E-07	7.30E+00	2.14E-06	1.27E-07	7.30E+00	9.29E-07	1.11E-11	4.20E+00	4.67E-11	**3.07E-06**
Fluoranthene	7.35E-01	8.05E-07	NA		3.50E-07	NA		3.06E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.00E-01	6.58E-07	1.20E+00	7.89E-07	2.86E-07	1.20E+00	3.43E-07	2.50E-11	3.85E-01	9.62E-12	**1.13E-06**
Naphthalene	2.49E-01	2.73E-07	1.20E-01	3.27E-08	1.19E-07	1.20E-01	1.42E-08	1.04E-11	1.19E-01	1.23E-12	4.70E-08
Phenanthrene	3.08E-01	3.38E-07	NA		1.47E-07	NA		1.28E-11	NA		
Pyrene	1.02E+00	1.12E-06	NA		4.86E-07	NA		4.25E-11	NA		
1,1-Dichloroethane	6.83E-03	7.48E-09	5.70E-03	4.27E-11	2.17E-09	5.70E-03	1.24E-11	2.84E-13	5.70E-03	1.62E-15	5.50E-11
Acetone	6.05E-02	6.63E-08	NA		1.92E-08	NA		2.52E-12	NA		
Chlorobenzene	2.24E+00	2.45E-06	NA		7.12E-07	NA		9.33E-11	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
cis-1,2-Dichloroethene	1.80E-02	1.97E-08	NA		5.72E-09	NA		7.49E-13	NA		
Ethylbenzene	1.01E-02	1.11E-08	1.10E-02	1.22E-10	3.21E-09	1.10E-02	3.53E-11	4.21E-13	8.75E-03	3.68E-15	1.57E-10
Isopropylbenzene (cumene)	1.05E-01	1.15E-07	NA		3.34E-08	NA		4.37E-12	NA		
Methyl ethyl ketone	1.79E-02	1.96E-08	NA		5.69E-09	NA		7.45E-13	NA		
Methyl isobutyl ketone	6.50E-03	7.12E-09	NA		2.07E-09	NA		2.71E-13	NA		
Methylcyclohexane	1.07E-01	1.17E-07	NA		3.40E-08	NA		4.46E-12	NA		
Methylene chloride	6.31E-03	6.92E-09	1.40E-02	9.68E-11	2.01E-09	1.40E-02	2.81E-11	2.63E-13	3.50E-03	9.20E-16	1.25E-10
Tetrachloroethene	6.38E-03	6.99E-09	5.40E-01	3.78E-09	2.03E-09	5.40E-01	1.09E-09	2.66E-13	2.07E-02	5.49E-15	4.87E-09
Toluene	4.40E-02	4.82E-08	NA		1.40E-08	NA		1.83E-12	NA		
Trichloroethene	4.00E-03	4.38E-09	5.90E-03	2.59E-11	1.27E-09	5.90E-03	7.50E-12	1.67E-13	7.00E-03	1.17E-15	3.34E-11
Vinyl chloride	1.00E-03	1.10E-09	7.20E-01	7.89E-10	3.18E-10	7.20E-01	2.29E-10	4.16E-14	2.73E-01	1.14E-14	1.02E-09
Xylenes, total	9.09E-02	9.96E-08	NA		2.89E-08	NA		3.78E-12	NA		
			Total Risk:	7.68E-05		**Total Risk:**	1.32E-05		**Total Risk:**	1.51E-08	**9.01E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **9E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-74
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (6 years)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	1.50E+01	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.24E+03	1.05E-01	1.00E+00	1.05E-01	3.06E-03	1.00E+00	3.06E-03	4.00E-06	1.40E-03	2.86E-03	**1.11E-01**
Antimony	3.48E+00	4.45E-05	4.00E-04	1.11E-01	1.29E-06	4.00E-04	3.23E-03	1.69E-09	NA		**1.14E-01**
Arsenic	1.81E+01	2.31E-04	3.00E-04	7.71E-01	2.01E-05	3.00E-04	6.71E-02	8.79E-09	4.29E-06	2.05E-03	**8.41E-01**
Barium	6.52E+02	8.34E-03	2.00E-01	4.17E-02	2.42E-04	2.00E-01	1.21E-03	3.17E-07	1.43E-04	2.22E-03	4.51E-02
Beryllium	2.81E-01	3.59E-06	2.00E-03	1.80E-03	1.04E-07	2.00E-03	5.21E-05	1.37E-10	2.00E-06	6.83E-05	1.92E-03
Cadmium	1.71E+00	2.19E-05	1.10E-05	1.99E+00	6.34E-08	1.10E-05	5.76E-03	8.31E-10	2.86E-06	2.91E-04	**1.99E+00**
Chromium	1.66E+02	2.12E-03	NA		6.15E-05	NA		8.06E-08	NA		
Cobalt	6.47E+00	8.27E-05	3.00E-04	2.76E-01	2.40E-06	3.00E-04	8.00E-03	3.14E-09	1.71E-06	1.83E-03	**2.86E-01**
Copper	1.14E+02	1.46E-03	4.00E-02	3.64E-02	4.23E-05	4.00E-02	1.06E-03	5.54E-08	NA		3.75E-02
Iron	2.14E+04	2.74E-01	7.00E-01	3.91E-01	7.93E-03	7.00E-01	1.13E-02	1.04E-05	NA		**4.02E-01**
Lead	2.75E+03	3.52E-02	NA		1.02E-03	NA		1.34E-06	NA		
Manganese	3.24E+02	4.14E-03	2.40E-02	1.73E-01	1.20E-04	2.40E-02	5.01E-03	1.57E-07	1.43E-05	1.10E-02	**1.89E-01**
Nickel	2.45E+01	3.13E-04	1.10E-02	2.85E-02	9.08E-06	1.10E-02	8.26E-04	1.19E-08	2.57E-05	4.63E-04	2.98E-02
Selenium	3.50E+00	4.47E-05	5.00E-03	8.95E-03	1.30E-06	5.00E-03	2.60E-04	1.70E-09	5.71E-03	2.98E-07	9.21E-03
Silver	4.95E-01	6.33E-06	5.00E-03	1.27E-03	1.84E-07	5.00E-03	3.67E-05	2.40E-10	NA		1.30E-03
Thallium	2.60E+00	3.32E-05	6.60E-05	5.04E-01	9.64E-07	6.60E-05	1.46E-02	1.26E-09	NA		**5.18E-01**
Vanadium	2.89E+01	3.69E-04	5.00E-03	7.39E-02	1.07E-05	5.00E-03	2.14E-03	1.40E-08	NA		7.60E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Zinc	3.21E+02	4.10E-03	3.00E-01	1.37E-02	1.19E-04	3.00E-01	3.97E-04	1.56E-07	NA		1.41E-02
Pesticides/PCBs											
4,4'-DDD	3.79E+00	4.85E-05	NA		7.03E-06	NA		1.84E-09	NA		
4,4'-DDE	2.10E+00	2.68E-05	NA		3.89E-06	NA		1.02E-09	NA		
4,4'-DDT	8.05E+01	1.03E-03	5.00E-04	2.06E+00	1.49E-04	5.00E-04	2.98E-01	3.91E-08	NA		**2.36E+00**
alpha-BHC	6.00E-03	7.67E-08	5.00E-04	1.53E-04	1.11E-08	5.00E-04	2.22E-05	2.91E-12	NA		1.76E-04
alpha-Chlordane	8.10E-02	1.04E-06	3.30E-05	3.14E-02	1.50E-07	3.30E-05	4.55E-03	3.93E-11	2.00E-04	1.97E-07	3.59E-02
beta-BHC	2.40E-02	3.07E-07	NA		4.45E-08	NA		1.17E-11	NA		
Dieldrin	8.60E-02	1.10E-06	5.00E-05	2.20E-02	1.59E-07	5.00E-05	3.19E-03	4.18E-11	NA		2.52E-02
Endosulfan I	7.40E-04	9.46E-09	6.00E-03	1.58E-06	1.37E-09	6.00E-03	2.29E-07	3.59E-13	NA		1.81E-06
Endosulfan sulfate	4.40E-03	5.63E-08	6.00E-03	9.38E-06	8.16E-09	6.00E-03	1.36E-06	2.14E-12	NA		1.07E-05
Endrin	1.40E-02	1.79E-07	3.00E-04	5.97E-04	2.60E-08	3.00E-04	8.65E-05	6.80E-12	NA		6.83E-04
Endrin aldehyde	4.90E-03	6.26E-08	3.00E-04	2.09E-04	9.08E-09	3.00E-04	3.03E-05	2.38E-12	NA		2.39E-04
Endrin ketone	6.90E-03	8.82E-08	3.00E-04	2.94E-04	1.28E-08	3.00E-04	4.26E-05	3.35E-12	NA		3.37E-04
gamma-BHC	2.16E-01	2.76E-06	3.00E-04	9.21E-03	4.00E-07	3.00E-04	1.33E-03	1.05E-10	NA		1.05E-02
gamma-Chlordane	8.30E-02	1.06E-06	3.30E-05	3.22E-02	1.54E-07	3.30E-05	4.66E-03	4.03E-11	2.00E-04	2.02E-07	3.68E-02
Heptachlor	6.50E-04	8.31E-09	3.00E-05	2.77E-04	1.21E-09	3.00E-05	4.02E-05	3.16E-13	3.00E-05	1.05E-08	3.17E-04
Heptachlor epoxide	2.80E-03	3.58E-08	1.30E-05	2.75E-03	5.19E-09	1.30E-05	3.99E-04	1.36E-12	NA		3.15E-03
Methoxychlor	7.00E-03	8.95E-08	2.00E-05	4.47E-03	1.30E-08	2.00E-05	6.49E-04	3.40E-12	2.00E-05	1.70E-07	5.12E-03
Aroclor-1260	3.30E-02	4.22E-07	2.00E-05	2.11E-02	1.84E-07	2.00E-05	9.18E-03	1.60E-11	NA		3.03E-02
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	1.34E-05	9.00E-02	1.49E-04	3.89E-06	9.00E-02	4.33E-05	5.10E-10	5.71E-02	8.93E-09	1.92E-04
1,4-Dichlorobenzene	2.00E-03	2.56E-08	7.00E-02	3.65E-07	7.42E-09	7.00E-02	1.06E-07	9.72E-13	2.29E-01	4.25E-12	4.71E-07
1,4-Dioxane (p-dioxane)	7.42E-02	9.49E-07	1.00E-01	9.49E-06	2.75E-07	1.00E-01	2.75E-06	3.60E-11	8.57E-01	4.21E-11	1.22E-05
2-Methylnaphthalene	1.36E+00	1.74E-05	4.00E-03	4.35E-03	7.56E-06	4.00E-03	1.89E-03	6.61E-10	NA		6.24E-03
Acetophenone	2.36E-01	3.02E-06	1.00E-01	3.02E-05	8.75E-07	1.00E-01	8.75E-06	1.15E-10	NA		3.89E-05
Anthracene	8.10E-02	1.04E-06	3.00E-01	3.45E-06	4.50E-07	3.00E-01	1.50E-06	3.93E-11	NA		4.95E-06
Benzo(a)anthracene	4.95E-01	6.33E-06	NA		2.75E-06	NA		2.40E-10	NA		
Benzo(a)pyrene	6.17E-01	7.89E-06	NA		3.43E-06	NA		3.00E-10	NA		
Benzo(b)fluoranthene	5.01E-01	6.41E-06	NA		2.79E-06	NA		2.43E-10	NA		
Benzo(g,h,i)perylene	5.81E-01	7.43E-06	NA		3.23E-06	NA		2.82E-10	NA		
Benzo(k)fluoranthene	4.95E-01	6.33E-06	NA		2.75E-06	NA		2.40E-10	NA		
Benzyl butyl phthalate	2.70E-01	3.45E-06	2.00E-01	1.73E-05	1.00E-06	2.00E-01	5.01E-06	1.31E-10	NA		2.23E-05
bis(2-Ethylhexyl)phthalate	9.04E-01	1.16E-05	2.00E-02	5.78E-04	3.35E-06	2.00E-02	1.68E-04	4.39E-10	NA		7.45E-04
Caprolactam	2.30E-01	2.94E-06	5.00E-01	5.88E-06	8.53E-07	5.00E-01	1.71E-06	1.12E-10	NA		7.59E-06
Chrysene	5.97E-01	7.63E-06	NA		3.32E-06	NA		2.90E-10	NA		
Dibenz(a,h)anthracene	2.67E-01	3.41E-06	NA		1.48E-06	NA		1.30E-10	NA		
Fluoranthene	7.35E-01	9.40E-06	4.00E-02	2.35E-04	4.09E-06	4.00E-02	1.02E-04	3.57E-10	NA		3.37E-04
Indeno(1,2,3-c,d)pyrene	6.00E-01	7.67E-06	NA		3.34E-06	NA		2.91E-10	NA		
Naphthalene	2.49E-01	3.18E-06	2.00E-02	1.59E-04	1.38E-06	2.00E-02	6.92E-05	1.21E-10	8.57E-04	1.41E-07	2.29E-04
Phenanthrene	3.08E-01	3.94E-06	NA		1.71E-06	NA		1.50E-10	NA		
Pyrene	1.02E+00	1.30E-05	3.00E-02	4.35E-04	5.67E-06	3.00E-02	1.89E-04	4.95E-10	NA		6.24E-04
1,1-Dichloroethane	6.83E-03	8.73E-08	2.00E-01	4.37E-07	2.53E-08	2.00E-01	1.27E-07	3.32E-12	NA		5.63E-07
Acetone	6.05E-02	7.74E-07	9.00E-01	8.59E-07	2.24E-07	9.00E-01	2.49E-07	2.94E-11	8.86E+00	3.32E-12	1.11E-06

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Chlorobenzene	2.24E+00	2.86E-05	2.00E-02	1.43E-03	8.31E-06	2.00E-02	4.15E-04	1.09E-09	1.43E-02	7.62E-08	1.85E-03
cis-1,2-Dichloroethene	1.80E-02	2.30E-07	1.00E-02	2.30E-05	6.67E-08	1.00E-02	6.67E-06	8.74E-12	NA		2.97E-05
Ethylbenzene	1.01E-02	1.29E-07	1.00E-01	1.29E-06	3.74E-08	1.00E-01	3.74E-07	4.91E-12	2.86E-01	1.72E-11	1.67E-06
Isopropylbenzene (cumene)	1.05E-01	1.34E-06	1.00E-01	1.34E-05	3.89E-07	1.00E-01	3.89E-06	5.10E-11	1.14E-01	4.46E-10	1.73E-05
Methyl ethyl ketone	1.79E-02	2.29E-07	6.00E-01	3.81E-07	6.64E-08	6.00E-01	1.11E-07	8.70E-12	1.43E+00	6.09E-12	4.92E-07
Methyl isobutyl ketone	6.50E-03	8.31E-08	8.00E-02	1.04E-06	2.41E-08	8.00E-02	3.01E-07	3.16E-12	8.57E-01	3.68E-12	1.34E-06
Methylcyclohexane	1.07E-01	1.37E-06	NA		3.97E-07	NA		5.20E-11	8.60E-01	6.04E-11	6.04E-11
Methylene chloride	6.31E-03	8.07E-08	6.00E-02	1.34E-06	2.34E-08	6.00E-02	3.90E-07	3.07E-12	2.86E-01	1.07E-11	1.73E-06
Tetrachloroethene	6.38E-03	8.16E-08	1.00E-02	8.16E-06	2.37E-08	1.00E-02	2.37E-06	3.10E-12	1.00E-02	3.10E-10	1.05E-05
Toluene	4.40E-02	5.63E-07	8.00E-02	7.03E-06	1.63E-07	8.00E-02	2.04E-06	2.14E-11	8.57E-02	2.49E-10	9.07E-06
Trichloroethene	4.00E-03	5.11E-08	3.00E-04	1.70E-04	1.48E-08	3.00E-04	4.94E-05	1.94E-12	1.00E-02	1.94E-10	2.20E-04
Vinyl chloride	1.00E-03	1.28E-08	3.00E-03	4.26E-06	3.71E-09	3.00E-03	1.24E-06	4.86E-13	2.86E-02	1.70E-11	5.50E-06
Xylenes, total	9.09E-02	1.16E-06	2.00E-01	5.81E-06	3.37E-07	2.00E-01	1.69E-06	4.42E-11	2.86E-02	1.55E-09	7.50E-06
		Total Risk (Hazard Index):		6.7	Total Risk (Hazard Index):		0.45	Total Risk (Hazard Index):		0.021	**7.2**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **7**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-75
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**1.3E-05**	**1.5E-06**	1.9E-08	**1.4E-05**	35%	**2.6E-06**	1.1E-08	**3.2E-05**	**3.2E-05**	36%
Subtotal Metals	**1.3E-05**	**1.5E-06**	2.3E-08	**1.4E-05**	35%	**2.6E-06**	1.4E-08	**3.2E-05**	**3.2E-05**	36%
Pesticides/PCBs										
4,4'-DDD	4.3E-07	8.5E-08	6.5E-11	5.1E-07	1.3%	1.4E-07	3.8E-11	**1.1E-06**	**1.1E-06**	1.3%
4,4'-DDT	**1.3E-05**	**2.6E-06**	2.0E-09	**1.5E-05**	38%	**4.3E-06**	1.1E-09	**3.4E-05**	**3.4E-05**	38%
Dieldrin	6.5E-07	1.3E-07	9.9E-11	7.8E-07	1.9%	2.2E-07	5.8E-11	**1.7E-06**	**1.7E-06**	1.9%
Subtotal Pest/PCBs	**1.5E-05**	**2.9E-06**	2.2E-09	**1.7E-05**	43%	**4.9E-06**	1.3E-09	**3.9E-05**	**3.9E-05**	43%
Semivolatile Organic Compounds										
Benzo(a)pyrene	**3.5E-06**	**2.1E-06**	1.7E-10	**5.6E-06**	14%	**3.5E-06**	9.9E-11	**1.2E-05**	**1.2E-05**	13%
Dibenz(a,h)anthracene	9.2E-07	5.5E-07	8.0E-11	**1.5E-06**	4%	9.3E-07	4.7E-11	**3.1E-06**	**3.1E-06**	3%
Subtotal SVOCs/VOCs	**5.6E-06**	**3.4E-06**	3.1E-10	**9.0E-06**	22%	**5.7E-06**	1.8E-10	**1.9E-05**	**1.9E-05**	21%
Total:	**3.3E-05**	**7.8E-06**	2.6E-08	**4.1E-05**		**1.3E-05**	1.5E-08	**9.0E-05**	**9.0E-05**	

Total Estimated Cancer Risk Across All Exposure Routes:				**4E-05**					**9E-05**	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**7.4E-05**	**2.1E-05**	**4.1E-08**	**1.31E-04**	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									**1E-04**	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-76

Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Adult/Child Resident - Deep Soil - Large Vacant Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Noncarcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	1.1E-02	4.5E-04	1.2E-03	1.3E-02	2%	**1.1E-01**	3.1E-03	2.9E-03	**1.1E-01**	2%
Antimony	1.2E-02	4.8E-04		1.2E-02	2%	**1.1E-01**	3.2E-03		**1.1E-01**	2%
Arsenic	8.3E-02	9.9E-03	8.8E-04	9.3E-02	16%	**7.7E-01**	6.7E-02	2.1E-03	**8.4E-01**	12%
Cadmium	4.7E-03	1.9E-05	1.2E-04	4.8E-03	1%	**2.0E+00**	5.8E-03	2.9E-04	**2.0E+00**	28%
Cobalt	3.0E-02	1.2E-03	7.9E-04	3.2E-02	5%	**2.8E-01**	8.0E-03	1.8E-03	**2.9E-01**	4%
Iron	4.2E-02	1.7E-03		4.4E-02	8%	**3.9E-01**	1.1E-02		**4.0E-01**	6%
Manganese	1.8E-02	7.4E-04	4.7E-03	2.4E-02	4%	**1.7E-01**	5.0E-03	1.1E-02	**1.9E-01**	3%
Thallium	5.4E-02	2.2E-03		5.6E-02	10%	**5.0E-01**	1.5E-02		**5.2E-01**	7%
Subtotal Metals	**2.8E-01**	1.7E-02	8.9E-03	**3.0E-01**	52%	**4.5E+00**	**1.2E-01**	2.1E-02	**4.7E+00**	65%
Pesticides/PCBs										
4,4'-DDT	**2.2E-01**	4.4E-02		**2.6E-01**	46%	**2.1E+00**	**3.0E-01**		**2.4E+00**	33%
Subtotal Pest/PCBs	**2.3E-01**	4.6E-02	1.7E-07	**2.7E-01**	47%	**2.2E+00**	**3.2E-01**	5.8E-07	**2.5E+00**	35%
Total:	**0.5**	0.06	0.009	**0.6**		**6.7**	**0.4**	0.02	**7.2**	

Total Estimated Hazard Index Across All Exposure Routes: Adult: **0.6** Child: **7**

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-77
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.24E+03	2.88E-03	NA		3.28E-04	NA		4.38E-07	NA		
Antimony	3.48E+00	1.22E-06	NA		1.39E-07	NA		1.85E-10	NA		
Arsenic	1.81E+01	6.33E-06	1.50E+00	9.49E-06	2.16E-06	1.50E+00	3.24E-06	9.61E-10	1.51E+01	1.45E-08	**1.27E-05**
Barium	6.52E+02	2.28E-04	NA		2.60E-05	NA		3.46E-08	NA		
Beryllium	2.81E-01	9.82E-08	NA		1.12E-08	NA		1.49E-11	8.40E+00	1.25E-10	1.25E-10
Cadmium	1.71E+00	5.98E-07	NA		6.81E-09	NA		9.08E-11	6.30E+00	5.72E-10	5.72E-10
Chromium	1.66E+02	5.80E-05	NA		6.61E-06	NA		8.82E-09	NA		
Cobalt	6.47E+00	2.26E-06	NA		2.58E-07	NA		3.44E-10	3.15E+00	1.08E-09	1.08E-09
Copper	1.14E+02	3.98E-05	NA		4.54E-06	NA		6.05E-09	NA		
Iron	2.14E+04	7.48E-03	NA		8.53E-04	NA		1.14E-06	NA		
Lead	2.75E+03	9.61E-04	NA		1.10E-04	NA		1.46E-07	NA		
Manganese	3.24E+02	1.13E-04	NA		1.29E-05	NA		1.72E-08	NA		
Nickel	2.45E+01	8.56E-06	NA		9.76E-07	NA		1.30E-09	9.10E-01	1.18E-09	1.18E-09
Selenium	3.50E+00	1.22E-06	NA		1.39E-07	NA		1.86E-10	NA		
Silver	4.95E-01	1.73E-07	NA		1.97E-08	NA		2.63E-11	NA		
Thallium	2.60E+00	9.09E-07	NA		1.04E-07	NA		1.38E-10	NA		
Vanadium	2.89E+01	1.01E-05	NA		1.15E-06	NA		1.53E-09	NA		
Zinc	3.21E+02	1.12E-04	NA		1.28E-05	NA		1.70E-08	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	3.79E+00	1.32E-06	2.40E-01	3.18E-07	7.55E-07	2.40E-01	1.81E-07	2.01E-10	2.42E-01	4.86E-11	4.99E-07
4,4'-DDE	2.10E+00	7.34E-07	3.40E-01	2.50E-07	4.18E-07	3.40E-01	1.42E-07	1.12E-10	3.40E-01	3.79E-11	3.92E-07
4,4'-DDT	8.05E+01	2.81E-05	3.40E-01	9.56E-06	1.60E-05	3.40E-01	5.45E-06	4.28E-09	3.40E-01	1.45E-09	**1.50E-05**
alpha-BHC	6.00E-03	2.10E-09	6.30E+00	1.32E-08	1.20E-09	6.30E+00	7.53E-09	3.19E-13	6.30E+00	2.01E-12	2.07E-08
alpha-Chlordane	8.10E-02	2.83E-08	1.30E+00	3.68E-08	1.61E-08	1.30E+00	2.10E-08	4.30E-12	3.50E-01	1.51E-12	5.78E-08
beta-BHC	2.40E-02	8.39E-09	1.80E+00	1.51E-08	4.78E-09	1.80E+00	8.60E-09	1.27E-12	1.86E+00	2.36E-12	2.37E-08
Dieldrin	8.60E-02	3.01E-08	1.60E+01	4.81E-07	1.71E-08	1.60E+01	2.74E-07	4.57E-12	1.61E+01	7.35E-11	7.55E-07
Endosulfan I	7.40E-04	2.59E-10	NA		1.47E-10	NA		3.93E-14	NA		
Endosulfan sulfate	4.40E-03	1.54E-09	NA		8.76E-10	NA		2.34E-13	NA		
Endrin	1.40E-02	4.89E-09	NA		2.79E-09	NA		7.44E-13	NA		
Endrin aldehyde	4.90E-03	1.71E-09	NA		9.76E-10	NA		2.60E-13	NA		
Endrin ketone	6.90E-03	2.41E-09	NA		1.37E-09	NA		3.66E-13	NA		
gamma-BHC	2.16E-01	7.55E-08	1.10E+00	8.30E-08	4.30E-08	1.10E+00	4.73E-08	1.15E-11	1.09E+00	1.24E-11	1.30E-07
gamma-Chlordane	8.30E-02	2.90E-08	1.20E+00	3.48E-08	1.65E-08	1.20E+00	1.98E-08	4.41E-12	3.50E-01	1.54E-12	5.46E-08
Heptachlor	6.50E-04	2.27E-10	4.50E+00	1.02E-09	1.29E-10	4.50E+00	5.83E-10	3.45E-14	4.55E+00	1.57E-13	1.60E-09
Heptachlor epoxide	2.80E-03	9.78E-10	9.10E+00	8.90E-09	5.58E-10	9.10E+00	5.08E-09	1.49E-13	9.10E+00	1.35E-12	1.40E-08
Methoxychlor	7.00E-03	2.45E-09	NA		1.39E-09	NA		3.72E-13	NA		
Aroclor-1260	3.30E-02	1.15E-08	2.00E+00	2.31E-08	1.97E-08	2.00E+00	3.94E-08	1.75E-12	2.00E+00	3.51E-12	6.25E-08
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	3.67E-07	NA		4.18E-07	NA		5.58E-11	NA		
1,4-Dichlorobenzene	2.00E-03	6.99E-10	5.40E-03	3.77E-12	7.97E-10	5.40E-03	4.30E-12	1.06E-13	3.85E-02	4.09E-15	8.08E-12
1,4-Dioxane (p-dioxane)	7.42E-02	2.59E-08	2.70E-02	7.00E-10	2.96E-08	2.70E-02	7.98E-10	3.94E-12	2.70E-02	1.06E-13	1.50E-09
2-Methylnaphthalene	1.36E+00	4.75E-07	NA		8.13E-07	NA		7.22E-11	NA		
Acetophenone	2.36E-01	8.25E-08	NA		9.40E-08	NA		1.25E-11	NA		
Anthracene	8.10E-02	2.83E-08	NA		4.84E-08	NA		4.30E-12	NA		
Benzo(a)anthracene	4.95E-01	1.73E-07	1.20E+00	2.08E-07	2.96E-07	1.20E+00	3.55E-07	2.63E-11	3.85E-01	1.01E-11	5.63E-07
Benzo(a)pyrene	6.17E-01	2.16E-07	1.20E+01	2.59E-06	3.69E-07	1.20E+01	4.42E-06	3.28E-11	3.85E+00	1.26E-10	**7.01E-06**
Benzo(b)fluoranthene	5.01E-01	1.75E-07	1.20E+00	2.10E-07	2.99E-07	1.20E+00	3.59E-07	2.66E-11	3.85E-01	1.02E-11	5.69E-07
Benzo(g,h,i)perylene	5.81E-01	2.03E-07	NA		3.47E-07	NA		3.09E-11	NA		
Benzo(k)fluoranthene	4.95E-01	1.73E-07	1.20E+00	2.08E-07	2.96E-07	1.20E+00	3.55E-07	2.63E-11	3.85E-01	1.01E-11	5.63E-07
Benzyl butyl phthalate	2.70E-01	9.44E-08	1.90E-03	1.79E-10	1.08E-07	1.90E-03	2.04E-10	1.43E-11	NA		3.84E-10
bis(2-Ethylhexyl)phthalate	9.04E-01	3.16E-07	1.40E-02	4.42E-09	3.60E-07	1.40E-02	5.04E-09	4.80E-11	8.40E-03	4.03E-13	9.46E-09
Caprolactam	2.30E-01	8.04E-08	NA		9.16E-08	NA		1.22E-11	NA		
Chrysene	5.97E-01	2.09E-07	1.20E-01	2.50E-08	3.57E-07	1.20E-01	4.28E-08	3.17E-11	3.85E-02	1.22E-12	6.78E-08
Dibenz(a,h)anthracene	2.67E-01	9.33E-08	7.30E+00	6.81E-07	1.60E-07	7.30E+00	1.16E-06	1.42E-11	4.20E+00	5.96E-11	**1.85E-06**
Fluoranthene	7.35E-01	2.57E-07	NA		4.39E-07	NA		3.90E-11	NA		
Indeno(1,2,3-c,d)pyrene	6.00E-01	2.10E-07	1.20E+00	2.52E-07	3.59E-07	1.20E+00	4.30E-07	3.19E-11	3.85E-01	1.23E-11	6.82E-07
Naphthalene	2.49E-01	8.70E-08	1.20E-01	1.04E-08	1.49E-07	1.20E-01	1.79E-08	1.32E-11	1.19E-01	1.57E-12	2.83E-08
Phenanthrene	3.08E-01	1.08E-07	NA		1.84E-07	NA		1.64E-11	NA		
Pyrene	1.02E+00	3.56E-07	NA		6.10E-07	NA		5.42E-11	NA		
1,1-Dichloroethane	6.83E-03	2.39E-09	5.70E-03	1.36E-11	2.72E-09	5.70E-03	1.55E-11	3.63E-13	5.70E-03	2.07E-15	2.91E-11
Acetone	6.05E-02	2.11E-08	NA		2.41E-08	NA		3.21E-12	NA		
Chlorobenzene	2.24E+00	7.83E-07	NA		8.92E-07	NA		1.19E-10	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
cis-1,2-Dichloroethene	1.80E-02	6.29E-09	NA		7.17E-09	NA		9.56E-13	NA		
Ethylbenzene	1.01E-02	3.53E-09	1.10E-02	3.88E-11	4.02E-09	1.10E-02	4.43E-11	5.36E-13	8.75E-03	4.69E-15	8.31E-11
Isopropylbenzene (cumene)	1.05E-01	3.67E-08	NA		4.18E-08	NA		5.58E-12	NA		
Methyl ethyl ketone	1.79E-02	6.26E-09	NA		7.13E-09	NA		9.51E-13	NA		
Methyl isobutyl ketone	6.50E-03	2.27E-09	NA		2.59E-09	NA		3.45E-13	NA		
Methylcyclohexane	1.07E-01	3.74E-08	NA		4.26E-08	NA		5.68E-12	NA		
Methylene chloride	6.31E-03	2.21E-09	1.40E-02	3.09E-11	2.51E-09	1.40E-02	3.52E-11	3.35E-13	3.50E-03	1.17E-15	6.61E-11
Tetrachloroethene	6.38E-03	2.23E-09	5.40E-01	1.20E-09	2.54E-09	5.40E-01	1.37E-09	3.39E-13	2.07E-02	7.00E-15	2.58E-09
Toluene	4.40E-02	1.54E-08	NA		1.75E-08	NA		2.34E-12	NA		
Trichloroethene	4.00E-03	1.40E-09	5.90E-03	8.25E-12	1.59E-09	5.90E-03	9.40E-12	2.12E-13	7.00E-03	1.49E-15	1.77E-11
Vinyl chloride	1.00E-03	3.49E-10	7.20E-01	2.52E-10	3.98E-10	7.20E-01	2.87E-10	5.31E-14	2.73E-01	1.45E-14	5.38E-10
Xylenes, total	9.09E-02	3.18E-08	NA		3.62E-08	NA		4.83E-12	NA		
			Total Risk:	2.45E-05		**Total Risk:**	1.66E-05		**Total Risk:**	1.93E-08	**4.11E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **4E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-78
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.240E+03	8.06E-03	1.00E+00	8.06E-03	9.19E-04	1.00E+00	9.19E-04	1.23E-06	1.40E-03	8.75E-04	9.86E-03
Antimony	3.480E+00	3.41E-06	4.00E-04	8.51E-03	3.88E-07	4.00E-04	9.70E-04	5.17E-10	NA		9.48E-03
Arsenic	1.810E+01	1.77E-05	3.00E-04	5.90E-02	6.06E-06	3.00E-04	2.02E-02	2.69E-09	4.29E-06	6.28E-04	7.99E-02
Barium	6.520E+02	6.38E-04	2.00E-01	3.19E-03	7.27E-05	2.00E-01	3.64E-04	9.70E-08	1.43E-04	6.79E-04	4.23E-03
Beryllium	2.810E-01	2.75E-07	2.00E-03	1.37E-04	3.13E-08	2.00E-03	1.57E-05	4.18E-11	2.00E-06	2.09E-05	1.74E-04
Cadmium	1.710E+00	1.67E-06	5.00E-04	3.35E-03	1.91E-08	5.00E-04	3.81E-05	2.54E-10	2.86E-06	8.90E-05	3.47E-03
Chromium	1.660E+02	1.62E-04	NA		1.85E-05	NA		2.47E-08	NA		
Cobalt	6.470E+00	6.33E-06	3.00E-04	2.11E-02	7.22E-07	3.00E-04	2.41E-03	9.62E-10	1.71E-06	5.61E-04	2.41E-02
Copper	1.140E+02	1.12E-04	4.00E-02	2.79E-03	1.27E-05	4.00E-02	3.18E-04	1.70E-08	NA		3.11E-03
Iron	2.140E+04	2.09E-02	7.00E-01	2.99E-02	2.39E-03	7.00E-01	3.41E-03	3.18E-06	NA		3.33E-02
Lead	2.750E+03	2.69E-03	NA		3.07E-04	NA		4.09E-07	NA		
Manganese	3.240E+02	3.17E-04	2.40E-02	1.32E-02	3.61E-05	2.40E-02	1.51E-03	4.82E-08	1.43E-05	3.37E-03	1.81E-02
Nickel	2.450E+01	2.40E-05	2.00E-02	1.20E-03	2.73E-06	2.00E-02	1.37E-04	3.64E-09	2.57E-05	1.42E-04	1.48E-03
Selenium	3.500E+00	3.42E-06	5.00E-03	6.85E-04	3.90E-07	5.00E-03	7.81E-05	5.20E-10	5.71E-03	9.11E-08	7.63E-04
Silver	4.950E-01	4.84E-07	5.00E-03	9.69E-05	5.52E-08	5.00E-03	1.10E-05	7.36E-11	NA		1.08E-04
Thallium	2.600E+00	2.54E-06	6.60E-05	3.85E-02	2.90E-07	6.60E-05	4.39E-03	3.87E-10	NA		4.29E-02
Vanadium	2.890E+01	2.83E-05	5.00E-03	5.66E-03	3.22E-06	5.00E-03	6.45E-04	4.30E-09	NA		6.30E-03
Zinc	3.210E+02	3.14E-04	3.00E-01	1.05E-03	3.58E-05	3.00E-01	1.19E-04	4.77E-08	NA		1.17E-03
Pesticides/PCBs											
4,4'-DDD	3.790E+00	3.71E-06	NA		2.11E-06	NA		5.64E-10	NA		
4,4'-DDE	2.100E+00	2.05E-06	NA		1.17E-06	NA		3.12E-10	NA		
4,4'-DDT	8.050E+01	7.88E-05	5.00E-04	1.58E-01	4.49E-05	5.00E-04	8.98E-02	1.20E-08	NA		**2.47E-01**

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
alpha-BHC	6.000E-03	5.87E-09	5.00E-04	1.17E-05	3.35E-09	5.00E-04	6.69E-06	8.92E-13	NA		1.84E-05
alpha-Chlordane	8.100E-02	7.93E-08	5.00E-04	1.59E-04	4.52E-08	5.00E-04	9.04E-05	1.20E-11	2.00E-04	6.02E-08	2.49E-04
beta-BHC	2.400E-02	2.35E-08	NA		1.34E-08	NA		3.57E-12	NA		
Dieldrin	8.600E-02	8.41E-08	5.00E-05	1.68E-03	4.80E-08	5.00E-05	9.59E-04	1.28E-11	NA		2.64E-03
Endosulfan I	7.400E-04	7.24E-10	6.00E-03	1.21E-07	4.13E-10	6.00E-03	6.88E-08	1.10E-13	NA		1.89E-07
Endosulfan sulfate	4.400E-03	4.31E-09	6.00E-03	7.18E-07	2.45E-09	6.00E-03	4.09E-07	6.54E-13	NA		1.13E-06
Endrin	1.400E-02	1.37E-08	3.00E-04	4.57E-05	7.81E-09	3.00E-04	2.60E-05	2.08E-12	NA		7.17E-05
Endrin aldehyde	4.900E-03	4.79E-09	3.00E-04	1.60E-05	2.73E-09	3.00E-04	9.11E-06	7.29E-13	NA		2.51E-05
Endrin ketone	6.900E-03	6.75E-09	3.00E-04	2.25E-05	3.85E-09	3.00E-04	1.28E-05	1.03E-12	NA		3.53E-05
gamma-BHC	2.160E-01	2.11E-07	3.00E-04	7.05E-04	1.20E-07	3.00E-04	4.02E-04	3.21E-11	NA		1.11E-03
gamma-Chlordane	8.300E-02	8.12E-08	5.00E-04	1.62E-04	4.63E-08	5.00E-04	9.26E-05	1.23E-11	2.00E-04	6.17E-08	2.55E-04
Heptachlor	6.500E-04	6.36E-10	3.00E-05	2.12E-05	3.63E-10	3.00E-05	1.21E-05	9.67E-14	NA		3.33E-05
Heptachlor epoxide	2.800E-03	2.74E-09	1.30E-05	2.11E-04	1.56E-09	1.30E-05	1.20E-04	4.16E-13	NA		3.31E-04
Methoxychlor	7.000E-03	6.85E-09	2.00E-05	3.42E-04	3.90E-09	2.00E-05	1.95E-04	1.04E-12	NA		5.38E-04
Aroclor-1260	3.300E-02	3.23E-08	2.00E-05	1.61E-03	5.52E-08	2.00E-05	2.76E-03	4.91E-12	NA		4.38E-03
SVOCs/VOCs											
1,2-Dichlorobenzene	1.050E+00	1.03E-06	9.00E-02	1.14E-05	1.17E-06	9.00E-02	1.30E-05	1.56E-10	5.71E-02	2.73E-09	2.44E-05
1,4-Dichlorobenzene	2.000E-03	1.96E-09	7.00E-02	2.80E-08	2.23E-09	7.00E-02	3.19E-08	2.97E-13	2.29E-01	1.30E-12	5.98E-08
1,4-Dioxane (p-dioxane)	7.420E-02	7.26E-08	1.00E-01	7.26E-07	8.28E-08	1.00E-01	8.28E-07	1.10E-11	8.57E-01	1.29E-11	1.55E-06
2-Methylnaphthalene	1.360E+00	1.33E-06	4.00E-03	3.33E-04	2.28E-06	4.00E-03	5.69E-04	2.02E-10	NA		9.02E-04
Acetophenone	2.360E-01	2.31E-07	1.00E-01	2.31E-06	2.63E-07	1.00E-01	2.63E-06	3.51E-11	NA		4.94E-06
Anthracene	8.100E-02	7.93E-08	3.00E-01	2.64E-07	1.36E-07	3.00E-01	4.52E-07	1.20E-11	NA		7.16E-07
Benzo(a)anthracene	4.950E-01	4.84E-07	NA		8.28E-07	NA		7.36E-11	NA		
Benzo(a)pyrene	6.170E-01	6.04E-07	NA		1.03E-06	NA		9.18E-11	NA		
Benzo(b)fluoranthene	5.010E-01	4.90E-07	NA		8.38E-07	NA		7.45E-11	NA		
Benzo(g,h,i)perylene	5.810E-01	5.68E-07	NA		9.72E-07	NA		8.64E-11	NA		
Benzo(k)fluoranthene	4.950E-01	4.84E-07	NA		8.28E-07	NA		7.36E-11	NA		
Benzyl butyl phthalate	2.700E-01	2.64E-07	2.00E-01	1.32E-06	3.01E-07	2.00E-01	1.51E-06	4.02E-11	NA		2.83E-06
bis(2-Ethylhexyl)phthalate	9.040E-01	8.85E-07	2.00E-02	4.42E-05	1.01E-06	2.00E-02	5.04E-05	1.34E-10	NA		9.46E-05
Caprolactam	2.300E-01	2.25E-07	5.00E-01	4.50E-07	2.57E-07	5.00E-01	5.13E-07	3.42E-11	NA		9.63E-07
Chrysene	5.970E-01	5.84E-07	NA		9.99E-07	NA		8.88E-11	NA		
Dibenz(a,h)anthracene	2.670E-01	2.61E-07	NA		4.47E-07	NA		3.97E-11	NA		
Fluoranthene	7.350E-01	7.19E-07	4.00E-02	1.80E-05	1.23E-06	4.00E-02	3.07E-05	1.09E-10	NA		4.87E-05
Indeno(1,2,3-c,d)pyrene	6.000E-01	5.87E-07	NA		1.00E-06	NA		8.92E-11	NA		
Naphthalene	2.490E-01	2.44E-07	2.00E-02	1.22E-05	4.17E-07	2.00E-02	2.08E-05	3.70E-11	8.57E-04	4.32E-08	3.31E-05
Phenanthrene	3.080E-01	3.01E-07	NA		5.15E-07	NA		4.58E-11	NA		
Pyrene	1.020E+00	9.98E-07	3.00E-02	3.33E-05	1.71E-06	3.00E-02	5.69E-05	1.52E-10	NA		9.02E-05
1,1-Dichloroethane	6.830E-03	6.68E-09	2.00E-01	3.34E-08	7.62E-09	2.00E-01	3.81E-08	1.02E-12	NA		7.15E-08
Acetone	6.050E-02	5.92E-08	9.00E-01	6.58E-08	6.75E-08	9.00E-01	7.50E-08	9.00E-12	8.86E+00	1.02E-12	1.41E-07
Chlorobenzene	2.240E+00	2.19E-06	2.00E-02	1.10E-04	2.50E-06	2.00E-02	1.25E-04	3.33E-10	1.43E-02	2.33E-08	2.35E-04
cis-1,2-Dichloroethene	1.800E-02	1.76E-08	1.00E-02	1.76E-06	2.01E-08	1.00E-02	2.01E-06	2.68E-12	NA		3.77E-06
Ethylbenzene	1.010E-02	9.88E-09	1.00E-01	9.88E-08	1.13E-08	1.00E-01	1.13E-07	1.50E-12	2.86E-01	5.26E-12	2.11E-07
Isopropylbenzene (cumene)	1.050E-01	1.03E-07	1.00E-01	1.03E-06	1.17E-07	1.00E-01	1.17E-06	1.56E-11	1.14E-01	1.37E-10	2.20E-06
Methyl ethyl ketone	1.790E-02	1.75E-08	6.00E-01	2.92E-08	2.00E-08	6.00E-01	3.33E-08	2.66E-12	1.43E+00	1.86E-12	6.25E-08
Methyl isobutyl ketone	6.500E-03	6.36E-09	8.00E-02	7.95E-08	7.25E-09	8.00E-02	9.06E-08	9.67E-13	8.57E-01	1.13E-12	1.70E-07
Methylcyclohexane	1.070E-01	1.05E-07	NA		1.19E-07	NA		1.59E-11	8.60E-01	1.85E-11	1.85E-11
Methylene chloride	6.310E-03	6.17E-09	6.00E-02	1.03E-07	7.04E-09	6.00E-02	1.17E-07	9.38E-13	2.86E-01	3.28E-12	2.20E-07
Tetrachloroethene	6.380E-03	6.24E-09	1.00E-02	6.24E-07	7.12E-09	1.00E-02	7.12E-07	9.49E-13	1.00E-02	9.49E-11	1.34E-06
Toluene	4.400E-02	4.31E-08	8.00E-02	5.38E-07	4.91E-08	8.00E-02	6.14E-07	6.54E-12	8.57E-02	7.63E-11	1.15E-06

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Trichloroethene	4.000E-03	3.91E-09	3.00E-04	1.30E-05	4.46E-09	3.00E-04	1.49E-05	5.95E-13	1.00E-02	5.95E-11	2.79E-05
Vinyl chloride	1.000E-03	9.78E-10	3.00E-03	3.26E-07	1.12E-09	3.00E-03	3.72E-07	1.49E-13	2.86E-02	5.20E-12	6.98E-07
Xylenes, total	9.090E-02	8.89E-08	2.00E-01	4.45E-07	1.01E-07	2.00E-01	5.07E-07	1.35E-11	2.86E-02	4.73E-10	9.52E-07
		Total Risk (Hazard Index):		3.60E-01	Total Risk (Hazard Index):		1.31E-01	Total Risk (Hazard Index):		6.37E-03	**4.97E-01**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **0**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-79
Risk Calculation Worksheet for Deep Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.24E+03	3.80E-04	NA		5.25E-05	NA		2.30E-05	NA		
Antimony	3.48E+00	1.61E-07	NA		2.22E-08	NA		9.73E-09	NA		
Arsenic	1.81E+01	8.35E-07	1.50E+00	1.25E-06	3.46E-07	1.50E+00	5.19E-07	5.06E-08	1.51E+01	7.62E-07	**2.53E-06**
Barium	6.52E+02	3.01E-05	NA		4.16E-06	NA		1.82E-06	NA		
Beryllium	2.81E-01	1.30E-08	NA		1.79E-09	NA		7.86E-10	8.40E+00	6.60E-09	6.60E-09
Cadmium	1.71E+00	7.89E-08	NA		1.09E-09	NA		4.78E-09	6.30E+00	3.01E-08	3.01E-08
Chromium	1.66E+02	7.66E-06	NA		1.06E-06	NA		4.64E-07	NA		
Cobalt	6.47E+00	2.98E-07	NA		4.12E-08	NA		1.81E-08	3.15E+00	5.70E-08	5.70E-08
Copper	1.14E+02	5.26E-06	NA		7.27E-07	NA		3.19E-07	NA		
Iron	2.14E+04	9.87E-04	NA		1.36E-04	NA		5.98E-05	NA		
Lead	2.75E+03	1.27E-04	NA		1.75E-05	NA		7.69E-06	NA		
Manganese	3.24E+02	1.49E-05	NA		2.07E-06	NA		9.06E-07	NA		
Nickel	2.45E+01	1.13E-06	NA		1.56E-07	NA		6.85E-08	9.10E-01	6.23E-08	6.23E-08
Selenium	3.50E+00	1.61E-07	NA		2.23E-08	NA		9.78E-09	NA		
Silver	4.95E-01	2.28E-08	NA		3.16E-09	NA		1.38E-09	NA		
Thallium	2.60E+00	1.20E-07	NA		1.66E-08	NA		7.27E-09	NA		
Vanadium	2.89E+01	1.33E-06	NA		1.84E-07	NA		8.08E-08	NA		
Zinc	3.21E+02	1.48E-05	NA		2.05E-06	NA		8.97E-07	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	3.79E+00	1.75E-07	2.40E-01	4.20E-08	1.21E-07	2.40E-01	2.90E-08	1.06E-08	2.42E-01	2.56E-09	7.35E-08
4,4'-DDE	2.10E+00	9.69E-08	3.40E-01	3.29E-08	6.69E-08	3.40E-01	2.28E-08	5.87E-09	3.40E-01	1.99E-09	5.77E-08
4,4'-DDT	8.05E+01	3.71E-06	3.40E-01	1.26E-06	2.57E-06	3.40E-01	8.72E-07	2.25E-07	3.40E-01	7.64E-08	**2.21E-06**
alpha-BHC	6.00E-03	2.77E-10	6.30E+00	1.74E-09	1.91E-10	6.30E+00	1.20E-09	1.68E-11	6.30E+00	1.06E-10	3.05E-09
alpha-Chlordane	8.10E-02	3.74E-09	1.30E+00	4.86E-09	2.58E-09	1.30E+00	3.36E-09	2.26E-10	3.50E-01	7.93E-11	8.29E-09
beta-BHC	2.40E-02	1.11E-09	1.80E+00	1.99E-09	7.65E-10	1.80E+00	1.38E-09	6.71E-11	1.86E+00	1.24E-10	3.49E-09
Dieldrin	8.60E-02	3.97E-09	1.60E+01	6.35E-08	2.74E-09	1.60E+01	4.39E-08	2.40E-10	1.61E+01	3.87E-09	1.11E-07
Endosulfan I	7.40E-04	3.41E-11	NA		2.36E-11	NA		2.07E-12	NA		
Endosulfan sulfate	4.40E-03	2.03E-10	NA		1.40E-10	NA		1.23E-11	NA		
Endrin	1.40E-02	6.46E-10	NA		4.46E-10	NA		3.91E-11	NA		
Endrin aldehyde	4.90E-03	2.26E-10	NA		1.56E-10	NA		1.37E-11	NA		
Endrin ketone	6.90E-03	3.18E-10	NA		2.20E-10	NA		1.93E-11	NA		
gamma-BHC	2.16E-01	9.96E-09	1.10E+00	1.10E-08	6.88E-09	1.10E+00	7.57E-09	6.04E-10	1.09E+00	6.55E-10	1.92E-08
gamma-Chlordane	8.30E-02	3.83E-09	1.20E+00	4.59E-09	2.65E-09	1.20E+00	3.17E-09	2.32E-10	3.50E-01	8.12E-11	7.85E-09
Heptachlor	6.50E-04	3.00E-11	4.50E+00	1.35E-10	2.07E-11	4.50E+00	9.32E-11	1.82E-12	4.55E+00	8.27E-12	2.36E-10
Heptachlor epoxide	2.80E-03	1.29E-10	9.10E+00	1.18E-09	8.92E-11	9.10E+00	8.12E-10	7.83E-12	9.10E+00	7.12E-11	2.06E-09
Methoxychlor	7.00E-03	3.23E-10	NA		2.23E-10	NA		1.96E-11	NA		
Aroclor-1260	3.30E-02	1.52E-09	2.00E+00	3.04E-09	3.16E-09	2.00E+00	6.31E-09	9.23E-11	2.00E+00	1.85E-10	9.54E-09
SVOCs/VOCs											
1,2-Dichlorobenzene	1.05E+00	4.84E-08	NA		6.69E-08	NA		2.94E-09	NA		
1,4-Dichlorobenzene	2.00E-03	9.23E-11	5.40E-03	4.98E-13	1.27E-10	5.40E-03	6.88E-13	5.59E-12	3.85E-02	2.15E-13	1.40E-12
1,4-Dioxane (p-dioxane)	7.42E-02	3.42E-09	2.70E-02	9.24E-11	4.73E-09	2.70E-02	1.28E-10	2.07E-10	2.70E-02	5.59E-12	2.26E-10
2-Methylnaphthalene	1.36E+00	6.27E-08	NA		1.30E-07	NA		3.80E-09	NA		
Acetophenone	2.36E-01	1.09E-08	NA		1.50E-08	NA		6.60E-10	NA		
Anthracene	8.10E-02	3.74E-09	NA		7.74E-09	NA		2.26E-10	NA		
Benzo(a)anthracene	4.95E-01	2.28E-08	1.20E+00	2.74E-08	4.73E-08	1.20E+00	5.68E-08	1.38E-09	3.85E-01	5.33E-10	8.47E-08
Benzo(a)pyrene	6.17E-01	2.85E-08	1.20E+01	3.42E-07	5.90E-08	1.20E+01	7.08E-07	1.72E-09	3.85E+00	6.64E-09	**1.06E-06**
Benzo(b)fluoranthene	5.01E-01	2.31E-08	1.20E+00	2.77E-08	4.79E-08	1.20E+00	5.75E-08	1.40E-09	3.85E-01	5.39E-10	8.58E-08
Benzo(g,h,i)perylene	5.81E-01	2.68E-08	NA		5.55E-08	NA		1.62E-09	NA		
Benzo(k)fluoranthene	4.95E-01	2.28E-08	1.20E+00	2.74E-08	4.73E-08	1.20E+00	5.68E-08	1.38E-09	3.85E-01	5.33E-10	8.47E-08
Benzyl butyl phthalate	2.70E-01	1.25E-08	1.90E-03	2.37E-11	1.72E-08	1.90E-03	3.27E-11	7.55E-10	NA		5.64E-11
bis(2-Ethylhexyl)phthalate	9.04E-01	4.17E-08	1.40E-02	5.84E-10	5.76E-08	1.40E-02	8.07E-10	2.53E-09	8.40E-03	2.12E-11	1.41E-09
Caprolactam	2.30E-01	1.06E-08	NA		1.47E-08	NA		6.43E-10	NA		
Chrysene	5.97E-01	2.75E-08	1.20E-01	3.30E-09	5.71E-08	1.20E-01	6.85E-09	1.67E-09	3.85E-02	6.43E-11	1.02E-08
Dibenz(a,h)anthracene	2.67E-01	1.23E-08	7.30E+00	8.99E-08	2.55E-08	7.30E+00	1.86E-07	7.46E-10	4.20E+00	3.14E-09	2.79E-07
Fluoranthene	7.35E-01	3.39E-08	NA		7.03E-08	NA		2.05E-09	NA		
Indeno(1,2,3-c,d)pyrene	6.00E-01	2.77E-08	1.20E+00	3.32E-08	5.74E-08	1.20E+00	6.88E-08	1.68E-09	3.85E-01	6.46E-10	1.03E-07
Naphthalene	2.49E-01	1.15E-08	1.20E-01	1.38E-09	2.38E-08	1.20E-01	2.86E-09	6.96E-10	1.19E-01	8.28E-11	4.32E-09
Phenanthrene	3.08E-01	1.42E-08	NA		2.94E-08	NA		8.61E-10	NA		
Pyrene	1.02E+00	4.71E-08	NA		9.75E-08	NA		2.85E-09	NA		
1,1-Dichloroethane	6.83E-03	3.15E-10	5.70E-03	1.80E-12	4.35E-10	5.70E-03	2.48E-12	1.91E-11	5.70E-03	1.09E-13	4.39E-12
Acetone	6.05E-02	2.79E-09	NA		3.86E-09	NA		1.69E-10	NA		
Chlorobenzene	2.24E+00	1.03E-07	NA		1.43E-07	NA		6.26E-09	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
cis-1,2-Dichloroethene	1.80E-02	8.30E-10	NA		1.15E-09	NA		5.03E-11	NA		
Ethylbenzene	1.01E-02	4.66E-10	1.10E-02	5.12E-12	6.44E-10	1.10E-02	7.08E-12	2.82E-11	8.75E-03	2.47E-13	1.25E-11
Isopropylbenzene (cumene)	1.05E-01	4.84E-09	NA		6.69E-09	NA		2.94E-10	NA		
Methyl ethyl ketone	1.79E-02	8.26E-10	NA		1.14E-09	NA		5.00E-11	NA		
Methyl isobutyl ketone	6.50E-03	3.00E-10	NA		4.14E-10	NA		1.82E-11	NA		
Methylcyclohexane	1.07E-01	4.94E-09	NA		6.82E-09	NA		2.99E-10	NA		
Methylene chloride	6.31E-03	2.91E-10	1.40E-02	4.07E-12	4.02E-10	1.40E-02	5.63E-12	1.76E-11	3.50E-03	6.17E-14	9.77E-12
Tetrachloroethene	6.38E-03	2.94E-10	5.40E-01	1.59E-10	4.07E-10	5.40E-01	2.20E-10	1.78E-11	2.07E-02	3.68E-13	3.79E-10
Toluene	4.40E-02	2.03E-09	NA		2.80E-09	NA		1.23E-10	NA		
Trichloroethene	4.00E-03	1.85E-10	5.90E-03	1.09E-12	2.55E-10	5.90E-03	1.50E-12	1.12E-11	7.00E-03	7.83E-14	2.67E-12
Vinyl chloride	1.00E-03	4.61E-11	7.20E-01	3.32E-11	6.37E-11	7.20E-01	4.59E-11	2.80E-12	2.73E-01	7.63E-13	7.99E-11
Xylenes, total	9.09E-02	4.19E-09	NA		5.79E-09	NA		2.54E-10	NA		
			Total Risk:	3.23E-06		Total Risk:	2.66E-06		Total Risk:	1.02E-06	**6.91E-06**

Total Estimated Carcinogenic Risk Across All Exposure Routes : 7E-06

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-80
Risk Calculation Worksheet for Deep Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Deep Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.240E+03	2.66E-02	1.00E+00	2.66E-02	3.68E-03	1.00E+00	3.68E-03	1.61E-03	1.40E-03	1.15E+00	**1.18E+00**
Antimony	3.480E+00	1.12E-05	4.00E-04	2.81E-02	1.55E-06	4.00E-04	3.88E-03	6.81E-07	NA		3.20E-02
Arsenic	1.810E+01	5.84E-05	3.00E-04	1.95E-01	2.42E-05	3.00E-04	8.08E-02	3.54E-06	4.29E-06	8.26E-01	**1.10E+00**
Barium	6.520E+02	2.11E-03	2.00E-01	1.05E-02	2.91E-04	2.00E-01	1.45E-03	1.28E-04	1.43E-04	8.93E-01	**9.05E-01**
Beryllium	2.810E-01	9.07E-07	2.00E-03	4.54E-04	1.25E-07	2.00E-03	6.27E-05	5.50E-08	2.00E-06	2.75E-02	2.80E-02
Cadmium	1.710E+00	5.52E-06	5.00E-04	1.10E-02	7.63E-08	5.00E-04	1.53E-04	3.35E-07	2.86E-06	1.17E-01	**1.28E-01**
Chromium	1.660E+02	5.36E-04	NA		7.41E-05	NA		3.25E-05	NA		
Cobalt	6.470E+00	2.09E-05	3.00E-04	6.96E-02	2.89E-06	3.00E-04	9.62E-03	1.27E-06	1.71E-06	7.39E-01	**8.18E-01**
Copper	1.140E+02	3.68E-04	4.00E-02	9.20E-03	5.09E-05	4.00E-02	1.27E-03	2.23E-05	NA		1.05E-02
Iron	2.140E+04	6.91E-02	7.00E-01	9.87E-02	9.55E-03	7.00E-01	1.36E-02	4.19E-03	NA		**1.12E-01**
Lead	2.750E+03	8.88E-03	NA		1.23E-03	NA		5.38E-04	NA		
Manganese	3.240E+02	1.05E-03	2.40E-02	4.36E-02	1.45E-04	2.40E-02	6.02E-03	6.34E-05	1.43E-05	4.44E+00	**4.49E+00**
Nickel	2.450E+01	7.91E-05	2.00E-02	3.96E-03	1.09E-05	2.00E-02	5.47E-04	4.79E-06	2.57E-05	1.86E-01	**1.91E-01**
Selenium	3.500E+00	1.13E-05	5.00E-03	2.26E-03	1.56E-06	5.00E-03	3.12E-04	6.85E-07	5.71E-03	1.20E-04	2.69E-03
Silver	4.950E-01	1.60E-06	5.00E-03	3.20E-04	2.21E-07	5.00E-03	4.42E-05	9.69E-08	NA		3.64E-04
Thallium	2.600E+00	8.40E-06	6.60E-05	1.27E-01	1.16E-06	6.60E-05	1.76E-02	5.09E-07	NA		**1.45E-01**
Vanadium	2.890E+01	9.33E-05	5.00E-03	1.87E-02	1.29E-05	5.00E-03	2.58E-03	5.66E-06	NA		2.12E-02
Zinc	3.210E+02	1.04E-03	3.00E-01	3.45E-03	1.43E-04	3.00E-01	4.77E-04	6.28E-05	NA		3.93E-03
Pesticides/PCBs											
4,4'-DDD	3.790E+00	1.22E-05	NA		8.46E-06	NA		7.42E-07	NA		
4,4'-DDE	2.100E+00	6.78E-06	NA		4.68E-06	NA		4.11E-07	NA		
4,4'-DDT	8.050E+01	2.60E-04	5.00E-04	5.20E-01	1.80E-04	5.00E-04	3.59E-01	1.58E-05	NA		**8.79E-01**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
alpha-BHC	6.000E-03	1.94E-08	5.00E-04	3.87E-05	1.34E-08	5.00E-04	2.68E-05	1.17E-09	NA		6.55E-05
alpha-Chlordane	8.100E-02	2.62E-07	5.00E-04	5.23E-04	1.81E-07	5.00E-04	3.61E-04	1.59E-08	2.00E-04	7.93E-05	9.64E-04
beta-BHC	2.400E-02	7.75E-08	NA		5.35E-08	NA		4.70E-09	NA		
Dieldrin	8.600E-02	2.78E-07	5.00E-05	5.55E-03	1.92E-07	5.00E-05	3.84E-03	1.68E-08	NA		9.39E-03
Endosulfan I	7.400E-04	2.39E-09	6.00E-03	3.98E-07	1.65E-09	6.00E-03	2.75E-07	1.45E-10	NA		6.73E-07
Endosulfan sulfate	4.400E-03	1.42E-08	6.00E-03	2.37E-06	9.82E-09	6.00E-03	1.64E-06	8.61E-10	NA		4.00E-06
Endrin	1.400E-02	4.52E-08	3.00E-04	1.51E-04	3.12E-08	3.00E-04	1.04E-04	2.74E-09	NA		2.55E-04
Endrin aldehyde	4.900E-03	1.58E-08	3.00E-04	5.27E-05	1.09E-08	3.00E-04	3.64E-05	9.59E-10	NA		8.92E-05
Endrin ketone	6.900E-03	2.23E-08	3.00E-04	7.43E-05	1.54E-08	3.00E-04	5.13E-05	1.35E-09	NA		1.26E-04
gamma-BHC	2.160E-01	6.97E-07	3.00E-04	2.32E-03	4.82E-07	3.00E-04	1.61E-03	4.23E-08	NA		3.93E-03
gamma-Chlordane	8.300E-02	2.68E-07	5.00E-04	5.36E-04	1.85E-07	5.00E-04	3.70E-04	1.62E-08	2.00E-04	8.12E-05	9.88E-04
Heptachlor	6.500E-04	2.10E-09	3.00E-05	7.00E-05	1.45E-09	3.00E-05	4.83E-05	1.27E-10	NA		1.18E-04
Heptachlor epoxide	2.800E-03	9.04E-09	1.30E-05	6.95E-04	6.25E-09	1.30E-05	4.81E-04	5.48E-10	NA		1.18E-03
Methoxychlor	7.000E-03	2.26E-08	2.00E-05	1.13E-03	1.56E-08	2.00E-05	7.81E-04	1.37E-09	NA		1.91E-03
Aroclor-1260	3.300E-02	1.07E-07	2.00E-05	5.33E-03	2.21E-07	2.00E-05	1.10E-02	6.46E-09	NA		1.64E-02
SVOCs/VOCs											
1,2-Dichlorobenzene	1.050E+00	3.39E-06	9.00E-02	3.77E-05	4.68E-06	9.00E-02	5.21E-05	2.05E-07	5.71E-02	3.60E-06	9.33E-05
1,4-Dichlorobenzene	2.000E-03	6.46E-09	7.00E-02	9.23E-08	8.92E-09	7.00E-02	1.27E-07	3.91E-10	2.29E-01	1.71E-09	2.21E-07
1,4-Dioxane (p-dioxane)	7.420E-02	2.40E-07	1.00E-01	2.40E-06	3.31E-07	1.00E-01	3.31E-06	1.45E-08	8.57E-01	1.69E-08	5.72E-06
2-Methylnaphthalene	1.360E+00	4.39E-06	4.00E-03	1.10E-03	9.10E-06	4.00E-03	2.28E-03	2.66E-07	NA		3.37E-03
Acetophenone	2.360E-01	7.62E-07	1.00E-01	7.62E-06	1.05E-06	1.00E-01	1.05E-05	4.62E-08	NA		1.82E-05
Anthracene	8.100E-02	2.62E-07	3.00E-01	8.72E-07	5.42E-07	3.00E-01	1.81E-06	1.59E-08	NA		2.68E-06
Benzo(a)anthracene	4.950E-01	1.60E-06	NA		3.31E-06	NA		9.69E-08	NA		
Benzo(a)pyrene	6.170E-01	1.99E-06	NA		4.13E-06	NA		1.21E-07	NA		
Benzo(b)fluoranthene	5.010E-01	1.62E-06	NA		3.35E-06	NA		9.80E-08	NA		
Benzo(g,h,i)perylene	5.810E-01	1.88E-06	NA		3.89E-06	NA		1.14E-07	NA		
Benzo(k)fluoranthene	4.950E-01	1.60E-06	NA		3.31E-06	NA		9.69E-08	NA		
Benzyl butyl phthalate	2.700E-01	8.72E-07	2.00E-01	4.36E-06	1.20E-06	2.00E-01	6.02E-06	5.28E-08	NA		1.04E-05
bis(2-Ethylhexyl)phthalate	9.040E-01	2.92E-06	2.00E-02	1.46E-04	4.03E-06	2.00E-02	2.02E-04	1.77E-07	NA		3.48E-04
Caprolactam	2.300E-01	7.43E-07	5.00E-01	1.49E-06	1.03E-06	5.00E-01	2.05E-06	4.50E-08	NA		3.54E-06
Chrysene	5.970E-01	1.93E-06	NA		4.00E-06	NA		1.17E-07	NA		
Dibenz(a,h)anthracene	2.670E-01	8.62E-07	NA		1.79E-06	NA		5.23E-08	NA		
Fluoranthene	7.350E-01	2.37E-06	4.00E-02	5.93E-05	4.92E-06	4.00E-02	1.23E-04	1.44E-07	NA		1.82E-04
Indeno(1,2,3-c,d)pyrene	6.000E-01	1.94E-06	NA		4.02E-06	NA		1.17E-07	NA		
Naphthalene	2.490E-01	8.04E-07	2.00E-02	4.02E-05	1.67E-06	2.00E-02	8.33E-05	4.87E-08	8.57E-04	5.68E-05	1.80E-04
Phenanthrene	3.080E-01	9.95E-07	NA		2.06E-06	NA		6.03E-08	NA		
Pyrene	1.020E+00	3.29E-06	3.00E-02	1.10E-04	6.83E-06	3.00E-02	2.28E-04	2.00E-07	NA		3.37E-04
1,1-Dichloroethane	6.830E-03	2.21E-08	2.00E-01	1.10E-07	3.05E-08	2.00E-01	1.52E-07	1.34E-09	NA		2.63E-07
Acetone	6.050E-02	1.95E-07	9.00E-01	2.17E-07	2.70E-07	9.00E-01	3.00E-07	1.18E-08	8.86E+00	1.34E-09	5.18E-07
Chlorobenzene	2.240E+00	7.23E-06	2.00E-02	3.62E-04	9.99E-06	2.00E-02	5.00E-04	4.38E-07	1.43E-02	3.07E-05	8.92E-04
cis-1,2-Dichloroethene	1.800E-02	5.81E-08	1.00E-02	5.81E-06	8.03E-08	1.00E-02	8.03E-06	3.52E-09	NA		1.38E-05
Ethylbenzene	1.010E-02	3.26E-08	1.00E-01	3.26E-07	4.51E-08	1.00E-01	4.51E-07	1.98E-09	2.86E-01	6.92E-09	7.84E-07
Isopropylbenzene (cumene)	1.050E-01	3.39E-07	1.00E-01	3.39E-06	4.68E-07	1.00E-01	4.68E-06	2.05E-08	1.14E-01	1.80E-07	8.26E-06
Methyl ethyl ketone	1.790E-02	5.78E-08	6.00E-01	9.63E-08	7.99E-08	6.00E-01	1.33E-07	3.50E-09	1.43E+00	2.45E-09	2.32E-07
Methyl isobutyl ketone	6.500E-03	2.10E-08	8.00E-02	2.62E-07	2.90E-08	8.00E-02	3.63E-07	1.27E-09	8.57E-01	1.48E-09	6.26E-07
Methylcyclohexane	1.070E-01	3.45E-07	NA		4.77E-07	NA		2.09E-08	8.60E-01	2.43E-08	2.43E-08
Methylene chloride	6.310E-03	2.04E-08	6.00E-02	3.40E-07	2.82E-08	6.00E-02	4.69E-07	1.23E-09	2.86E-01	4.32E-09	8.13E-07
Tetrachloroethene	6.380E-03	2.06E-08	1.00E-02	2.06E-06	2.85E-08	1.00E-02	2.85E-06	1.25E-09	1.00E-02	1.25E-07	5.03E-06
Toluene	4.400E-02	1.42E-07	8.00E-02	1.78E-06	1.96E-07	8.00E-02	2.45E-06	8.61E-09	8.57E-02	1.00E-07	4.33E-06

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Trichloroethene	4.000E-03	1.29E-08	3.00E-04	4.31E-05	1.78E-08	3.00E-04	5.95E-05	7.83E-10	1.00E-02	7.83E-08	1.03E-04
Vinyl chloride	1.000E-03	3.23E-09	3.00E-03	1.08E-06	4.46E-09	3.00E-03	1.49E-06	1.96E-10	2.86E-02	6.85E-09	2.57E-06
Xylenes, total	9.090E-02	2.94E-07	2.00E-01	1.47E-06	4.06E-07	2.00E-01	2.03E-06	1.78E-08	2.86E-02	6.23E-07	4.12E-06
			Total Risk (Hazard Index):	1.19E+00		**Total Risk (Hazard Index):**	5.24E-01		**Total Risk (Hazard Index):**	8.38E+00	**1.01E+01**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **10**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-81
Cancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**9.5E-06**	**3.2E-06**	1.4E-08	**1.3E-05**	31%	**1.3E-06**	5.2E-07	7.6E-07	**2.5E-06**	37%
Subtotal Metals	**9.5E-06**	**3.2E-06**	1.7E-08	**1.3E-05**	31%	**1.3E-06**	5.2E-07	9.2E-07	**2.7E-06**	39%
Pesticides/PCBs										
4,4'-DDT	**9.6E-06**	**5.5E-06**	1.5E-09	**1.5E-05**	37%	**1.3E-06**	8.7E-07	7.6E-08	**2.2E-06**	32%
Subtotal Pesticides/PCBs	**1.1E-05**	**6.2E-06**	1.6E-09	**1.7E-05**	41%	**1.4E-06**	9.9E-07	8.6E-08	**2.5E-06**	36%
SVOCs/VOCs										
Benzo(a)pyrene	**2.6E-06**	**4.4E-06**	1.3E-10	**7.0E-06**	17%	3.4E-07	7.1E-07	6.6E-09	**1.1E-06**	15%
Dibenz(a,h)anthracene	6.8E-07	**1.2E-06**	6.0E-11	**1.8E-06**	4%	9.0E-08	1.9E-07	3.1E-09	2.8E-07	4%
Subtotal SVOCs/VOCs	**4.2E-06**	**7.2E-06**	2.3E-10	**1.1E-05**	28%	5.5E-07	**1.1E-06**	1.2E-08	**1.7E-06**	25%
Total:	**2.5E-05**	**1.7E-05**	1.9E-08	**4.11E-05**		**3.2E-06**	**2.7E-06**	**1.0E-06**	**6.91E-06**	

Total Estimated Cancer Risk Across All Exposure Routes: Future Industrial Worker: **4E-05**; Future Construction Worker: **7E-06**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-82
Noncancer Risk Results - Detailed Summary of Risk Drivers - Future Industrial/Construction Worker - Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	5.9E-02	2.0E-02	6.3E-04	8.0E-02	16%	**1.9E-01**	8.1E-02	**8.3E-01**	**1.1E+00**	11%
Iron	3.0E-02	3.4E-03		3.3E-02	7%	9.9E-02	1.4E-02		**1.1E-01**	1%
Thallium	3.9E-02	4.4E-03		4.3E-02	9%	**1.3E-01**	1.8E-02		**1.4E-01**	1%
Vanadium	5.7E-03	6.4E-04		6.3E-03	1%	1.9E-02	2.6E-03		2.1E-02	0%
Subtotal Metals	**2.0E-01**	3.6E-02	6.4E-03	**2.4E-01**	48%	**6.5E-01**	**1.4E-01**	**8.4E+00**	**9.2E+00**	91%
Pesticides/PCBs										
4,4'-DDT	**1.6E-01**	9.0E-02		**2.5E-01**	50%	**5.2E-01**	**3.6E-01**		**8.8E-01**	9%
Subtotal Pesticides/PCBs	**1.6E-01**	9.2E-02	1.2E-07	**2.5E-01**	51%	**5.3E-01**	**3.7E-01**	1.6E-04	**9.0E-01**	9%
Total:	**0.4**	**0.1**	0.01	**0.49**		**1.2**	**0.5**	**8.38**	**10.1**	

Total Estimated Hazard Index Across All Exposure Routes: Future Industrial Worker: **0.5**; Future Construction Worker: **10**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-83
Exposure Point Concentrations - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Units	Exposure Point Concentration (EPC)	EPC Basis
Metals			
Aluminum	mg/kg	8.02E+03	Maximum Result
Arsenic	mg/kg	1.42E+01	Maximum Result
Barium	mg/kg	2.78E+02	Maximum Result
Beryllium	mg/kg	2.90E-01	Maximum Result
Cadmium	mg/kg	2.10E+00	Maximum Result
Cobalt	mg/kg	6.70E+00	Maximum Result
Copper	mg/kg	9.58E+01	Maximum Result
Iron	mg/kg	1.63E+04	Maximum Result
Lead	mg/kg	3.86E+02	Maximum Result
Nickel	mg/kg	2.38E+01	Maximum Result
Silver	mg/kg	6.50E-01	Maximum Result
Vanadium	mg/kg	2.65E+01	Maximum Result
Zinc	mg/kg	7.36E+02	Maximum Result
Pesticides/PCBs			
4,4'-DDD	mg/kg	5.90E+00	Maximum Result
4,4'-DDE	mg/kg	1.80E+01	Maximum Result
4,4'-DDT	mg/kg	4.50E+01	Maximum Result
alpha-Chlordane	mg/kg	8.20E+00	Maximum Result
Dieldrin	mg/kg	1.30E+00	Maximum Result
gamma-Chlordane	mg/kg	5.90E+00	Maximum Result

Table 1-84
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.02E+03	3.77E-03	NA		1.50E-04	NA		5.72E-07	NA		
Arsenic	1.42E+01	6.67E-06	1.50E+00	1.00E-05	7.98E-07	1.50E+00	1.20E-06	1.01E-09	1.51E+01	1.53E-08	**1.12E-05**
Barium	2.78E+02	1.31E-04	NA		5.21E-06	NA		1.98E-08	NA		
Beryllium	2.90E-01	1.36E-07	NA		5.43E-09	NA		2.07E-11	8.40E+00	1.74E-10	1.74E-10
Cadmium	2.10E+00	9.86E-07	NA		3.94E-09	NA		1.50E-10	6.30E+00	9.44E-10	9.44E-10
Cobalt	6.70E+00	3.15E-06	NA		1.26E-07	NA		4.78E-10	3.15E+00	1.51E-09	1.51E-09
Copper	9.58E+01	4.50E-05	NA		1.80E-06	NA		6.84E-09	NA		
Iron	1.63E+04	7.66E-03	NA		3.05E-04	NA		1.16E-06	NA		
Lead	3.86E+02	1.81E-04	NA		7.23E-06	NA		2.76E-08	NA		
Nickel	2.38E+01	1.12E-05	NA		4.46E-07	NA		1.70E-09	9.10E-01	1.55E-09	1.55E-09
Silver	6.50E-01	3.05E-07	NA		1.22E-08	NA		4.64E-11	NA		
Vanadium	2.65E+01	1.24E-05	NA		4.97E-07	NA		1.89E-09	NA		
Zinc	7.36E+02	3.46E-04	NA		1.38E-05	NA		5.25E-08	NA		
Pesticides/PCBs											
4,4'-DDD	5.90E+00	2.77E-06	2.40E-01	6.65E-07	5.53E-07	2.40E-01	1.33E-07	4.21E-10	2.42E-01	1.02E-10	7.98E-07
4,4'-DDE	1.80E+01	8.45E-06	3.40E-01	2.87E-06	1.69E-06	3.40E-01	5.73E-07	1.28E-09	3.40E-01	4.36E-10	**3.45E-06**
4,4'-DDT	4.50E+01	2.11E-05	3.40E-01	7.19E-06	4.22E-06	3.40E-01	1.43E-06	3.21E-09	3.40E-01	1.09E-09	**8.62E-06**
alpha-Chlordane	8.20E+00	3.85E-06	1.30E+00	5.01E-06	7.68E-07	1.30E+00	9.99E-07	5.85E-10	3.50E-01	2.05E-10	**6.01E-06**

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Dieldrin	1.30E+00	6.11E-07	1.60E+01	9.77E-06	1.22E-07	1.60E+01	1.95E-06	9.28E-11	1.61E+01	1.49E-09	**1.17E-05**
gamma-Chlordane	5.90E+00	2.77E-06	1.20E+00	3.33E-06	5.53E-07	1.20E+00	6.63E-07	4.21E-10	3.50E-01	1.47E-10	**3.99E-06**
			Total Risk:	3.88E-05		**Total Risk:**	6.95E-06		**Total Risk:**	2.29E-08	**4.58E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **5E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-85
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.02E+03	1.10E-02	1.00E+00	1.10E-02	4.38E-04	1.00E+00	4.38E-04	1.67E-06	1.40E-03	1.19E-03	1.26E-02
Arsenic	1.42E+01	1.95E-05	3.00E-04	6.48E-02	2.33E-06	3.00E-04	7.76E-03	2.96E-09	4.29E-06	6.90E-04	7.33E-02
Barium	2.78E+02	3.81E-04	2.00E-01	1.90E-03	1.52E-05	2.00E-01	7.60E-05	5.79E-08	1.43E-04	4.05E-04	2.39E-03
Beryllium	2.90E-01	3.97E-07	2.00E-03	1.99E-04	1.59E-08	2.00E-03	7.93E-06	6.04E-11	2.00E-06	3.02E-05	2.37E-04
Cadmium	2.10E+00	2.88E-06	5.00E-04	5.75E-03	1.15E-08	5.00E-04	2.30E-05	4.37E-10	2.86E-06	1.53E-04	5.93E-03
Cobalt	6.70E+00	9.18E-06	3.00E-04	3.06E-02	3.66E-07	3.00E-04	1.22E-03	1.39E-09	1.71E-06	8.14E-04	3.26E-02
Copper	9.58E+01	1.31E-04	4.00E-02	3.28E-03	5.24E-06	4.00E-02	1.31E-04	1.99E-08	NA		3.41E-03
Iron	1.63E+04	2.23E-02	7.00E-01	3.19E-02	8.91E-04	7.00E-01	1.27E-03	3.39E-06	NA		3.32E-02
Lead	3.86E+02	5.29E-04	NA		2.11E-05	NA		8.04E-08	NA		
Nickel	2.38E+01	3.26E-05	2.00E-02	1.63E-03	1.30E-06	2.00E-02	6.50E-05	4.95E-09	2.57E-05	1.93E-04	1.89E-03
Silver	6.50E-01	8.90E-07	5.00E-03	1.78E-04	3.55E-08	5.00E-03	7.11E-06	1.35E-10	NA		1.85E-04
Vanadium	2.65E+01	3.63E-05	5.00E-03	7.26E-03	1.45E-06	5.00E-03	2.90E-04	5.52E-09	NA		7.55E-03
Zinc	7.36E+02	1.01E-03	3.00E-01	3.36E-03	4.02E-05	3.00E-01	1.34E-04	1.53E-07	NA		3.49E-03

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	5.90E+00	8.08E-06	NA		1.61E-06	NA		1.23E-09	NA		
4,4'-DDE	1.80E+01	2.47E-05	NA		4.92E-06	NA		3.75E-09	NA		
4,4'-DDT	4.50E+01	6.16E-05	5.00E-04	1.23E-01	1.23E-05	5.00E-04	2.46E-02	9.37E-09	NA		**1.48E-01**
alpha-Chlordane	8.20E+00	1.12E-05	5.00E-04	2.25E-02	2.24E-06	5.00E-04	4.48E-03	1.71E-09	2.00E-04	8.54E-06	2.70E-02
Dieldrin	1.30E+00	1.78E-06	5.00E-05	3.56E-02	3.55E-07	5.00E-05	7.11E-03	2.71E-10	NA		4.27E-02
gamma-Chlordane	5.90E+00	8.08E-06	5.00E-04	1.62E-02	1.61E-06	5.00E-04	3.22E-03	1.23E-09	2.00E-04	6.14E-06	1.94E-02
		Total Risk (Hazard Index):		3.6E-01	**Total Risk (Hazard Index):**		5.1E-02	**Total Risk (Hazard Index):**		3.5E-03	**4.1E-01**

Notes:

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **0.4**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-86
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.02E+03	8.79E-03	NA		2.55E-04	NA		3.34E-07	NA		
Arsenic	1.42E+01	1.56E-05	1.50E+00	2.33E-05	1.35E-06	1.50E+00	2.03E-06	5.91E-10	1.51E+01	8.90E-09	**2.54E-05**
Barium	2.78E+02	3.05E-04	NA		8.84E-06	NA		1.16E-08	NA		
Beryllium	2.90E-01	3.18E-07	NA		9.22E-09	NA		1.21E-11	8.40E+00	1.01E-10	1.01E-10
Cadmium	2.10E+00	2.30E-06	NA		6.67E-09	NA		8.74E-11	6.30E+00	5.51E-10	5.51E-10
Cobalt	6.70E+00	7.34E-06	NA		2.13E-07	NA		2.79E-10	3.15E+00	8.79E-10	8.79E-10
Copper	9.58E+01	1.05E-04	NA		3.04E-06	NA		3.99E-09	NA		
Iron	1.63E+04	1.79E-02	NA		5.18E-04	NA		6.79E-07	NA		
Lead	3.86E+02	4.23E-04	NA		1.23E-05	NA		1.61E-08	NA		
Nickel	2.38E+01	2.61E-05	NA		7.56E-07	NA		9.91E-10	9.10E-01	9.02E-10	9.02E-10
Silver	6.50E-01	7.12E-07	NA		2.07E-08	NA		2.71E-11	NA		
Vanadium	2.65E+01	2.90E-05	NA		8.42E-07	NA		1.10E-09	NA		
Zinc	7.36E+02	8.07E-04	NA		2.34E-05	NA		3.06E-08	NA		
Pesticides/PCBs											
4,4'-DDD	5.90E+00	6.47E-06	2.40E-01	1.55E-06	9.38E-07	2.40E-01	2.25E-07	2.46E-10	2.42E-01	5.93E-11	**1.78E-06**
4,4'-DDE	1.80E+01	1.97E-05	3.40E-01	6.71E-06	2.86E-06	3.40E-01	9.72E-07	7.49E-10	3.40E-01	2.54E-10	**7.68E-06**
4,4'-DDT	4.50E+01	4.93E-05	3.40E-01	1.68E-05	7.15E-06	3.40E-01	2.43E-06	1.87E-09	3.40E-01	6.36E-10	**1.92E-05**
alpha-Chlordane	8.20E+00	8.99E-06	1.30E+00	1.17E-05	1.30E-06	1.30E+00	1.69E-06	3.41E-10	3.50E-01	1.19E-10	**1.34E-05**

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Dieldrin	1.30E+00	1.42E-06	1.60E+01	2.28E-05	2.07E-07	1.60E+01	3.31E-06	5.41E-11	1.61E+01	8.71E-10	**2.61E-05**
gamma-Chlordane	5.90E+00	6.47E-06	1.20E+00	7.76E-06	9.38E-07	1.20E+00	1.13E-06	2.46E-10	3.50E-01	8.60E-11	**8.88E-06**
			Total Risk:	9.06E-05		**Total Risk:**	1.18E-05		**Total Risk:**	1.34E-08	**1.02E-04**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-04**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-87
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	2.90E+03	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.02E+03	1.03E-01	1.00E+00	1.03E-01	2.97E-03	1.00E+00	2.97E-03	3.90E-06	1.40E-03	2.78E-03	**1.1E-01**
Arsenic	1.42E+01	1.82E-04	3.00E-04	6.05E-01	1.58E-05	3.00E-04	5.27E-02	6.90E-09	4.29E-06	1.61E-03	**6.6E-01**
Barium	2.78E+02	3.55E-03	2.00E-01	1.78E-02	1.03E-04	2.00E-01	5.15E-04	1.35E-07	1.43E-04	9.45E-04	1.9E-02
Beryllium	2.90E-01	3.71E-06	2.00E-03	1.85E-03	1.08E-07	2.00E-03	5.38E-05	1.41E-10	2.00E-06	7.04E-05	2.0E-03
Cadmium	2.10E+00	2.68E-05	1.10E-05	2.44E+00	7.79E-08	1.10E-05	7.08E-03	1.02E-09	2.86E-06	3.57E-04	**2.4E+00**
Cobalt	6.70E+00	8.57E-05	3.00E-04	2.86E-01	2.48E-06	3.00E-04	8.28E-03	3.25E-09	1.71E-06	1.90E-03	**3.0E-01**
Copper	9.58E+01	1.22E-03	4.00E-02	3.06E-02	3.55E-05	4.00E-02	8.88E-04	4.65E-08	NA		3.2E-02
Iron	1.63E+04	2.08E-01	7.00E-01	2.98E-01	6.04E-03	7.00E-01	8.63E-03	7.92E-06	NA		**3.1E-01**
Lead	3.86E+02	4.94E-03	NA		1.43E-04	NA		1.88E-07	NA		
Nickel	2.38E+01	3.04E-04	1.10E-02	2.77E-02	8.82E-06	1.10E-02	8.02E-04	1.16E-08	2.57E-05	4.50E-04	2.9E-02
Silver	6.50E-01	8.31E-06	5.00E-03	1.66E-03	2.41E-07	5.00E-03	4.82E-05	3.16E-10	NA		1.7E-03

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Reference Dose [mg/kg/day]**	**Hazard Quotient**	**Chronic Daily Intake [mg/kg/day]**	**Reference Dose [mg/kg/day]**	**Hazard Quotient**	**Chronic Daily Intake [mg/kg/day]**	**Reference Dose [mg/kg/day]**	**Hazard Quotient**	**Total Hazard Quotient [-]**
Vanadium	2.65E+01	3.39E-04	5.00E-03	6.78E-02	9.83E-06	5.00E-03	1.97E-03	1.29E-08	NA		7.0E-02
Zinc	7.36E+02	9.41E-03	3.00E-01	3.14E-02	2.73E-04	3.00E-01	9.10E-04	3.58E-07	NA		3.2E-02
Pesticides/PCBs											
4,4'-DDD	5.90E+00	7.54E-05	NA		1.09E-05	NA		2.87E-09	NA		
4,4'-DDE	1.80E+01	2.30E-04	NA		3.34E-05	NA		8.74E-09	NA		
4,4'-DDT	4.50E+01	5.75E-04	5.00E-04	1.15E+00	8.34E-05	5.00E-04	1.67E-01	2.19E-08	NA		**1.3E+00**
alpha-Chlordane	8.20E+00	1.05E-04	3.30E-05	3.18E+00	1.52E-05	3.30E-05	4.61E-01	3.98E-09	2.00E-04	1.99E-05	**3.6E+00**
Dieldrin	1.30E+00	1.66E-05	5.00E-05	3.32E-01	2.41E-06	5.00E-05	4.82E-02	6.31E-10	NA		**3.8E-01**
gamma-Chlordane	5.90E+00	7.54E-05	3.30E-05	2.29E+00	1.09E-05	3.30E-05	3.31E-01	2.87E-09	2.00E-04	1.43E-05	**2.6E+00**
		Total Risk (Hazard Index):		1.09E+01	**Total Risk (Hazard Index):**		1.09E+00	**Total Risk (Hazard Index):**		8.15E-03	**1.2E+01**

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **12**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-88
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**1.0E-05**	**1.2E-06**	1.5E-08	**1.1E-05**	24%	**2.3E-05**	**2.0E-06**	8.9E-09	**2.5E-05**	25%
Subtotal Metals	**1.0E-05**	**1.2E-06**	1.9E-08	**1.1E-05**	24%	**2.3E-05**	**2.0E-06**	1.1E-08	**2.5E-05**	25%
Pesticides/PCBs										
4,4'-DDD	6.7E-07	1.3E-07	1.0E-10	8.0E-07	1.7%	**1.6E-06**	2.3E-07	5.9E-11	**1.8E-06**	1.7%
4,4'-DDE	**2.9E-06**	5.7E-07	4.4E-10	**3.4E-06**	8%	**6.7E-06**	9.7E-07	2.5E-10	**7.7E-06**	7%
4,4'-DDT	**7.2E-06**	**1.4E-06**	1.1E-09	**8.6E-06**	19%	**1.7E-05**	**2.4E-06**	6.4E-10	**1.9E-05**	19%
alpha-Chlordane	**5.0E-06**	1.0E-06	2.0E-10	**6.0E-06**	13%	**1.2E-05**	**1.7E-06**	1.2E-10	**1.3E-05**	13%
Dieldrin	**9.8E-06**	**1.9E-06**	1.5E-09	**1.2E-05**	26%	**2.3E-05**	**3.3E-06**	8.7E-10	**2.6E-05**	25%
gamma-Chlordane	**3.3E-06**	6.6E-07	1.5E-10	**4.0E-06**	9%	**7.8E-06**	**1.1E-06**	8.6E-11	**8.9E-06**	9%
Subtotal Pesticides/PCBs	**2.9E-05**	**5.8E-06**	3.5E-09	**3.5E-05**	76%	**6.7E-05**	**9.8E-06**	2.0E-09	**7.7E-05**	75%
Total:	**3.9E-05**	**6.9E-06**	2.3E-08	**4.6E-05**		**9.1E-05**	**1.2E-05**	1.3E-08	**1.0E-04**	

Total Estimated Cancer Risk Across All Exposure Routes:				**5E-05**					**1E-04**	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**1.3E-04**	**1.9E-05**	**3.6E-08**	**1.48E-04**	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									**1E-04**	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-89
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Adult Resident Ingestion	Adult Resident Dermal	Adult Resident Inhalation	Adult Resident Total	Adult Resident % Contribution	Child Resident Ingestion	Child Resident Dermal	Child Resident Inhalation	Child Resident Total	Child Resident % Contribution
	Non-Carcinogenic Effects Risk Results - Hazard Quotients; Future Residential; Reasonable Maximum Exposure									
Metals										
Aluminum	1.1E-02	4.4E-04	1.2E-03	1.3E-02	3%	**1.0E-01**	3.0E-03	2.8E-03	**1.1E-01**	1%
Arsenic	6.5E-02	7.8E-03	6.9E-04	7.3E-02	18%	**6.1E-01**	5.3E-02	1.6E-03	**6.6E-01**	6%
Cadmium	5.8E-03	2.3E-05	1.5E-04	5.9E-03	1%	**2.4E+00**	7.1E-03	3.6E-04	**2.4E+00**	20%
Cobalt	3.1E-02	1.2E-03	8.1E-04	3.3E-02	8%	**2.9E-01**	8.3E-03	1.9E-03	**3.0E-01**	2%
Iron	3.2E-02	1.3E-03		3.3E-02	8%	**3.0E-01**	8.6E-03		**3.1E-01**	3%
Subtotal Metals	**1.6E-01**	1.1E-02	3.5E-03	**1.8E-01**	43%	**3.9E+00**	8.5E-02	8.1E-03	**4.0E+00**	33%
Pesticides/PCBs										
4,4'-DDT	**1.2E-01**	2.5E-02		**1.5E-01**	36%	**1.2E+00**	**1.7E-01**		**1.3E+00**	11%
alpha-Chlordane	2.2E-02	4.5E-03	8.5E-06	2.7E-02	7%	**3.2E+00**	**4.6E-01**	2.0E-05	**3.6E+00**	30%
Dieldrin	3.6E-02	7.1E-03		4.3E-02	10%	**3.3E-01**	4.8E-02		**3.8E-01**	3%
gamma-Chlordane	1.6E-02	3.2E-03	6.1E-06	1.9E-02	5%	**2.3E+00**	**3.3E-01**	1.4E-05	**2.6E+00**	22%
Subtotal Pesticides/PCBs	**2.0E-01**	3.9E-02	1.5E-05	**2.4E-01**	57%	**6.9E+00**	**1.0E+00**	3.4E-05	**8.0E+00**	67%
Total:	**0.4**	0.1	0.003	**0.4**		**10.9**	**1.1**	0.01	**12.0**	

	Adult Resident	Child Resident
Total Estimated Hazard Index Across All Exposure Routes:	**0.4**	**12**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-90
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.02E+03	2.80E-03	NA		3.19E-04	NA		4.26E-07	NA		
Arsenic	1.42E+01	4.96E-06	1.50E+00	7.44E-06	1.70E-06	1.50E+00	2.55E-06	7.54E-10	1.51E+01	1.13E-08	**1.00E-05**
Barium	2.78E+02	9.71E-05	NA		1.11E-05	NA		1.48E-08	NA		
Beryllium	2.90E-01	1.01E-07	NA		1.16E-08	NA		1.54E-11	8.40E+00	1.29E-10	1.29E-10
Cadmium	2.10E+00	7.34E-07	NA		8.37E-09	NA		1.12E-10	6.30E+00	7.03E-10	7.03E-10
Cobalt	6.70E+00	2.34E-06	NA		2.67E-07	NA		3.56E-10	3.15E+00	1.12E-09	1.12E-09
Copper	9.58E+01	3.35E-05	NA		3.82E-06	NA		5.09E-09	NA		
Iron	1.63E+04	5.70E-03	NA		6.49E-04	NA		8.66E-07	NA		
Lead	3.86E+02	1.35E-04	NA		1.54E-05	NA		2.05E-08	NA		
Nickel	2.38E+01	8.32E-06	NA		9.48E-07	NA		1.26E-09	9.10E-01	1.15E-09	1.15E-09
Silver	6.50E-01	2.27E-07	NA		2.59E-08	NA		3.45E-11	NA		
Vanadium	2.65E+01	9.26E-06	NA		1.06E-06	NA		1.41E-09	NA		
Zinc	7.36E+02	2.57E-04	NA		2.93E-05	NA		3.91E-08	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	5.90E+00	2.06E-06	2.40E-01	4.95E-07	1.18E-06	2.40E-01	2.82E-07	3.13E-10	2.42E-01	7.57E-11	7.77E-07
4,4'-DDE	1.80E+01	6.29E-06	3.40E-01	2.14E-06	3.59E-06	3.40E-01	1.22E-06	9.56E-10	3.40E-01	3.25E-10	**3.36E-06**
4,4'-DDT	4.50E+01	1.57E-05	3.40E-01	5.35E-06	8.96E-06	3.40E-01	3.05E-06	2.39E-09	3.40E-01	8.11E-10	**8.40E-06**
alpha-Chlordane	8.20E+00	2.87E-06	1.30E+00	3.73E-06	1.63E-06	1.30E+00	2.12E-06	4.35E-10	3.50E-01	1.52E-10	**5.85E-06**
Dieldrin	1.30E+00	4.54E-07	1.60E+01	7.27E-06	2.59E-07	1.60E+01	4.14E-06	6.90E-11	1.61E+01	1.11E-09	**1.14E-05**
gamma-Chlordane	5.90E+00	2.06E-06	1.20E+00	2.47E-06	1.18E-06	1.20E+00	1.41E-06	3.13E-10	3.50E-01	1.10E-10	**3.88E-06**
			Total Risk:	2.89E-05		**Total Risk:**	1.48E-05		**Total Risk:**	1.70E-08	**4.37E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **4E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-91
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.02E+03	7.85E-03	1.00E+00	7.85E-03	8.95E-04	1.00E+00	8.95E-04	1.19E-06	1.40E-03	8.52E-04	9.59E-03
Arsenic	1.42E+01	1.39E-05	3.00E-04	4.63E-02	4.75E-06	3.00E-04	1.58E-02	2.11E-09	4.29E-06	4.93E-04	6.26E-02
Barium	2.78E+02	2.72E-04	2.00E-01	1.36E-03	3.10E-05	2.00E-01	1.55E-04	4.13E-08	1.43E-04	2.89E-04	1.80E-03
Beryllium	2.90E-01	2.84E-07	2.00E-03	1.42E-04	3.23E-08	2.00E-03	1.62E-05	4.31E-11	2.00E-06	2.16E-05	1.80E-04
Cadmium	2.10E+00	2.05E-06	5.00E-04	4.11E-03	2.34E-08	5.00E-04	4.68E-05	3.12E-10	2.86E-06	1.09E-04	4.27E-03
Cobalt	6.70E+00	6.56E-06	3.00E-04	2.19E-02	7.47E-07	3.00E-04	2.49E-03	9.96E-10	1.71E-06	5.81E-04	2.49E-02
Copper	9.58E+01	9.37E-05	4.00E-02	2.34E-03	1.07E-05	4.00E-02	2.67E-04	1.42E-08	NA		2.61E-03
Iron	1.63E+04	1.59E-02	7.00E-01	2.28E-02	1.82E-03	7.00E-01	2.60E-03	2.42E-06	NA		2.54E-02
Lead	3.86E+02	3.78E-04	NA		4.31E-05	NA		5.74E-08	NA		
Nickel	2.38E+01	2.33E-05	2.00E-02	1.16E-03	2.65E-06	2.00E-02	1.33E-04	3.54E-09	2.57E-05	1.38E-04	1.43E-03
Silver	6.50E-01	6.36E-07	5.00E-03	1.27E-04	7.25E-08	5.00E-03	1.45E-05	9.67E-11	NA		1.42E-04
Vanadium	2.65E+01	2.59E-05	5.00E-03	5.19E-03	2.96E-06	5.00E-03	5.91E-04	3.94E-09	NA		5.78E-03
Zinc	7.36E+02	7.20E-04	3.00E-01	2.40E-03	8.21E-05	3.00E-01	2.74E-04	1.09E-07	NA		2.67E-03

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Pesticides/PCBs											
4,4'-DDD	5.90E+00	5.77E-06	NA		3.29E-06	NA		8.77E-10	NA		
4,4'-DDE	1.80E+01	1.76E-05	NA		1.00E-05	NA		2.68E-09	NA		
4,4'-DDT	4.50E+01	4.40E-05	5.00E-04	8.81E-02	2.51E-05	5.00E-04	5.02E-02	6.69E-09	NA		1.38E-01
alpha-Chlordane	8.20E+00	8.02E-06	5.00E-04	1.60E-02	4.57E-06	5.00E-04	9.15E-03	1.22E-09	2.00E-04	6.10E-06	2.52E-02
Dieldrin	1.30E+00	1.27E-06	5.00E-05	2.54E-02	7.25E-07	5.00E-05	1.45E-02	1.93E-10	NA		3.99E-02
gamma-Chlordane	5.90E+00	5.77E-06	5.00E-04	1.15E-02	3.29E-06	5.00E-04	6.58E-03	8.77E-10	2.00E-04	4.39E-06	1.81E-02
		Total Risk (Hazard Index):		2.57E-01	**Total Risk (Hazard Index):**		1.04E-01	**Total Risk (Hazard Index):**		2.49E-03	3.63E-01

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **0.4**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-92
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Aluminum	8.02E+03	3.70E-04	NA		5.11E-05	NA		2.24E-05	NA		
Arsenic	1.42E+01	6.55E-07	1.50E+00	9.83E-07	2.72E-07	1.50E+00	4.07E-07	3.97E-08	1.51E+01	5.97E-07	**1.99E-06**
Barium	2.78E+02	1.28E-05	NA		1.77E-06	NA		7.77E-07	NA		
Beryllium	2.90E-01	1.34E-08	NA		1.85E-09	NA		8.11E-10	8.40E+00	6.81E-09	6.81E-09
Cadmium	2.10E+00	9.69E-08	NA		1.34E-09	NA		5.87E-09	6.30E+00	3.70E-08	3.70E-08
Cobalt	6.70E+00	3.09E-07	NA		4.27E-08	NA		1.87E-08	3.15E+00	5.90E-08	5.90E-08
Copper	9.58E+01	4.42E-06	NA		6.11E-07	NA		2.68E-07	NA		
Iron	1.63E+04	7.52E-04	NA		1.04E-04	NA		4.56E-05	NA		
Lead	3.86E+02	1.78E-05	NA		2.46E-06	NA		1.08E-06	NA		
Nickel	2.38E+01	1.10E-06	NA		1.52E-07	NA		6.65E-08	9.10E-01	6.05E-08	6.05E-08
Silver	6.50E-01	3.00E-08	NA		4.14E-09	NA		1.82E-09	NA		
Vanadium	2.65E+01	1.22E-06	NA		1.69E-07	NA		7.41E-08	NA		
Zinc	7.36E+02	3.40E-05	NA		4.69E-06	NA		2.06E-06	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Pesticides/PCBs											
4,4'-DDD	5.90E+00	2.72E-07	2.40E-01	6.53E-08	1.88E-07	2.40E-01	4.51E-08	1.65E-08	2.42E-01	3.98E-09	1.14E-07
4,4'-DDE	1.80E+01	8.30E-07	3.40E-01	2.82E-07	5.74E-07	3.40E-01	1.95E-07	5.03E-08	3.40E-01	1.71E-08	4.94E-07
4,4'-DDT	4.50E+01	2.08E-06	3.40E-01	7.06E-07	1.43E-06	3.40E-01	4.88E-07	1.26E-07	3.40E-01	4.27E-08	**1.24E-06**
alpha-Chlordane	8.20E+00	3.78E-07	1.30E+00	4.92E-07	2.61E-07	1.30E+00	3.40E-07	2.29E-08	3.50E-01	8.02E-09	8.39E-07
Dieldrin	1.30E+00	6.00E-08	1.60E+01	9.59E-07	4.14E-08	1.60E+01	6.63E-07	3.63E-09	1.61E+01	5.85E-08	**1.68E-06**
gamma-Chlordane	5.90E+00	2.72E-07	1.20E+00	3.27E-07	1.88E-07	1.20E+00	2.26E-07	1.65E-08	3.50E-01	5.77E-09	5.58E-07
			Total Risk:	3.81E-06		**Total Risk:**	2.36E-06		**Total Risk:**	8.97E-07	**7.07E-06**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **7E-06**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-93
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	OnSite
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Particulate Emission Factor	PEF	1.00E+06	m3/kg
Skin Surface Area (Soil Contact; 1 event per day)	SA_s	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.03	unitless
Pesticides	ABSpest	0.05	unitless
Semi-Volatiles (Organics)	ABSsvoc	0.1	unitless
Volatiles (Organics)	ABSvoc	0.1	unitless
PAHs and PCBs	ABSpah	0.15	unitless
Dioxins and Furans	ABSdioxin	0.03	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	8.02E+03	2.59E-02	1.00E+00	2.59E-02	3.58E-03	1.00E+00	3.58E-03	1.57E-03	1.40E-03	1.12E+00	**1.15E+00**
Arsenic	1.42E+01	4.59E-05	3.00E-04	1.53E-01	1.90E-05	3.00E-04	6.34E-02	2.78E-06	4.29E-06	6.48E-01	**8.65E-01**
Barium	2.78E+02	8.98E-04	2.00E-01	4.49E-03	1.24E-04	2.00E-01	6.20E-04	5.44E-05	1.43E-04	3.81E-01	**3.86E-01**
Beryllium	2.90E-01	9.36E-07	2.00E-03	4.68E-04	1.29E-07	2.00E-03	6.47E-05	5.68E-08	2.00E-06	2.84E-02	2.89E-02
Cadmium	2.10E+00	6.78E-06	1.10E-05	6.16E-01	9.37E-08	1.10E-05	8.52E-03	4.11E-07	2.86E-06	1.44E-01	**7.69E-01**
Cobalt	6.70E+00	2.16E-05	3.00E-04	7.21E-02	2.99E-06	3.00E-04	9.96E-03	1.31E-06	1.71E-06	7.65E-01	**8.47E-01**
Copper	9.58E+01	3.09E-04	4.00E-02	7.73E-03	4.27E-05	4.00E-02	1.07E-03	1.87E-05	NA		8.80E-03
Iron	1.63E+04	5.26E-02	7.00E-01	7.52E-02	7.27E-03	7.00E-01	1.04E-02	3.19E-03	NA		8.56E-02
Lead	3.86E+02	1.25E-03	NA		1.72E-04	NA		7.55E-05	NA		
Nickel	2.38E+01	7.68E-05	1.10E-02	6.99E-03	1.06E-05	1.10E-02	9.65E-04	4.66E-06	2.57E-05	1.81E-01	**1.89E-01**
Silver	6.50E-01	2.10E-06	5.00E-03	4.20E-04	2.90E-07	5.00E-03	5.80E-05	1.27E-07	NA		4.78E-04
Vanadium	2.65E+01	8.56E-05	5.00E-03	1.71E-02	1.18E-05	5.00E-03	2.36E-03	5.19E-06	NA		1.95E-02
Zinc	7.36E+02	2.38E-03	3.00E-01	7.92E-03	3.28E-04	3.00E-01	1.09E-03	1.44E-04	NA		9.02E-03
Pesticides/PCBs											
4,4'-DDD	5.90E+00	1.91E-05	NA		1.32E-05	NA		1.15E-06	NA		
4,4'-DDE	1.80E+01	5.81E-05	NA		4.02E-05	NA		3.52E-06	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
4,4'-DDT	4.50E+01	1.45E-04	5.00E-04	2.91E-01	1.00E-04	5.00E-04	2.01E-01	8.81E-06	NA		**4.91E-01**
alpha-Chlordane	8.20E+00	2.65E-05	3.30E-05	8.02E-01	1.83E-05	3.30E-05	5.54E-01	1.60E-06	2.00E-04	8.02E-03	**1.36E+00**
Dieldrin	1.30E+00	4.20E-06	5.00E-05	8.40E-02	2.90E-06	5.00E-05	5.80E-02	2.54E-07	NA		**1.42E-01**
gamma-Chlordane	5.90E+00	1.91E-05	3.30E-05	5.77E-01	1.32E-05	3.30E-05	3.99E-01	1.15E-06	2.00E-04	5.77E-03	**9.82E-01**
		Total Risk (Hazard Index):		2.74E+00	**Total Risk (Hazard Index):**		1.31E+00	**Total Risk (Hazard Index):**		3.282E+00	**7.34E+00**

Notes:

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **7**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-94
Cancer Risk Results Detailed Summary for Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**7.4E-06**	**2.5E-06**	1.1E-08	**1.0E-05**	23%	9.8E-07	4.1E-07	6.0E-07	**2.0E-06**	28%
Subtotal Metals	**7.4E-06**	**2.5E-06**	1.4E-08	**1.0E-05**	23%	9.8E-07	4.1E-07	7.6E-07	**2.2E-06**	30%
Pesticides/PCBs										
4,4'-DDE	**2.1E-06**	**1.2E-06**	3.2E-10	**3.4E-06**	8%	2.8E-07	2.0E-07	1.7E-08	4.9E-07	7%
4,4'-DDT	**5.3E-06**	**3.0E-06**	8.1E-10	**8.4E-06**	19%	7.1E-07	4.9E-07	4.3E-08	**1.2E-06**	17%
alpha-Chlordane	**3.7E-06**	**2.1E-06**	1.5E-10	**5.8E-06**	13%	4.9E-07	3.4E-07	8.0E-09	8.4E-07	12%
Dieldrin	**7.3E-06**	**4.1E-06**	1.1E-09	**1.1E-05**	26%	9.6E-07	6.6E-07	5.9E-08	**1.7E-06**	24%
gamma-Chlordane	**2.5E-06**	**1.4E-06**	1.1E-10	**3.9E-06**	9%	3.3E-07	2.3E-07	5.8E-09	5.6E-07	8%
Subtotal Pesticides/PCBs	**2.1E-05**	**1.2E-05**	2.6E-09	**3.4E-05**	77%	**2.8E-06**	**2.0E-06**	1.4E-07	**4.9E-06**	70%
Total:	**2.9E-05**	**1.5E-05**	1.7E-08	**4.37E-05**		**3.8E-06**	**2.4E-06**	9.0E-07	**7.07E-06**	

Total Estimated Cancer Risk Across All Exposure Routes:	Future Industrial Worker	Future Construction Worker
	4E-05	**7E-06**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-95

Noncancer Risk Results Detailed Summary for Risk Drivers - Future Industrial/Construction Worker - Shallow Soil - Small Vacant Lot

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	7.8E-03	8.9E-04	8.5E-04	9.6E-03	3%	2.6E-02	3.6E-03	**1.1E+00**	**1.2E+00**	16%
Arsenic	4.6E-02	1.6E-02	4.9E-04	6.3E-02	17%	**1.5E-01**	6.3E-02	**6.5E-01**	**8.6E-01**	12%
Barium	1.4E-03	1.6E-04	2.9E-04	1.8E-03	0%	4.5E-03	6.2E-04	**3.8E-01**	**3.9E-01**	5%
Cadmium	4.1E-03	4.7E-05	1.1E-04	4.3E-03	1%	**6.2E-01**	8.5E-03	**1.4E-01**	**7.7E-01**	10%
Cobalt	2.2E-02	2.5E-03	5.8E-04	2.5E-02	7%	7.2E-02	1.0E-02	**7.6E-01**	**8.5E-01**	12%
Nickel	1.2E-03	1.3E-04	1.4E-04	1.4E-03	0%	7.0E-03	9.7E-04	**1.8E-01**	**1.9E-01**	3%
Subtotal Metals	**1.2E-01**	2.3E-02	2.5E-03	**1.4E-01**	39%	**9.9E-01**	**1.0E-01**	**3.3E+00**	**4.4E+00**	59%
Pesticides/PCBs										
4,4'-DDT	8.8E-02	5.0E-02		**1.4E-01**	38%	**2.9E-01**	**2.0E-01**		**4.9E-01**	7%
alpha-Chlordane	1.6E-02	9.1E-03	6.1E-06	2.5E-02	7%	**8.0E-01**	**5.5E-01**	8.0E-03	**1.4E+00**	19%
Dieldrin	2.5E-02	1.5E-02		4.0E-02	11%	8.4E-02	5.8E-02		**1.4E-01**	2%
gamma-Chlordane	1.2E-02	6.6E-03	4.4E-06	1.8E-02	5%	**5.8E-01**	**4.0E-01**	5.8E-03	**9.8E-01**	13%
Subtotal Pesticides/PCBs	**1.4E-01**	8.0E-02	1.0E-05	**2.2E-01**	61%	**1.8E+00**	**1.2E+00**	1.4E-02	**3.0E+00**	41%
Total:	**0.3**	**0.1**	0.002	**0.4**		**2.7**	**1.3**	**3.282**	**7.3**	

Total Estimated Hazard Index Across All Exposure Routes: **0.4** (Future Industrial Worker) **7** (Future Construction Worker)

Notes:

Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.

% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-96
Soil Exposure Point Concentrations for City of Oakland Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Constituent	Units	Exposure Point Concentration
Metals		
Antimony	mg/kg	5.90E+00
Arsenic	mg/kg	1.40E+01
Beryllium	mg/kg	9.00E-01
Cadmium	mg/kg	1.50E+00
Chromium	mg/kg	9.14E+01
Copper	mg/kg	5.96E+01
Lead	mg/kg	1.47E+01
Mercury	mg/kg	4.00E-01
Nickel	mg/kg	1.20E+02
Selenium	mg/kg	5.60E+00
Silver	mg/kg	1.70E+00
Thallium	mg/kg	4.25E+01
Zinc	mg/kg	9.15E+01

Notes:
Oakland Urban Land Redevelopment Program, City of Oakland, Survey of Background Metal Concentration Studies (Colluvian and Fill).

Table 1-97
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Antimony	5.90E+00	2.77E-06	NA		1.11E-07	NA		4.21E-10	NA		
Arsenic	1.40E+01	6.58E-06	1.50E+00	9.86E-06	7.87E-07	1.50E+00	1.18E-06	9.99E-10	1.51E+01	1.50E-08	**1.11E-05**
Beryllium	9.00E-01	4.23E-07	NA		1.69E-08	NA		6.42E-11	8.40E+00	5.40E-10	5.40E-10
Cadmium	1.50E+00	7.05E-07	NA		2.81E-09	NA		1.07E-10	6.30E+00	6.75E-10	6.75E-10
Chromium	9.14E+01	4.29E-05	NA		1.71E-06	NA		6.52E-09	NA		
Copper	5.96E+01	2.80E-05	NA		1.12E-06	NA		4.25E-09	NA		
Lead	1.47E+01	6.90E-06	NA		2.75E-07	NA		1.05E-09	NA		
Mercury	4.00E-01	1.88E-07	NA		7.50E-09	NA		2.86E-11	NA		
Nickel	1.20E+02	5.65E-05	NA		2.25E-06	NA		8.58E-09	9.10E-01	7.81E-09	7.81E-09
Selenium	5.60E+00	2.63E-06	NA		1.05E-07	NA		4.00E-10	NA		
Silver	1.70E+00	7.98E-07	NA		3.19E-08	NA		1.21E-10	NA		
Thallium	4.25E+01	2.00E-05	NA		7.96E-07	NA		3.03E-09	NA		
Zinc	9.15E+01	4.30E-05	NA		1.71E-06	NA		6.53E-09	NA		
			Total Risk:	9.86E-06		**Total Risk:**	1.18E-06		**Total Risk:**	2.41E-08	**1.11E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1.1E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-98

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident Receptor - Background

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	24	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.07	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Antimony	5.90E+00	8.08E-06	4.00E-04	2.02E-02	3.22E-07	4.00E-04	8.06E-04	1.23E-09	NA		2.10E-02
Arsenic	1.40E+01	1.92E-05	3.00E-04	6.39E-02	2.30E-06	3.00E-04	7.65E-03	2.91E-09	4.29E-06	6.80E-04	7.23E-02
Beryllium	9.00E-01	1.23E-06	2.00E-03	6.16E-04	4.92E-08	2.00E-03	2.46E-05	1.87E-10	2.00E-06	9.37E-05	7.35E-04
Cadmium	1.50E+00	2.05E-06	5.00E-04	4.11E-03	8.20E-09	5.00E-04	1.64E-05	3.12E-10	2.86E-06	1.09E-04	4.24E-03
Chromium	9.14E+01	1.25E-04	NA		5.00E-06	NA		1.90E-08	NA		
Copper	5.96E+01	8.16E-05	4.00E-02	2.04E-03	3.26E-06	4.00E-02	8.14E-05	1.24E-08	NA		2.12E-03
Lead	1.47E+01	2.01E-05	NA		8.03E-07	NA		3.06E-09	NA		
Mercury	4.00E-01	5.48E-07	3.00E-04	1.83E-03	2.19E-08	3.00E-04	7.29E-05	8.33E-11	NA		1.90E-03
Nickel	1.20E+02	1.65E-04	1.10E-02	1.50E-02	6.57E-06	2.00E-02	3.28E-04	2.50E-08	2.57E-05	9.73E-04	1.63E-02
Selenium	5.60E+00	7.67E-06	5.00E-03	1.53E-03	3.06E-07	5.00E-03	6.12E-05	1.17E-09	5.71E-03	2.04E-07	1.60E-03
Silver	1.70E+00	2.33E-06	5.00E-03	4.66E-04	9.29E-08	5.00E-03	1.86E-05	3.54E-10	NA		4.84E-04
Thallium	4.25E+01	5.82E-05	6.60E-05	8.82E-01	2.32E-06	6.60E-05	3.52E-02	8.85E-09	NA		9.17E-01
Zinc	9.15E+01	1.25E-04	3.00E-01	4.18E-04	5.00E-06	3.00E-01	1.67E-05	1.90E-08	NA		4.34E-04
		Total Risk (Hazard Index):		9.9E-01	Total Risk (Hazard Index):		4.4E-02	Total Risk (Hazard Index):		1.9E-03	1.0E+00

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **1**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-99

Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident Receptor - Background

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	2.90E+03	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Antimony	5.90E+00	6.47E-06	NA		1.88E-07	NA		2.46E-10	NA		
Arsenic	1.40E+01	1.53E-05	1.50E+00	2.30E-05	1.33E-06	1.50E+00	2.00E-06	5.83E-10	1.51E+01	8.77E-09	**2.50E-05**
Beryllium	9.00E-01	9.86E-07	NA		2.86E-08	NA		3.75E-11	8.40E+00	3.15E-10	3.15E-10
Cadmium	1.50E+00	1.64E-06	NA		4.77E-09	NA		6.25E-11	6.30E+00	3.93E-10	3.93E-10
Chromium	9.14E+01	1.00E-04	NA		2.90E-06	NA		3.81E-09	NA		
Copper	5.96E+01	6.53E-05	NA		1.89E-06	NA		2.48E-09	NA		
Lead	1.47E+01	1.61E-05	NA		4.67E-07	NA		6.12E-10	NA		
Mercury	4.00E-01	4.38E-07	NA		1.27E-08	NA		1.67E-11	NA		
Nickel	1.20E+02	1.32E-04	NA		3.82E-06	NA		5.00E-09	9.10E-01	4.55E-09	4.55E-09
Selenium	5.60E+00	6.14E-06	NA		1.78E-07	NA		2.33E-10	NA		
Silver	1.70E+00	1.86E-06	NA		5.40E-08	NA		7.08E-11	NA		
Thallium	4.25E+01	4.66E-05	NA		1.35E-06	NA		1.77E-09	NA		
Zinc	9.15E+01	1.00E-04	NA		2.91E-06	NA		3.81E-09	NA		
			Total Risk:	2.30E-05		**Total Risk:**	2.00E-06		**Total Risk:**	1.40E-08	**2.50E-05**

Notes:

Total Estimated Carcinogenic Risk Across All Exposure Routes : **3E-05**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-100

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Shallow Soil Exposure Scenario - Future Child Resident Receptor - Background

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Shallow Soil
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Child Resident
	Receptor Age:	Child (0 to 6 yrs)

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	day/yr
Exposure Duration	ED	6	yr
Soil Ingestion Rate	IR	200	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	10	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	2.90E+03	cm2/day [soil]
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Antimony	5.90E+00	7.54E-05	4.00E-04	**1.89E-01**	2.19E-06	4.00E-04	5.47E-03	2.87E-09	NA		**1.94E-01**
Arsenic	1.40E+01	1.79E-04	3.00E-04	**5.97E-01**	1.56E-05	3.00E-04	5.19E-02	6.80E-09	4.29E-06	1.59E-03	**6.50E-01**
Beryllium	9.00E-01	1.15E-05	2.00E-03	5.75E-03	3.34E-07	2.00E-03	1.67E-04	4.37E-10	2.00E-06	2.19E-04	6.14E-03
Cadmium	1.50E+00	1.92E-05	1.10E-05	**1.74E+00**	5.56E-08	1.10E-05	5.06E-03	7.29E-10	2.86E-06	2.55E-04	**1.75E+00**
Chromium	9.14E+01	1.17E-03	NA		3.39E-05	NA		4.44E-08	NA		
Copper	5.96E+01	7.62E-04	4.00E-02	1.91E-02	2.21E-05	4.00E-02	5.52E-04	2.90E-08	NA		1.96E-02
Lead	1.47E+01	1.88E-04	NA		5.45E-06	NA		7.14E-09	NA		
Mercury	4.00E-01	5.11E-06	3.00E-04	1.70E-02	1.48E-07	3.00E-04	4.94E-04	1.94E-10	NA		1.75E-02
Nickel	1.20E+02	1.54E-03	1.10E-02	**1.40E-01**	4.46E-05	1.10E-02	4.05E-03	5.84E-08	2.57E-05	2.27E-03	**1.46E-01**
Selenium	5.60E+00	7.16E-05	5.00E-03	1.43E-02	2.08E-06	5.00E-03	4.15E-04	2.72E-09	5.71E-03	4.76E-07	1.47E-02
Silver	1.70E+00	2.17E-05	5.00E-03	4.35E-03	6.30E-07	5.00E-03	1.26E-04	8.26E-10	NA		4.47E-03
Thallium	4.25E+01	5.43E-04	6.60E-05	**8.23E+00**	1.58E-05	6.60E-05	**2.39E-01**	2.06E-08	NA		**8.47E+00**
Zinc	9.15E+01	1.17E-03	3.00E-01	3.90E-03	3.39E-05	3.00E-01	1.13E-04	4.44E-08	NA		4.01E-03
		Total Risk (Hazard Index):		**1.10E+01**	**Total Risk (Hazard Index):**		**3.07E-01**	**Total Risk (Hazard Index):**		4.33E-03	**1.13E+01**

Notes:

Total Estimated Non-Carcinogenic Risk (Hazard Index) Across All Exposure Routes : **11**

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-101
Cancer Risk Results Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**9.9E-06**	**1.2E-06**	1.5E-08	**1.1E-05**	100%	**2.3E-05**	**2.0E-06**	8.8E-09	**2.5E-05**	100%
Subtotal Metals	**9.9E-06**	**1.2E-06**	2.4E-08	**1.1E-05**	100%	**2.3E-05**	**2.0E-06**	1.4E-08	**2.5E-05**	100%
Total:	**9.9E-06**	**1.2E-06**	2.4E-08	**1.1E-05**	100%	**2.3E-05**	**2.0E-06**	1.4E-08	**2.5E-05**	100%

Total Estimated Cancer Risk Across All Exposure Routes:	**1E-05**				**3E-05**
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):		**3.3E-05**	**3.2E-06**	**3.8E-08**	**3.61E-05**
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:					**4E-05**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-102
Noncancer Risk Results Detailed Summary of Risk Drivers - Future Adult/Child Resident - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Antimony	2.0E-02	8.1E-04		2.1E-02	2%	**1.9E-01**	5.5E-03		**1.9E-01**	2%
Arsenic	6.4E-02	7.7E-03	6.8E-04	7.2E-02	7%	**6.0E-01**	5.2E-02	1.6E-03	**6.5E-01**	6%
Cadmium	4.1E-03	1.6E-05	1.1E-04	4.2E-03	0.4%	**1.7E+00**	5.1E-03	2.6E-04	**1.7E+00**	16%
Nickel	1.5E-02	3.3E-04	9.7E-04	1.6E-02	2%	**1.4E-01**	4.1E-03	2.3E-03	**1.5E-01**	1%
Thallium	**8.8E-01**	3.5E-02		**9.2E-01**	88%	**8.2E+00**	**2.4E-01**		**8.5E+00**	75%
Subtotal Metals	**9.9E-01**	4.4E-02	1.9E-03	**1.04E+00**	100%	**1.1E+01**	**3.1E-01**	4.3E-03	**1.1E+01**	100%
Total:	**1.0**	0.04	0.002	**1.0**	100%	**11.0**	**0.3**	0.004	**11.3**	100%

	Adult	Child
Total Estimated Hazard Index Across All Exposure Routes:	**1**	**11**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 1-103

Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker Receptor - Background

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Metals											
Antimony	5.90E+00	2.06E-06	NA		2.35E-07	NA		3.13E-10	NA		
Arsenic	1.40E+01	4.89E-06	1.50E+00	7.34E-06	1.67E-06	1.50E+00	2.51E-06	7.44E-10	1.51E+01	1.12E-08	**9.86E-06**
Beryllium	9.00E-01	3.15E-07	NA		3.59E-08	NA		4.78E-11	8.40E+00	4.02E-10	4.02E-10
Cadmium	1.50E+00	5.24E-07	NA		5.98E-09	NA		7.97E-11	6.30E+00	5.02E-10	5.02E-10
Chromium	9.14E+01	3.19E-05	NA		3.64E-06	NA		4.85E-09	NA		
Copper	5.96E+01	2.08E-05	NA		2.37E-06	NA		3.17E-09	NA		
Lead	1.47E+01	5.14E-06	NA		5.86E-07	NA		7.81E-10	NA		
Mercury	4.00E-01	1.40E-07	NA		1.59E-08	NA		2.12E-11	NA		
Nickel	1.20E+02	4.20E-05	NA		4.79E-06	NA		6.38E-09	9.10E-01	5.81E-09	5.81E-09
Selenium	5.60E+00	1.96E-06	NA		2.23E-07	NA		2.97E-10	NA		
Silver	1.70E+00	5.94E-07	NA		6.77E-08	NA		9.03E-11	NA		
Thallium	4.25E+01	1.49E-05	NA		1.69E-06	NA		2.26E-09	NA		
Zinc	9.15E+01	3.20E-05	NA		3.65E-06	NA		4.86E-09	NA		
			Total Risk:	7.34E-06		**Total Risk:**	2.51E-06		**Total Risk:**	1.79E-08	**9.87E-06**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-05**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-104

Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Occupational Exposure Scenario - Future Industrial Worker Receptor - Background

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Industrial Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	25	yr
Soil Ingestion Rate	IR	100	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.2	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Antimony	5.90E+00	5.77E-06	4.00E-04	1.44E-02	6.58E-07	4.00E-04	1.65E-03	8.77E-10	NA		1.61E-02
Arsenic	1.40E+01	1.37E-05	3.00E-04	4.57E-02	4.68E-06	3.00E-04	1.56E-02	2.08E-09	4.29E-06	4.86E-04	6.18E-02
Beryllium	9.00E-01	8.81E-07	2.00E-03	4.40E-04	1.00E-07	2.00E-03	5.02E-05	1.34E-10	2.00E-06	6.69E-05	5.57E-04
Cadmium	1.50E+00	1.47E-06	5.00E-04	2.94E-03	1.67E-08	5.00E-04	3.35E-05	2.23E-10	2.86E-06	7.81E-05	3.05E-03
Chromium	9.14E+01	8.94E-05	NA		1.02E-05	NA		1.36E-08	NA		
Copper	5.96E+01	5.83E-05	4.00E-02	1.46E-03	6.65E-06	4.00E-02	1.66E-04	8.86E-09	NA		1.62E-03
Lead	1.47E+01	1.44E-05	NA		1.64E-06	NA		2.19E-09	NA		
Mercury	4.00E-01	3.91E-07	3.00E-04	1.30E-03	4.46E-08	3.00E-04	1.49E-04	5.95E-11	NA		1.45E-03
Nickel	1.20E+02	1.18E-04	2.00E-02	5.88E-03	1.34E-05	2.00E-02	6.70E-04	1.79E-08	2.57E-05	6.95E-04	7.25E-03
Selenium	5.60E+00	5.48E-06	5.00E-03	1.10E-03	6.25E-07	5.00E-03	1.25E-04	8.33E-10	5.71E-03	1.46E-07	1.22E-03
Silver	1.70E+00	1.66E-06	5.00E-03	3.33E-04	1.90E-07	5.00E-03	3.79E-05	2.53E-10	NA		3.71E-04
Thallium	4.25E+01	4.16E-05	6.60E-05	6.30E-01	4.74E-06	6.60E-05	7.18E-02	6.32E-09	NA		7.02E-01
Zinc	9.15E+01	8.95E-05	3.00E-01	2.98E-04	1.02E-05	3.00E-01	3.40E-05	1.36E-08	NA		3.32E-04
			Total Risk:	7.04E-01		**Total Risk:**	9.04E-02		**Total Risk:**	1.33E-03	7.96E-01

Total Estimated Non-carcinogenic Risk (Hazard Index) Across All Exposure Routes : **0.8**

Notes:

NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.

RME = reasonable maximum exposure.

EPC = exposure point concentration.

Table 1-105
Risk Calculation Worksheet for Shallow Soil - Carcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cs [mg/kg]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Antimony	5.90E+00	2.72E-07	NA		3.76E-08	NA		1.25E-11	NA		
Arsenic	1.40E+01	6.46E-07	1.50E+00	9.69E-07	2.68E-07	1.50E+00	4.02E-07	2.97E-11	1.51E+01	4.48E-10	**1.37E-06**
Beryllium	9.00E-01	4.15E-08	NA		5.74E-09	NA		1.91E-12	8.40E+00	1.61E-11	1.61E-11
Cadmium	1.50E+00	6.92E-08	NA		9.56E-10	NA		3.19E-12	6.30E+00	2.01E-11	2.01E-11
Chromium	9.14E+01	4.22E-06	NA		5.83E-07	NA		1.94E-10	NA		
Copper	5.96E+01	2.75E-06	NA		3.80E-07	NA		1.27E-10	NA		
Lead	1.47E+01	6.78E-07	NA		9.37E-08	NA		3.12E-11	NA		
Mercury	4.00E-01	1.85E-08	NA		2.55E-09	NA		8.50E-13	NA		
Nickel	1.20E+02	5.54E-06	NA		7.66E-07	NA		2.55E-10	9.10E-01	2.32E-10	2.32E-10
Selenium	5.60E+00	2.58E-07	NA		3.57E-08	NA		1.19E-11	NA		
Silver	1.70E+00	7.84E-08	NA		1.08E-08	NA		3.61E-12	NA		
Thallium	4.25E+01	1.96E-06	NA		2.71E-07	NA		9.03E-11	NA		
Zinc	9.15E+01	4.22E-06	NA		5.83E-07	NA		1.94E-10	NA		
			Total Risk:	9.69E-07		**Total Risk:**	4.02E-07		**Total Risk:**	7.16E-10	**1.37E-06**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **1E-06**

Notes:
NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-106
Risk Calculation Worksheet for Shallow Soil - Noncarcinogenic Effects - Construction Exposure Scenario - Future Construction Worker Receptor - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Shallow Soil
	Exposure Point:	Background
	Receptor Population:	Future Construction Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter (units)	Variable	Value	Units
Exposure Frequency	EF	250	day/yr
Exposure Duration	ED	1	yr
Soil Ingestion Rate	IR	330	mg/day
Inhalation Rate (Soil Particulate Inhalation)	InR	20	m3/day
Skin Surface Area (Soil Contact; 1 event per day)	SA	5.70E+03	cm2/day [soil]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (yr to day)	CF3	2.74E-03	yrs/day
Conversion Factor (mg to kg)	CF4	1.00E-06	kg/mg
Particulate Emission Factor	PEF	1.32E+09	m3/kg
Chemical Specific skin absorption defaults	ABS		
Inorganics	ABSin	0.01	
Arsenic	ABSas	0.03	unitless
Cadmium	ABScd	0.001	unitless
Adherence Factor	AF	0.8	mg/cm2

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cs [mg/kg]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Antimony	5.90E+00	1.91E-05	4.00E-04	4.76E-02	2.63E-06	4.00E-04	6.58E-03	8.77E-10	NA		5.42E-02
Arsenic	1.40E+01	4.52E-05	3.00E-04	1.51E-01	1.87E-05	3.00E-04	6.25E-02	2.08E-09	4.29E-06	4.86E-04	2.14E-01
Beryllium	9.00E-01	2.91E-06	2.00E-03	1.45E-03	4.02E-07	2.00E-03	2.01E-04	1.34E-10	2.00E-06	6.69E-05	1.72E-03
Cadmium	1.50E+00	4.84E-06	5.00E-04	9.69E-03	6.69E-08	5.00E-04	1.34E-04	2.23E-10	2.86E-06	7.81E-05	9.90E-03
Chromium	9.14E+01	2.95E-04	NA		4.08E-05	NA		1.36E-08	NA		
Copper	5.96E+01	1.92E-04	4.00E-02	4.81E-03	2.66E-05	4.00E-02	6.65E-04	8.86E-09	NA		5.48E-03
Lead	1.47E+01	4.75E-05	NA		6.56E-06	NA		2.19E-09	NA		
Mercury	4.00E-01	1.29E-06	3.00E-04	4.31E-03	1.78E-07	3.00E-04	5.95E-04	5.95E-11	NA		4.90E-03
Nickel	1.20E+02	3.88E-04	2.00E-02	1.94E-02	5.36E-05	2.00E-02	2.68E-03	1.79E-08	2.57E-05	6.95E-04	2.28E-02
Selenium	5.60E+00	1.81E-05	5.00E-03	3.62E-03	2.50E-06	5.00E-03	5.00E-04	8.33E-10	5.71E-03	1.46E-07	4.12E-03
Silver	1.70E+00	5.49E-06	5.00E-03	1.10E-03	7.59E-07	5.00E-03	1.52E-04	2.53E-10	NA		1.25E-03
Thallium	4.25E+01	1.37E-04	6.60E-05	2.08E+00	1.90E-05	6.60E-05	2.87E-01	6.32E-09	NA		2.37E+00
Zinc	9.15E+01	2.95E-04	3.00E-01	9.85E-04	4.08E-05	3.00E-01	1.36E-04	1.36E-08	NA		1.12E-03
			Total Risk:	2.32E+00		**Total Risk:**	3.61E-01		**Total Risk:**	1.33E-03	2.69

Total Estimated Carcinogenic Risk Across All Exposure Routes : **3**

Notes:
NA = no data; this toxicity value is not available in the standard U.S. EPA toxicity value databases.
RME = reasonable maximum exposure.
EPC = exposure point concentration.

Table 1-107
Cancer Risk Results Detailed Summary of Risk Drivers - Future Construction and Industrial Worker - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**7.3E-06**	**2.5E-06**	1.1E-08	**9.9E-06**	100%	9.7E-07	4.0E-07	4.5E-10	**1.4E-06**	100%
Subtotal Metals	**7.3E-06**	**2.5E-06**	1.8E-08	**9.9E-06**	100%	9.7E-07	4.0E-07	7.2E-10	**1.4E-06**	100%
Total:	**7.3E-06**	**2.5E-06**	1.8E-08	**9.87E-06**		9.7E-07	4.0E-07	7.2E-10	**1.37E-06**	

Total Estimated Cancer Risk Across All Exposure Routes: **1E-05** **1E-06**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 1-108
Noncancer Risk Results Detailed Summary of Risk Drivers - Future Construction Worker - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Industrial Worker					Future Construction Worker				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	4.6E-02	1.6E-02	4.9E-04	6.2E-02	8%	**1.5E-01**	6.2E-02	4.9E-04	**2.1E-01**	8%
Thallium	**6.3E-01**	7.2E-02		**7.0E-01**	88%	**2.1E+00**	**2.9E-01**		**2.4E+00**	88%
Subtotal Metals	**7.0E-01**	9.0E-02	1.3E-03	**8.0E-01**	100%	**2.3E+00**	**3.6E-01**	1.3E-03	**2.7E+00**	100%
Total:	0.7	0.1	0.001	0.8		2.3	0.4	0.001	2.7	

Total Estimated Hazard Index Across All Exposure Routes:	**0.8**	**3**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard quotient for all chemicals evaluated.

Table 109
Summary of Cancer Risks and Noncancer Hazards - Soil
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Main Property		Parking Lot		Large Vacant Lot		Small Vacant Lot		Background	
	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer
Worker										
Industrial Worker										
Shallow Soil	1E-04	1	5E-05	1	6E-05	0.7	4E-05	0.4	1E-05	0.8
Deep Soil	1E-04	1	1E-04	1	4E-05	0.5				
Future Construction Worker										
Shallow Soil	1E-05	23	9E-06	30	1E-05	12	7E-06	7	1E-06	3
Deep Soil	1E-05	20	2E-05	25	7E-06	10				
Hypothetical Resident										
Future Adult Resident (24 years)										
Shallow Soil	1E-04	1	5E-05	1	6E-05	0.8	5E-05	0.4	1E-05	1
Deep Soil	1E-04	2	1E-04	1	4E-05	0.6				
Future Child Resident (6 years)										
Shallow Soil	2E-04	10	1E-04	26	1E-04	10	1E-04	12	3E-05	11
Deep Soil	2E-04	11	2E-04	25	9E-05	7				
Sum of Adult plus Child (30 years)										
Shallow Soil	3E-04		2E-04		2E-04		1E-04		4E-05	
Deep Soil	3E-04		4E-04		1E-04					

Notes:

[1] Although arsenic is a risk driver, concentrations of arsenic detected in this exposure area are similar to or less than arsenic levels found in the background data set; therefore, the risk contributions from arsenic may not be site-related.

Table 110
Summary of Cancer Risks and Noncancer Hazards - Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer	Noncancer
Trench Worker	1E-04	34
Hypothetical Resident		
Future Adult Resident (24 years)	5E-02	262
Future Child Resident (6 years)	3E-02	628
Sum of Adult plus Child (30 years)	7E-02	

Table 1-111
Summary of Target Organ / Endpoint for Health Hazards
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Target Organ / Endpoint	Source
1,2,4-Trimethylbenzene	Decreased body weight	PPRTV
1,3,5-Trimethylbenzene	Decreased body weight	PPRTV
2-Methylnaphthalene	Lungs	IRIS
4,4'-DDT	Liver	IRIS
Aldrin	Liver	IRIS
Aluminum	NA	PPRTV
alpha-Chlordane	Liver	IRIS
Antimony	Blood (glucose), Mortality	IRIS
Aroclor-1260*	Eyes	IRIS
Arsenic	Skin, Circulatory System	IRIS
Barium	Kidney	IRIS
Benzene	Immune system (decreased lymphocyte count)	IRIS
Beryllium	GI (Small intestinal lesions)	IRIS
Cadmium	Kidney	IRIS
Chlorobenzene	Liver	IRIS
Chloromethane	Brain (cerebellar lesions)	IRIS
cis-1,2-Dichloroethene	Decreased hematocrit and hemoglobin (Blood)	PPRTV
Copper	GI	HEAST
Dieldrin	Liver	IRIS
gamma-Chlordane	Liver	IRIS
Iron	Liver, Blood	NCEA
Manganese	CNS	IRIS
Mercury	CNS	IRIS
Naphthalene	Decreased body weight	IRIS
Nickel	Whole body	IRIS
Selenium	Respiratory system - selenosis	IRIS
Silver	Skin	IRIS
Tetrachloroethene	Kidney	OEHHA
Thallium**	Liver enzyme increase	IRIS
Toluene	Kidney	IRIS
Trichloroethene	Nervous system	NCEA
Vanadium	Respiratory system	NCEA
Vinyl chloride	Liver	IRIS
Xylenes, total	Decreased body weight, increased mortality	IRIS
Zinc	Red blood cells	IRIS

Notes
NA = Target organ data not available
*Aroclor 1254 used as surrogate
**Thallium chloride used as a surrogate
PPRTV = Provisional Peer Reviewed Toxicity Value
IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment
OEHHA = Office of Environmental Health Hazard Assessment

Table 1-112
Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow and Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Xylenes, total	0.3	20%	Decreased body weight, increased mortality
Naphthalene	0.3	19%	Decreased body weight
Toluene	0.1	8%	Kidney
Total Hazard Index[1]	**1**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Naphthalene	0.3	18%	Decreased body weight
Xylenes, total	0.3	17%	Decreased body weight, increased mortality
2-Methylnaphthalene	0.2	14%	Lungs
Aroclor-1260	0.1	7%	Eyes
Total Hazard Index[1]	**2**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are prese
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-113
Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Cadmium	2	19%	Kidney
Xylenes, total	0.7	7%	Decreased body weight, increased mortality
Naphthalene	0.7	7%	Decreased body weight
Manganese	0.7	7%	CNS
Thallium	0.6	6%	Liver enzyme increase
Aldrin	0.6	6%	Liver
Aroclor-1260	0.6	6%	Eyes
2-Methylnaphthalene	0.5	5%	Lungs
Iron	0.5	5%	Liver, Blood
Antimony	0.4	5%	Blood (glucose), Mortality
Total Hazard Index[1]	**10**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Cadmium	2	18%	Kidney
2-Methylnaphthalene	2	16%	Lungs
Aroclor-1260	0.9	8%	Eyes
Antimony	0.7	6%	Blood (glucose), Mortality
Naphthalene	0.7	6%	Decreased body weight
Xylenes, total	0.6	5%	Decreased body weight, increased mortality
Dieldrin	0.6	5%	Liver
Thallium	0.6	5%	Liver enzyme increase
Manganese	0.5	4%	CNS
Aldrin	0.5	4%	Liver
Total Hazard Index[1]	**11**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-114
Noncancer Health Hazard - Risk Drivers for Industrial Worker - Shallow and Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Xylenes, total	0.2	17%	Decreased body weight, increased mortality
Naphthalene	0.2	17%	Decreased body weight
Total Hazard Index[1]	**1.2**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
2-Methylnaphthalene	0.3	20%	Lungs
Naphthalene	0.2	15%	Decreased body weight
Xylenes, total	0.2	14%	Decreased body weight, increased mortality
Total Hazard Index[1]	**1.3**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-115
Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow and Deep Soil - Former AMCO Chemical Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Manganese	16	69%	CNS
Aluminum	1.8	8%	NA
Cobalt	1.1	5%	Circulatory
Barium	0.7	3%	Kidney
Arsenic	0.5	2%	Skin, Circulatory System
Nickel	0.3	1%	Whole body
Aroclor-1260	0.3	1%	Eyes
2-Methylnaphthalene	0.3	1%	Lungs
Aldrin	0.2	1%	Liver
Naphthalene	0.2	1%	Decreased body weight
Total Hazard Index[1]	**23**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Manganese	12	60%	CNS
Aluminum	2	9%	NA
Cobalt	1.0	5%	Circulatory
2-Methylnaphthalene	1.0	5%	Lungs
Barium	0.8	4%	Kidney
Arsenic	0.5	3%	Skin, Circulatory System
Nickel	0.3	1%	Whole body
Dieldrin	0.2	1%	Liver
Naphthalene	0.2	1%	Decreased body weight
Xylenes, total	0.2	1%	Decreased body weight, increased mortality
Total Hazard Index[1]	**20**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-116
Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow and Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Antimony	7.7E-01	53%	Blood (glucose), Mortality
Iron	1.5E-01	10%	Liver, Blood
Thallium	1.1E-01	7%	Liver enzyme increase
Arsenic	1.0E-01	7%	Skin, Circulatory System
Total Hazard Index[1]	**1.5**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Antimony	0.8	59%	Blood (glucose), Mortality
Iron	0.1	9%	Liver, Blood
Total Hazard Index[1]	**1.3**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-117
Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Cadmium	13	50%	Kidney
Antimony	7	27%	Blood (glucose), Mortality
Iron	1	5%	Liver, Blood
Thallium	1.0	4%	Liver enzyme increase
Arsenic	0.9	4%	Skin, Circulatory System
Cobalt	0.7	3%	Circulatory
Manganese	0.6	2%	CNS
Zinc	0.4	1%	Red blood cells
Barium	0.3	1%	Kidney
Aluminum	0.2	1%	NA
Total Hazard Index[1]	**26**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Cadmium	13	53%	Kidney
Antimony	7	29%	Blood (glucose), Mortality
Iron	1.1	4%	Liver, Blood
Thallium	0.8	3%	Liver enzyme increase
Arsenic	0.6	2%	Skin, Circulatory System
Cobalt	0.5	2%	Circulatory
Manganese	0.5	2%	CNS
Zinc	0.4	1%	Red blood cells
Barium	0.2	1%	Kidney
Aluminum	0.2	1%	NA
Total Hazard Index[1]	**25**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-118
Noncancer Health Hazard - Risk Drivers for Industrial Worker - Shallow and Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Antimony	0.6	53%	Blood (glucose), Mortality
Iron	0.1	10%	Liver, Blood
Total Hazard Index[1]	**1.1**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Antimony	0.6	59%	Blood (glucose), Mortality
Total Hazard Index[1]	**1.0**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-119
Noncancer Health Hazard - Risk Drivers for Future Construction Worker - Shallow and Deep Soil - Parking Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Manganese	15	51%	CNS
Barium	5.3	18%	Kidney
Antimony	2.0	7%	Blood (glucose), Mortality
Aluminum	1.9	6%	NA
Cobalt	1.9	6%	Circulatory
Arsenic	1.2	4%	Skin, Circulatory System
Cadmium	0.8	3%	Kidney
Nickel	0.6	2%	Whole body
Iron	0.39	1%	Liver, Blood
Thallium	0.27	1%	Liver enzyme increase
Total Hazard Index[1]	**30**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Manganese	12	48%	CNS
Barium	4.9	20%	Kidney
Antimony	2.0	8%	Blood (glucose), Mortality
Aluminum	1.9	7%	NA
Cobalt	1.5	6%	Circulatory
Cadmium	0.8	3%	Kidney
Arsenic	0.8	3%	Skin, Circulatory System
Nickel	0.5	2%	Whole body
Iron	0.30	1%	Liver, Blood
Thallium	0.21	1%	Liver enzyme increase
Total Hazard Index[1]	**25**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-120
Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow and Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
4,4'-DDT	4	36%	Liver
Cadmium	3	29%	Kidney
Arsenic	1	13%	Skin, Circulatory System
Thallium	0.5	5%	Liver enzyme increase
Iron	0.5	5%	Liver, Blood
Cobalt	0.3	3%	Circulatory
Manganese	0.2	2%	CNS
Aluminum	0.1	1%	NA
Antimony	0.1	1%	Blood (glucose), Mortality
Total Hazard Index[1]	**10**		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
4,4'-DDT	2	33%	Liver
Cadmium	2.0	28%	Kidney
Arsenic	0.8	12%	Skin, Circulatory System
Thallium	0.5	7%	Liver enzyme increase
Iron	0.4	6%	Liver, Blood
Cobalt	0.3	4%	Circulatory
Manganese	0.2	3%	CNS
Antimony	0.1	2%	Blood (glucose), Mortality
Aluminum	0.1	2%	NA
Total Hazard Index[1]	**7**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-121
Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow and Deep Soil - Large Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Manganese	5	41%	CNS
Arsenic	2	13%	Skin, Circulatory System
4,4'-DDT	1	11%	Liver
Aluminum	1	11%	NA
Barium	1	11%	Kidney
Cobalt	0.9	7%	Circulatory
Nickel	0.2	2%	Whole body
Cadmium	0.2	1%	Kidney
Thallium	0.1	1%	Liver enzyme increase
Iron	0.1	1%	Liver, Blood
Total Hazard Index[1]	12		

Deep Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Arsenic	1	11%	Skin, Circulatory System
4,4'-DDT	0.9	9%	Liver
Thallium	0.1	1%	Liver enzyme increase
Iron	0.1	1%	Liver, Blood
Total Hazard Index[1]	10		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-122
Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
alpha-Chlordane	4	30%	Liver
gamma-Chlordane	2.6	22%	Liver
Cadmium	2.4	20%	Kidney
4,4'-DDT	1.3	11%	Liver
Arsenic	0.7	6%	Skin, Circulatory System
Dieldrin	0.4	3%	Liver
Iron	0.3	3%	Liver, Blood
Cobalt	0.3	2%	Circulatory
Aluminum	0.1	1%	NA
Total Hazard Index[1]	**12**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-123
Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow Soil - Small Vacant Lot
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
alpha-Chlordane	1.4	19%	Liver
Aluminum	1.2	16%	NA
gamma-Chlordane	1.0	13%	Liver
Arsenic	0.9	12%	Skin, Circulatory System
Cobalt	0.8	12%	Circulatory
Cadmium	0.77	10%	Kidney
4,4'-DDT	0.49	7%	Liver
Barium	0.39	5%	Kidney
Nickel	0.19	3%	Whole body
Dieldrin	0.14	2%	Liver
Total Hazard Index[1]	**7**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-124
Noncancer Health Hazard - Risk Drivers for Future Adult Residents - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Thallium	0.9	88%	Liver enzyme increase
Total Hazard Index[1]	**1**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-125
Noncancer Health Hazard - Risk Drivers for Future Child Residents - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Thallium	8	75%	Liver enzyme increase
Cadmium	1.7	16%	Kidney
Arsenic	0.7	6%	Skin, Circulatory System
Antimony	0.19	2%	Blood (glucose), Mortality
Nickel	0.15	1.3%	Whole body
Total Hazard Index[1]	**11**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 1-126
Noncancer Health Hazard - Risk Drivers for Future Construction Workers - Shallow Soil - Background
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Shallow Soil

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Arsenic	0	8%	Skin, Circulatory System
Thallium	2.4	88%	Liver enzyme increase
Total Hazard Index[1]	**3**		

Notes
NA = Target organ data not available
CNS = Central Nervous System
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors with HI above 0.1 are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Attachment 2
Detailed Risk and Hazard Results for Exposure to Groundwater

Attachment 2 - Table of Contents - Groundwater Risk Calculations
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 2-1	AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Table 2-2	Groundwater Exposure Assumptions - Future Residents
Table 2-3	Groundwater Exposure Assumptions - Trench Workers
Table 2-4	Dermal Permeability Constants and Volatile Compounds - Groundwater
Table 2-5	Exposure Point Concentrations for Groundwater
Table 2-6	Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Table 2-7	Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Table 2-8	Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Table 2-9	Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Table 2-10	**Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater**
Table 2-11	**Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater**
Table 2-12	Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Construction Exposure Scenario - Trench Worker
Table 2-13	Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Construction Exposure Scenario - Trench Worker
Table 2-14	**Cancer Risk Results Detailed Summary - Trench Worker**
Table 2-15	**Noncancer Risk Results Detailed Summary - Trench Worker**
Table 2-16	Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Adult Resident
Table 2-17	Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Child Resident
Table 2-18	Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Adult Trench Worker
Table 2-19	Emissions to Air from Standing Water
Table 2-20	Mass Transfer Coefficient Calculations - Water to Air
Table 2-21	Calculation of Concentration in Air from Emissions from Water
Table 2-22	**Summary of Cancer Risks and Noncancer Hazards - Groundwater**
Table 2-23	**Summary of Cancer Risks - Resident Receptors - Soil plus Groundwater**
Table 2-24	Summary of Target Organ / Endpoint for Health Hazards
Table 2-25	Noncancer Health Hazard - Target Organs/Endpoints for Future Adult Residents - Groundwater
Table 2-26	Noncancer Health Hazard - Target Organs/Endpoints for Future Child Residents - Groundwater
Table 2-27	Noncancer Health Hazard - Target Organs/Endpoints for Trenchworkers - Groundwater

Table 2-1
AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
GrabShallowData combined with 2005-2006 ShallowZoneData															
Metals															
Aluminum	38	51	75	ug/L	215	62700	200	400	BPZ-01	3560	9820	12143	97.5% Chebyshev (Mean, Sd) UCL	12143	97.5% Chebyshev (Mean, Sd) UCL
Antimony	6	51	12	ug/L	1.7	4.7	1	4	BPZ-01	1.44	0.744	1.62	95% Student's-t UCL	1.62	95% Student's-t UCL
Arsenic	50	51	98	ug/L	1.3	1430	2	2	RMW-09-15	118	248	334	97.5% Chebyshev (Mean, Sd) UCL	334	97.5% Chebyshev (Mean, Sd) UCL
Barium	51	51	100	ug/L	17.1	828	NA	NA	RMW-02-13	140	177	179	95% H-UCL	179	95% H-UCL
Beryllium	8	51	16	ug/L	0.09	1.5	0.5	2	BPZ-01	0.622	0.307	0.809	95% Chebyshev (Mean, Sd) UCL	0.809	95% Chebyshev (Mean, Sd) UCL
Boron	18	18	100	ug/L	359	9560	NA	NA	BPZ-01	3010	2640	4307	95% Approximate Gamma UCL	4307	95% Approximate Gamma UCL
Cadmium	18	51	35	ug/L	0.03	5.8	1	2	BPZ-01	0.805	0.995	1.41	95% Chebyshev (Mean, Sd) UCL	1.41	95% Chebyshev (Mean, Sd) UCL
Chromium	36	51	71	ug/L	2.2	187	2	4	BPZ-01	15.9	33.3	21.7	95% H-UCL	21.7	95% H-UCL
Chromium (VI)	1	6	17	ug/L	0.35	0.35	0.2	1	RMW-06-15	0.275	0.199	0.63	95% Chebyshev (Mean, Sd) UCL	0.35	Maximum Result
Cobalt	47	51	92	ug/L	0.35	40.8	1	1	RMW-10-15	7.27	8.75	9.52	95% Approximate Gamma UCL	9.52	95% Approximate Gamma UCL
Copper	49	51	96	ug/L	1.8	1650	2	4	BMW-08	60.8	232	264	97.5% Chebyshev (Mean, Sd) UCL	264	97.5% Chebyshev (Mean, Sd) UCL
Iron	50	51	98	mg/L	0.103	105	0.1	0.1	BPZ-01	13.8	22.9	61.4	95% H-UCL	61.4	95% H-UCL
Lead	48	51	94	ug/L	0.23	1050	1	1	BPZ-01	41.9	154	50.9	95% H-UCL	50.9	95% H-UCL
Manganese	51	51	100	ug/L	44.2	13600	NA	NA	RMW-09-15	3410	3640	4534	95% Approximate Gamma UCL	4534	95% Approximate Gamma UCL
Mercury	17	51	33	ug/L	0.029	0.83	0.03	0.2	RMW-02-13	0.103	0.108	0.169	95% Chebyshev (Mean, Sd) UCL	0.169	95% Chebyshev (Mean, Sd) UCL
Molybdenum	4	18	22	ug/L	0.78	8.6	5	10	RMW-04-15	3.42	2.16	5.64	95% Chebyshev (Mean, Sd) UCL	5.64	95% Chebyshev (Mean, Sd) UCL
Nickel	51	51	100	ug/L	3.1	376	NA	NA	RMW-10-15	43.1	66.6	58.4	95% H-UCL	58.4	95% H-UCL
Selenium	22	51	43	ug/L	0.59	174	5	10	BMW-08	8.84	24.9	24.1	95% Chebyshev (Mean, Sd) UCL	24.1	95% Chebyshev (Mean, Sd) UCL
Silver	1	51	2	ug/L	0.12	0.12	0.5	2	RMW-01-17	0.625	0.241	0.682	95% Student's-t UCL	0.12	Maximum Result
Thallium	1	51	2	ug/L	0.05	0.05	1	2	RMW-10-15	0.628	0.239	0.685	95% Student's-t UCL	0.05	Maximum Result
Vanadium	46	51	90	ug/L	1.4	186	1	2	BPZ-01	13.9	28.4	38.8	97.5% Chebyshev (Mean, Sd) UCL	38.8	97.5% Chebyshev (Mean, Sd) UCL
Zinc	48	48	100	ug/L	5.6	6870	NA	NA	RMW-10-15	372	1270	2200	99% Chebyshev (Mean, Sd) UCL	2200	99% Chebyshev (Mean, Sd) UCL
Cyanide	3	6	50	ug/L	2.8	62.9	10	10	RMW-03-15	14.4	23.8	111	99% Chebyshev (Mean, Sd) UCL	62.9	Maximum Result
Pesticides/PCBs															
4,4'-DDD	20	44	45	ug/L	0.007	17	0.02	0.02	RMW-02-13	1.18	3.52	6.47	99% Chebyshev (Mean, Sd) UCL	6.47	99% Chebyshev (Mean, Sd) UCL
4,4'-DDE	17	44	39	ug/L	0.00022	2	0.02	0.02	RMW-02-13	0.132	0.388	0.714	99% Chebyshev (Mean, Sd) UCL	0.714	99% Chebyshev (Mean, Sd) UCL
4,4'-DDT	4	43	9	ug/L	0.0015	0.18	0.02	0.2	RMW-02-13	0.0186	0.0319	0.0398	95% Chebyshev (Mean, Sd) UCL	0.0398	95% Chebyshev (Mean, Sd) UCL
Aldrin	8	44	18	ug/L	0.014	1.4	0.01	0.01	RMW-02-13	0.0686	0.234	0.419	99% Chebyshev (Mean, Sd) UCL	0.419	99% Chebyshev (Mean, Sd) UCL
alpha-BHC	3	44	7	ug/L	0.0049	0.3	0.01	0.1	MW-12	0.0153	0.0454	0.0452	95% Chebyshev (Mean, Sd) UCL	0.0452	95% Chebyshev (Mean, Sd) UCL
alpha-Chlordane	4	43	9	ug/L	0.0035	0.01	0.01	0.1	RMW-01-17	0.00766	0.00962	0.014	95% Chebyshev (Mean, Sd) UCL	0.01	Maximum Result
Atrazine	1	50	2	ug/L	2	2	0.1	50	RMW-02-13	1.82	4.91	8.73	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
beta-BHC	4	44	9	ug/L	0.0075	1.1	0.01	0.1	MW-12	0.0343	0.165	0.282	99% Chebyshev (Mean, Sd) UCL	0.282	99% Chebyshev (Mean, Sd) UCL
delta-BHC	1	43	2	ug/L	0.012	0.012	0.01	0.1	RMW-03-15	0.0087	0.0116	0.0164	95% Chebyshev (Mean, Sd) UCL	0.012	Maximum Result
Diazinon	1	17	6	ug/L	0.69	0.69	0.05	0.5	MW-12	0.0832	0.167	0.26	95% Chebyshev (Mean, Sd) UCL	0.26	95% Chebyshev (Mean, Sd) UCL
Dieldrin	14	43	33	ug/L	0.0014	2.8	0.02	0.02	RMW-02-13	0.204	0.568	1.07	99% Chebyshev (Mean, Sd) UCL	1.07	99% Chebyshev (Mean, Sd) UCL
Endosulfan I	2	43	5	ug/L	0.022	0.127	0.01	0.1	MW-12	0.0103	0.0206	0.0239	95% Chebyshev (Mean, Sd) UCL	0.0239	95% Chebyshev (Mean, Sd) UCL
Endosulfan sulfate	5	44	11	ug/L	0.0011	0.077	0.02	0.2	RMW-02-13	0.0165	0.0217	0.0307	95% Chebyshev (Mean, Sd) UCL	0.0307	95% Chebyshev (Mean, Sd) UCL
Endrin	2	44	5	ug/L	0.0013	0.7	0.02	0.2	MW-12	0.0324	0.106	0.102	95% Chebyshev (Mean, Sd) UCL	0.102	95% Chebyshev (Mean, Sd) UCL
Endrin aldehyde	2	43	5	ug/L	0.0037	0.14	0.02	0.2	RMW-02-13	0.0179	0.0273	0.036	95% Chebyshev (Mean, Sd) UCL	0.036	95% Chebyshev (Mean, Sd) UCL
Endrin ketone	4	43	9	ug/L	0.00042	0.17	0.02	0.2	BMW-03	0.0207	0.0331	0.0709	99% Chebyshev (Mean, Sd) UCL	0.0709	99% Chebyshev (Mean, Sd) UCL
gamma-BHC	4	44	9	ug/L	0.0064	0.36	0.01	0.1	MW-12	0.0171	0.0542	0.0527	95% Chebyshev (Mean, Sd) UCL	0.0527	95% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	5	44	11	ug/L	0.0013	0.12	0.01	0.1	MW-12	0.0119	0.0227	0.0268	95% Chebyshev (Mean, Sd) UCL	0.0268	95% Chebyshev (Mean, Sd) UCL
Heptachlor	1	43	2	ug/L	0.0016	0.0016	0.01	0.1	RMW-03-15	0.00844	0.0116	0.0162	95% Chebyshev (Mean, Sd) UCL	0.0016	Maximum Result
Heptachlor epoxide	3	44	7	ug/L	0.00011	0.01	0.01	0.1	MW-12	0.00837	0.0115	0.016	95% Chebyshev (Mean, Sd) UCL	0.01	Maximum Result
Methoxychlor	1	44	2	ug/L	0.12	0.12	0.1	1	MW-12	0.0861	0.115	0.162	95% Chebyshev (Mean, Sd) UCL	0.12	Maximum Result
Aroclor-1260	2	43	5	ug/L	4.3	6.3	0.2	2	RMW-02-13	0.372	1.13	1.12	95% Chebyshev (Mean, Sd) UCL	1.12	95% Chebyshev (Mean, Sd) UCL
SVOCs/VOCs															
1,2-Dichlorobenzene	27	106	25	ug/L	0.7	7800	0.5	250	RGW-12	95.7	758	828	99% Chebyshev (Mean, Sd) UCL	828	99% Chebyshev (Mean, Sd) UCL
1,3-Dichlorobenzene	12	105	11	ug/L	0.14	360	0.5	400	RGW-12	6.23	40	30.6	97.5% Chebyshev (Mean, Sd) UCL	30.6	97.5% Chebyshev (Mean, Sd) UCL
1,4-Dioxane (p-dioxane)	40	78	51	ug/L	0.1	780	0.1	20000	RGW-16	369	1280	1810	99% Chebyshev (Mean, Sd) UCL	780	Maximum Result
2,4,6-Trichlorophenol	4	51	8	ug/L	0.2	10	0.04	50	RMW-02-13	2.1	4.96	6.44	97.5% Chebyshev (Mean, Sd) UCL	6.44	97.5% Chebyshev (Mean, Sd) UCL
2,4-Dimethylphenol	5	51	10	ug/L	110	300	5	20	RMW-02-13	25.4	71.2	87.7	97.5% Chebyshev (Mean, Sd) UCL	87.7	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorophenol	3	51	6	ug/L	3	4.3	5	100	RMW-01-17	5.16	7.81	9.93	95% Chebyshev (Mean, Sd) UCL	4.3	Maximum Result
2-Methylnaphthalene	9	51	18	ug/L	2.1	860	5	20	RMW-02-13	50	164	194	97.5% Chebyshev (Mean, Sd) UCL	194	97.5% Chebyshev (Mean, Sd) UCL

Table 2-1
AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
2-Methylphenol	6	51	12	ug/L	110	540	5	20	MW-12	44.4	122	151	97.5% Chebyshev (Mean, Sd) UCL	151	97.5% Chebyshev (Mean, Sd) UCL
2-Nitroaniline	4	50	8	ug/L	0.3	10	0.1	200	RMW-02-13	10.5	19	37.2	99% Chebyshev (Mean, Sd) UCL	10	Maximum Result
3,4-Methylphenol	1	1	100	ug/L	840	840	NA	NA	MW-12	NA	NA	NA		840	Maximum Result
4-Chloro-3-methylphenol	3	51	6	ug/L	58	180	5	100	MW-12	11.4	30	37.6	97.5% Chebyshev (Mean, Sd) UCL	37.6	97.5% Chebyshev (Mean, Sd) UCL
4-Methylphenol	5	50	10	ug/L	310	960	5	20	RMW-02-13	62.3	191	231	97.5% Chebyshev (Mean, Sd) UCL	231	97.5% Chebyshev (Mean, Sd) UCL
Acenaphthene	4	50	8	ug/L	1.1	2	1	100	RMW-01-17	5.03	7.95	9.93	95% Chebyshev (Mean, Sd) UCL	2	Maximum Result
Benzo(a)anthracene	5	51	10	ug/L	0.04	0.9	0.01	50	RMW-02-13	1.77	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.9	Maximum Result
Benzo(a)pyrene	6	51	12	ug/L	0.01	0.4	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.4	Maximum Result
Benzo(b)fluoranthene	4	51	8	ug/L	0.02	0.5	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.5	Maximum Result
Benzo(g,h,i)perylene	7	51	14	ug/L	0.01	0.2	0.01	50	RMW-02-13	1.75	4.88	8.54	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
Benzo(k)fluoranthene	3	51	6	ug/L	0.03	0.46	0.01	50	RMW-02-13	1.76	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.46	Maximum Result
Biphenyl (diphenyl)	1	49	2	ug/L	1.3	1.3	5	100	RMW-02-13	5.23	7.97	10.2	95% Chebyshev (Mean, Sd) UCL	1.3	Maximum Result
bis(2-Chloroethoxy)methane	3	51	6	ug/L	0.02	0.2	0.1	50	BPZ-01	1.77	4.87	8.55	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
bis(2-Ethylhexyl)phthalate	5	51	10	ug/L	1	120	0.1	50	RMW-05-15	5.11	17.2	20.1	97.5% Chebyshev (Mean, Sd) UCL	20.1	97.5% Chebyshev (Mean, Sd) UCL
Caprolactam	1	49	2	ug/L	2.4	2.4	5	100	BMW-08	5.25	7.96	10.2	95% Chebyshev (Mean, Sd) UCL	2.4	Maximum Result
Carbazole	5	34	15	ug/L	0.1	39	0.04	1	RMW-02-13	1.55	6.88	13.3	99% Chebyshev (Mean, Sd) UCL	13.3	99% Chebyshev (Mean, Sd) UCL
Chrysene	3	51	6	ug/L	0.03	0.42	0.1	100	RMW-02-13	4.3	8.19	15.7	99% Chebyshev (Mean, Sd) UCL	0.42	Maximum Result
Dibenz(a,h)anthracene	1	51	2	ug/L	0.02	0.02	0.01	50	RMW-09-15	1.74	4.88	8.54	99% Chebyshev (Mean, Sd) UCL	0.02	Maximum Result
Diethylphthalate	1	50	2	ug/L	1	1	1	100	RMW-06-15	5.13	7.92	10	95% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Di-n-butyl phthalate	1	50	2	ug/L	2.1	2.1	1	100	RMW-02-13	5.15	7.91	10	95% Chebyshev (Mean, Sd) UCL	2.1	Maximum Result
Fluoranthene	1	51	2	ug/L	1.1	1.1	1	100	RMW-02-13	5.08	7.85	9.87	95% Chebyshev (Mean, Sd) UCL	1.10	Maximum Result
Fluorene	1	50	2	ug/L	1	1	1	100	RMW-01-17	5.08	7.93	9.97	95% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Hexachloroethane	3	51	6	ug/L	0.04	1	0.1	50	RMW-02-13	1.78	4.87	8.56	99% Chebyshev (Mean, Sd) UCL	1	Maximum Result
Indeno(1,2,3-c,d)pyrene	4	51	8	ug/L	0.01	0.2	0.01	50	RMW-02-13	1.75	4.87	8.54	99% Chebyshev (Mean, Sd) UCL	0.2	Maximum Result
Naphthalene	26	100	26	ug/L	0.2	670	0.5	20	RMW-02-13	38.7	115	153	99% Chebyshev (Mean, Sd) UCL	153	99% Chebyshev (Mean, Sd) UCL
Nitrobenzene	3	51	6	ug/L	1	2	0.1	50	RMW-01-17	1.91	4.84	8.66	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
N-Nitrosodi-n-propylamine	3	51	6	ug/L	0.3	2	0.01	50	RMW-01-17	1.82	4.86	8.59	99% Chebyshev (Mean, Sd) UCL	2	Maximum Result
N-Nitrosodiphenylamine	1	50	2	ug/L	1.2	1.2	5	100	RMW-02-13	5.17	7.9	10	95% Chebyshev (Mean, Sd) UCL	1.2	Maximum Result
Pentachlorophenol	7	51	14	ug/L	0.2	85	0.5	50	RMW-02-13	3.87	12.3	14.7	97.5% Chebyshev (Mean, Sd) UCL	14.7	97.5% Chebyshev (Mean, Sd) UCL
Phenanthrene	2	51	4	ug/L	2	2.6	1	100	RMW-02-13	5.05	7.85	9.84	95% Chebyshev (Mean, Sd) UCL	2.6	Maximum Result
Phenol	8	51	16	ug/L	1.1	190	5	20	MW-12	19.2	47	60.3	97.5% Chebyshev (Mean, Sd) UCL	60.3	97.5% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethane	56	106	53	ug/L	0.2	3200	0.5	10	MW-12	140	478	602	99% Chebyshev (Mean, Sd) UCL	602	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	23	105	22	ug/L	0.3	250	0.5	500	RMW-02-13	13.6	51.3	44.9	97.5% Chebyshev (Mean, Sd) UCL	44.9	97.5% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	6	106	6	ug/L	1.4	960	0.5	500	MW-12	34.7	158	130	97.5% Chebyshev (Mean, Sd) UCL	130.3	97.5% Chebyshev (Mean, Sd) UCL
1,1,2,2-Tetrachloroethane	3	106	3	ug/L	0.09	18	0.5	400	RMW-02-13	2.72	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	14.5	97.5% Chebyshev (Mean, Sd) UCL
1,1,2-Trichloroethane	5	106	5	ug/L	3.1	18	0.5	400	MW-12	2.91	19.5	14.7	97.5% Chebyshev (Mean, Sd) UCL	14.7	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dibromo-3-chloropropane	1	102	1	ug/L	2.4	2.4	0.05	100	RGW-16	1.69	5.73	5.24	97.5% Chebyshev (Mean, Sd) UCL	2.4	Maximum Result
1,2-Dichloroethane	8	106	8	ug/L	0.4	30	0.5	400	MW-12	3.44	19.9	15.5	97.5% Chebyshev (Mean, Sd) UCL	15.5	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dichloropropane	6	106	6	ug/L	0.2	5.1	0.5	400	MW-12	2.63	19.4	14.4	97.5% Chebyshev (Mean, Sd) UCL	5.1	Maximum Result
1,2,3-Trichlorobenzene	8	89	9	ug/L	0.2	20	0.5	25	RGW-12	1.12	2.79	3	97.5% Chebyshev (Mean, Sd) UCL	3.0	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trichlorobenzene	8	105	8	ug/L	0.3	85	0.5	400	RGW-12	3.92	21.3	16.9	97.5% Chebyshev (Mean, Sd) UCL	16.9	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trimethylbenzene	20	50	40	ug/L	0.2	650	0.5	10	MW-12	77.2	189	343	99% Chebyshev (Mean, Sd) UCL	343	99% Chebyshev (Mean, Sd) UCL
1,3,5-Trimethylbenzene	13	50	26	ug/L	0.2	200	0.5	10	MW-12	22.1	56.4	101	99% Chebyshev (Mean, Sd) UCL	101	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	22	105	21	ug/L	0.2	3500	0.5	400	RGW-12	38.3	342	247	97.5% Chebyshev (Mean, Sd) UCL	247	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorotoluene	2	50	4	ug/L	0.2	7.4	0.5	25	RGW-12	0.962	2.18	2.89	97.5% Chebyshev (Mean, Sd) UCL	2.89	97.5% Chebyshev (Mean, Sd) UCL
2-Hexanone	2	83	2	ug/L	8.9	9.6	4	400	RMW-02-13	8.63	24.9	20.5	95% Chebyshev (Mean, Sd) UCL	9.60	Maximum Result
2,2-Dichloropropane	1	50	2	ug/L	0.5	0.5	0.5	25	RMW-02-13	0.82	1.97	2.04	95% Chebyshev (Mean, Sd) UCL	0.5	Maximum Result
Acetone	32	106	30	ug/L	2.2	3300	4	5000	RMW-02-13	150	539	477	97.5% Chebyshev (Mean, Sd) UCL	477	97.5% Chebyshev (Mean, Sd) UCL
Benzene	49	106	46	ug/L	0.16	4000	0.5	500	MW-12	69.3	398	454	99% Chebyshev (Mean, Sd) UCL	454	99% Chebyshev (Mean, Sd) UCL
Bromoform	1	105	1	ug/L	12	12	0.5	400	RMW-02-13	2.57	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	12	Maximum Result
Carbon disulfide	6	84	7	ug/L	0.19	3.1	0.5	400	MW-12	3.09	21.8	17.9	97.5% Chebyshev (Mean, Sd) UCL	3.1	Maximum Result
Carbon tetrachloride	1	106	1	ug/L	0.3	0.3	0.5	400	RGW-11	2.55	19.4	14.3	97.5% Chebyshev (Mean, Sd) UCL	0.3	Maximum Result
Chlorobenzene	27	106	25	ug/L	0.2	6700	0.5	400	RGW-12	110	665	752	99% Chebyshev (Mean, Sd) UCL	752	99% Chebyshev (Mean, Sd) UCL
Chloroethane	15	106	14	ug/L	0.2	680	0.5	250	RGW-03	22.5	89	108	99% Chebyshev (Mean, Sd) UCL	108	99% Chebyshev (Mean, Sd) UCL
Chloroform	3	105	3	ug/L	0.35	4.4	0.5	400	RGW-12	2.57	19.5	14.5	97.5% Chebyshev (Mean, Sd) UCL	4.4	Maximum Result
Chloromethane	8	106	8	ug/L	0.2	7.4	0.5	400	MW-12	2.71	19.4	14.5	97.5% Chebyshev (Mean, Sd) UCL	7.4	Maximum Result
cis-1,2-Dichloroethene	58	106	55	ug/L	0.28	90000	0.5	10	MW-12	2890	12700	15118	99% Chebyshev (Mean, Sd) UCL	15118	99% Chebyshev (Mean, Sd) UCL
cis-1,3-Dichloropropene	2	106	2	ug/L	0.74	4.2	0.5	400	RGW-16	2.59	19.4	14.4	97.5% Chebyshev (Mean, Sd) UCL	4.2	Maximum Result

Table 2-1
AMCO Summary Statistics and Exposure Point Concentrations for Groundwater Exposure Area
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Number of Detects	Number of Analyses	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Non-detected Value	Maximum Non-detected Value	Location of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Exposure Point Concentration	EPC Basis	Final Exposure Point Concentration (may be Max)	EPC Basis (may be Max)
Cyclohexane	5	66	8	ug/L	0.21	16	0.5	400	RMW-02-13	4.07	24.7	23.0	97.5% Chebyshev (Mean, Sd) UCL	16	Maximum Result
Ethyl tert-butyl ether (ETBE)	1	79	1	ug/L	1.2	1.2	0.5	200	MW-12	7.46	15.1	18.1	97.5% Chebyshev (Mean, Sd) UCL	1.2	Maximum Result
Ethylbenzene	24	106	23	ug/L	0.2	4000	0.5	500	MW-12	86.7	424	496	99% Chebyshev (Mean, Sd) UCL	496	99% Chebyshev (Mean, Sd) UCL
Isopropyl ether	1	6	17	ug/L	430	430	4	8	RMW-02-13	73.7	175	783	99% Chebyshev (Mean, Sd) UCL	430	Maximum Result
Isopropylbenzene (cumene)	18	106	17	ug/L	0.2	46	0.5	500	RGW-12	9.07	34	29.7	97.5% Chebyshev (Mean, Sd) UCL	29.7	97.5% Chebyshev (Mean, Sd) UCL
m,p-Xylene	22	56	39	ug/L	0.2	4000	0.5	5	RMW-02-13	192	664	1075	99% Chebyshev (Mean, Sd) UCL	1075	99% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	18	105	17	ug/L	0.82	3800	4	100	RMW-02-13	132	574	482	97.5% Chebyshev (Mean, Sd) UCL	482	97.5% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	8	84	10	ug/L	1200	40000	4	5000	MW-12	755	4440	5570	99% Chebyshev (Mean, Sd) UCL	5570	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	21	106	20	ug/L	0.2	83	0.5	400	RMW-02-13	6.95	25.5	22.4	97.5% Chebyshev (Mean, Sd) UCL	22.4	97.5% Chebyshev (Mean, Sd) UCL
Methylcyclohexane	3	66	5	ug/L	4.8	36	0.5	400	RMW-02-13	6.08	29	28.4	97.5% Chebyshev (Mean, Sd) UCL	28.4	97.5% Chebyshev (Mean, Sd) UCL
Methylene chloride	20	106	19	ug/L	0.39	110	0.5	25	RMW-02-13	2.51	10.9	9.11	97.5% Chebyshev (Mean, Sd) UCL	9.11	97.5% Chebyshev (Mean, Sd) UCL
n-Butylbenzene	7	50	14	ug/L	0.4	23	0.5	10	MW-12	1.9	4.77	6.12	97.5% Chebyshev (Mean, Sd) UCL	6.12	97.5% Chebyshev (Mean, Sd) UCL
n-Propylbenzene	13	50	26	ug/L	0.5	150	0.5	10	RGW-12	13	30.7	56.1	99% Chebyshev (Mean, Sd) UCL	56.1	99% Chebyshev (Mean, Sd) UCL
o-Xylene	19	56	34	ug/L	0.2	1600	0.5	10	RMW-02-13	100	300	499	99% Chebyshev (Mean, Sd) UCL	499	99% Chebyshev (Mean, Sd) UCL
p-Cymene (p-Isopropyltoluene)	12	50	24	ug/L	0.4	210	0.5	10	MW-12	15.7	44.6	78.6	99% Chebyshev (Mean, Sd) UCL	78.6	99% Chebyshev (Mean, Sd) UCL
sec-Butylbenzene	10	50	20	ug/L	0.3	13	0.5	25	RMW-01-17	2.09	4.02	5.64	97.5% Chebyshev (Mean, Sd) UCL	5.64	97.5% Chebyshev (Mean, Sd) UCL
Styrene	2	105	2	ug/L	23	37	0.5	400	MW-12	3.11	19.9	15.2	97.5% Chebyshev (Mean, Sd) UCL	15.2	97.5% Chebyshev (Mean, Sd) UCL
tert-Butyl alcohol	20	63	32	ug/L	10	260	10	1000	BPZ-01	53.2	98.2	130	97.5% Chebyshev (Mean, Sd) UCL	130	97.5% Chebyshev (Mean, Sd) UCL
tert-Butylbenzene	4	50	8	ug/L	0.7	2.1	0.5	25	RMW-02-13	0.916	1.98	2.14	95% Chebyshev (Mean, Sd) UCL	2.10	Maximum Result
Tetrachloroethene	11	106	10	ug/L	0.15	12	0.5	400	RGW-12	2.75	19.4	14.5	97.5% Chebyshev (Mean, Sd) UCL	12	Maximum Result
Toluene	31	106	29	ug/L	0.2	31000	0.5	110	RMW-02-13	1600	5440	6856	99% Chebyshev (Mean, Sd) UCL	6856	99% Chebyshev (Mean, Sd) UCL
trans-1,2-Dichloroethene	30	106	28	ug/L	0.16	4000	0.5	500	MW-12	63.4	401	451	99% Chebyshev (Mean, Sd) UCL	451	99% Chebyshev (Mean, Sd) UCL
trans-1,3-Dichloropropene	2	106	2	ug/L	0.36	4.1	0.5	500	RMW-10-15	4.94	30.9	23.7	97.5% Chebyshev (Mean, Sd) UCL	4.1	Maximum Result
Trichloroethene	34	106	32	ug/L	0.2	880	0.5	100	RGW-09	11.9	85.5	63.8	97.5% Chebyshev (Mean, Sd) UCL	63.8	97.5% Chebyshev (Mean, Sd) UCL
Vinyl chloride	41	106	39	ug/L	0.2	8400	0.5	400	MW-12	378	1470	1799	99% Chebyshev (Mean, Sd) UCL	1799	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	10	50	20	ug/L	0.25	4600	0.5	0.5	RMW-02-13	267	948	1600	99% Chebyshev (Mean, Sd) UCL	1600	99% Chebyshev (Mean, Sd) UCL
Dioxins/Furans															
1,2,3,4,6,7,8-HpCDD	4	6	67	pg/L	33.4	634	1.76	11.2	RMW-02-13	222	302	2910	95% Adjusted Gamma UCL	634	Maximum Result
1,2,3,4,6,7,8-HpCDF	2	6	33	pg/L	115	147	0.835	19.7	RMW-02-13	46.7	66.2	557	95% Adjusted Gamma UCL	147	Maximum Result
1,2,3,4,7,8,9-HpCDF	3	6	50	pg/L	1.83	14.1	1.25	15.7	RMW-02-13	6.11	5.85	10.9	95% Student's-t UCL	10.9	95% Student's-t UCL
1,2,3,4,7,8-HxCDD	2	6	33	pg/L	2.77	5.3	1.45	10.7	RMW-02-13	2.64	2.22	4.46	95% Student's-t UCL	4.46	95% Student's-t UCL
1,2,3,4,7,8-HxCDF	2	6	33	pg/L	1.79	15.7	0.839	13.4	RMW-02-13	4.49	5.95	16.4	95% Approximate Gamma UCL	15.7	Maximum Result
1,2,3,6,7,8-HxCDD	3	6	50	pg/L	2.44	20	1.45	9	RMW-02-13	7.51	8.5	14.5	95% Student's-t UCL	14.5	95% Student's-t UCL
1,2,3,6,7,8-HxCDF	2	6	33	pg/L	1.35	4.56	0.886	3.86	RMW-02-13	1.73	1.51	2.97	95% Student's-t UCL	2.97	95% Student's-t UCL
1,2,3,7,8,9-HxCDD	2	6	33	pg/L	4.89	13	1.47	10.6	RMW-02-13	4.27	4.77	8.19	95% Student's-t UCL	8.19	95% Student's-t UCL
1,2,3,7,8,9-HxCDF	1	6	17	pg/L	6.5	6.5	1.18	7.3	RMW-02-13	2.22	2.4	6.05	95% Approximate Gamma UCL	6.05	95% Approximate Gamma UCL
1,2,3,7,8-PeCDD	2	6	33	pg/L	1.13	4.3	1.02	3.8	RMW-02-13	1.59	1.41	3.44	95% Approximate Gamma UCL	3.44	95% Approximate Gamma UCL
1,2,3,7,8-PeCDF	2	6	33	pg/L	1.37	4.3	1.32	3.8	RMW-02-13	1.67	1.37	3.36	95% Approximate Gamma UCL	3.36	95% Approximate Gamma UCL
2,3,4,6,7,8-HxCDF	1	6	17	pg/L	6.6	6.6	0.869	6.27	RMW-02-13	2.31	2.37	4.26	95% Student's-t UCL	4.26	95% Student's-t UCL
2,3,4,7,8-PeCDF	2	6	33	pg/L	1.71	5.5	1.28	9.72	RMW-02-13	2.6	2.06	4.29	95% Student's-t UCL	4.29	95% Student's-t UCL
2,3,7,8-TCDF	1	6	17	pg/L	4.25	4.25	2.33	4.6	RMW-02-13	2.05	1.14	3.27	95% Approximate Gamma UCL	3.27	95% Approximate Gamma UCL
OCDD	4	6	67	pg/L	312	10500	10.5	35.2	RMW-02-13	3710	5270	62100	95% Adjusted Gamma UCL	10500	Maximum Result
OCDF	4	6	67	pg/L	33.4	1050	3.4	21	RMW-02-13	383	519	5090	95% Adjusted Gamma UCL	1050	Maximum Result

Notes:
EPC = exposure point concentration
a) For a discussion of reporting limits, please see Section 6.1.2 Reporting Limits, of Appendix H, Human Health Risk Assessment.
b) one-half the detection limit is used for non-detects to calculate this statistic.

Table 2-2
Groundwater Exposure Assumptions - Future Residents
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Parameter		Units	Reasonable Maximum Exposure (RME) Scenario: Residential Adult		Residential Child		Intake Equation
Ingestion of Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		
Ingestion Rate	IngR	L/day	2	EPA, 1989	1	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	$\frac{C_{gw} \times IngR \times EF \times ED}{BW \times AT}$
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 2004[b]	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Inhalation of VOCs in Groundwater							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		
Inhalation Rate	InhR	m^3/day	20	EPA, 1989	10	EPA, 1989	
Volatilization Factor	VF	L/m^3	0.5	EPA, 2004[b]	0.5	EPA, 2004[b]	$\frac{C_{gw} \times InhR \times VF \times ET \times EF \times ED}{BW \times AT}$
Exposure Time	ET	hours/day	24	EPA, 1989	24	EPA, 1989	
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1989	15	EPA, 1989	
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	
Dermal Contact with Groundwater While Showering							
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		Chemical specific		$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Event Duration	t_{event}	hours/event	0.58	EPA, 2004[a]	1	EPA, 2004[a]	Where for Organics:
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Permeability Constant for chemicals in groundwater	K_P	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	If t_{event} > t*
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	$DA_{event} = FA \times K_p \times C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004[a]	Chemical specific	EPA, 2004[a]	
Skin Surface Area	SA	cm^2/day	18,000	EPA, 1997	6,600	EPA, 2004[a]	If t_{event} < t*
Exposure Frequency	EF	days/year	350	EPA, 1989	350	EPA, 1989	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	24	EPA, 1989	6	EPA, 1989	
Body Weight	BW	kg	70	EPA, 1997	15	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	AT_C	days	25,550	EPA, 1989	25,550	EPA, 1989	
Averaging Time for noncarcinogens	AT_{NC}	days	8,760	EPA, 1989	2,190	EPA, 1989	$DA_{event} = K_p \times C_{gw} \times t_{event}$

Notes:
AT_C = 70 years x 365 days/year
AT_{NC} = ED (years) x 365 days/year
RME = Reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 1997: Exposure Factors Handbook. Volume I, General Factors. August.
EPA, 2004[a]: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.
EPA, 2004[b]: User's Guide and Background Technical Document for Preliminary Remediation Goals Table. Region 9. October.

Table 2-3
Groundwater Exposure Assumptions - Trench Workers
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Reasonable Maximum Exposure (RME) Scenario			
		Units	Trench Worker		Intake Equation
Inhalation of VOCs in Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Concentration (VOCs) in breathing zone	C_{air}	ug/m^3	Chemical specific	CalEPA, 2006	
Total emission rate	Ei	mg/s	Chemical specific	CalEPA, 2006	$\frac{C_{air} \times InhR \times ET \times EF \times ED \times CF_1}{BW \times AT}$
Inhalation Rate	InhR	m^3/hour	2.5	CalEPA, 2005	
Assumed velocity of air in the trench	u	m/s	0.152	CalEPA, 2006	
Mixing Height (adult breating zone)	H	m	1.83	CalEPA, 2006	
Width of trench perpendicular to wind direction	W	m	3.05	CalEPA, 2006	
Overall mass transfer coefficient	Ki	cm/s	Chemical specific	CalEPA, 2006	
Bottom area of the trench covered with contaminated water	A_w	cm^2	65,032	CalEPA, 2006	$C_{air} = \frac{E_i \times CF_2}{u \times H \times W}$
Exposure Time	ET	hours/day	8	CalEPA, 2005	
Exposure Frequency	EF	days/year	90	CalEPA, 2006	
Exposure Duration	ED	years	1	CalEPA, 2006	
Conversion Factor$_1$	CF_1	mg/ug	0.001		
Conversion Factor$_2$	CF_2	ug/mg	1000		$E_i = K_i \times A_w \times C_{gw}$
Body Weight	BW	kg	70	EPA, 1989	
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	
Dermal Contact with Groundwater While Working in a Trench					
Concentration in Groundwater	C_{gw}	mg/L	Chemical specific		
Absorbed dose per event per area of skin exposed	DA_{event}	mg/cm^2-event	Chemical specific	EPA, 2004	$\frac{DA_{event} \times SA \times EF \times ED}{BW \times AT}$
Event Duration	t_{event}	hours/event	8	CalEPA, 2005	For Organics:
Time to reach steady state	t*	hours	Chemical specific	EPA, 2004	
Skin Permeability Constant for chemicals in groundwater	K_P	cm/hour	Chemical specific	EPA, 2004	If $t_{event} < t^*$
Lag time per event	τ	hours/event	Chemical specific	EPA, 2004	$DA_{event} = FA \times K_p C_{gw} \left[\frac{t_{event}}{1+B} + 2\tau \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$
Dimensionless coefficient	B	cm/hour	Chemical specific	EPA, 2004	
Fraction Absorbed	FA	unitless	Chemical specific	EPA, 2004	
Skin Surface Area	SA	cm^2/day	5,700	CalEPA, 2005	If $t_{event} > t^*$
Exposure Frequency	EF	days/year	90	CalEPA, 2006	$DA_{event} = 2\ FA \times K_p \times C_{gw} \sqrt{\frac{6\tau \times t_{event}}{\Pi}}$
Exposure Duration	ED	years	1	CalEPA, 2006	
Body Weight	BW	kg	70	EPA, 1989	For Inorganics:
Averaging Time for carcinogens	ATc	days	25,550	EPA, 1989	$DA_{event} = K_p \times C_{gw} \times t_{event}$
Averaging Time for noncarcinogens	ATnc	days	365	CalEPA, 2006	

Notes:
RME = Reasonable maximum exposure.
EPA, 1989: Risk Assessment Guidance for Superfund (RAGS) Volume I Human Health Evaluation Manual Part A.
EPA, 2004: RAGS Part E, Supplemental Guidance for Dermal Risk Assessment.
CalEPA, DTSC, HERD, 2005: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.
CalEPA, DTSC, HERD, 2006: Memorandum: Risk Assessment Issues, PAHs and Exposure Routes…,T.Taros, Staff Toxicologist, DTSC, 8810 Cal Center Drive, Sacramento, CA. August 11.

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
Metals		
Aluminum	1.0E-03	NV
Antimony	1.0E-03	NV
Arsenic	1.0E-03	NV
Barium	1.0E-03	NV
Beryllium	1.0E-03	NV
Boron	1.0E-03	NV
Cadmium	1.0E-03	NV
Chromium	1.0E-03	NV
Chromium (VI)	2.0E-03	NV
Cobalt	4.0E-04	NV
Copper	1.0E-03	NV
Iron	1.0E-03	NV
Lead	1.0E-04	NV
Manganese	1.0E-03	NV
Mercury	1.0E-03	NV
Molybdenum	1.0E-03	NV
Nickel	2.0E-04	NV
Selenium	1.0E-03	NV
Silver	6.0E-04	NV
Thallium	1.0E-03	NV
Vanadium	1.0E-03	NV
Zinc	6.0E-04	NV
Cyanide	1.0E-03	NV
Pesticides/PCBs		
4,4'-DDD	1.8E-01	NV
4,4'-DDE	1.6E-01	NV
4,4'-DDT	2.7E-01	NV
Aldrin	1.4E-03	NV
alpha-BHC	1.1E-02	NV
alpha-Chlordane	3.4E-02	NV
Atrazine	5.2E-03	NV
beta-BHC	1.1E-02	NV
delta-BHC	1.1E-02	NV
Diazinon	1.0E-02	NV
Dieldrin	1.2E-02	NV
Endosulfan I	2.8E-03	NV
Endosulfan II	1.8E-03	NV
Endosulfan sulfate	NA	NV
Endrin	1.2E-02	NV
Endrin aldehyde	NA	NV
Endrin ketone	NA	NV
gamma-BHC	1.1E-02	NV
gamma-Chlordane	3.4E-02	NV
Heptachlor	8.6E-03	NV
Heptachlor epoxide	2.0E-02	NV
Methoxychlor	4.1E-02	NV

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
Aroclor-1260	7.5E-01	NV
SVOCs/VOCs		
1,4-Dioxane (p-dioxane)	3.3E-04	NV
2,4,6-Trichlorophenol	3.5E-02	NV
2,4-Dimethylphenol	1.1E-02	NV
2-Chlorophenol	8.0E-03	V
2-Methylnaphthalene	8.9E-02	V
2-Methylphenol	7.7E-03	NV
2-Nitroaniline	4.4E-03	NV
3,4-methylphenol	7.7E-03	NV
4-Chloro-3-methylphenol	NA	NV
4-Methylphenol	7.7E-03	NV
Acenaphthene	1.3E-01	V
Acenaphthylene	1.4E-01	V
Anthracene	2.3E-01	V
Benzo(a)anthracene	4.7E-01	NV
Benzo(a)pyrene	7.0E-01	NV
Benzo(b)fluoranthene	7.0E-01	NV
Benzo(g,h,i)perylene	1.1E+00	NV
Benzo(k)fluoranthene	6.6E-01	NV
Biphenyl (Diphenyl)	9.2E-02	NV
bis(2-Chloroethoxy)methane	1.2E-03	V
bis(2-Ethylhexyl)phthalate	2.5E-02	NV
Bromoform	2.2E-03	V
Caprolactam	1.0E-03	NV
Carbazole	5.2E-02	NV
Chrysene	4.7E-01	NV
Dibenz(a,h)anthracene	1.5E+00	NV
Diethylphthalate	3.9E-03	NV
Di-n-butyl phthalate	2.4E-02	NV
Fluoranthene	2.2E-01	NV
Fluorene	1.7E-01	V
Hexachloroethane	3.0E-02	NV
Indeno(1,2,3-c,d)pyrene	1.0E+00	NV
Naphthalene	4.7E-02	V
Nitrobenzene	5.4E-03	V
N-Nitrosodi-n-propylamine	2.3E-03	NV
N-Nitrosodiphenylamine	2.6E-02	NV
Pentachlorophenol	3.9E-01	NV
Phenanthrene	1.4E-01	NV
Pyrene	3.2E-01	V
1,1,1-Trichloroethane	1.3E-02	V
1,1,2,2-Tetrachloroethane	6.9E-03	V
1,1,2-Trichloroethane	6.4E-03	V
1,1-Dichloroethane	6.7E-03	V
1,1-Dichloroethene	1.2E-02	V
1,2,3-Trichlorobenzene	NA	V

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
1,2,4-Trichlorobenzene	6.6E-02	V
1,2,4-Trimethylbenzene	8.4E-02	V
1,2-Dibromo-3-chloropropane	6.8E-03	V
1,2-Dichlorobenzene	4.1E-02	V
1,2-Dichloroethane	6.7E-03	V
1,2-Dichloropropane	7.8E-03	V
1,3,5-Trimethylbenzene	6.1E-02	V
1,3-Dichlorobenzene	5.8E-02	V
1,4-Dichlorobenzene	4.2E-02	V
2-Chlorotoluene	NA	V
2-Hexanone	3.5E-03	V
2,2-Dichloropropane	NA	V
Acetone	5.2E-04	V
Benzene	1.5E-02	V
Carbon disulfide	1.7E-02	V
Carbon tetrachloride	1.6E-02	V
Chlorobenzene	2.8E-02	V
Chloroethane	6.1E-03	V
Chloroform	6.8E-03	V
Chloromethane	3.3E-03	V
cis-1,2-Dichloroethene	1.1E-02	V
cis-1,3-Dichloropropene	4.3E-03	V
Cyclohexane	1.0E-01	V
Ethyl tert-butyl ether (ETBE)	NA	V
Ethylbenzene	4.9E-02	V
Isopropyl ether	NA	V
Isopropylbenzene (cumene)	8.8E-02	V
Methyl acetate	8.0E-04	V
Methyl ethyl ketone	9.6E-04	V
Methyl isobutyl ketone	2.7E-03	V
Methyl tert-butyl ether	2.1E-03	V
Methylcyclohexane	1.1E-01	V
Methylene chloride	3.5E-03	V
n-Butylbenzene	NA	V
n-Propylbenzene	NA	V
p-Cymene (p-isopropyltoluene)	NA	V
Phenol	4.3E-03	NV
sec-Butylbenzene	NA	V
Styrene	3.7E-02	V
tert-Butylbenzene	NA	V
tert-Butyl alcohol	NA	V
Tetrachloroethene	3.3E-02	V
Toluene	3.1E-02	V
trans-1,2-Dichloroethene	7.7E-03	V
trans-1,3-Dichloropropene	4.3E-03	V
Trichloroethene	1.2E-02	V
Vinyl chloride	5.6E-03	V

Table 2-4
Dermal Permeability Constants and Volatile Compounds - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Kp[a] (cm/hr)	Volatility[b]
m,p-Xylene	5.3E-02	V
o-Xylene	7.0E-02	V
Xylenes, total	5.3E-02	V
Dioxans/Furans		
1,2,3,4,6,7,8-HpCDD	8.1E-01	NV
1,2,3,4,6,7,8-HpCDF	8.1E-01	NV
1,2,3,4,7,8,9-HpCDF	8.1E-01	NV
1,2,3,4,7,8-HxCDD	8.1E-01	NV
1,2,3,4,7,8-HxCDF	8.1E-01	NV
1,2,3,6,7,8-HxCDD	8.1E-01	NV
1,2,3,6,7,8-HxCDF	8.1E-01	NV
1,2,3,7,8,9-HxCDD	8.1E-01	NV
1,2,3,7,8,9-HxCDF	8.1E-01	NV
1,2,3,7,8-PeCDD	8.1E-01	NV
1,2,3,7,8-PeCDF	8.1E-01	NV
2,3,4,6,7,8-HxCDF	8.1E-01	NV
2,3,4,7,8-PeCDF	8.1E-01	NV
2,3,7,8-TCDF	8.1E-01	NV
OCDF	8.1E-01	NV
OCDD	8.1E-01	NV

Notes:
NA = no Kp value available
NV = Nonvolatile, V = Volatile
[a] EPA RAGS Part E, 2004
[b] EPA Region 9 PRGs, 2004

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
Metals			
Aluminum	mg/L	9.40E+00	97.5% Chebyshev (Mean, Sd) UCL
Antimony	mg/L	1.51E-03	95% Student's-t UCL
Arsenic	mg/L	2.87E-01	95% H-UCL
Barium	mg/L	1.68E-01	95% H-UCL
Beryllium	mg/L	7.64E-04	95% Chebyshev (Mean, Sd) UCL
Boron	mg/L	4.31E+00	95% Approximate Gamma UCL
Cadmium	mg/L	1.26E-03	95% Chebyshev (Mean, Sd) UCL
Chromium	mg/L	3.57E-02	97.5% Chebyshev (Mean, Sd) UCL
Chromium (VI)	mg/L	3.50E-04	Maximum Result
Cobalt	mg/L	8.89E-03	95% Approximate Gamma UCL
Copper	mg/L	4.66E-02	95% H-UCL
Iron	mg/L	5.35E+01	95% Chebyshev (MVUE) UCL
Lead	mg/L	4.00E-02	95% H-UCL
Manganese	mg/L	4.33E+00	95% Approximate Gamma UCL
Mercury	mg/L	1.21E-04	95% Student's-t UCL
Molybdenum	mg/L	5.64E-03	95% Chebyshev (Mean, Sd) UCL
Nickel	mg/L	5.46E-02	95% H-UCL
Selenium	mg/L	1.89E-02	95% Chebyshev (Mean, Sd) UCL
Silver	mg/L	1.20E-04	Maximum Result
Thallium	mg/L	5.00E-05	Maximum Result
Vanadium	mg/L	3.19E-02	97.5% Chebyshev (Mean, Sd) UCL
Zinc	mg/L	3.03E-01	95% H-UCL
Cyanide	mg/L	6.29E-02	Maximum Result
Pesticides/PCBs			
4,4'-DDD	mg/L	5.00E-03	99% Chebyshev (Mean, Sd) UCL
4,4'-DDE	mg/L	7.76E-04	97.5% Chebyshev (Mean, Sd) UCL
4,4'-DDT	mg/L	1.80E-04	Maximum Result
Aldrin	mg/L	4.05E-04	97.5% Chebyshev (Mean, Sd) UCL
alpha-BHC	mg/L	3.00E-04	Maximum Result
alpha-Chlordane	mg/L	3.34E-04	97.5% Chebyshev (Mean, Sd) UCL
Atrazine	mg/L	2.00E-03	Maximum Result
beta-BHC	mg/L	3.69E-04	97.5% Chebyshev (Mean, Sd) UCL
delta-BHC	mg/L	1.60E-04	Maximum Result
Diazinon	mg/L	2.60E-04	95% Chebyshev (Mean, Sd) UCL
Dieldrin	mg/L	9.24E-04	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan I	mg/L	3.31E-04	97.5% Chebyshev (Mean, Sd) UCL
Endosulfan II	mg/L	2.30E-04	Maximum Result
Endosulfan sulfate	mg/L	9.20E-05	Maximum Result
Endrin	mg/L	6.46E-04	97.5% Chebyshev (Mean, Sd) UCL
Endrin aldehyde	mg/L	1.40E-04	Maximum Result
Endrin ketone	mg/L	1.70E-04	Maximum Result
gamma-BHC	mg/L	3.28E-04	97.5% Chebyshev (Mean, Sd) UCL
gamma-Chlordane	mg/L	2.50E-04	Maximum Result
Heptachlor	mg/L	1.11E-04	97.5% Chebyshev (Mean, Sd) UCL
Heptachlor epoxide	mg/L	1.20E-04	Maximum Result
Methoxychlor	mg/L	1.20E-04	Maximum Result

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
Aroclor-1260	mg/L	9.63E-04	95% Chebyshev (Mean, Sd) UCL
SVOCs/VOCs			
1,4-Dioxane (p-dioxane)	mg/L	7.80E-01	Maximum Result
2,4,6-Trichlorophenol	mg/L	7.14E-03	97.5% Chebyshev (Mean, Sd) UCL
2,4-Dimethylphenol	mg/L	7.87E-02	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorophenol	mg/L	4.30E-03	Maximum Result
2-Methylnaphthalene	mg/L	2.26E-01	99% Chebyshev (Mean, Sd) UCL
2-Methylphenol	mg/L	1.23E-01	97.5% Chebyshev (Mean, Sd) UCL
2-Nitroaniline	mg/L	1.00E-02	Maximum Result
3,4-methylphenol	mg/L	8.40E-01	Maximum Result
4-Chloro-3-methylphenol	mg/L	2.38E-02	95% Chebyshev (Mean, Sd) UCL
4-Methylphenol	mg/L	1.94E-01	97.5% Chebyshev (Mean, Sd) UCL
Acenaphthene	mg/L	4.50E-03	Maximum Result
Acenaphthylene	mg/L	9.54E-03	97.5% Chebyshev (Mean, Sd) UCL
Anthracene	mg/L	3.20E-03	Maximum Result
Benzo(a)anthracene	mg/L	9.00E-04	Maximum Result
Benzo(a)pyrene	mg/L	5.00E-04	Maximum Result
Benzo(b)fluoranthene	mg/L	7.60E-04	Maximum Result
Benzo(g,h,i)perylene	mg/L	2.00E-04	Maximum Result
Benzo(k)fluoranthene	mg/L	4.60E-04	Maximum Result
Biphenyl (Diphenyl)	mg/L	1.30E-03	Maximum Result
bis(2-Chloroethoxy)methane	mg/L	2.00E-04	Maximum Result
bis(2-Ethylhexyl)phthalate	mg/L	1.69E-02	97.5% Chebyshev (Mean, Sd) UCL
Bromoform	mg/L	1.20E-02	Maximum Result
Caprolactam	mg/L	2.40E-03	Maximum Result
Carbazole	mg/L	1.25E-02	99% Chebyshev (Mean, Sd) UCL
Chrysene	mg/L	1.10E-03	Maximum Result
Dibenz(a,h)anthracene	mg/L	4.50E-05	Maximum Result
Diethylphthalate	mg/L	1.03E-02	95% Chebyshev (Mean, Sd) UCL
Di-n-butyl phthalate	mg/L	1.17E-02	95% Chebyshev (Mean, Sd) UCL
Fluoranthene	mg/L	2.40E-03	Maximum Result
Fluorene	mg/L	2.60E-03	Maximum Result
Hexachloroethane	mg/L	1.00E-03	Maximum Result
Indeno(1,2,3-c,d)pyrene	mg/L	2.00E-04	Maximum Result
Naphthalene	mg/L	1.36E-01	99% Chebyshev (Mean, Sd) UCL
Nitrobenzene	mg/L	2.00E-03	Maximum Result
N-Nitrosodi-n-propylamine	mg/L	2.00E-03	Maximum Result
N-Nitrosodiphenylamine	mg/L	1.20E-03	Maximum Result
Pentachlorophenol	mg/L	1.13E-02	97.5% Chebyshev (Mean, Sd) UCL
Phenanthrene	mg/L	6.00E-03	Maximum Result
Pyrene	mg/L	2.40E-03	Maximum Result
1,1-Dichloroethane	mg/L	5.57E-01	99% Chebyshev (Mean, Sd) UCL
1,1-Dichloroethene	mg/L	4.16E-02	97.5% Chebyshev (Mean, Sd) UCL
1,1,1-Trichloroethane	mg/L	1.18E-01	97.5% Chebyshev (Mean, Sd) UCL
1,1,2-Trichloroethane	mg/L	1.33E-02	97.5% Chebyshev (Mean, Sd) UCL
1,1,2,2-Tetrachloroethane	mg/L	1.29E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2,3-Trichlorobenzene	mg/L	2.72E-03	97.5% Chebyshev (Mean, Sd) UCL

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
1,2,4-Trichlorobenzene	mg/L	1.51E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2,4-Trimethylbenzene	mg/L	2.78E-01	99% Chebyshev (Mean, Sd) UCL
1,2-Dibromo-3-chloropropane	mg/L	2.40E-03	Maximum Result
1,2-Dichlorobenzene	mg/L	7.34E-01	99% Chebyshev (Mean, Sd) UCL
1,2-Dichloroethane	mg/L	1.44E-02	97.5% Chebyshev (Mean, Sd) UCL
1,2-Dichloropropane	mg/L	5.10E-03	Maximum Result
1,3-Dichlorobenzene	mg/L	2.71E-02	97.5% Chebyshev (Mean, Sd) UCL
1,3,5-Trimethylbenzene	mg/L	1.10E-01	99% Chebyshev (Mean, Sd) UCL
1,4-Dichlorobenzene	mg/L	2.18E-01	97.5% Chebyshev (Mean, Sd) UCL
2-Chlorotoluene	mg/L	2.89E-03	97.5% Chebyshev (Mean, Sd) UCL
2-Hexanone	mg/L	2.35E-02	95% Chebyshev (Mean, Sd) UCL
2,2-Dichloropropane	mg/L	5.00E-04	Maximum Result
Acetone	mg/L	4.85E-01	97.5% Chebyshev (Mean, Sd) UCL
Benzene	mg/L	4.00E-01	99% Chebyshev (Mean, Sd) UCL
Carbon disulfide	mg/L	3.10E-03	Maximum Result
Carbon tetrachloride	mg/L	3.00E-04	Maximum Result
Chlorobenzene	mg/L	6.74E-01	99% Chebyshev (Mean, Sd) UCL
Chloroethane	mg/L	9.74E-02	99% Chebyshev (Mean, Sd) UCL
Chloroform	mg/L	4.40E-03	Maximum Result
Chloromethane	mg/L	7.40E-03	Maximum Result
cis-1,2-Dichloroethene	mg/L	1.37E+01	99% Chebyshev (Mean, Sd) UCL
cis-1,3-Dichloropropene	mg/L	4.20E-03	Maximum Result
Cyclohexane	mg/L	1.80E-02	Maximum Result
Ethyl tert-butyl ether (ETBE)	mg/L	1.20E-03	Maximum Result
Ethylbenzene	mg/L	4.49E-01	99% Chebyshev (Mean, Sd) UCL
Isopropyl ether	mg/L	4.30E-01	Maximum Result
Isopropylbenzene (cumene)	mg/L	2.71E-02	97.5% Chebyshev (Mean, Sd) UCL
Methyl acetate	mg/L	2.25E-02	97.5% Chebyshev (Mean, Sd) UCL
Methyl ethyl ketone	mg/L	4.30E-01	97.5% Chebyshev (Mean, Sd) UCL
Methyl isobutyl ketone	mg/L	4.86E+00	99% Chebyshev (Mean, Sd) UCL
Methyl tert-butyl ether	mg/L	2.01E-02	97.5% Chebyshev (Mean, Sd) UCL
Methylcyclohexane	mg/L	2.45E-02	97.5% Chebyshev (Mean, Sd) UCL
Methylene chloride	mg/L	8.19E-03	97.5% Chebyshev (Mean, Sd) UCL
n-Butylbenzene	mg/L	6.12E-03	97.5% Chebyshev (Mean, Sd) UCL
n-Propylbenzene	mg/L	5.61E-02	99% Chebyshev (Mean, Sd) UCL
p-Cymene (p-isopropyltoluene)	mg/L	7.86E-02	99% Chebyshev (Mean, Sd) UCL
Phenol	mg/L	4.80E-02	97.5% Chebyshev (Mean, Sd) UCL
sec-Butylbenzene	mg/L	5.64E-03	97.5% Chebyshev (Mean, Sd) UCL
Styrene	mg/L	1.39E-02	97.5% Chebyshev (Mean, Sd) UCL
tert-Butylbenzene	mg/L	2.10E-03	Maximum Result
tert-Butyl alcohol	mg/L	1.17E-01	97.5% Chebyshev (Mean, Sd) UCL
Tetrachloroethene	mg/L	1.20E-02	Maximum Result
Toluene	mg/L	6.11E+00	99% Chebyshev (Mean, Sd) UCL
trans-1,2-Dichloroethene	mg/L	4.01E-01	99% Chebyshev (Mean, Sd) UCL
trans-1,3-Dichloropropene	mg/L	4.10E-03	Maximum Result
Trichloroethene	mg/L	5.70E-02	97.5% Chebyshev (Mean, Sd) UCL
Vinyl chloride	mg/L	1.63E+00	99% Chebyshev (Mean, Sd) UCL

Table 2-5
Exposure Point Concentrations for Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Units	Exposure Point Concentration	EPC Basis
m,p-Xylene	mg/L	9.44E-01	99% Chebyshev (Mean, Sd) UCL
o-Xylene	mg/L	4.45E-01	99% Chebyshev (Mean, Sd) UCL
Xylenes, total	mg/L	1.60E+00	99% Chebyshev (Mean, Sd) UCL
Dioxans/Furans			
1,2,3,4,6,7,8-HpCDD	mg/L	4.64E-07	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,6,7,8-HpCDF	mg/L	9.49E-08	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8,9-HpCDF	mg/L	9.79E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8-HxCDD	mg/L	2.62E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,4,7,8-HxCDF	mg/L	8.49E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,6,7,8-HxCDD	mg/L	1.33E-08	99% Chebyshev (Mean, Sd) UCL
1,2,3,6,7,8-HxCDF	mg/L	1.62E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,7,8,9-HxCDD	mg/L	4.40E-09	95% Chebyshev (Mean, Sd) UCL
1,2,3,7,8,9-HxCDF	mg/L	3.87E-09	99% Chebyshev (Mean, Sd) UCL
1,2,3,7,8-PeCDD	mg/L	1.08E-09	95% H-UCL
1,2,3,7,8-PeCDF	mg/L	2.28E-09	95% Chebyshev (Mean, Sd) UCL
2,3,4,6,7,8-HxCDF	mg/L	3.94E-09	99% Chebyshev (Mean, Sd) UCL
2,3,4,7,8-PeCDF	mg/L	2.64E-09	95% Chebyshev (Mean, Sd) UCL
2,3,7,8-TCDF	mg/L	1.68E-09	95% Chebyshev (Mean, Sd) UCL
OCDF	mg/L	7.44E-07	99% Chebyshev (Mean, Sd) UCL
OCDD	mg/L	2.18E-06	95% Hall's Bootstrap UCL

Table 2-6
Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	0.58	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	24	years
Ingestion Rate	IngR	2	L/day
Inhalation Rate	InhR	0.83	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	9.40E+00	8.83E-02	NA		4.61E-04	NA		NV	NA		
Antimony	1.51E-03	1.42E-05	NA		7.41E-08	NA		NV	NA		
Arsenic	2.87E-01	2.69E-03	1.50E+00	4.04E-03	1.41E-05	1.50E+00	2.11E-05	NV	1.51E+01		**4.06E-03**
Barium	1.68E-01	1.57E-03	NA		8.22E-06	NA		NV	NA		
Beryllium	7.64E-04	7.18E-06	NA		3.75E-08	NA		NV	8.40E+00		
Boron	4.31E+00	4.05E-02	NA		2.11E-04	NA		NV	NA		
Cadmium	1.26E-03	1.18E-05	NA		6.16E-08	NA		NV	6.30E+00		
Chromium	3.57E-02	3.35E-04	NA		1.75E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	3.29E-06	5.00E-01	1.64E-06	3.43E-08	5.00E-01	1.72E-08	NV	2.94E-01		**1.66E-06**
Cobalt	8.89E-03	8.35E-05	NA		1.74E-07	NA		NV	3.15E+00		
Copper	4.66E-02	4.38E-04	NA		2.28E-06	NA		NV	NA		
Iron	5.35E+01	5.03E-01	NA		2.62E-03	NA		NV	NA		
Lead	4.00E-02	3.76E-04	NA		1.96E-07	NA		NV	NA		
Manganese	4.33E+00	4.07E-02	NA		2.12E-04	NA		NV	NA		
Mercury	1.21E-04	1.14E-06	NA		5.93E-09	NA		NV	NA		
Molybdenum	5.64E-03	5.29E-05	NA		2.76E-07	NA		NV	NA		
Nickel	5.46E-02	5.13E-04	NA		5.35E-07	NA		NV	9.10E-01		
Selenium	1.89E-02	1.78E-04	NA		9.27E-07	NA		NV	NA		
Silver	1.20E-04	1.13E-06	NA		3.53E-09	NA		NV	NA		

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Thallium	5.00E-05	4.70E-07	NA		2.45E-09	NA		NV	NA		
Vanadium	3.19E-02	3.00E-04	NA		1.57E-06	NA		NV	NA		
Zinc	3.03E-01	2.85E-03	NA		8.91E-06	NA		NV	NA		
Cyanide	6.29E-02	5.91E-04	NA		3.08E-06	NA		NV	NA		
Pesticides/PCBs											
4,4'-DDD	5.00E-03	4.69E-05	2.40E-01	1.13E-05	3.27E-04	2.40E-01	7.84E-05	NV	2.42E-01		**8.97E-05**
4,4'-DDE	7.76E-04	7.29E-06	3.40E-01	2.48E-06	4.45E-05	3.40E-01	1.51E-05	NV	3.40E-01		**1.76E-05**
4,4'-DDT	1.80E-04	1.69E-06	3.40E-01	5.75E-07	1.94E-05	3.40E-01	6.58E-06	NV	3.40E-01		**7.16E-06**
Aldrin	4.05E-04	3.80E-06	1.70E+01	6.46E-05	3.44E-07	1.70E+01	5.85E-06	NV	1.72E+01		**7.04E-05**
alpha-BHC	3.00E-04	2.82E-06	6.30E+00	1.78E-05	1.24E-06	6.30E+00	7.82E-06	NV	6.30E+00		**2.56E-05**
alpha-Chlordane	3.34E-04	3.14E-06	1.30E+00	4.08E-06	6.45E-06	1.30E+00	8.38E-06	NV	3.50E-01		**1.25E-05**
Atrazine	2.00E-03	1.88E-05	2.30E-01	4.32E-06	2.40E-06	2.30E-01	5.53E-07	NV	NA		**4.87E-06**
beta-BHC	3.69E-04	3.46E-06	1.80E+00	6.23E-06	1.53E-06	1.80E+00	2.75E-06	NV	1.86E+00		**8.98E-06**
delta-BHC	1.60E-04	1.50E-06	NA		6.62E-07	NA		NV	NA		
Diazinon	2.60E-04	2.44E-06	NA		1.09E-06	NA		NV	NA		
Dieldrin	9.24E-04	8.68E-06	1.60E+01	1.39E-04	5.97E-06	1.60E+01	9.55E-05	NV	1.61E+01		**2.34E-04**
Endosulfan I	3.31E-04	3.11E-06	NA		7.41E-07	NA		NV	NA		
Endosulfan II	2.30E-04	2.16E-06	NA		3.21E-07	NA		NV	NA		
Endosulfan sulfate	9.20E-05	8.64E-07	NA		NA	NA		NV	NA		
Endrin	6.46E-04	6.07E-06	NA		4.18E-06	NA		NV	NA		
Endrin aldehyde	1.40E-04	1.32E-06	NA		NA	NA		NV	NA		
Endrin ketone	1.70E-04	1.60E-06	NA		NA	NA		NV	NA		
gamma-BHC	3.28E-04	3.08E-06	1.10E+00	3.38E-06	1.36E-06	1.10E+00	1.49E-06	NV	1.09E+00		**4.88E-06**
gamma-Chlordane	2.50E-04	2.35E-06	1.20E+00	2.82E-06	4.83E-06	1.20E+00	5.79E-06	NV	3.50E-01		**8.61E-06**
Heptachlor	1.11E-04	1.04E-06	4.50E+00	4.68E-06	4.88E-07	4.50E+00	2.20E-06	NV	4.55E+00		**6.88E-06**
Heptachlor epoxide	1.20E-04	1.13E-06	9.10E+00	1.03E-05	1.73E-06	9.10E+00	1.57E-05	NV	9.10E+00		**2.60E-05**
Methoxychlor	1.20E-04	1.13E-06	NA		2.66E-06	NA		NV	NA		
Aroclor-1260	9.63E-04	9.04E-06	2.00E+00	1.81E-05	3.20E-04	2.00E+00	6.39E-04	NV	2.00E+00		**6.58E-04**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	7.33E-03	2.70E-02	1.98E-04	2.62E-05	2.70E-02	7.08E-07	NV	2.70E-02		**1.99E-04**
2,4,6-Trichlorophenol	7.14E-03	6.71E-05	7.00E-02	4.69E-06	5.15E-05	7.00E-02	3.60E-06	NV	7.00E-02		**8.30E-06**
2,4-Dimethylphenol	7.87E-02	7.39E-04	NA		1.10E-04	NA		NV	NA		
2-Chlorophenol	4.30E-03	4.04E-05	NA		4.55E-06	NA		2.01E-04	NA		
2-Methylnaphthalene	2.26E-01	2.12E-03	NA		2.91E-03	NA		1.05E-02	NA		
2-Methylphenol	1.23E-01	1.15E-03	NA		1.10E-04	NA		NV	NA		
2-Nitroaniline	1.00E-02	9.39E-05	NA		6.24E-06	NA		NV	NA		
3,4-methylphenol	8.40E-01	7.89E-03	NA		7.49E-04	NA		NV	NA		
4-Chloro-3-methylphenol	2.38E-02	2.24E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.82E-03	NA		1.73E-04	NA		NV	NA		
Acenaphthene	4.50E-03	4.23E-05	NA		9.33E-05	NA		2.11E-04	NA		
Acenaphthylene	9.54E-03	8.96E-05	NA		2.07E-04	NA		4.46E-04	NA		
Anthracene	3.20E-03	3.01E-05	NA		1.31E-04	NA		1.50E-04	NA		
Benzo(a)anthracene	9.00E-04	8.45E-06	1.20E+00	1.01E-05	1.06E-04	1.20E+00	1.28E-04	NV	3.85E-01		**1.38E-04**
Benzo(a)pyrene	5.00E-04	4.70E-06	1.20E+01	5.64E-05	1.01E-04	1.20E+01	1.21E-03	NV	3.85E+00		**1.27E-03**
Benzo(b)fluoranthene	7.60E-04	7.14E-06	1.20E+00	8.57E-06	1.56E-04	1.20E+00	1.87E-04	NV	3.85E-01		**1.96E-04**
Benzo(g,h,i)perylene	2.00E-04	1.88E-06	NA		7.32E-05	NA		NV	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Oral: Cancer Risk [-]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Dermal: Cancer Risk [-]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Exposure Route = Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
Benzo(k)fluoranthene	4.60E-04	4.32E-06	1.20E+00	5.19E-06	8.91E-05	1.20E+00	1.07E-04	NV	3.85E-01		**1.12E-04**
Biphenyl (Diphenyl)	1.30E-03	1.22E-05	NA		1.86E-05	NA		NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	1.88E-06	NA		4.32E-08	NA		9.36E-06	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	1.59E-04	1.40E-02	2.22E-06	3.03E-04	1.40E-02	4.25E-06	NV	8.40E-03		**6.47E-06**
Bromoform	1.20E-02	1.13E-04	1.10E-02	1.24E-06	7.77E-06	1.10E-02	8.55E-08	5.61E-04	3.85E-03	2.16E-06	**3.49E-06**
Caprolactam	2.40E-03	2.25E-05	NA		2.89E-07	NA		NV	NA		
Carbazole	1.25E-02	1.18E-04	NA		1.11E-04	NA		NV	NA		
Chrysene	1.10E-03	1.03E-05	1.20E-01	1.24E-06	1.30E-04	1.20E-01	1.56E-05	NV	3.85E-02		**1.68E-05**
Dibenz(a,h)anthracene	4.50E-05	4.23E-07	7.30E+00	3.09E-06	1.41E-05	7.30E+00	1.03E-04	NV	4.20E+00		**1.06E-04**
Diethylphthalate	1.03E-02	9.68E-05	NA		9.70E-06	NA		NV	NA		
Di-n-butyl phthalate	1.17E-02	1.09E-04	NA		8.72E-05	NA		NV	NA		
Fluoranthene	2.40E-03	2.25E-05	NA		1.12E-04	NA		NV	NA		
Fluorene	2.60E-03	2.44E-05	NA		7.49E-05	NA		1.22E-04	NA		
Hexachloroethane	1.00E-03	9.39E-06	3.90E-02	3.66E-07	7.96E-06	3.90E-02	3.11E-07	NV	3.85E-01		6.77E-07
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.88E-06	1.20E+00	2.25E-06	4.11E-05	1.20E+00	4.93E-05	NV	3.85E-01		**5.16E-05**
Naphthalene	1.36E-01	1.28E-03	1.20E-01	1.54E-04	8.44E-04	1.20E-01	1.01E-04	6.37E-03	1.19E-01	7.58E-04	**1.01E-03**
Nitrobenzene	2.00E-03	1.88E-05	NA		1.38E-06	NA		9.36E-05	1.40E-01	1.31E-05	**1.31E-05**
N-Nitrosodi-n-propylamine	2.00E-03	1.88E-05	7.00E+00	1.32E-04	6.24E-07	7.00E+00	4.37E-06	NV	7.00E+00		**1.36E-04**
N-Nitrosodiphenylamine	1.20E-03	1.13E-05	9.00E-03	1.01E-07	6.46E-06	9.00E-03	5.82E-08	NV	9.10E-03		1.60E-07
Pentachlorophenol	1.13E-02	1.06E-04	1.20E-01	1.27E-05	1.27E-03	1.20E-01	1.53E-04	NV	1.79E-02		**1.66E-04**
Phenanthrene	6.00E-03	5.64E-05	NA		1.53E-04	NA		NV	NA		
Pyrene	2.40E-03	2.25E-05	NA		1.65E-04	NA		1.12E-04	NA		
1,1,1-Trichloroethane	1.18E-01	1.11E-03	NA		2.09E-04	NA		5.52E-03	NA		
1,1,2,2-Tetrachloroethane	1.29E-02	1.21E-04	2.00E-01	2.43E-05	1.52E-05	2.00E-01	3.04E-06	6.04E-04	2.03E-01	1.23E-04	**1.50E-04**
1,1,2-Trichloroethane	1.33E-02	1.25E-04	7.20E-02	9.01E-06	1.16E-05	7.20E-02	8.37E-07	6.23E-04	5.70E-02	3.55E-05	**4.54E-05**
1,1-Dichloroethane	5.57E-01	5.23E-03	5.70E-03	2.98E-05	4.08E-04	5.70E-03	2.32E-06	2.61E-02	5.70E-03	1.49E-04	**1.81E-04**
1,1-Dichloroethene	4.16E-02	3.91E-04	NA		5.38E-05	NA		1.94E-03	9.10E-02	1.77E-04	**1.77E-04**
1,2,3-Trichlorobenzene	2.72E-03	2.56E-05	NA		NA	NA		1.27E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	1.42E-04	2.90E-02	4.11E-06	1.85E-04	2.90E-02	5.37E-06	7.06E-04	NA		**9.48E-06**
1,2,4-Trimethylbenzene	2.78E-01	2.61E-03	NA		2.91E-03	NA		1.30E-02	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	2.25E-05	7.00E+00	1.58E-04	4.30E-06	7.00E+00	3.01E-05	1.12E-04	7.00E+00	7.86E-04	**9.74E-04**
1,2-Dichlorobenzene	7.34E-01	6.90E-03	NA		4.48E-03	NA		3.44E-02	NA		
1,2-Dichloroethane	1.44E-02	1.35E-04	9.10E-02	1.23E-05	1.05E-05	9.10E-02	9.57E-07	6.72E-04	9.10E-02	6.11E-05	**7.44E-05**
1,2-Dichloropropane	5.10E-03	4.79E-05	3.60E-02	1.72E-06	4.76E-06	3.60E-02	1.71E-07	2.39E-04	3.50E-02	8.35E-06	**1.02E-05**
1,3,5-Trimethylbenzene	1.10E-01	1.04E-03	NA		8.40E-04	NA		5.16E-03	NA		
1,3-Dichlorobenzene	2.71E-02	2.55E-04	NA		2.34E-04	NA		1.27E-03	NA		
1,4-Dichlorobenzene	2.18E-01	2.05E-03	5.40E-03	1.10E-05	1.36E-03	5.40E-03	7.36E-06	1.02E-02	3.85E-02	3.92E-04	**4.11E-04**
2-Chlorotoluene	2.89E-03	2.71E-05	NA		NA	NA		1.35E-04	NA		
2-Hexanone	2.35E-02	2.21E-04	NA		9.19E-06	NA		1.10E-03	NA		
2,2-Dichloropropane	5.00E-04	4.70E-06	NA		NA	NA		2.34E-05	NA		
Acetone	4.85E-01	4.56E-03	NA		2.19E-05	NA		2.27E-02	NA		
Benzene	4.00E-01	3.76E-03	1.00E-01	3.76E-04	5.73E-04	1.00E-01	5.73E-05	1.87E-02	1.02E-01	1.90E-03	**2.33E-03**
Carbon disulfide	3.10E-03	2.91E-05	NA		5.09E-06	NA		1.45E-04	NA		
Carbon tetrachloride	3.00E-04	2.82E-06	1.50E-01	4.23E-07	7.47E-07	1.50E-01	1.12E-07	1.40E-05	1.47E-01	2.06E-06	**2.60E-06**
Chlorobenzene	6.74E-01	6.33E-03	NA		2.25E-03	NA		3.15E-02	NA		
Chloroethane	9.74E-02	9.15E-04	NA		5.33E-05	NA		4.56E-03	2.90E-03	1.32E-05	**1.32E-05**

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Chloroform	4.40E-03	4.13E-05	3.10E-02	1.28E-06	3.73E-06	3.10E-02	1.16E-07	2.06E-04	1.86E-02	3.82E-06	**5.21E-06**
Chloromethane	7.40E-03	6.95E-05	NA		2.03E-06	NA		3.46E-04	NA		
cis-1,2-Dichloroethene	1.37E+01	1.29E-01	NA		1.61E-02	NA		6.42E-01	NA		
cis-1,3-Dichloropropene	4.20E-03	3.95E-05	1.00E-01	3.95E-06	2.13E-06	1.00E-01	2.13E-07	1.96E-04	5.60E-02	1.10E-05	**1.52E-05**
Cyclohexane	1.80E-02	1.69E-04	NA		1.78E-04	NA		8.42E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	1.13E-05	NA		NA	NA		5.61E-05	NA		
Ethylbenzene	4.49E-01	4.22E-03	1.10E-02	4.64E-05	2.52E-03	1.10E-02	2.77E-05	2.10E-02	8.75E-03	1.84E-04	**2.58E-04**
Isopropyl ether	4.30E-01	4.04E-03	NA		NA	NA		2.01E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	2.54E-04	NA		2.97E-04	NA		1.27E-03	NA		
Methyl acetate	2.25E-02	2.12E-04	NA		1.68E-06	NA		1.05E-03	NA		
Methyl ethyl ketone	4.30E-01	4.04E-03	NA		3.79E-05	NA		2.01E-02	NA		
Methyl isobutyl ketone	4.86E+00	4.56E-02	NA		1.42E-03	NA		2.27E-01	NA		
Methyl tert-butyl ether	2.01E-02	1.89E-04	1.80E-03	3.40E-07	4.35E-06	1.80E-03	7.84E-09	9.42E-04	9.10E-04	8.57E-07	**1.21E-06**
Methylcyclohexane	2.45E-02	2.30E-04	NA		2.87E-04	NA		1.15E-03	NA		
Methylene chloride	8.19E-03	7.69E-05	1.40E-02	1.08E-06	2.86E-06	1.40E-02	4.00E-08	3.83E-04	3.50E-03	1.34E-06	**2.46E-06**
n-Butylbenzene	6.12E-03	5.74E-05	NA		NA	NA		2.86E-04	NA		
n-Propylbenzene	5.61E-02	5.27E-04	NA		NA	NA		2.63E-03	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	7.38E-04	NA		NA	NA		3.67E-03	NA		
Phenol	4.80E-02	4.51E-04	NA		2.19E-05	NA		NV	NA		
sec-Butylbenzene	5.64E-03	5.30E-05	NA		NA	NA		2.64E-04	NA		
Styrene	1.39E-02	1.31E-04	NA		5.82E-05	NA		6.51E-04	NA		
tert-Butylbenzene	2.10E-03	1.97E-05	NA		NA	NA		9.82E-05	NA		
tert-Butyl alcohol	1.17E-01	1.10E-03	NA		NA	NA		5.47E-03	NA		
Tetrachloroethene	1.20E-02	1.13E-04	5.40E-01	6.09E-05	6.66E-05	5.40E-01	3.59E-05	5.61E-04	2.07E-02	1.16E-05	**1.08E-04**
Toluene	6.11E+00	5.74E-02	NA		1.98E-02	NA		2.86E-01	NA		
trans-1,2-Dichloroethene	4.01E-01	3.77E-03	NA		3.33E-04	NA		1.88E-02	NA		
trans-1,3-Dichloropropene	4.10E-03	3.85E-05	1.00E-01	3.85E-06	2.08E-06	1.00E-01	2.08E-07	1.92E-04	5.60E-02	1.07E-05	**1.48E-05**
Trichloroethene	5.70E-02	5.35E-04	5.90E-03	3.16E-06	9.20E-05	5.90E-03	5.43E-07	2.66E-03	7.00E-03	1.86E-05	**2.23E-05**
Vinyl chloride	1.63E+00	1.53E-02	7.20E-01	1.10E-02	8.08E-04	7.20E-01	5.82E-04	7.61E-02	2.73E-01	2.08E-02	**3.24E-02**
m,p-Xylenes	9.44E-01	8.87E-03	NA		NA	NA		4.42E-02	NA		
o-Xylene	4.45E-01	4.18E-03	NA		3.58E-03	NA		2.08E-02	NA		
Xylenes, total	1.60E+00	1.50E-02	NA		9.71E-03	NA		7.49E-02	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	4.36E-09	1.50E+03	6.54E-06	1.68E-07	1.50E+03	2.53E-04	NV	1.50E+03		**2.59E-04**
1,2,3,4,6,7,8-HpCDF	9.49E-08	8.92E-10	1.50E+03	1.34E-06	3.11E-08	1.50E+03	4.66E-05	NV	1.50E+03		**4.79E-05**
1,2,3,4,7,8,9-HpCDF	9.79E-09	9.20E-11	1.50E+03	1.38E-07	3.20E-09	1.50E+03	4.80E-06	NV	1.50E+03		**4.94E-06**
1,2,3,4,7,8-HxCDD	2.62E-09	2.46E-11	1.50E+04	3.70E-07	7.62E-10	1.50E+04	1.14E-05	NV	1.50E+04		**1.18E-05**
1,2,3,4,7,8-HxCDF	8.49E-09	7.98E-11	1.50E+04	1.20E-06	2.23E-09	1.50E+04	3.34E-05	NV	1.50E+04		**3.46E-05**
1,2,3,6,7,8-HxCDD	1.33E-08	1.25E-10	1.50E+04	1.87E-06	3.86E-09	1.50E+04	5.79E-05	NV	1.50E+04		**5.98E-05**
1,2,3,6,7,8-HxCDF	1.62E-09	1.52E-11	1.50E+04	2.28E-07	4.24E-10	1.50E+04	6.35E-06	NV	1.50E+04		**6.58E-06**
1,2,3,7,8,9-HxCDD	4.40E-09	4.14E-11	1.50E+04	6.20E-07	1.28E-09	1.50E+04	1.92E-05	NV	1.50E+04		**1.98E-05**
1,2,3,7,8,9-HxCDF	3.87E-09	3.63E-11	1.50E+04	5.45E-07	1.01E-09	1.50E+04	1.52E-05	NV	1.50E+04		**1.57E-05**
1,2,3,7,8-PeCDD	1.08E-09	1.01E-11	1.50E+05	1.52E-06	2.51E-10	1.50E+05	3.77E-05	NV	1.50E+05		**3.92E-05**
1,2,3,7,8-PeCDF	2.28E-09	2.14E-11	7.50E+03	1.61E-07	4.78E-10	7.50E+03	3.59E-06	NV	7.50E+03		**3.75E-06**
2,3,4,6,7,8-HxCDF	3.94E-09	3.70E-11	1.50E+04	5.56E-07	1.03E-09	1.50E+04	1.55E-05	NV	1.50E+04		**1.61E-05**
2,3,4,7,8-PeCDF	2.64E-09	2.48E-11	7.50E+04	1.86E-06	5.53E-10	7.50E+04	4.15E-05	NV	7.50E+04		**4.33E-05**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Oral: Chronic Daily Intake [mg/kg/day]	Oral: Cancer Slope Factor, SF [mg/kg/day]-1	Oral: Cancer Risk [-]	Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Cancer Slope Factor, SF [mg/kg/day]-1	Dermal: Cancer Risk [-]	Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Cancer Slope Factor, SF [mg/kg/day]-1	Inhalation: Cancer Risk [-]	Total Cancer Risk [-]
2,3,7,8-TCDF	1.68E-09	1.58E-11	1.50E+04	2.37E-07	2.82E-10	1.50E+04	4.23E-06	NV	1.50E+04		**4.47E-06**
OCDF	7.44E-07	6.98E-09	1.50E+01	1.05E-07	3.04E-07	1.50E+01	4.56E-06	NV	1.50E+01		**4.66E-06**
OCDD	2.18E-06	2.05E-08	1.50E+01	3.07E-07	9.87E-07	1.50E+01	1.48E-05	NV	1.50E+01		**1.51E-05**
			Total Risk:	1.67E-02		**Total Risk:**	4.30E-03		**Total Risk:**	2.54E-02	**4.64E-02**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **4.6E-02**

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-7
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Adult Resident
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	0.58	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	24	years
Ingestion Rate	IngR	2	L/day
Inhalation Rate	InhR	0.83	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	24	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.40E+00	2.57E-01	1.00E+00	2.57E-01	1.34E-03	1.00E+00	1.34E-03	NV	1.40E-03		**2.59E-01**
Antimony	1.51E-03	4.14E-05	4.00E-04	1.04E-01	2.16E-07	4.00E-04	5.41E-04	NV	NA		**1.04E-01**
Arsenic	2.87E-01	7.86E-03	3.00E-04	2.62E+01	4.10E-05	3.00E-04	1.37E-01	NV	4.29E-06		**2.63E+01**
Barium	1.68E-01	4.59E-03	2.00E-01	2.30E-02	2.40E-05	2.00E-01	1.20E-04	NV	1.43E-04		2.31E-02
Beryllium	7.64E-04	2.09E-05	2.00E-03	1.05E-02	1.09E-07	2.00E-03	5.46E-05	NV	2.00E-06		1.05E-02
Boron	4.31E+00	1.18E-01	2.00E-01	5.90E-01	6.16E-04	2.00E-01	3.08E-03	NV	5.70E-03		**5.93E-01**
Cadmium	1.26E-03	3.44E-05	5.00E-04	6.88E-02	1.80E-07	5.00E-04	3.59E-04	NV	2.86E-06		6.92E-02
Chromium	3.57E-02	9.78E-04	NA		5.10E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	9.59E-06	3.00E-03	3.20E-03	1.00E-07	3.00E-03	3.34E-05	NV	2.86E-05		3.23E-03
Cobalt	8.89E-03	2.44E-04	3.00E-04	8.12E-01	5.09E-07	3.00E-04	1.70E-03	NV	1.71E-06		**8.14E-01**
Copper	4.66E-02	1.28E-03	4.00E-02	3.19E-02	6.66E-06	4.00E-02	1.67E-04	NV	NA		3.21E-02
Iron	5.35E+01	1.47E+00	7.00E-01	2.09E+00	7.65E-03	7.00E-01	1.09E-02	NV	NA		**2.11E+00**
Lead	4.00E-02	1.10E-03	NA		5.72E-07	NA		NV	NA		
Manganese	4.33E+00	1.19E-01	2.40E-02	4.94E+00	6.19E-04	2.40E-02	2.58E-02	NV	1.43E-05		**4.97E+00**
Mercury	1.21E-04	3.32E-06	3.00E-04	1.11E-02	1.73E-08	3.00E-04	5.77E-05	NV	NA		1.11E-02
Molybdenum	5.64E-03	1.54E-04	5.00E-03	3.09E-02	8.06E-07	5.00E-03	1.61E-04	NV	NA		3.10E-02
Nickel	5.46E-02	1.50E-03	2.00E-02	7.48E-02	1.56E-06	2.00E-02	7.81E-05	NV	2.57E-05		7.49E-02
Selenium	1.89E-02	5.18E-04	5.00E-03	1.04E-01	2.70E-06	5.00E-03	5.41E-04	NV	5.71E-03		**1.04E-01**
Silver	1.20E-04	3.29E-06	5.00E-03	6.58E-04	1.03E-08	5.00E-03	2.06E-06	NV	NA		6.60E-04
Thallium	5.00E-05	1.37E-06	6.60E-05	2.08E-02	7.15E-09	6.60E-05	1.08E-04	NV	NA		2.09E-02

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Vanadium	3.19E-02	8.75E-04	5.00E-03	1.75E-01	4.57E-06	5.00E-03	9.14E-04	NV	NA		**1.76E-01**
Zinc	3.03E-01	8.30E-03	3.00E-01	2.77E-02	2.60E-05	3.00E-01	8.67E-05	NV	NA		2.78E-02
Cyanide	6.29E-02	1.72E-03	2.00E-02	8.62E-02	9.00E-06	2.00E-02	4.50E-04	NV	NA		8.66E-02
Pesticides/PCBs											
4,4'-DDD	5.00E-03	1.37E-04	NA		9.53E-04	NA		NV	NA		
4,4'-DDE	7.76E-04	2.13E-05	NA		1.30E-04	NA		NV	NA		
4,4'-DDT	1.80E-04	4.93E-06	5.00E-04	9.86E-03	5.65E-05	5.00E-04	1.13E-01	NV	NA		**1.23E-01**
Aldrin	4.05E-04	1.11E-05	3.00E-05	3.69E-01	1.00E-06	3.00E-05	3.34E-02	NV	NA		**4.03E-01**
alpha-BHC	3.00E-04	8.22E-06	5.00E-04	1.64E-02	3.62E-06	5.00E-04	7.24E-03	NV	NA		2.37E-02
alpha-Chlordane	3.34E-04	9.15E-06	5.00E-04	1.83E-02	1.88E-05	5.00E-04	3.76E-02	NV	2.00E-04		5.59E-02
Atrazine	2.00E-03	5.48E-05	3.50E-02	1.57E-03	7.01E-06	3.50E-02	2.00E-04	NV	NA		1.77E-03
beta-BHC	3.69E-04	1.01E-05	NA		4.45E-06	NA		NV	NA		
delta-BHC	1.60E-04	4.38E-06	NA		1.93E-06	NA		NV	NA		
Diazinon	2.60E-04	7.11E-06	7.00E-04	1.02E-02	3.18E-06	7.00E-04	4.55E-03	NV	NA		1.47E-02
Dieldrin	9.24E-04	2.53E-05	5.00E-05	5.06E-01	1.74E-05	5.00E-05	3.48E-01	NV	NA		**8.54E-01**
Endosulfan I	3.31E-04	9.07E-06	6.00E-03	1.51E-03	2.16E-06	6.00E-03	3.60E-04	NV	NA		1.87E-03
Endosulfan II	2.30E-04	6.30E-06	6.00E-03	1.05E-03	9.37E-07	6.00E-03	1.56E-04	NV	NA		1.21E-03
Endosulfan sulfate	9.20E-05	2.52E-06	6.00E-03	4.20E-04	NA	6.00E-03		NV	NA		4.20E-04
Endrin	6.46E-04	1.77E-05	3.00E-04	5.90E-02	1.22E-05	3.00E-04	4.06E-02	NV	NA		9.96E-02
Endrin aldehyde	1.40E-04	3.84E-06	3.00E-04	1.28E-02	NA	3.00E-04		NV	NA		1.28E-02
Endrin ketone	1.70E-04	4.66E-06	3.00E-04	1.55E-02	NA	3.00E-04		NV	NA		1.55E-02
gamma-BHC	3.28E-04	8.97E-06	3.00E-04	2.99E-02	3.95E-06	3.00E-04	1.32E-02	NV	NA		4.31E-02
gamma-Chlordane	2.50E-04	6.85E-06	5.00E-04	1.37E-02	1.41E-05	5.00E-04	2.82E-02	NV	2.00E-04		4.19E-02
Heptachlor	1.11E-04	3.03E-06	3.00E-05	1.01E-01	1.42E-06	3.00E-05	4.75E-02	NV	NA		**1.49E-01**
Heptachlor epoxide	1.20E-04	3.29E-06	1.30E-05	2.53E-01	5.04E-06	1.30E-05	3.87E-01	NV	NA		**6.40E-01**
Methoxychlor	1.20E-04	3.29E-06	2.00E-05	1.64E-01	7.77E-06	2.00E-05	3.88E-01	NV	NA		**5.53E-01**
Aroclor-1260	9.63E-04	2.64E-05	2.00E-05	1.32E+00	9.33E-04	2.00E-05	4.66E+01	NV	NA		**4.79E+01**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	2.14E-02	1.00E-01	2.14E-01	7.65E-05	1.00E-01	7.65E-04	NV	8.57E-01		**2.14E-01**
2,4,6-Trichlorophenol	7.14E-03	1.96E-04	1.00E-03	1.96E-01	1.50E-04	1.00E-03	1.50E-01	NV	NA		**3.46E-01**
2,4-Dimethylphenol	7.87E-02	2.16E-03	2.00E-02	1.08E-01	3.20E-04	2.00E-02	1.60E-02	NV	NA		**1.24E-01**
2-Chlorophenol	4.30E-03	1.18E-04	5.00E-03	2.36E-02	1.33E-05	5.00E-03	2.65E-03	5.87E-04	NA		2.62E-02
2-Methylnaphthalene	2.26E-01	6.18E-03	4.00E-03	1.54E+00	8.49E-03	4.00E-03	2.12E+00	3.08E-02	NA		**3.67E+00**
2-Methylphenol	1.23E-01	3.37E-03	5.00E-02	6.73E-02	3.20E-04	5.00E-02	6.39E-03	NV	1.71E-01		7.37E-02
2-Nitroaniline	1.00E-02	2.74E-04	1.00E-02	2.74E-02	1.82E-05	1.00E-02	1.82E-03	NV	1.43E-05		2.92E-02
3,4-methylphenol	8.40E-01	2.30E-02	5.00E-03	4.60E+00	2.19E-03	5.00E-03	4.37E-01	NV	1.71E-01		**5.04E+00**
4-Chloro-3-methylphenol	2.38E-02	6.52E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	5.31E-03	5.00E-03	1.06E+00	5.04E-04	5.00E-03	1.01E-01	NV	1.71E-01		**1.16E+00**
Acenaphthene	4.50E-03	1.23E-04	6.00E-02	2.05E-03	2.72E-04	6.00E-02	4.54E-03	6.14E-04	NA		6.59E-03
Acenaphthylene	9.54E-03	2.61E-04	NA		6.04E-04	NA		1.30E-03	NA		
Anthracene	3.20E-03	8.77E-05	3.00E-01	2.92E-04	3.82E-04	3.00E-01	1.27E-03	4.37E-04	NA		1.57E-03
Benzo(a)anthracene	9.00E-04	2.47E-05	NA		3.10E-04	NA		NV	NA		
Benzo(a)pyrene	5.00E-04	1.37E-05	NA		2.95E-04	NA		NV	NA		
Benzo(b)fluoranthene	7.60E-04	2.08E-05	NA		4.55E-04	NA		NV	NA		
Benzo(g,h,i)perylene	2.00E-04	5.48E-06	NA		2.13E-04	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	1.26E-05	NA		2.60E-04	NA		NV	NA		
Biphenyl (Diphenyl)	1.30E-03	3.56E-05	5.00E-02	7.12E-04	5.43E-05	5.00E-02	1.09E-03	NV	NA		1.80E-03

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
bis(2-Chloroethoxy)methane	2.00E-04	5.48E-06	3.00E-03	1.83E-03	1.26E-07	3.00E-03	4.20E-05	2.73E-05	NA		1.87E-03
bis(2-Ethylhexyl)phthalate	1.69E-02	4.63E-04	2.00E-02	2.32E-02	8.85E-04	2.00E-02	4.43E-02	NV	NA		6.74E-02
Bromoform	1.20E-02	3.29E-04	2.00E-02	1.64E-02	2.27E-05	2.00E-02	1.13E-03	1.64E-03	NA		1.76E-02
Caprolactam	2.40E-03	6.58E-05	5.00E-01	1.32E-04	8.42E-07	5.00E-01	1.68E-06	NV	NA		1.33E-04
Carbazole	1.25E-02	3.43E-04	NA		3.24E-04	NA		NV	NA		
Chrysene	1.10E-03	3.01E-05	NA		3.79E-04	NA		NV	NA		
Dibenz(a,h)anthracene	4.50E-05	1.23E-06	NA		4.10E-05	NA		NV	NA		
Diethylphthalate	1.03E-02	2.82E-04	8.00E-01	3.53E-04	2.83E-05	8.00E-01	3.54E-05	NV	NA		3.88E-04
Di-n-butyl phthalate	1.17E-02	3.19E-04	1.00E-01	3.19E-03	2.54E-04	1.00E-01	2.54E-03	NV	NA		5.74E-03
Fluoranthene	2.40E-03	6.58E-05	4.00E-02	1.64E-03	3.27E-04	4.00E-02	8.19E-03	NV	NA		9.83E-03
Fluorene	2.60E-03	7.12E-05	4.00E-02	1.78E-03	2.19E-04	4.00E-02	5.46E-03	3.55E-04	NA		7.24E-03
Hexachloroethane	1.00E-03	2.74E-05	1.00E-03	2.74E-02	2.32E-05	1.00E-03	2.32E-02	NV	NA		5.06E-02
Indeno(1,2,3-c,d)pyrene	2.00E-04	5.48E-06	NA		1.20E-04	NA		NV	NA		
Naphthalene	1.36E-01	3.73E-03	2.00E-02	1.87E-01	2.46E-03	2.00E-02	1.23E-01	1.86E-02	8.57E-04	2.17E+01	**2.20E+01**
Nitrobenzene	2.00E-03	5.48E-05	2.00E-03	2.74E-02	4.01E-06	2.00E-03	2.01E-03	2.73E-04	2.57E-03	1.06E-01	**1.36E-01**
N-Nitrosodi-n-propylamine	2.00E-03	5.48E-05	NA		1.82E-06	NA		NV	NA		
N-Nitrosodiphenylamine	1.20E-03	3.29E-05	2.00E-02	1.64E-03	1.89E-05	2.00E-02	9.43E-04	NV	2.00E-02		2.59E-03
Pentachlorophenol	1.13E-02	3.09E-04	3.00E-02	1.03E-02	3.71E-03	3.00E-02	1.24E-01	NV	3.00E-02		**1.34E-01**
Phenanthrene	6.00E-03	1.64E-04	NA		4.46E-04	NA		NV	NA		
Pyrene	2.40E-03	6.58E-05	3.00E-02	2.19E-03	4.82E-04	3.00E-02	1.61E-02	3.27E-04	NA		1.83E-02
1,1,1-Trichloroethane	1.18E-01	3.23E-03	2.00E+00	1.62E-03	6.10E-04	2.00E+00	3.05E-04	1.61E-02	1.43E+00	1.13E-02	1.32E-02
1,1,2,2-Tetrachloroethane	1.29E-02	3.54E-04	4.00E-03	8.85E-02	4.43E-05	4.00E-03	1.11E-02	1.76E-03	6.00E-02	2.94E-02	**1.29E-01**
1,1,2-Trichloroethane	1.33E-02	3.65E-04	4.00E-03	9.13E-02	3.39E-05	4.00E-03	8.48E-03	1.82E-03	NA		9.98E-02
1,1-Dichloroethane	5.57E-01	1.53E-02	2.00E-01	7.63E-02	1.19E-03	2.00E-01	5.95E-03	7.60E-02	NA		8.22E-02
1,1-Dichloroethene	4.16E-02	1.14E-03	5.00E-02	2.28E-02	1.57E-04	5.00E-02	3.14E-03	5.67E-03	2.00E-02	2.84E-01	**3.10E-01**
1,2,3-Trichlorobenzene	2.72E-03	7.46E-05	NA		NA	NA		3.72E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	4.13E-04	1.00E-02	4.13E-02	5.40E-04	1.00E-02	5.40E-02	2.06E-03	5.71E-04	3.60E+00	**3.70E+00**
1,2,4-Trimethylbenzene	2.78E-01	7.61E-03	7.00E-03	1.09E+00	8.49E-03	7.00E-03	1.21E+00	3.79E-02	NA		**2.30E+00**
1,2-Dibromo-3-chloropropane	2.40E-03	6.58E-05	2.00E-04	3.29E-01	1.25E-05	2.00E-04	6.27E-02	3.27E-04	5.71E-05	5.73E+00	**6.12E+00**
1,2-Dichlorobenzene	7.34E-01	2.01E-02	9.00E-02	2.24E-01	1.31E-02	9.00E-02	1.45E-01	1.00E-01	5.71E-02	1.75E+00	**2.12E+00**
1,2-Dichloroethane	1.44E-02	3.94E-04	2.00E-02	1.97E-02	3.07E-05	2.00E-02	1.53E-03	1.96E-03	6.86E-01	2.86E-03	2.41E-02
1,2-Dichloropropane	5.10E-03	1.40E-04	9.00E-02	1.55E-03	1.39E-05	9.00E-02	1.54E-04	6.96E-04	1.14E-03	6.09E-01	**6.11E-01**
1,3,5-Trimethylbenzene	1.10E-01	3.02E-03	1.00E-02	3.02E-01	2.45E-03	1.00E-02	2.45E-01	1.50E-02	NA		**5.47E-01**
1,3-Dichlorobenzene	2.71E-02	7.42E-04	NA		6.82E-04	NA		3.70E-03	NA		
1,4-Dichlorobenzene	2.18E-01	5.97E-03	7.00E-02	8.53E-02	3.97E-03	7.00E-02	5.68E-02	2.97E-02	2.29E-01	1.30E-01	**2.72E-01**
2-Chlorotoluene	2.89E-03	7.91E-05	2.00E-02	3.95E-03	NA	2.00E-02		3.94E-04	NA		3.95E-03
2-Hexanone	2.35E-02	6.45E-04	5.00E-03	1.29E-01	2.68E-05	5.00E-03	5.36E-03	3.21E-03	8.57E-03	3.75E-01	**5.09E-01**
2,2-Dichloropropane	5.00E-04	1.37E-05	NA		NA	NA		6.82E-05	NA		
Acetone	4.85E-01	1.33E-02	9.00E-01	1.48E-02	6.38E-05	9.00E-01	7.09E-05	6.62E-02	8.86E+00	7.48E-03	2.23E-02
Benzene	4.00E-01	1.10E-02	4.00E-03	2.74E+00	1.67E-03	4.00E-03	4.18E-01	5.46E-02	8.57E-03	6.37E+00	**9.53E+00**
Carbon disulfide	3.10E-03	8.49E-05	1.00E-01	8.49E-04	1.49E-05	1.00E-01	1.49E-04	4.23E-04	2.00E-01	2.11E-03	3.11E-03
Carbon tetrachloride	3.00E-04	8.22E-06	4.00E-03	2.05E-03	2.18E-06	4.00E-03	5.44E-04	4.09E-05	1.14E-02	3.58E-03	6.18E-03
Chlorobenzene	6.74E-01	1.85E-02	2.00E-02	9.23E-01	6.57E-03	2.00E-02	3.28E-01	9.20E-02	1.43E-02	6.44E+00	**7.69E+00**
Chloroethane	9.74E-02	2.67E-03	NA		1.55E-04	NA		1.33E-02	2.86E+00	4.65E-03	4.65E-03
Chloroform	4.40E-03	1.21E-04	1.00E-02	1.21E-02	1.09E-05	1.00E-02	1.09E-03	6.00E-04	2.80E-02	2.14E-02	3.46E-02
Chloromethane	7.40E-03	2.03E-04	NA		5.91E-06	NA		1.01E-03	2.57E-02	3.93E-02	3.93E-02
cis-1,2-Dichloroethene	1.37E+01	3.76E-01	1.00E-02	3.76E+01	4.69E-02	1.00E-02	4.69E+00	1.87E+00	NA		**4.23E+01**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
cis-1,3-Dichloropropene	4.20E-03	1.15E-04	3.00E-02	3.84E-03	6.22E-06	3.00E-02	2.07E-04	5.73E-04	5.71E-03	1.00E-01	**1.04E-01**
Cyclohexane	1.80E-02	4.93E-04	NA		5.20E-04	NA		2.46E-03	1.71E+00	1.43E-03	1.43E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	3.29E-05	NA		NA	NA		1.64E-04	NA		
Ethylbenzene	4.49E-01	1.23E-02	1.00E-01	1.23E-01	7.34E-03	1.00E-01	7.34E-02	6.12E-02	2.86E-01	2.14E-01	**4.11E-01**
Isopropyl ether	4.30E-01	1.18E-02	NA		NA	NA		5.87E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	7.41E-04	1.00E-01	7.41E-03	8.66E-04	1.00E-01	8.66E-03	3.69E-03	1.14E-01	3.23E-02	4.84E-02
Methyl acetate	2.25E-02	6.17E-04	1.00E+00	6.17E-04	4.90E-06	1.00E+00	4.90E-06	3.07E-03	NA		6.22E-04
Methyl ethyl ketone	4.30E-01	1.18E-02	6.00E-01	1.96E-02	1.11E-04	6.00E-01	1.84E-04	5.87E-02	1.43E+00	4.11E-02	6.09E-02
Methyl isobutyl ketone	4.86E+00	1.33E-01	8.00E-02	1.66E+00	4.15E-03	8.00E-02	5.19E-02	6.63E-01	8.57E-01	7.73E-01	**2.49E+00**
Methyl tert-butyl ether	2.01E-02	5.52E-04	NA		1.27E-05	NA		2.75E-03	8.57E-01	3.21E-03	3.21E-03
Methylcyclohexane	2.45E-02	6.72E-04	NA		8.38E-04	NA		3.35E-03	8.60E-01	3.89E-03	3.89E-03
Methylene chloride	8.19E-03	2.24E-04	6.00E-02	3.74E-03	8.34E-06	6.00E-02	1.39E-04	1.12E-03	2.86E-01	3.91E-03	7.79E-03
n-Butylbenzene	6.12E-03	1.68E-04	4.00E-02	4.19E-03	NA	4.00E-02		8.34E-04	NA		4.19E-03
n-Propylbenzene	5.61E-02	1.54E-03	4.00E-02	3.85E-02	NA	4.00E-02		7.66E-03	NA		3.85E-02
p-Cymene (p-isopropyltoluene)	7.86E-02	2.15E-03	NA		NA	NA		1.07E-02	NA		
Phenol	4.80E-02	1.32E-03	3.00E-01	4.39E-03	6.38E-05	3.00E-01	2.13E-04	NV	5.71E-02		4.60E-03
sec-Butylbenzene	5.64E-03	1.54E-04	4.00E-02	3.86E-03	NA	4.00E-02		7.69E-04	4.00E-02	1.92E-02	2.31E-02
Styrene	1.39E-02	3.81E-04	2.00E-01	1.91E-03	1.70E-04	2.00E-01	8.48E-04	1.90E-03	2.57E-01	7.39E-03	1.01E-02
tert-Butylbenzene	2.10E-03	5.75E-05	4.00E-02	1.44E-03	NA	4.00E-02		2.87E-04	NA		1.44E-03
tert-Butyl alcohol	1.17E-01	3.20E-03	1.00E-01	3.20E-02	NA	1.00E-01		1.59E-02	2.60E-03	6.13E+00	**6.17E+00**
Tetrachloroethene	1.20E-02	3.29E-04	1.00E-02	3.29E-02	1.94E-04	1.00E-02	1.94E-02	1.64E-03	1.00E-02	1.64E-01	**2.16E-01**
Toluene	6.11E+00	1.67E-01	8.00E-02	2.09E+00	5.77E-02	8.00E-02	7.22E-01	8.34E-01	8.57E-02	9.73E+00	**1.25E+01**
trans-1,2-Dichloroethene	4.01E-01	1.10E-02	2.00E-02	5.50E-01	9.72E-04	2.00E-02	4.86E-02	5.48E-02	1.71E-02	3.19E+00	**3.79E+00**
trans-1,3-Dichloropropene	4.10E-03	1.12E-04	3.00E-02	3.74E-03	6.07E-06	3.00E-02	2.02E-04	5.59E-04	5.71E-03	9.79E-02	**1.02E-01**
Trichloroethene	5.70E-02	1.56E-03	3.00E-04	5.20E+00	2.68E-04	3.00E-04	8.95E-01	7.77E-03	1.00E-02	7.77E-01	**6.87E+00**
Vinyl chloride	1.63E+00	4.46E-02	3.00E-03	1.49E+01	2.36E-03	3.00E-03	7.86E-01	2.22E-01	2.86E-02	7.77E+00	**2.34E+01**
m,p-Xylenes	9.44E-01	2.59E-02	2.00E-01	1.29E-01	NA	2.00E-01		1.29E-01	2.00E-01	6.44E-01	**7.73E-01**
o-Xylene	4.45E-01	1.22E-02	2.00E-01	6.09E-02	1.04E-02	2.00E-01	5.22E-02	6.07E-02	2.00E-01	3.03E-01	**4.17E-01**
Xylenes, total	1.60E+00	4.38E-02	2.00E-01	2.19E-01	2.83E-02	2.00E-01	1.42E-01	2.18E-01	2.86E-02	7.64E+00	**8.00E+00**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	1.27E-08	NA		4.91E-07	NA		NV	1.14E-08		
1,2,3,4,6,7,8-HpCDF	9.49E-08	2.60E-09	NA		9.06E-08	NA		NV	1.14E-08		
1,2,3,4,7,8,9-HpCDF	9.79E-09	2.68E-10	NA		9.34E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDD	2.62E-09	7.19E-11	NA		2.22E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDF	8.49E-09	2.33E-10	NA		6.49E-09	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDD	1.33E-08	3.64E-10	NA		1.13E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDF	1.62E-09	4.43E-11	NA		1.24E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDD	4.40E-09	1.21E-10	NA		3.73E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDF	3.87E-09	1.06E-10	NA		2.95E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDD	1.08E-09	2.96E-11	NA		7.32E-10	NA		NV	1.14E-08		
1,2,3,7,8-PeCDF	2.28E-09	6.25E-11	NA		1.40E-09	NA		NV	1.14E-08		
2,3,4,6,7,8-HxCDF	3.94E-09	1.08E-10	NA		3.01E-09	NA		NV	1.14E-08		
2,3,4,7,8-PeCDF	2.64E-09	7.22E-11	NA		1.61E-09	NA		NV	1.14E-08		
2,3,7,8-TCDF	1.68E-09	4.60E-11	NA		8.23E-10	NA		NV	1.14E-08		

Risk Calculations												
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
OCDF	7.44E-07	2.04E-08	NA		8.86E-07	NA		NV	1.14E-08		
OCDD	2.18E-06	5.97E-08	NA		2.88E-06	NA		NV	1.14E-08		
			Total Hazard Index:	1.16E+02		Total Hazard Index:	6.15E+01		Total Hazard Index:	8.49E+01	**2.62E+02**

Total Estimated Hazard Index Across All Exposure Routes : 262

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constan

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-8
Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	**Variable**	**Value**	**Units**
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	1.0	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	6	years
Ingestion Rate	IngR	1	L/day
Inhalation Rate	InhR	0.42	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			**Exposure Route = Dermal**			**Exposure Route = Inhalation**			
Chemical of Potential Concern	**RME Medium EPC Value, Cw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals											
Aluminum	9.40E+00	5.15E-02	NA		3.40E-04	NA		NV	NA		
Antimony	1.51E-03	8.29E-06	NA		5.47E-08	NA		NV	NA		
Arsenic	2.87E-01	1.57E-03	1.50E+00	2.36E-03	1.04E-05	1.50E+00	1.56E-05	NV	1.51E+01		**2.37E-03**
Barium	1.68E-01	9.19E-04	NA		6.06E-06	NA		NV	NA		
Beryllium	7.64E-04	4.19E-06	NA		2.76E-08	NA		NV	8.40E+00		
Boron	4.31E+00	2.36E-02	NA		1.56E-04	NA		NV	NA		
Cadmium	1.26E-03	6.88E-06	NA		4.54E-08	NA		NV	6.30E+00		
Chromium	3.57E-02	1.96E-04	NA		1.29E-06	NA		NV	NA		
Chromium (VI)	3.50E-04	1.92E-06	5.00E-01	9.59E-07	2.53E-08	5.00E-01	1.27E-08	NV	2.94E-01		9.72E-07
Cobalt	8.89E-03	4.87E-05	NA		1.29E-07	NA		NV	3.15E+00		
Copper	4.66E-02	2.55E-04	NA		1.68E-06	NA		NV	NA		
Iron	5.35E+01	2.93E-01	NA		1.93E-03	NA		NV	NA		
Lead	4.00E-02	2.19E-04	NA		1.45E-07	NA		NV	NA		
Manganese	4.33E+00	2.37E-02	NA		1.57E-04	NA		NV	NA		
Mercury	1.21E-04	6.63E-07	NA		4.38E-09	NA		NV	NA		
Molybdenum	5.64E-03	3.09E-05	NA		2.04E-07	NA		NV	NA		
Nickel	5.46E-02	2.99E-04	NA		3.95E-07	NA		NV	9.10E-01		
Selenium	1.89E-02	1.04E-04	NA		6.83E-07	NA		NV	NA		
Silver	1.20E-04	6.58E-07	NA		2.60E-09	NA		NV	NA		
Thallium	5.00E-05	2.74E-07	NA		1.81E-09	NA		NV	NA		
Vanadium	3.19E-02	1.75E-04	NA		1.16E-06	NA		NV	NA		
Zinc	3.03E-01	1.66E-03	NA		6.57E-06	NA		NV	NA		
Cyanide	6.29E-02	3.45E-04	NA		2.27E-06	NA		NV	NA		

Risk Calculations		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	**RME Medium EPC Value, Cw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Pesticides/PCBs											
4,4'-DDD	5.00E-03	2.74E-05	2.40E-01	6.57E-06	1.84E-04	2.40E-01	4.41E-05	NV	2.42E-01		**5.06E-05**
4,4'-DDE	7.76E-04	4.25E-06	3.40E-01	1.45E-06	2.50E-05	3.40E-01	8.51E-06	NV	3.40E-01		**9.95E-06**
4,4'-DDT	1.80E-04	9.86E-07	3.40E-01	3.35E-07	1.09E-05	3.40E-01	3.70E-06	NV	3.40E-01		**4.03E-06**
Aldrin	4.05E-04	2.22E-06	1.70E+01	3.77E-05	1.93E-07	1.70E+01	3.28E-06	NV	1.72E+01		**4.10E-05**
alpha-BHC	3.00E-04	1.64E-06	6.30E+00	1.04E-05	6.98E-07	6.30E+00	4.39E-06	NV	6.30E+00		**1.48E-05**
alpha-Chlordane	3.34E-04	1.83E-06	1.30E+00	2.38E-06	3.62E-06	1.30E+00	4.71E-06	NV	3.50E-01		**7.08E-06**
Atrazine	2.00E-03	1.10E-05	2.30E-01	2.52E-06	1.35E-06	2.30E-01	3.11E-07	NV	NA		**2.83E-06**
beta-BHC	3.69E-04	2.02E-06	1.80E+00	3.64E-06	8.57E-07	1.80E+00	1.54E-06	NV	1.86E+00		**5.18E-06**
delta-BHC	1.60E-04	8.77E-07	NA		3.72E-07	NA		NV	NA		
Diazinon	2.60E-04	1.42E-06	NA		6.13E-07	NA		NV	NA		
Dieldrin	9.24E-04	5.06E-06	1.60E+01	8.10E-05	3.35E-06	1.60E+01	5.36E-05	NV	1.61E+01		**1.35E-04**
Endosulfan I	3.31E-04	1.81E-06	NA		4.16E-07	NA		NV	NA		
Endosulfan II	2.30E-04	1.26E-06	NA		1.80E-07	NA		NV	NA		
Endosulfan sulfate	9.20E-05	5.04E-07	NA		NA	NA		NV	NA		
Endrin	6.46E-04	3.54E-06	NA		2.35E-06	NA		NV	NA		
Endrin aldehyde	1.40E-04	7.67E-07	NA		NA	NA		NV	NA		
Endrin ketone	1.70E-04	9.32E-07	NA		NA	NA		NV	NA		
gamma-BHC	3.28E-04	1.79E-06	1.10E+00	1.97E-06	7.62E-07	1.10E+00	8.38E-07	NV	1.09E+00		**2.81E-06**
gamma-Chlordane	2.50E-04	1.37E-06	1.20E+00	1.64E-06	2.71E-06	1.20E+00	3.25E-06	NV	3.50E-01		**4.90E-06**
Heptachlor	1.11E-04	6.07E-07	4.50E+00	2.73E-06	2.74E-07	4.50E+00	1.23E-06	NV	4.55E+00		**3.96E-06**
Heptachlor epoxide	1.20E-04	6.58E-07	9.10E+00	5.98E-06	9.70E-07	9.10E+00	8.82E-06	NV	9.10E+00		**1.48E-05**
Methoxychlor	1.20E-04	6.58E-07	NA		1.50E-06	NA		NV	NA		
Aroclor-1260	9.63E-04	5.27E-06	2.00E+00	1.05E-05	1.80E-04	2.00E+00	3.59E-04	NV	2.00E+00		**3.70E-04**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	4.27E-03	2.70E-02	1.15E-04	1.54E-05	2.70E-02	4.16E-07	NV	2.70E-02		**1.16E-04**
2,4,6-Trichlorophenol	7.14E-03	3.91E-05	7.00E-02	2.74E-06	2.89E-05	7.00E-02	2.02E-06	NV	7.00E-02		**4.76E-06**
2,4-Dimethylphenol	7.87E-02	4.31E-04	NA		6.17E-05	NA		NV	NA		
2-Chlorophenol	4.30E-03	2.36E-05	NA		2.55E-06	NA		1.19E-04	NA		
2-Methylnaphthalene	2.26E-01	1.24E-03	NA		1.63E-03	NA		6.23E-03	NA		
2-Methylphenol	1.23E-01	6.73E-04	NA		6.16E-05	NA		NV	NA		
2-Nitroaniline	1.00E-02	5.48E-05	NA		3.51E-06	NA		NV	NA		
3,4-methylphenol	8.40E-01	4.60E-03	NA		4.21E-04	NA		NV	NA		
4-Chloro-3-methylphenol	2.38E-02	1.30E-04	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.06E-03	NA		9.70E-05	NA		NV	NA		
Acenaphthene	4.50E-03	2.47E-05	NA		5.24E-05	NA		1.24E-04	NA		
Acenaphthylene	9.54E-03	5.23E-05	NA		1.16E-04	NA		2.63E-04	NA		
Anthracene	3.20E-03	1.75E-05	NA		7.36E-05	NA		8.84E-05	NA		
Benzo(a)anthracene	9.00E-04	4.93E-06	1.20E+00	5.92E-06	5.97E-05	1.20E+00	7.17E-05	NV	3.85E-01		**7.76E-05**
Benzo(a)pyrene	5.00E-04	2.74E-06	1.20E+01	3.29E-05	5.69E-05	1.20E+01	6.82E-04	NV	3.85E+00		**7.15E-04**
Benzo(b)fluoranthene	7.60E-04	4.16E-06	1.20E+00	5.00E-06	8.76E-05	1.20E+00	1.05E-04	NV	3.85E-01		**1.10E-04**
Benzo(g,h,i)perylene	2.00E-04	1.10E-06	NA		4.11E-05	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	2.52E-06	1.20E+00	3.02E-06	5.01E-05	1.20E+00	6.01E-05	NV	3.85E-01		**6.31E-05**
Biphenyl (Diphenyl)	1.30E-03	7.12E-06	NA		1.05E-05	NA		NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	1.10E-06	NA		2.43E-08	NA		5.52E-06	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	9.27E-05	1.40E-02	1.30E-06	1.70E-04	1.40E-02	2.39E-06	NV	8.40E-03		**3.68E-06**
Bromoform	1.20E-02	6.58E-05	1.10E-02	7.23E-07	4.36E-06	1.10E-02	4.80E-08	3.31E-04	3.85E-03	1.28E-06	**2.05E-06**
Caprolactam	2.40E-03	1.32E-05	NA		1.62E-07	NA		NV	NA		
Carbazole	1.25E-02	6.86E-05	NA		6.25E-05	NA		NV	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Chrysene	1.10E-03	6.03E-06	1.20E-01	7.23E-07	7.30E-05	1.20E-01	8.76E-06	NV	3.85E-02		**9.49E-06**
Dibenz(a,h)anthracene	4.50E-05	2.47E-07	7.30E+00	1.80E-06	7.90E-06	7.30E+00	5.77E-05	NV	4.20E+00		**5.95E-05**
Diethylphthalate	1.03E-02	5.64E-05	NA		5.45E-06	NA		NV	NA		
Di-n-butyl phthalate	1.17E-02	6.38E-05	NA		4.90E-05	NA		NV	NA		
Fluoranthene	2.40E-03	1.32E-05	NA		6.31E-05	NA		NV	NA		
Fluorene	2.60E-03	1.42E-05	NA		4.21E-05	NA		7.18E-05	NA		
Hexachloroethane	1.00E-03	5.48E-06	3.90E-02	2.14E-07	4.47E-06	3.90E-02	1.74E-07	NV	3.85E-01		3.88E-07
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.10E-06	1.20E+00	1.32E-06	2.31E-05	1.20E+00	2.77E-05	NV	3.85E-01		**2.90E-05**
Naphthalene	1.36E-01	7.47E-04	1.20E-01	8.96E-05	4.74E-04	1.20E-01	5.69E-05	3.76E-03	1.19E-01	4.48E-04	**5.94E-04**
Nitrobenzene	2.00E-03	1.10E-05	NA		7.73E-07	NA		5.52E-05	1.40E-01	7.73E-06	**7.73E-06**
N-Nitrosodi-n-propylamine	2.00E-03	1.10E-05	7.00E+00	7.67E-05	3.51E-07	7.00E+00	2.45E-06	NV	7.00E+00		**7.92E-05**
N-Nitrosodiphenylamine	1.20E-03	6.58E-06	9.00E-03	5.92E-08	3.63E-06	9.00E-03	3.27E-08	NV	9.10E-03		9.19E-08
Pentachlorophenol	1.13E-02	6.18E-05	1.20E-01	7.42E-06	7.15E-04	1.20E-01	8.58E-05	NV	1.79E-02		**9.32E-05**
Phenanthrene	6.00E-03	3.29E-05	NA		8.59E-05	NA		NV	NA		
Pyrene	2.40E-03	1.32E-05	NA		9.29E-05	NA		6.63E-05	NA		
1,1,1-Trichloroethane	1.18E-01	6.47E-04	NA		1.18E-04	NA		3.26E-03	NA		
1,1,2,2-Tetrachloroethane	1.29E-02	7.08E-05	2.00E-01	1.42E-05	8.53E-06	2.00E-01	1.71E-06	3.57E-04	2.03E-01	7.24E-05	**8.83E-05**
1,1,2-Trichloroethane	1.33E-02	7.30E-05	7.20E-02	5.26E-06	6.53E-06	7.20E-02	4.70E-07	3.68E-04	5.70E-02	2.10E-05	**2.67E-05**
1,1-Dichloroethane	5.57E-01	3.05E-03	5.70E-03	1.74E-05	2.36E-04	5.70E-03	1.34E-06	1.54E-02	5.70E-03	8.77E-05	**1.06E-04**
1,1-Dichloroethene	4.16E-02	2.28E-04	NA		3.11E-05	NA		1.15E-03	9.10E-02	1.04E-04	**1.04E-04**
1,2,3-Trichlorobenzene	2.72E-03	1.49E-05	NA		NA	NA		7.52E-05	NA		
1,2,4-Trichlorobenzene	1.51E-02	8.27E-05	2.90E-02	2.40E-06	1.04E-04	2.90E-02	3.02E-06	4.17E-04	NA		**5.42E-06**
1,2,4-Trimethylbenzene	2.78E-01	1.52E-03	NA		1.63E-03	NA		7.67E-03	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	1.32E-05	7.00E+00	9.21E-05	2.41E-06	7.00E+00	1.69E-05	6.63E-05	7.00E+00	4.64E-04	**5.73E-04**
1,2-Dichlorobenzene	7.34E-01	4.02E-03	NA		2.52E-03	NA		2.03E-02	NA		
1,2-Dichloroethane	1.44E-02	7.87E-05	9.10E-02	7.16E-06	6.08E-06	9.10E-02	5.54E-07	3.97E-04	9.10E-02	3.61E-05	**4.38E-05**
1,2-Dichloropropane	5.10E-03	2.79E-05	3.60E-02	1.01E-06	2.67E-06	3.60E-02	9.62E-08	1.41E-04	3.50E-02	4.93E-06	**6.03E-06**
1,3,5-Trimethylbenzene	1.10E-01	6.04E-04	NA		4.72E-04	NA		3.04E-03	NA		
1,3-Dichlorobenzene	2.71E-02	1.48E-04	NA		1.31E-04	NA		7.48E-04	NA		
1,4-Dichlorobenzene	2.18E-01	1.19E-03	5.40E-03	6.45E-06	7.65E-04	5.40E-03	4.13E-06	6.02E-03	3.85E-02	2.32E-04	**2.42E-04**
2-Chlorotoluene	2.89E-03	1.58E-05	NA		NA	NA		7.97E-05	NA		
2-Hexanone	2.35E-02	1.29E-04	NA		5.32E-06	NA		6.50E-04	NA		
2,2-Dichloropropane	5.00E-04	2.74E-06	NA		NA	NA		1.38E-05	NA		
Acetone	4.85E-01	2.66E-03	NA		1.32E-05	NA		1.34E-02	NA		
Benzene	4.00E-01	2.19E-03	1.00E-01	2.19E-04	3.38E-04	1.00E-01	3.38E-05	1.10E-02	1.02E-01	1.12E-03	**1.37E-03**
Carbon disulfide	3.10E-03	1.70E-05	NA		2.99E-06	NA		8.56E-05	NA		
Carbon tetrachloride	3.00E-04	1.64E-06	1.50E-01	2.47E-07	4.19E-07	1.50E-01	6.29E-08	8.28E-06	1.47E-01	1.22E-06	**1.53E-06**
Chlorobenzene	6.74E-01	3.69E-03	NA		1.26E-03	NA		1.86E-02	NA		
Chloroethane	9.74E-02	5.34E-04	NA		3.17E-05	NA		2.69E-03	2.90E-03	7.80E-06	**7.80E-06**
Chloroform	4.40E-03	2.41E-05	3.10E-02	7.47E-07	2.09E-06	3.10E-02	6.49E-08	1.22E-04	1.86E-02	2.25E-06	**3.07E-06**
Chloromethane	7.40E-03	4.05E-05	NA		1.23E-06	NA		2.04E-04	NA		
cis-1,2-Dichloroethene	1.37E+01	7.52E-02	NA		9.31E-03	NA		3.79E-01	NA		
cis-1,3-Dichloropropene	4.20E-03	2.30E-05	1.00E-01	2.30E-06	1.20E-06	1.00E-01	1.20E-07	1.16E-04	5.60E-02	6.50E-06	**8.92E-06**
Cyclohexane	1.80E-02	9.86E-05	NA		1.02E-04	NA		4.97E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	6.58E-06	NA		NA	NA		3.31E-05	NA		
Ethylbenzene	4.49E-01	2.46E-03	1.10E-02	2.71E-05	1.45E-03	1.10E-02	1.59E-05	1.24E-02	8.75E-03	1.08E-04	**1.51E-04**
Isopropyl ether	4.30E-01	2.36E-03	NA		NA	NA		1.19E-02	NA		
Isopropylbenzene (cumene)	2.71E-02	1.48E-04	NA		1.67E-04	NA		7.47E-04	NA		
Methyl acetate	2.25E-02	1.23E-04	NA		1.01E-06	NA		6.22E-04	NA		

Risk Calculations											
		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Methyl ethyl ketone	4.30E-01	2.36E-03	NA		2.29E-05	NA		1.19E-02	NA		
Methyl isobutyl ketone	4.86E+00	2.66E-02	NA		8.24E-04	NA		1.34E-01	NA		
Methyl tert-butyl ether	2.01E-02	1.10E-04	1.80E-03	1.99E-07	2.55E-06	1.80E-03	4.60E-09	5.56E-04	9.10E-04	5.06E-07	7.09E-07
Methylcyclohexane	2.45E-02	1.34E-04	NA		1.66E-04	NA		6.77E-04	NA		
Methylene chloride	8.19E-03	4.49E-05	1.40E-02	6.28E-07	1.68E-06	1.40E-02	2.36E-08	2.26E-04	3.50E-03	7.91E-07	**1.44E-06**
n-Butylbenzene	6.12E-03	3.35E-05	NA		NA	NA		1.69E-04	NA		
n-Propylbenzene	5.61E-02	3.08E-04	NA		NA	NA		1.55E-03	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	4.30E-04	NA		NA	NA		2.17E-03	NA		
Phenol	4.80E-02	2.63E-04	NA		1.27E-05	NA		NV	NA		
sec-Butylbenzene	5.64E-03	3.09E-05	NA		NA	NA		1.56E-04	NA		
Styrene	1.39E-02	7.63E-05	NA		3.34E-05	NA		3.85E-04	NA		
tert-Butylbenzene	2.10E-03	1.15E-05	NA		NA	NA		5.80E-05	NA		
tert-Butyl alcohol	1.17E-01	6.41E-04	NA		NA	NA		3.23E-03	NA		
Tetrachloroethene	1.20E-02	6.58E-05	5.40E-01	3.55E-05	3.74E-05	5.40E-01	2.02E-05	3.31E-04	2.07E-02	6.84E-06	**6.25E-05**
Toluene	6.11E+00	3.35E-02	NA		1.14E-02	NA		1.69E-01	NA		
trans-1,2-Dichloroethene	4.01E-01	2.20E-03	NA		1.93E-04	NA		1.11E-02	NA		
trans-1,3-Dichloropropene	4.10E-03	2.25E-05	1.00E-01	2.25E-06	1.17E-06	1.00E-01	1.17E-07	1.13E-04	5.60E-02	6.34E-06	**8.70E-06**
Trichloroethene	5.70E-02	3.12E-04	5.90E-03	1.84E-06	5.17E-05	5.90E-03	3.05E-07	1.57E-03	7.00E-03	1.10E-05	**1.32E-05**
Vinyl chloride	1.63E+00	8.91E-03	7.20E-01	6.42E-03	4.82E-04	7.20E-01	3.47E-04	4.49E-02	2.73E-01	1.23E-02	**1.90E-02**
m,p-Xylenes	9.44E-01	5.17E-03	NA		NA	NA		2.61E-02	NA		
o-Xylene	4.45E-01	2.44E-03	NA		2.07E-03	NA		1.23E-02	NA		
Xylenes, total	1.60E+00	8.77E-03	NA		5.59E-03	NA		4.42E-02	NA		
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.54E-09	1.50E+03	3.82E-06	9.46E-08	1.50E+03	1.42E-04	NV	1.50E+03		**1.46E-04**
1,2,3,4,6,7,8-HpCDF	9.49E-08	5.20E-10	1.50E+03	7.80E-07	1.74E-08	1.50E+03	2.62E-05	NV	1.50E+03		**2.69E-05**
1,2,3,4,7,8,9-HpCDF	9.79E-09	5.36E-11	1.50E+03	8.05E-08	1.80E-09	1.50E+03	2.70E-06	NV	1.50E+03		**2.78E-06**
1,2,3,4,7,8-HxCDD	2.62E-09	1.44E-11	1.50E+04	2.16E-07	4.28E-10	1.50E+04	6.42E-06	NV	1.50E+04		**6.64E-06**
1,2,3,4,7,8-HxCDF	8.49E-09	4.65E-11	1.50E+04	6.98E-07	1.25E-09	1.50E+04	1.87E-05	NV	1.50E+04		**1.94E-05**
1,2,3,6,7,8-HxCDD	1.33E-08	7.28E-11	1.50E+04	1.09E-06	2.17E-09	1.50E+04	3.25E-05	NV	1.50E+04		**3.36E-05**
1,2,3,6,7,8-HxCDF	1.62E-09	8.86E-12	1.50E+04	1.33E-07	2.38E-10	1.50E+04	3.57E-06	NV	1.50E+04		**3.70E-06**
1,2,3,7,8,9-HxCDD	4.40E-09	2.41E-11	1.50E+04	3.62E-07	7.18E-10	1.50E+04	1.08E-05	NV	1.50E+04		**1.11E-05**
1,2,3,7,8,9-HxCDF	3.87E-09	2.12E-11	1.50E+04	3.18E-07	5.69E-10	1.50E+04	8.53E-06	NV	1.50E+04		**8.85E-06**
1,2,3,7,8-PeCDD	1.08E-09	5.91E-12	1.50E+05	8.87E-07	1.41E-10	1.50E+05	2.11E-05	NV	1.50E+05		**2.20E-05**
1,2,3,7,8-PeCDF	2.28E-09	1.25E-11	7.50E+03	9.37E-08	2.69E-10	7.50E+03	2.01E-06	NV	7.50E+03		**2.11E-06**
2,3,4,6,7,8-HxCDF	3.94E-09	2.16E-11	1.50E+04	3.24E-07	5.80E-10	1.50E+04	8.71E-06	NV	1.50E+04		**9.03E-06**
2,3,4,7,8-PeCDF	2.64E-09	1.44E-11	7.50E+04	1.08E-06	3.11E-10	7.50E+04	2.33E-05	NV	7.50E+04		**2.44E-05**
2,3,7,8-TCDF	1.68E-09	9.20E-12	1.50E+04	1.38E-07	1.59E-10	1.50E+04	2.38E-06	NV	1.50E+04		**2.52E-06**
OCDF	7.44E-07	4.07E-09	1.50E+01	6.11E-08	1.71E-07	1.50E+01	2.56E-06	NV	1.50E+01		**2.62E-06**
OCDD	2.18E-06	1.19E-08	1.50E+01	1.79E-07	5.54E-07	1.50E+01	8.32E-06	NV	1.50E+01		**8.50E-06**
			Total Risk:	9.74E-03		**Total Risk:**	2.44E-03		**Total Risk:**	1.50E-02	**2.72E-02**

Total Estimated Carcinogenic Risk Across All Exposure Routes : **2.7E-02**

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-9
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Residential Exposure Scenario - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Future Child Resident
	Receptor Age:	Child
Exposure Scenario/Exposure Area Description		
Site Risks		

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for dermal exposure	ET_d	1	hr/day
Exposure Time for inhalation of volatiles	ET_i	24	hr/day
Exposure Duration	ED	6	years
Ingestion Rate	IngR	1	L/day
Inhalation Rate	InhR	0.42	m3/hr
Volatilization Factor	VFw	0.5	L/m3
Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	6	yr
Conversion Factor 1	CF1	1.00E-03	L/cm3
Conversion Factor 2	CF2	1.00E+06	cm3/m3
Conversion Factor 3	CF3	2.74E-03	yr/day
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Oral			Exposure Route = Dermal			Exposure Route = Inhalation			
Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals											
Aluminum	9.40E+00	6.01E-01	1.00E+00	6.01E-01	3.96E-03	1.00E+00	3.96E-03	NV	1.40E-03		**6.05E-01**
Antimony	1.51E-03	9.67E-05	4.00E-04	2.42E-01	6.38E-07	4.00E-04	1.59E-03	NV	NA		**2.43E-01**
Arsenic	2.87E-01	1.83E-02	3.00E-04	6.11E+01	1.21E-04	3.00E-04	4.03E-01	NV	4.29E-06		**6.15E+01**
Barium	1.68E-01	1.07E-02	2.00E-01	5.36E-02	7.07E-05	2.00E-01	3.54E-04	NV	1.43E-04		5.39E-02
Beryllium	7.64E-04	4.88E-05	2.00E-03	2.44E-02	3.22E-07	2.00E-03	1.61E-04	NV	2.00E-06		2.46E-02
Boron	4.31E+00	2.75E-01	2.00E-01	1.38E+00	1.82E-03	2.00E-01	9.09E-03	NV	5.70E-03		**1.39E+00**
Cadmium	1.26E-03	8.03E-05	1.10E-05	7.30E+00	5.30E-07	1.10E-05	4.82E-02	NV	2.86E-06		**7.35E+00**
Chromium	3.57E-02	2.28E-03	NA		1.51E-05	NA		NV	NA		
Chromium (VI)	3.50E-04	2.24E-05	3.00E-03	7.46E-03	2.95E-07	3.00E-03	9.84E-05	NV	2.86E-05		7.56E-03
Cobalt	8.89E-03	5.68E-04	3.00E-04	1.89E+00	1.50E-06	3.00E-04	5.00E-03	NV	1.71E-06		**1.90E+00**
Copper	4.66E-02	2.98E-03	4.00E-02	7.44E-02	1.97E-05	4.00E-02	4.91E-04	NV	NA		7.49E-02
Iron	5.35E+01	3.42E+00	7.00E-01	4.89E+00	2.26E-02	7.00E-01	3.22E-02	NV	NA		**4.92E+00**
Lead	4.00E-02	2.56E-03	NA		1.69E-06	NA		NV	NA		
Manganese	4.33E+00	2.77E-01	2.40E-02	1.15E+01	1.83E-03	2.40E-02	7.61E-02	NV	1.43E-05		**1.16E+01**
Mercury	1.21E-04	7.74E-06	3.00E-04	2.58E-02	5.11E-08	3.00E-04	1.70E-04	NV	NA		2.60E-02
Molybdenum	5.64E-03	3.60E-04	5.00E-03	7.21E-02	2.38E-06	5.00E-03	4.76E-04	NV	NA		7.25E-02
Nickel	5.46E-02	3.49E-03	1.10E-02	3.17E-01	4.61E-06	1.10E-02	4.19E-04	NV	2.57E-05		**3.18E-01**
Selenium	1.89E-02	1.21E-03	5.00E-03	2.42E-01	7.97E-06	5.00E-03	1.59E-03	NV	5.71E-03		**2.43E-01**
Silver	1.20E-04	7.67E-06	5.00E-03	1.53E-03	3.04E-08	5.00E-03	6.08E-06	NV	NA		1.54E-03
Thallium	5.00E-05	3.20E-06	6.60E-05	4.84E-02	2.11E-08	6.60E-05	3.20E-04	NV	NA		4.87E-02
Vanadium	3.19E-02	2.04E-03	5.00E-03	4.08E-01	1.35E-05	5.00E-03	2.70E-03	NV	NA		**4.11E-01**
Zinc	3.03E-01	1.94E-02	3.00E-01	6.46E-02	7.67E-05	3.00E-01	2.56E-04	NV	NA		6.48E-02
Cyanide	6.29E-02	4.02E-03	2.00E-02	2.01E-01	2.65E-05	2.00E-02	1.33E-03	NV	NA		**2.02E-01**
Pesticides/PCBs											
4,4'-DDD	5.00E-03	3.19E-04	NA		2.14E-03	NA		NV	NA		
4,4'-DDE	7.76E-04	4.96E-05	NA		2.92E-04	NA		NV	NA		

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Exposure Route = Oral: Reference Dose [mg/kg/day]	Exposure Route = Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
4,4'-DDT	1.80E-04	1.15E-05	5.00E-04	2.30E-02	1.27E-04	5.00E-04	2.54E-01	NV	NA		**2.77E-01**
Aldrin	4.05E-04	2.59E-05	3.00E-05	8.62E-01	2.25E-06	3.00E-05	7.51E-02	NV	NA		**9.37E-01**
alpha-BHC	3.00E-04	1.92E-05	5.00E-04	3.84E-02	8.14E-06	5.00E-04	1.63E-02	NV	NA		5.46E-02
alpha-Chlordane	3.34E-04	2.13E-05	3.30E-05	6.47E-01	4.22E-05	3.30E-05	1.28E+00	NV	2.00E-04		**1.93E+00**
Atrazine	2.00E-03	1.28E-04	6.00E-03	2.13E-02	1.58E-05	6.00E-03	2.63E-03	NV	NA		2.39E-02
beta-BHC	3.69E-04	2.36E-05	NA		1.00E-05	NA		NV	NA		
delta-BHC	1.60E-04	1.02E-05	NA		4.34E-06	NA		NV	NA		
Diazinon	2.60E-04	1.66E-05	7.00E-04	2.37E-02	7.15E-06	7.00E-04	1.02E-02	NV	NA		3.39E-02
Dieldrin	9.24E-04	5.90E-05	5.00E-05	1.18E+00	3.91E-05	5.00E-05	7.82E-01	NV	NA		**1.96E+00**
Endosulfan I	3.31E-04	2.12E-05	6.00E-03	3.53E-03	4.85E-06	6.00E-03	8.09E-04	NV	NA		4.34E-03
Endosulfan II	2.30E-04	1.47E-05	6.00E-03	2.45E-03	2.10E-06	6.00E-03	3.51E-04	NV	NA		2.80E-03
Endosulfan sulfate	9.20E-05	5.88E-06	6.00E-03	9.80E-04	NA	6.00E-03		NV	NA		9.80E-04
Endrin	6.46E-04	4.13E-05	3.00E-04	1.38E-01	2.74E-05	3.00E-04	9.12E-02	NV	NA		**2.29E-01**
Endrin aldehyde	1.40E-04	8.95E-06	3.00E-04	2.98E-02	NA	3.00E-04		NV	NA		2.98E-02
Endrin ketone	1.70E-04	1.09E-05	3.00E-04	3.62E-02	NA	3.00E-04		NV	NA		3.62E-02
gamma-BHC	3.28E-04	2.09E-05	3.00E-04	6.98E-02	8.88E-06	3.00E-04	2.96E-02	NV	NA		9.94E-02
gamma-Chlordane	2.50E-04	1.60E-05	3.30E-05	4.84E-01	3.16E-05	3.30E-05	9.59E-01	NV	2.00E-04		**1.44E+00**
Heptachlor	1.11E-04	7.08E-06	3.00E-05	2.36E-01	3.20E-06	3.00E-05	1.07E-01	NV	NA		**3.43E-01**
Heptachlor epoxide	1.20E-04	7.67E-06	1.30E-05	5.90E-01	1.13E-05	1.30E-05	8.70E-01	NV	NA		**1.46E+00**
Methoxychlor	1.20E-04	7.67E-06	2.00E-05	3.84E-01	1.75E-05	2.00E-05	8.73E-01	NV	NA		**1.26E+00**
Aroclor-1260	9.63E-04	6.15E-05	2.00E-05	3.08E+00	2.10E-03	2.00E-05	1.05E+02	NV	NA		**1.08E+02**
SVOCs/VOCs											
1,4-Dioxane (p-dioxane)	7.80E-01	4.99E-02	1.00E-01	4.99E-01	1.80E-04	1.00E-01	1.80E-03	NV	8.57E-01		**5.00E-01**
2,4,6-Trichlorophenol	7.14E-03	4.56E-04	1.00E-03	4.56E-01	3.37E-04	1.00E-03	3.37E-01	NV	NA		**7.94E-01**
2,4-Dimethylphenol	7.87E-02	5.03E-03	2.00E-02	2.51E-01	7.20E-04	2.00E-02	3.60E-02	NV	NA		**2.87E-01**
2-Chlorophenol	4.30E-03	2.75E-04	5.00E-03	5.50E-02	2.98E-05	5.00E-03	5.96E-03	1.39E-03	NA		6.09E-02
2-Methylnaphthalene	2.26E-01	1.44E-02	4.00E-03	3.60E+00	1.91E-02	4.00E-03	4.77E+00	7.27E-02	NA		**8.37E+00**
2-Methylphenol	1.23E-01	7.86E-03	5.00E-02	1.57E-01	7.18E-04	5.00E-02	1.44E-02	NV	1.71E-01		**1.71E-01**
2-Nitroaniline	1.00E-02	6.39E-04	1.00E-02	6.39E-02	4.09E-05	1.00E-02	4.09E-03	NV	1.43E-05		6.80E-02
3,4-methylphenol	8.40E-01	5.37E-02	5.00E-03	1.07E+01	4.91E-03	5.00E-03	9.82E-01	NV	1.71E-01		**1.17E+01**
4-Chloro-3-methylphenol	2.38E-02	1.52E-03	NA		NA	NA		NV	NA		
4-Methylphenol	1.94E-01	1.24E-02	5.00E-03	2.48E+00	1.13E-03	5.00E-03	2.26E-01	NV	1.71E-01		**2.70E+00**
Acenaphthene	4.50E-03	2.88E-04	6.00E-02	4.79E-03	6.12E-04	6.00E-02	1.02E-02	1.45E-03	NA		1.50E-02
Acenaphthylene	9.54E-03	6.10E-04	NA		1.36E-03	NA		3.07E-03	NA		
Anthracene	3.20E-03	2.05E-04	3.00E-01	6.82E-04	8.59E-04	3.00E-01	2.86E-03	1.03E-03	NA		3.55E-03
Benzo(a)anthracene	9.00E-04	5.75E-05	NA		6.97E-04	NA		NV	NA		
Benzo(a)pyrene	5.00E-04	3.20E-05	NA		6.63E-04	NA		NV	NA		
Benzo(b)fluoranthene	7.60E-04	4.86E-05	NA		1.02E-03	NA		NV	NA		
Benzo(g,h,i)perylene	2.00E-04	1.28E-05	NA		4.79E-04	NA		NV	NA		
Benzo(k)fluoranthene	4.60E-04	2.94E-05	NA		5.84E-04	NA		NV	NA		
Biphenyl (Diphenyl)	1.30E-03	8.31E-05	5.00E-02	1.66E-03	1.22E-04	5.00E-02	2.44E-03	NV	NA		4.10E-03
bis(2-Chloroethoxy)methane	2.00E-04	1.28E-05	3.00E-03	4.26E-03	2.83E-07	3.00E-03	9.44E-05	6.44E-05	NA		4.36E-03
bis(2-Ethylhexyl)phthalate	1.69E-02	1.08E-03	2.00E-02	5.41E-02	1.99E-03	2.00E-02	9.94E-02	NV	NA		**1.53E-01**
Bromoform	1.20E-02	7.67E-04	2.00E-02	3.84E-02	5.09E-05	2.00E-02	2.55E-03	3.87E-03	NA		4.09E-02
Caprolactam	2.40E-03	1.53E-04	5.00E-01	3.07E-04	1.89E-06	5.00E-01	3.78E-06	NV	NA		3.11E-04
Carbazole	1.25E-02	8.01E-04	NA		7.29E-04	NA		NV	NA		
Chrysene	1.10E-03	7.03E-05	NA		8.52E-04	NA		NV	NA		
Dibenz(a,h)anthracene	4.50E-05	2.88E-06	NA		9.22E-05	NA		NV	NA		
Diethylphthalate	1.03E-02	6.59E-04	8.00E-01	8.23E-04	6.36E-05	8.00E-01	7.95E-05	NV	NA		9.03E-04
Di-n-butyl phthalate	1.17E-02	7.45E-04	1.00E-01	7.45E-03	5.71E-04	1.00E-01	5.71E-03	NV	NA		1.32E-02
Fluoranthene	2.40E-03	1.53E-04	4.00E-02	3.84E-03	7.36E-04	4.00E-02	1.84E-02	NV	NA		2.22E-02
Fluorene	2.60E-03	1.66E-04	4.00E-02	4.16E-03	4.91E-04	4.00E-02	1.23E-02	8.38E-04	NA		1.64E-02

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Hexachloroethane	1.00E-03	6.39E-05	1.00E-03	6.39E-02	5.22E-05	1.00E-03	5.22E-02	NV	NA		**1.16E-01**
Indeno(1,2,3-c,d)pyrene	2.00E-04	1.28E-05	NA		2.69E-04	NA		NV	NA		
Naphthalene	1.36E-01	8.71E-03	2.00E-02	4.35E-01	5.53E-03	2.00E-02	2.77E-01	4.39E-02	8.57E-04	5.12E+01	**5.19E+01**
Nitrobenzene	2.00E-03	1.28E-04	2.00E-03	6.39E-02	9.02E-06	2.00E-03	4.51E-03	6.44E-04	2.57E-03	2.51E-01	**3.19E-01**
N-Nitrosodi-n-propylamine	2.00E-03	1.28E-04	NA		4.09E-06	NA		NV	NA		
N-Nitrosodiphenylamine	1.20E-03	7.67E-05	2.00E-02	3.84E-03	4.24E-05	2.00E-02	2.12E-03	NV	2.00E-02		5.95E-03
Pentachlorophenol	1.13E-02	7.21E-04	1.00E-03	7.21E-01	8.34E-03	1.00E-03	8.34E+00	NV	3.00E-02		**9.07E+00**
Phenanthrene	6.00E-03	3.84E-04	NA		1.00E-03	NA		NV	NA		
Pyrene	2.40E-03	1.53E-04	3.00E-02	5.11E-03	1.08E-03	3.00E-02	3.61E-02	7.73E-04	NA		4.12E-02
1,1,1-Trichloroethane	1.18E-01	7.54E-03	2.00E+00	3.77E-03	1.37E-03	2.00E+00	6.86E-04	3.80E-02	1.43E+00	2.66E-02	3.11E-02
1,1,2,2-Tetrachloroethane	1.29E-02	8.26E-04	4.00E-03	2.06E-01	9.95E-05	4.00E-03	2.49E-02	4.16E-03	6.00E-02	6.94E-02	**3.01E-01**
1,1,2-Trichloroethane	1.33E-02	8.52E-04	4.00E-03	2.13E-01	7.62E-05	4.00E-03	1.91E-02	4.29E-03	NA		**2.32E-01**
1,1-Dichloroethane	5.57E-01	3.56E-02	2.00E-01	1.78E-01	2.75E-03	2.00E-01	1.38E-02	1.79E-01	NA		**1.92E-01**
1,1-Dichloroethene	4.16E-02	2.66E-03	5.00E-02	5.32E-02	3.63E-04	5.00E-02	7.26E-03	1.34E-02	2.00E-02	6.70E-01	**7.30E-01**
1,2,3-Trichlorobenzene	2.72E-03	1.74E-04	NA		NA	NA		8.77E-04	NA		
1,2,4-Trichlorobenzene	1.51E-02	9.65E-04	1.00E-02	9.65E-02	1.21E-03	1.00E-02	1.21E-01	4.86E-03	5.71E-04	8.51E+00	**8.73E+00**
1,2,4-Trimethylbenzene	2.78E-01	1.77E-02	7.00E-03	2.54E+00	1.91E-02	7.00E-03	2.72E+00	8.94E-02	NA		**5.26E+00**
1,2-Dibromo-3-chloropropane	2.40E-03	1.53E-04	2.00E-04	7.67E-01	2.82E-05	2.00E-04	1.41E-01	7.73E-04	5.71E-05	1.35E+01	**1.44E+01**
1,2-Dichlorobenzene	7.34E-01	4.70E-02	9.00E-02	5.22E-01	2.94E-02	9.00E-02	3.26E-01	2.37E-01	5.71E-02	4.14E+00	**4.99E+00**
1,2-Dichloroethane	1.44E-02	9.18E-04	2.00E-02	4.59E-02	7.10E-05	2.00E-02	3.55E-03	4.63E-03	6.86E-01	6.75E-03	5.62E-02
1,2-Dichloropropane	5.10E-03	3.26E-04	9.00E-02	3.62E-03	3.12E-05	9.00E-02	3.46E-04	1.64E-03	1.14E-03	1.44E+00	**1.44E+00**
1,3,5-Trimethylbenzene	1.10E-01	7.05E-03	1.00E-02	7.05E-01	5.50E-03	1.00E-02	5.50E-01	3.55E-02	NA		**1.25E+00**
1,3-Dichlorobenzene	2.71E-02	1.73E-03	NA		1.53E-03	NA		8.73E-03	NA		
1,4-Dichlorobenzene	2.18E-01	1.39E-02	7.00E-02	1.99E-01	8.93E-03	7.00E-02	1.28E-01	7.02E-02	2.29E-01	3.07E-01	**6.33E-01**
2-Chlorotoluene	2.89E-03	1.84E-04	2.00E-02	9.22E-03	NA	2.00E-02		9.30E-04	NA		9.22E-03
2-Hexanone	2.35E-02	1.51E-03	5.00E-03	3.01E-01	6.21E-05	5.00E-03	1.24E-02	7.59E-03	8.57E-03	8.85E-01	**1.20E+00**
2,2-Dichloropropane	5.00E-04	3.20E-05	NA		NA	NA		1.61E-04	NA		
Acetone	4.85E-01	3.10E-02	9.00E-01	3.45E-02	1.54E-04	9.00E-01	1.71E-04	1.56E-01	8.86E+00	1.77E-02	5.23E-02
Benzene	4.00E-01	2.56E-02	4.00E-03	6.39E+00	3.94E-03	4.00E-03	9.85E-01	1.29E-01	8.57E-03	1.50E+01	**2.24E+01**
Carbon disulfide	3.10E-03	1.98E-04	1.00E-01	1.98E-03	3.49E-05	1.00E-01	3.49E-04	9.99E-04	2.00E-01	4.99E-03	7.32E-03
Carbon tetrachloride	3.00E-04	1.92E-05	4.00E-03	4.79E-03	4.89E-06	4.00E-03	1.22E-03	9.67E-05	1.14E-02	8.46E-03	1.45E-02
Chlorobenzene	6.74E-01	4.31E-02	2.00E-02	2.15E+00	1.48E-02	2.00E-02	7.38E-01	2.17E-01	1.43E-02	1.52E+01	**1.81E+01**
Chloroethane	9.74E-02	6.23E-03	NA		3.69E-04	NA		3.14E-02	2.86E+00	1.10E-02	1.10E-02
Chloroform	4.40E-03	2.81E-04	1.00E-02	2.81E-02	2.44E-05	1.00E-02	2.44E-03	1.42E-03	2.80E-02	5.06E-02	8.12E-02
Chloromethane	7.40E-03	4.73E-04	NA		1.44E-05	NA		2.38E-03	2.57E-02	9.27E-02	9.27E-02
cis-1,2-Dichloroethene	1.37E+01	8.77E-01	1.00E-02	8.77E+01	1.09E-01	1.00E-02	1.09E+01	4.42E+00	NA		**9.86E+01**
cis-1,3-Dichloropropene	4.20E-03	2.68E-04	3.00E-02	8.95E-03	1.40E-05	3.00E-02	4.66E-04	1.35E-03	5.71E-03	2.37E-01	**2.46E-01**
Cyclohexane	1.80E-02	1.15E-03	NA		1.19E-03	NA		5.80E-03	1.71E+00	3.38E-03	3.38E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	7.67E-05	NA		NA	NA		3.87E-04	NA		
Ethylbenzene	4.49E-01	2.87E-02	1.00E-01	2.87E-01	1.69E-02	1.00E-01	1.69E-01	1.45E-01	2.86E-01	5.06E-01	**9.62E-01**
Isopropyl ether	4.30E-01	2.75E-02	NA		NA	NA		1.39E-01	NA		
Isopropylbenzene (cumene)	2.71E-02	1.73E-03	1.00E-01	1.73E-02	1.95E-03	1.00E-01	1.95E-02	8.72E-03	1.14E-01	7.63E-02	**1.13E-01**
Methyl acetate	2.25E-02	1.44E-03	1.00E+00	1.44E-03	1.18E-05	1.00E+00	1.18E-05	7.26E-03	NA		1.45E-03
Methyl ethyl ketone	4.30E-01	2.75E-02	6.00E-01	4.58E-02	2.67E-04	6.00E-01	4.44E-04	1.39E-01	1.43E+00	9.70E-02	**1.43E-01**
Methyl isobutyl ketone	4.86E+00	3.11E-01	8.00E-02	3.88E+00	9.61E-03	8.00E-02	1.20E-01	1.57E+00	8.57E-01	1.83E+00	**5.83E+00**
Methyl tert-butyl ether	2.01E-02	1.29E-03	NA		2.98E-05	NA		6.49E-03	8.57E-01	7.57E-03	7.57E-03
Methylcyclohexane	2.45E-02	1.57E-03	NA		1.94E-03	NA		7.90E-03	8.60E-01	9.19E-03	9.19E-03
Methylene chloride	8.19E-03	5.23E-04	6.00E-02	8.72E-03	1.96E-05	6.00E-02	3.27E-04	2.64E-03	2.86E-01	9.23E-03	1.83E-02
n-Butylbenzene	6.12E-03	3.91E-04	4.00E-02	9.77E-03	NA	4.00E-02		1.97E-03	NA		9.77E-03
n-Propylbenzene	5.61E-02	3.59E-03	4.00E-02	8.97E-02	NA	4.00E-02		1.81E-02	NA		8.97E-02
p-Cymene (p-isopropyltoluene)	7.86E-02	5.02E-03	NA		NA	NA		2.53E-02	NA		
Phenol	4.80E-02	3.07E-03	3.00E-01	1.02E-02	1.48E-04	3.00E-01	4.95E-04	NV	5.71E-02		1.07E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cw [mg/L]	Exposure Route = Oral: Chronic Daily Intake [mg/kg/day]	Oral: Reference Dose [mg/kg/day]	Oral: Hazard Quotient	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Dermal: Reference Dose [mg/kg/day]	Dermal: Hazard Quotient	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Inhalation: Reference Dose [mg/kg/day]	Inhalation: Hazard Quotient	Total Hazard Quotient [-]
sec-Butylbenzene	5.64E-03	3.60E-04	4.00E-02	9.01E-03	NA	4.00E-02		1.82E-03	4.00E-02	4.54E-02	5.44E-02
Styrene	1.39E-02	8.90E-04	2.00E-01	4.45E-03	3.90E-04	2.00E-01	1.95E-03	4.49E-03	2.57E-01	1.74E-02	2.38E-02
tert-Butylbenzene	2.10E-03	1.34E-04	4.00E-02	3.36E-03	NA	4.00E-02		6.77E-04	NA		3.36E-03
tert-Butyl alcohol	1.17E-01	7.47E-03	1.00E-01	7.47E-02	NA	1.00E-01		3.77E-02	2.60E-03	1.45E+01	**1.46E+01**
Tetrachloroethene	1.20E-02	7.67E-04	1.00E-02	7.67E-02	4.36E-04	1.00E-02	4.36E-02	3.87E-03	1.00E-02	3.87E-01	**5.07E-01**
Toluene	6.11E+00	3.91E-01	8.00E-02	4.88E+00	1.33E-01	8.00E-02	1.66E+00	1.97E+00	8.57E-02	2.30E+01	**2.95E+01**
trans-1,2-Dichloroethene	4.01E-01	2.57E-02	2.00E-02	1.28E+00	2.25E-03	2.00E-02	1.13E-01	1.29E-01	1.71E-02	7.54E+00	**8.94E+00**
trans-1,3-Dichloropropene	4.10E-03	2.62E-04	3.00E-02	8.74E-03	1.36E-05	3.00E-02	4.55E-04	1.32E-03	5.71E-03	2.31E-01	**2.40E-01**
Trichloroethene	5.70E-02	3.64E-03	3.00E-04	1.21E+01	6.03E-04	3.00E-04	2.01E+00	1.84E-02	1.00E-02	1.84E+00	**1.60E+01**
Vinyl chloride	1.63E+00	1.04E-01	3.00E-03	3.47E+01	5.62E-03	3.00E-03	1.87E+00	5.24E-01	2.86E-02	1.83E+01	**5.49E+01**
m,p-Xylenes	9.44E-01	6.04E-02	2.00E-01	3.02E-01	NA	2.00E-01		3.04E-01	2.00E-01	1.52E+00	**1.82E+00**
o-Xylene	4.45E-01	2.84E-02	2.00E-01	1.42E-01	2.42E-02	2.00E-01	1.21E-01	1.43E-01	2.00E-01	7.16E-01	**9.79E-01**
Xylenes, total	1.60E+00	1.02E-01	2.00E-01	5.11E-01	6.52E-02	2.00E-01	3.26E-01	5.16E-01	2.86E-02	1.80E+01	**1.89E+01**
Dioxans/Furans											
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.97E-08	NA		1.10E-06	NA		NV	1.14E-08		
1,2,3,4,6,7,8-HpCDF	9.49E-08	6.07E-09	NA		2.03E-07	NA		NV	1.14E-08		
1,2,3,4,7,8,9-HpCDF	9.79E-09	6.26E-10	NA		2.10E-08	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDD	2.62E-09	1.68E-10	NA		4.99E-09	NA		NV	1.14E-08		
1,2,3,4,7,8-HxCDF	8.49E-09	5.43E-10	NA		1.46E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDD	1.33E-08	8.50E-10	NA		2.53E-08	NA		NV	1.14E-08		
1,2,3,6,7,8-HxCDF	1.62E-09	1.03E-10	NA		2.78E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDD	4.40E-09	2.81E-10	NA		8.38E-09	NA		NV	1.14E-08		
1,2,3,7,8,9-HxCDF	3.87E-09	2.47E-10	NA		6.64E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDD	1.08E-09	6.90E-11	NA		1.64E-09	NA		NV	1.14E-08		
1,2,3,7,8-PeCDF	2.28E-09	1.46E-10	NA		3.13E-09	NA		NV	1.14E-08		
2,3,4,6,7,8-HxCDF	3.94E-09	2.52E-10	NA		6.77E-09	NA		NV	1.14E-08		
2,3,4,7,8-PeCDF	2.64E-09	1.69E-10	NA		3.62E-09	NA		NV	1.14E-08		
2,3,7,8-TCDF	1.68E-09	1.07E-10	NA		1.85E-09	NA		NV	1.14E-08		
OCDF	7.44E-07	4.75E-08	NA		1.99E-06	NA		NV	1.14E-08		
OCDD	2.18E-06	1.39E-07	NA		6.47E-06	NA		NV	1.14E-08		
			Total Hazard Index:	2.79E+02		**Total Hazard Index:**	1.49E+02		**Total Hazard Index:**	2.00E+02	**6.28E+02**

Total Estimated Hazard Index Across All Exposure Routes : 628

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

NV = Chemical classified as Nonvolatile thus no CDI was calculated.

Table 2-10
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Arsenic	**4.0E-03**	**2.1E-05**		**4.1E-03**	9%	**2.4E-03**	**1.6E-05**		2.4E-03	9%
Chromium (VI)	**1.6E-06**	1.7E-08		**1.7E-06**	0%	9.6E-07	1.3E-08		9.7E-07	0%
Subtotal Metals	**4.0E-03**	**2.1E-05**		**4.1E-03**	9%	**2.4E-03**	**1.6E-05**		2.4E-03	9%
Pesticides/PCBs										
4,4'-DDD	**1.1E-05**	**7.8E-05**		**9.0E-05**	0.2%	**6.6E-06**	**4.4E-05**		5.1E-05	0.2%
4,4'-DDE	**2.5E-06**	**1.5E-05**		**1.8E-05**	0.04%	**1.4E-06**	**8.5E-06**		1.0E-05	0.04%
4,4'-DDT	5.7E-07	**6.6E-06**		**7.2E-06**	0.015%	3.4E-07	**3.7E-06**		4.0E-06	0.015%
Aldrin	**6.5E-05**	**5.8E-06**		**7.0E-05**	0.2%	**3.8E-05**	**3.3E-06**		4.1E-05	0.2%
alpha-BHC	**1.8E-05**	**7.8E-06**		**2.6E-05**	0.06%	**1.0E-05**	**4.4E-06**		1.5E-05	0.05%
alpha-Chlordane	**4.1E-06**	**8.4E-06**		**1.2E-05**	0.03%	**2.4E-06**	**4.7E-06**		7.1E-06	0.03%
Atrazine	**4.3E-06**	5.5E-07		**4.9E-06**	0.010%	**2.5E-06**	3.1E-07		2.8E-06	0.010%
beta-BHC	**6.2E-06**	**2.7E-06**		**9.0E-06**	0.02%	**3.6E-06**	**1.5E-06**		5.2E-06	0.02%
Dieldrin	**1.4E-04**	**9.5E-05**		**2.3E-04**	0.5%	**8.1E-05**	**5.4E-05**		1.3E-04	0.5%
gamma-BHC	**3.4E-06**	**1.5E-06**		**4.9E-06**	0.011%	**2.0E-06**	8.4E-07		2.8E-06	0.010%
gamma-Chlordane	**2.8E-06**	**5.8E-06**		**8.6E-06**	0.02%	**1.6E-06**	**3.3E-06**		4.9E-06	0.02%
Heptachlor	**4.7E-06**	**2.2E-06**		**6.9E-06**	0.015%	**2.7E-06**	**1.2E-06**		4.0E-06	0.015%
Heptachlor epoxide	**1.0E-05**	**1.6E-05**		**2.6E-05**	0.06%	**6.0E-06**	**8.8E-06**		1.5E-05	0.05%
Aroclor-1260	**1.8E-05**	**6.4E-04**		**6.6E-04**	1.4%	**1.1E-05**	**3.6E-04**		3.7E-04	1.4%
Subtotal Pesticides/PCBs	**2.9E-04**	**8.9E-04**		**1.2E-03**	3%	**1.7E-04**	**5.0E-04**		6.7E-04	2%
SVOCs/VOCs										
1,4-Dioxane (p-dioxane)	**2.0E-04**	7.1E-07		**2.0E-04**	0.4%	**1.2E-04**	4.2E-07		1.2E-04	0.4%
2,4,6-Trichlorophenol	**4.7E-06**	**3.6E-06**		**8.3E-06**	0.02%	**2.7E-06**	**2.0E-06**		4.8E-06	0.02%
Benzo(a)anthracene	**1.0E-05**	**1.3E-04**		**1.4E-04**	0.3%	**5.9E-06**	**7.2E-05**		7.8E-05	0.3%
Benzo(a)pyrene	**5.6E-05**	**1.2E-03**		**1.3E-03**	3%	**3.3E-05**	**6.8E-04**		7.2E-04	3%
Benzo(b)fluoranthene	**8.6E-06**	**1.9E-04**		**2.0E-04**	0.4%	**5.0E-06**	**1.1E-04**		1.1E-04	0.4%
Benzo(k)fluoranthene	**5.2E-06**	**1.1E-04**		**1.1E-04**	0.2%	**3.0E-06**	**6.0E-05**		6.3E-05	0.2%
bis(2-Ethylhexyl)phthalate	**2.2E-06**	**4.2E-06**		**6.5E-06**	0.014%	**1.3E-06**	**2.4E-06**		3.7E-06	0.014%
Bromoform	**1.2E-06**	8.5E-08	**2.2E-06**	**3.5E-06**	0.008%	7.2E-07	4.8E-08	**1.3E-06**	2.0E-06	0.008%
Chrysene	**1.2E-06**	**1.6E-05**		**1.7E-05**	0.04%	7.2E-07	**8.8E-06**		9.5E-06	0.03%
Dibenz(a,h)anthracene	**3.1E-06**	**1.0E-04**		**1.1E-04**	0.2%	**1.8E-06**	**5.8E-05**		5.9E-05	0.2%
Indeno(1,2,3-c,d)pyrene	**2.3E-06**	**4.9E-05**		**5.2E-05**	0.11%	**1.3E-06**	**2.8E-05**		2.9E-05	0.11%

Table 2-10
Cancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
	Future Residential									
Chemical of Potential Concern	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Naphthalene	**1.5E-04**	**1.0E-04**	**7.6E-04**	**1.0E-03**	2%	**9.0E-05**	**5.7E-05**	**4.5E-04**	5.9E-04	2%
Nitrobenzene			**1.3E-05**	**1.3E-05**	0%			**7.7E-06**	7.7E-06	0%
N-Nitrosodi-n-propylamine	**1.3E-04**	**4.4E-06**		**1.4E-04**	0.3%	**7.7E-05**	**2.5E-06**		7.9E-05	0.3%
Pentachlorophenol	**1.3E-05**	**1.5E-04**		**1.7E-04**	0.4%	**7.4E-06**	**8.6E-05**		9.3E-05	0.3%
1,1,2,2-Tetrachloroethane	**2.4E-05**	**3.0E-06**	**1.2E-04**	**1.5E-04**	0.3%	**1.4E-05**	**1.7E-06**	**7.2E-05**	8.8E-05	0.3%
1,1,2-Trichloroethane	**9.0E-06**	8.4E-07	**3.6E-05**	**4.5E-05**	0.1%	**5.3E-06**	4.7E-07	**2.1E-05**	2.7E-05	0.10%
1,1-Dichloroethane	**3.0E-05**	**2.3E-06**	**1.5E-04**	**1.8E-04**	0.4%	**1.7E-05**	**1.3E-06**	**8.8E-05**	1.1E-04	0.4%
1,1-Dichloroethene			**1.8E-04**	**1.8E-04**	0.4%			**1.0E-04**	1.0E-04	0.4%
1,2,4-Trichlorobenzene	**4.1E-06**	**5.4E-06**		**9.5E-06**	0.020%	**2.4E-06**	**3.0E-06**		5.4E-06	0.020%
1,2-Dibromo-3-chloropropane	**1.6E-04**	**3.0E-05**	**7.9E-04**	**9.7E-04**	2%	**9.2E-05**	**1.7E-05**	**4.6E-04**	5.7E-04	2%
1,2-Dichloroethane	**1.2E-05**	9.6E-07	**6.1E-05**	**7.4E-05**	0.2%	**7.2E-06**	5.5E-07	**3.6E-05**	4.4E-05	0.16%
1,2-Dichloropropane	**1.7E-06**	1.7E-07	**8.4E-06**	**1.0E-05**	0.02%	**1.0E-06**	9.6E-08	**4.9E-06**	6.0E-06	0.02%
1,4-Dichlorobenzene	**1.1E-05**	**7.4E-06**	**3.9E-04**	**4.1E-04**	0.9%	**6.4E-06**	**4.1E-06**	**2.3E-04**	2.4E-04	0.9%
Benzene	**3.8E-04**	**5.7E-05**	**1.9E-03**	**2.3E-03**	5%	**2.2E-04**	**3.4E-05**	**1.1E-03**	1.4E-03	5%
Carbon tetrachloride	4.2E-07	1.1E-07	**2.1E-06**	**2.6E-06**	0.006%	2.5E-07	6.3E-08	**1.2E-06**	1.5E-06	0.006%
Chloroethane			**1.3E-05**	**1.3E-05**	0.03%			**7.8E-06**	7.8E-06	0.03%
Chloroform	**1.3E-06**	1.2E-07	**3.8E-06**	**5.2E-06**	0.01%	7.5E-07	6.5E-08	**2.3E-06**	3.1E-06	0.01%
cis-1,3-Dichloropropene	**3.9E-06**	2.1E-07	**1.1E-05**	**1.5E-05**	0.03%	**2.3E-06**	1.2E-07	**6.5E-06**	8.9E-06	0.03%
Ethylbenzene	**4.6E-05**	**2.8E-05**	**1.8E-04**	**2.6E-04**	1%	**2.7E-05**	**1.6E-05**	**1.1E-04**	1.5E-04	1%
Methyl tert-butyl ether	3.4E-07	7.8E-09	8.6E-07	**1.2E-06**	0.003%	2.0E-07	4.6E-09	5.1E-07	7.1E-07	0.003%
Methylene chloride	**1.1E-06**	4.0E-08	**1.3E-06**	**2.5E-06**	0.005%	6.3E-07	2.4E-08	7.9E-07	1.4E-06	0.005%
Tetrachloroethene	**6.1E-05**	**3.6E-05**	**1.2E-05**	**1.1E-04**	0.2%	**3.6E-05**	**2.0E-05**	**6.8E-06**	6.3E-05	0.2%
trans-1,3-Dichloropropene	**3.9E-06**	2.1E-07	**1.1E-05**	**1.5E-05**	0.03%	**2.2E-06**	1.2E-07	**6.3E-06**	8.7E-06	0.03%
Trichloroethene	**3.2E-06**	5.4E-07	**1.9E-05**	**2.2E-05**	0%	**1.8E-06**	3.0E-07	**1.1E-05**	1.3E-05	0%
Vinyl chloride	**1.1E-02**	**5.8E-04**	**2.1E-02**	**3.2E-02**	70%	**6.4E-03**	**3.5E-04**	**1.2E-02**	1.9E-02	70%
Subtotal SVOCs/VOCs	**1.2E-02**	**2.8E-03**	**2.5E-02**	**4.1E-02**	87%	**7.2E-03**	**1.6E-03**	**1.5E-02**	2.4E-02	88%
Dioxans/Furans										
1,2,3,4,6,7,8-HpCDD	**6.5E-06**	**2.5E-04**		**2.6E-04**	0.6%	**3.8E-06**	**1.4E-04**		1.5E-04	0.5%
1,2,3,4,6,7,8-HpCDF	**1.3E-06**	**4.7E-05**		**4.8E-05**	0.10%	7.8E-07	**2.6E-05**		2.7E-05	0.10%
1,2,3,4,7,8,9-HpCDF	1.4E-07	**4.8E-06**		**4.9E-06**	0.01%	8.0E-08	**2.7E-06**		2.8E-06	0.01%
1,2,3,4,7,8-HxCDD	3.7E-07	**1.1E-05**		**1.2E-05**	0.03%	2.2E-07	**6.4E-06**		6.6E-06	0.02%
1,2,3,4,7,8-HxCDF	**1.2E-06**	**3.3E-05**		**3.5E-05**	0.07%	7.0E-07	**1.9E-05**		1.9E-05	0.07%
1,2,3,6,7,8-HxCDD	**1.9E-06**	**5.8E-05**		**6.0E-05**	0.13%	**1.1E-06**	**3.3E-05**		3.4E-05	0.12%

Table 2-10
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Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
1,2,3,6,7,8-HxCDF	2.3E-07	**6.4E-06**		**6.6E-06**	0.01%	1.3E-07	**3.6E-06**		3.7E-06	0.01%
1,2,3,7,8,9-HxCDD	6.2E-07	**1.9E-05**		**2.0E-05**	0.04%	3.6E-07	**1.1E-05**		1.1E-05	0.04%
1,2,3,7,8,9-HxCDF	5.4E-07	**1.5E-05**		**1.6E-05**	0.03%	3.2E-07	**8.5E-06**		8.9E-06	0.03%
1,2,3,7,8-PeCDD	**1.5E-06**	**3.8E-05**		**3.9E-05**	0.1%	8.9E-07	**2.1E-05**		2.2E-05	0.08%
1,2,3,7,8-PeCDF	1.6E-07	**3.6E-06**		**3.7E-06**	0.01%	9.4E-08	**2.0E-06**		2.1E-06	0.008%
2,3,4,6,7,8-HxCDF	5.6E-07	**1.5E-05**		**1.6E-05**	0.03%	3.2E-07	**8.7E-06**		9.0E-06	0.03%
2,3,4,7,8-PeCDF	**1.9E-06**	**4.1E-05**		**4.3E-05**	0.09%	**1.1E-06**	**2.3E-05**		2.4E-05	0.09%
2,3,7,8-TCDF	2.4E-07	**4.2E-06**		**4.5E-06**	0.010%	1.4E-07	**2.4E-06**		2.5E-06	0.009%
OCDF	1.0E-07	**4.6E-06**		**4.7E-06**	0.010%	6.1E-08	**2.6E-06**		2.6E-06	0.010%
OCDD	3.1E-07	**1.5E-05**		**1.5E-05**	0.03%	1.8E-07	**8.3E-06**		8.5E-06	0.03%
Subtotal Dioxans/Furans	**1.8E-05**	**5.7E-04**		**5.9E-04**	1.3%	**1.0E-05**	**3.2E-04**		3.3E-04	1.2%
Total:	**1.7E-02**	**4.3E-03**	**2.5E-02**	**4.64E-02**		**9.7E-03**	**2.4E-03**	**1.5E-02**	2.72E-02	
Total Estimated Cancer Risk Across All Exposure Routes:				**5E-02**					3E-02	
Sum of Adult and Child Excess Lifetime Cancer Risk (30 year exposure):						**2.6E-02**	**6.7E-03**	**4.0E-02**	7.36E-02	
Total Estimated Adult plus Child Cancer Risk Across All Exposure Routes:									7E-02	

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical of Potential Concern	Non-Carcinogenic Effects Risk Results - Hazard Quotients									
	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
Metals										
Aluminum	**2.6E-01**	1.3E-03		**2.6E-01**	0.1%	**6.0E-01**	4.0E-03		6.0E-01	0.1%
Antimony	**1.0E-01**	5.4E-04		**1.0E-01**	0.04%	**2.4E-01**	1.6E-03		2.4E-01	0.04%
Arsenic	**2.6E+01**	**1.4E-01**		**2.6E+01**	10%	**6.1E+01**	**4.0E-01**		6.2E+01	10%
Boron	**5.9E-01**	3.1E-03		**5.9E-01**	0.2%	**1.4E+00**	9.1E-03		1.4E+00	0.2%
Cadmium	6.9E-02	3.6E-04		6.9E-02	0.03%	**7.3E+00**	4.8E-02		7.3E+00	1.17%
Cobalt	**8.1E-01**	1.7E-03		**8.1E-01**	0%	**1.9E+00**	5.0E-03		1.9E+00	0%
Iron	**2.1E+00**	1.1E-02		**2.1E+00**	1%	**4.9E+00**	3.2E-02		4.9E+00	1%
Manganese	**4.9E+00**	2.6E-02		**5.0E+00**	2%	**1.2E+01**	7.6E-02		1.2E+01	2%
Nickel	7.5E-02	7.8E-05		7.5E-02	0.03%	**3.2E-01**	4.2E-04		3.2E-01	0.05%
Selenium	**1.0E-01**	5.4E-04		**1.0E-01**	0.04%	**2.4E-01**	1.6E-03		2.4E-01	0.04%
Vanadium	**1.8E-01**	9.1E-04		**1.8E-01**	0.1%	**4.1E-01**	2.7E-03		4.1E-01	0.1%
Cyanide	8.6E-02	4.5E-04		8.7E-02	0.03%	**2.0E-01**	1.3E-03		2.0E-01	0.03%
Subtotal Metals	**3.6E+01**	**1.8E-01**		**3.6E+01**	14%	**9.0E+01**	**5.9E-01**		9.1E+01	15%
Pesticides/PCBs										
4,4'-DDT	9.9E-03	**1.1E-01**		**1.2E-01**	0.05%	2.3E-02	**2.5E-01**		2.8E-01	0.04%
Aldrin	**3.7E-01**	3.3E-02		**4.0E-01**	0.2%	**8.6E-01**	7.5E-02		9.4E-01	0.1%
alpha-Chlordane	1.8E-02	3.8E-02		5.6E-02	0.02%	**6.5E-01**	**1.3E+00**		1.9E+00	0.31%
Dieldrin	**5.1E-01**	**3.5E-01**		**8.5E-01**	0.3%	**1.2E+00**	**7.8E-01**		2.0E+00	0.3%
Endrin	5.9E-02	4.1E-02		1.0E-01	0.04%	**1.4E-01**	9.1E-02		2.3E-01	0.04%
gamma-Chlordane	1.4E-02	2.8E-02		4.2E-02	0%	**4.8E-01**	**9.6E-01**		1.4E+00	0%
Heptachlor	**1.0E-01**	4.7E-02		**1.5E-01**	0%	**2.4E-01**	**1.1E-01**		3.4E-01	0%
Heptachlor epoxide	**2.5E-01**	**3.9E-01**		**6.4E-01**	0.2%	**5.9E-01**	**8.7E-01**		1.5E+00	0.2%
Methoxychlor	**1.6E-01**	**3.9E-01**		**5.5E-01**	0%	**3.8E-01**	**8.7E-01**		1.3E+00	0%
Aroclor-1260	**1.3E+00**	**4.7E+01**		**4.8E+01**	18%	**3.1E+00**	**1.0E+02**		1.1E+02	17%
Subtotal Pesticides/PCBs	**2.9E+00**	**4.8E+01**		**5.1E+01**	19%	**7.8E+00**	**1.1E+02**		1.2E+02	19%
SVOCs/VOCs										
1,4-Dioxane (p-dioxane)	**2.1E-01**	7.6E-04		**2.1E-01**	0.1%	**5.0E-01**	1.8E-03		5.0E-01	0.1%
2,4,6-Trichlorophenol	**2.0E-01**	**1.5E-01**		**3.5E-01**	0.1%	**4.6E-01**	**3.4E-01**		7.9E-01	0.1%
2,4-Dimethylphenol	**1.1E-01**	1.6E-02		**1.2E-01**	0.05%	**2.5E-01**	3.6E-02		2.9E-01	0.05%
2-Methylnaphthalene	**1.5E+00**	**2.1E+00**		**3.7E+00**	1.4%	**3.6E+00**	**4.8E+00**		8.4E+00	1.3%
2-Methylphenol	6.7E-02	6.4E-03		7.4E-02	0.03%	**1.6E-01**	1.4E-02		1.7E-01	0.03%

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
	Future Residential									
Chemical of Potential Concern	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
3,4-methylphenol	**4.6E+00**	**4.4E-01**		**5.0E+00**	1.9%	**1.1E+01**	**9.8E-01**		1.2E+01	1.9%
4-Methylphenol	**1.1E+00**	**1.0E-01**		**1.2E+00**	0.4%	**2.5E+00**	**2.3E-01**		2.7E+00	0.4%
bis(2-Ethylhexyl)phthalate	2.3E-02	4.4E-02		6.7E-02	0.03%	5.4E-02	9.9E-02		1.5E-01	0.02%
Hexachloroethane	2.7E-02	2.3E-02		5.1E-02	0.02%	6.4E-02	5.2E-02		1.2E-01	0.02%
Naphthalene	**1.9E-01**	**1.2E-01**	**2.2E+01**	**2.2E+01**	8%	**4.4E-01**	**2.8E-01**	**5.1E+01**	5.2E+01	8%
Nitrobenzene	2.7E-02	2.0E-03	**1.1E-01**	**1.4E-01**	0.1%	6.4E-02	4.5E-03	**2.5E-01**	3.2E-01	0.1%
Pentachlorophenol	1.0E-02	**1.2E-01**		**1.3E-01**	0.05%	**7.2E-01**	**8.3E+00**		9.1E+00	1.44%
1,1,2,2-Tetrachloroethane	8.8E-02	1.1E-02	2.9E-02	**1.3E-01**	0.0%	**2.1E-01**	2.5E-02	6.9E-02	3.0E-01	0.0%
1,1,2-Trichloroethane	9.1E-02	8.5E-03		1.0E-01	0.0%	**2.1E-01**	1.9E-02		2.3E-01	0.0%
1,1-Dichloroethane	7.6E-02	5.9E-03		8.2E-02	0.0%	**1.8E-01**	1.4E-02		1.9E-01	0.0%
1,1-Dichloroethene	2.3E-02	3.1E-03	**2.8E-01**	**3.1E-01**	0.1%	5.3E-02	7.3E-03	**6.7E-01**	7.3E-01	0.1%
1,2,4-Trichlorobenzene	4.1E-02	5.4E-02	**3.6E+00**	**3.7E+00**	1.4%	9.6E-02	**1.2E-01**	**8.5E+00**	8.7E+00	1.4%
1,2,4-Trimethylbenzene	**1.1E+00**	**1.2E+00**		**2.3E+00**	1%	**2.5E+00**	**2.7E+00**		5.3E+00	1%
1,2-Dibromo-3-chloropropane	**3.3E-01**	6.3E-02	**5.7E+00**	**6.1E+00**	2%	**7.7E-01**	**1.4E-01**	**1.4E+01**	1.4E+01	2%
1,2-Dichlorobenzene	**2.2E-01**	**1.5E-01**	**1.8E+00**	**2.1E+00**	0.8%	**5.2E-01**	**3.3E-01**	**4.1E+00**	5.0E+00	0.8%
1,2-Dichloropropane	1.6E-03	1.5E-04	**6.1E-01**	**6.1E-01**	0.2%	3.6E-03	3.5E-04	**1.4E+00**	1.4E+00	0.2%
1,3,5-Trimethylbenzene	**3.0E-01**	**2.4E-01**		**5.5E-01**	0%	**7.0E-01**	**5.5E-01**		1.3E+00	0%
1,4-Dichlorobenzene	8.5E-02	5.7E-02	**1.3E-01**	**2.7E-01**	0.1%	**2.0E-01**	**1.3E-01**	**3.1E-01**	6.3E-01	0.1%
2-Hexanone	**1.3E-01**	5.4E-03	**3.7E-01**	**5.1E-01**	0%	**3.0E-01**	1.2E-02	**8.9E-01**	1.2E+00	0%
Benzene	**2.7E+00**	**4.2E-01**	**6.4E+00**	**9.5E+00**	4%	**6.4E+00**	**9.9E-01**	**1.5E+01**	2.2E+01	4%
Chlorobenzene	**9.2E-01**	**3.3E-01**	**6.4E+00**	**7.7E+00**	3%	**2.2E+00**	**7.4E-01**	**1.5E+01**	1.8E+01	3%
cis-1,2-Dichloroethene	**3.8E+01**	**4.7E+00**		**4.2E+01**	16%	**8.8E+01**	**1.1E+01**		9.9E+01	16%
cis-1,3-Dichloropropene	3.8E-03	2.1E-04	**1.0E-01**	**1.0E-01**	0.04%	8.9E-03	4.7E-04	**2.4E-01**	2.5E-01	0.04%
Ethylbenzene	**1.2E-01**	7.3E-02	**2.1E-01**	**4.1E-01**	0.2%	**2.9E-01**	**1.7E-01**	**5.1E-01**	9.6E-01	0.2%
Isopropylbenzene (cumene)	7.4E-03	8.7E-03	3.2E-02	4.8E-02	0.02%	1.7E-02	1.9E-02	7.6E-02	1.1E-01	0.02%
Methyl ethyl ketone	2.0E-02	1.8E-04	4.1E-02	6.1E-02	0.02%	4.6E-02	4.4E-04	9.7E-02	1.4E-01	0.02%
Methyl isobutyl ketone	**1.7E+00**	5.2E-02	**7.7E-01**	**2.5E+00**	1.0%	**3.9E+00**	**1.2E-01**	**1.8E+00**	5.8E+00	0.93%
tert-Butyl alcohol	3.2E-02		**6.1E+00**	**6.2E+00**	2%	7.5E-02		**1.4E+01**	1.5E+01	2%
Tetrachloroethene	3.3E-02	1.9E-02	**1.6E-01**	**2.2E-01**	0.08%	7.7E-02	4.4E-02	**3.9E-01**	5.1E-01	0.08%
Toluene	**2.1E+00**	**7.2E-01**	**9.7E+00**	**1.3E+01**	5%	**4.9E+00**	**1.7E+00**	**2.3E+01**	3.0E+01	5%
trans-1,2-Dichloroethene	**5.5E-01**	4.9E-02	**3.2E+00**	**3.8E+00**	1.4%	**1.3E+00**	**1.1E-01**	**7.5E+00**	8.9E+00	1.42%
trans-1,3-Dichloropropene	3.7E-03	2.0E-04	9.8E-02	**1.0E-01**	0.04%	8.7E-03	4.5E-04	**2.3E-01**	2.4E-01	0.04%
Trichloroethene	**5.2E+00**	**8.9E-01**	**7.8E-01**	**6.9E+00**	3%	**1.2E+01**	**2.0E+00**	**1.8E+00**	1.6E+01	3%
Vinyl chloride	**1.5E+01**	**7.9E-01**	**7.8E+00**	**2.3E+01**	9%	**3.5E+01**	**1.9E+00**	**1.8E+01**	5.5E+01	9%

Table 2-11
Noncancer Risk Results Detailed Summary for Risk Drivers - Future Adult/Child Resident - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients										
Chemical of Potential Concern	Future Residential									
	Adult Resident					Child Resident				
	Reasonable Maximum Exposure									
	Ingestion	Dermal	Inhalation	Total	% Contribution	Ingestion	Dermal	Inhalation	Total	% Contribution
m,p-Xylenes	**1.3E-01**		**6.4E-01**	**7.7E-01**	0%	**3.0E-01**		**1.5E+00**	1.8E+00	0%
o-Xylene	6.1E-02	5.2E-02	**3.0E-01**	**4.2E-01**	0.2%	**1.4E-01**	**1.2E-01**	**7.2E-01**	9.8E-01	0.2%
Xylenes, total	**2.2E-01**	**1.4E-01**	**7.6E+00**	**8.0E+00**	3%	**5.1E-01**	**3.3E-01**	**1.8E+01**	1.9E+01	3%
Subtotal SVOCs/VOCs	**7.7E+01**	**1.3E+01**	**8.5E+01**	**1.8E+02**	67%	**1.8E+02**	**3.8E+01**	**2.0E+02**	4.2E+02	67%
Total:	**1.2E+02**	**6.2E+01**	**8.5E+01**	**2.62E+02**		**2.8E+02**	**1.5E+02**	**2.0E+02**	6.28E+02	

Total Estimated Hazard Index Across All Exposure Routes: **262** 628

Notes:
Subtotals and Total: Cumulative Hazard Index of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard index for all chemicals evaluated.

Table 2-12

Risk Calculation Worksheet for Groundwater - Carcinogenic Effects - Construction Exposure Scenario - Trench Worker

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Trench Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	90	day/yr
Exposure Duration	ED	1	yr
Exposure Time	ET	8	hr/day
Inhalation Rate (VOCs in Water Inhalation)	InRw	2.5	m3/hr
Skin Surface Area (Water Contact)	SA_w	5700	cm2 [water]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (L/cm^3)	CF	1.00E-03	L/cm3
Conversion Factor (yr/day)	CF	2.74E-03	yr/day
Conversion Factor (mg/ug)	CF	1.00E-03	mg/ug
Constituent Specific Permeability Constant	Kp	Chemical Specific	cm/hr

Risk Calculations

		Exposure Route = Dermal				Exposure Route = Inhalation				
Chemical of Potential Concern	**RME Medium EPC Value, Cgw [mg/L]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Concentration in Air, Cair [ug/m3]**	**Chronic Daily Intake [mg/kg/day]**	**Cancer Slope Factor, SF [mg/kg/day]-1**	**Cancer Risk [-]**	**Total Cancer Risk [-]**
Metals									
Aluminum	9.40E+00	2.16E-05	NA		NA	NV	NA		
Antimony	1.51E-03	3.47E-09	NA		NA	NV	NA		
Arsenic	2.87E-01	6.58E-07	1.50E+00	9.87E-07	NA	NV	1.50E+00		9.87E-07
Barium	1.68E-01	3.85E-07	NA		NA	NV	NA		
Beryllium	7.64E-04	1.75E-09	NA		NA	NV	NA		
Boron	4.31E+00	9.88E-06	NA		NA	NV	NA		
Cadmium	1.26E-03	2.88E-09	NA		NA	NV	NA		
Chromium	3.57E-02	8.19E-08	NA		NA	NV	NA		
Chromium (VI)	3.50E-04	1.61E-09	5.00E-01	8.03E-10	NA	NV	5.00E-01		8.03E-10
Cobalt	8.89E-03	8.16E-09	NA		NA	NV	NA		
Copper	4.66E-02	1.07E-07	NA		NA	NV	NA		
Iron	5.35E+01	1.23E-04	NA		NA	NV	NA		
Lead	4.00E-02	9.18E-09	NA		NA	NV	NA		
Manganese	4.33E+00	9.94E-06	NA		NA	NV	NA		
Mercury	1.21E-04	2.78E-10	NA		NA	NV	NA		
Molybdenum	5.64E-03	1.29E-08	NA		NA	NV	NA		
Nickel	5.46E-02	2.51E-08	NA		NA	NV	NA		
Selenium	1.89E-02	4.34E-08	NA		NA	NV	NA		

Risk Calculations									
		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Silver	1.20E-04	1.65E-10	NA		NA	NV	NA		
Thallium	5.00E-05	1.15E-10	NA		NA	NV	NA		
Vanadium	3.19E-02	7.33E-08	NA		NA	NV	NA		
Zinc	3.03E-01	4.17E-07	NA		NA	NV	NA		
Cyanide	6.29E-02	1.44E-07	NA		NA	NV	NA		
Pesticides/PCBs									
4,4'-DDD	5.00E-03	4.12E-06	2.40E-01	9.88E-07	NA	NV	2.40E-01		9.88E-07
4,4'-DDE	7.76E-04	5.61E-07	3.40E-01	1.91E-07	NA	NV	3.40E-01		1.91E-07
4,4'-DDT	1.80E-04	2.44E-07	3.40E-01	8.30E-08	NA	NV	3.40E-01		8.30E-08
Aldrin	4.05E-04	4.33E-09	1.70E+01	7.37E-08	NA	NV	1.70E+01		7.37E-08
alpha-BHC	3.00E-04	1.56E-08	6.30E+00	9.86E-08	NA	NV	6.30E+00		9.86E-08
alpha-Chlordane	3.34E-04	8.12E-08	1.30E+00	1.06E-07	NA	NV	1.30E+00		1.06E-07
Atrazine	2.00E-03	3.35E-08	2.30E-01	7.71E-09	NA	NV	2.30E-01		7.71E-09
beta-BHC	3.69E-04	1.92E-08	1.80E+00	3.46E-08	NA	NV	1.80E+00		3.46E-08
delta-BHC	1.60E-04	8.35E-09	NA		NA	NV	NA		
Diazinon	2.60E-04	1.38E-08	NA		NA	NV	NA		
Dieldrin	9.24E-04	7.52E-08	1.60E+01	1.20E-06	NA	NV	1.60E+01		**1.20E-06**
Endosulfan I	3.31E-04	9.33E-09	NA		NA	NV	NA		
Endosulfan II	2.30E-04	4.05E-09	NA		NA	NV	NA		
Endosulfan sulfate	9.20E-05	NA	NA		NA	NV	NA		
Endrin	6.46E-04	5.26E-08	NA		NA	NV	NA		
Endrin aldehyde	1.40E-04	NA	NA		NA	NV	NA		
Endrin ketone	1.70E-04	NA	NA		NA	NV	NA		
gamma-BHC	3.28E-04	1.71E-08	1.10E+00	1.88E-08	NA	NV	1.10E+00		1.88E-08
gamma-Chlordane	2.50E-04	6.08E-08	1.20E+00	7.30E-08	NA	NV	1.20E+00		7.30E-08
Heptachlor	1.11E-04	6.15E-09	4.50E+00	2.77E-08	NA	NV	4.50E+00		2.77E-08
Heptachlor epoxide	1.20E-04	2.18E-08	9.10E+00	1.98E-07	NA	NV	9.10E+00		1.98E-07
Methoxychlor	1.20E-04	3.36E-08	NA		NA	NV	NA		
Aroclor-1260	9.63E-04	4.03E-06	2.00E+00	8.06E-06	NA	NV	2.00E+00		**8.06E-06**
SVOCs/VOCs									
1,4-Dioxane (p-dioxane)	7.80E-01	6.38E-07	2.70E-02	1.72E-08	NA	NV	2.70E-02		1.72E-08
2,4,6-Trichlorophenol	7.14E-03	7.10E-07	7.00E-02	4.97E-08	NA	NV	7.00E-02		4.97E-08
2,4-Dimethylphenol	7.87E-02	2.16E-06	NA		NA	NV	NA		
2-Chlorophenol	4.30E-03	8.75E-08	NA		2.86E-01	2.87E-07	NA		
2-Methylnaphthalene	2.26E-01	4.33E-05	NA		NA	NA	NA		
2-Methylphenol	1.23E-01	2.34E-06	NA		NA	NV	NA		
2-Nitroaniline	1.00E-02	1.16E-07	NA		NA	NV	NA		
3,4-methylphenol	8.40E-01	1.60E-05	NA		NA	NV	NA		
4-Chloro-3-methylphenol	2.38E-02	NA	NA		NA	NV	NA		
4-Methylphenol	1.94E-01	3.69E-06	NA		NA	NV	NA		

Risk Calculations

		Exposure Route = Dermal				Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
Acenaphthene	4.50E-03	1.25E-06	NA		2.32E-01	2.33E-07	NA		
Acenaphthylene	9.54E-03	2.75E-06	NA		1.14E-01	1.14E-07	NA		
Anthracene	3.20E-03	1.56E-06	NA		1.14E-01	1.14E-07	NA		
Benzo(a)anthracene	9.00E-04	1.34E-06	1.20E+00	1.61E-06	NA	NV	1.20E+00		**1.61E-06**
Benzo(a)pyrene	5.00E-04	1.28E-06	1.20E+01	1.53E-05	NA	NV	1.20E+01		**1.53E-05**
Benzo(b)fluoranthene	7.60E-04	1.97E-06	1.20E+00	2.36E-06	NA	NV	1.20E+00		**2.36E-06**
Benzo(g,h,i)perylene	2.00E-04	9.22E-07	NA		NA	NV	NA		
Benzo(k)fluoranthene	4.60E-04	1.12E-06	1.20E+00	1.35E-06	NA	NV	1.20E+00		**1.35E-06**
Biphenyl (Diphenyl)	1.30E-03	2.64E-07	NA		NA	NV	NA		
bis(2-Chloroethoxy)methane	2.00E-04	6.99E-10	NA		NA	NA	NA		
bis(2-Ethylhexyl)phthalate	1.69E-02	3.82E-06	1.40E-02	5.35E-08	NA	NV	1.40E-02		5.35E-08
Bromoform	1.20E-02	1.02E-07	1.10E-02	1.12E-09	5.98E-01	6.02E-07	1.10E-02	6.62E-09	7.74E-09
Caprolactam	2.40E-03	6.14E-09	NA		NA	NV	NA		
Carbazole	1.25E-02	1.62E-06	NA		NA	NV	NA		
Chrysene	1.10E-03	1.64E-06	1.20E-01	1.97E-07	NA	NV	1.20E-01		1.97E-07
Dibenz(a,h)anthracene	4.50E-05	1.77E-07	7.30E+00	1.29E-06	NA	NV	7.30E+00		**1.29E-06**
Diethylphthalate	1.03E-02	1.34E-07	NA		NA	NV	NA		
Di-n-butyl phthalate	1.17E-02	1.10E-06	NA		NA	NV	NA		
Fluoranthene	2.40E-03	1.35E-06	NA		NA	NV	NA		
Fluorene	2.60E-03	9.34E-07	NA		1.02E-01	1.03E-07	NA		
Hexachloroethane	1.00E-03	1.03E-07	3.90E-02	4.03E-09	NA	NV	3.90E-02		4.03E-09
Indeno(1,2,3-c,d)pyrene	2.00E-04	5.18E-07	1.20E+00	6.22E-07	NA	NV	1.20E+00		6.22E-07
Naphthalene	1.36E-01	1.46E-05	1.20E-01	1.75E-06	9.34E+00	9.40E-06	1.20E-01	1.13E-06	**2.88E-06**
Nitrobenzene	2.00E-03	2.74E-08	NA		4.65E-02	4.68E-08	NA		
N-Nitrosodi-n-propylamine	2.00E-03	1.21E-08	7.00E+00	8.50E-08	NA	NV	7.00E+00		8.50E-08
N-Nitrosodiphenylamine	1.20E-03	9.04E-08	9.00E-03	8.13E-10	NA	NV	9.00E-03		8.13E-10
Pentachlorophenol	1.13E-02	1.60E-05	1.20E-01	1.93E-06	NA	NV	1.20E-01		**1.93E-06**
Phenanthrene	6.00E-03	1.92E-06	NA		NA	NV	NA		
Pyrene	2.40E-03	1.95E-06	NA		2.53E-02	2.55E-08	NA		
1,1-Dichloroethene	4.16E-02	1.20E-06	NA		3.65E+00	3.68E-06	NA		
1,1-Dichloroethane	5.57E-01	9.18E-06	5.70E-03	5.23E-08	4.80E+01	4.83E-05	5.70E-03	2.76E-07	3.28E-07
1,1,2-Trichloroethane	1.33E-02	2.20E-07	7.20E-02	1.58E-08	9.44E-01	9.50E-07	7.20E-02	6.84E-08	8.42E-08
1,1,2,2-Tetrachloroethane	1.29E-02	2.46E-07	2.00E-01	4.93E-08	7.47E-01	7.51E-07	2.00E-01	1.50E-07	2.00E-07
1,1,1-Trichloroethane	1.18E-01	3.87E-06	NA		8.85E+00	8.90E-06	NA		
1,1,2-Trichloroethane	1.33E-02	2.20E-07	7.20E-02	1.58E-08	9.44E-01	9.50E-07	7.20E-02	6.84E-08	8.42E-08
1,1,2,2-Tetrachloroethane	1.29E-02	2.46E-07	2.00E-01	4.93E-08	7.47E-01	7.51E-07	2.00E-01	1.50E-07	2.00E-07
1,2,3-Trichlorobenzene	2.72E-03	NA	NA		1.69E-01	1.70E-07	NA		
1,2,4-Trichlorobenzene	1.51E-02	2.53E-06	2.90E-02	7.33E-08	9.37E-01	9.43E-07	2.90E-02	2.74E-08	1.01E-07
1,2,4-Trimethylbenzene	2.78E-01	4.82E-05	NA		2.17E+01	2.19E-05	NA		
1,2-Dibromo-3-chloropropane	2.40E-03	5.73E-08	7.00E+00	4.01E-07	1.00E-01	1.01E-07	7.00E+00	7.06E-07	**1.11E-06**

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Exposure Route = Inhalation: Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Total Cancer Risk [-]
1,2-Dichlorobenzene	7.34E-01	7.23E-05	NA		5.10E+01	5.14E-05	NA		
1,2-Dichloroethane	1.44E-02	2.37E-07	9.10E-02	2.15E-08	1.18E+00	1.19E-06	9.10E-02	1.08E-07	1.30E-07
1,2-Dichloropropane	5.10E-03	9.91E-08	3.60E-02	3.57E-09	4.08E-01	4.10E-07	3.60E-02	1.48E-08	1.83E-08
1,3-Dichlorobenzene	2.71E-02	3.63E-06	NA		1.88E+00	1.90E-06	NA		
1,3,5-Trimethylbenzene	1.10E-01	1.46E-05	NA		8.65E+00	8.71E-06	NA		
1,4-Dichlorobenzene	2.18E-01	2.19E-05	5.40E-03	1.18E-07	1.52E+01	1.53E-05	5.40E-03	8.28E-08	2.01E-07
2-Chlorotoluene	2.89E-03	NA	NA		NA	NA	NA		
2-Hexanone	2.35E-02	2.08E-07	NA		NA	NA	NA		
2,2-Dichloropropane	5.00E-04	NA	NA		NA	NA	NA		
Acetone	4.85E-01	6.11E-07	NA		2.07E+01	2.08E-05	NA		
Benzene	4.00E-01	1.41E-05	1.00E-01	1.41E-06	3.88E+01	3.91E-05	1.00E-01	3.91E-06	**5.32E-06**
Carbon disulfide	3.10E-03	1.24E-07	NA		3.08E-01	3.10E-07	NA		
Carbon tetrachloride	3.00E-04	1.25E-08	1.50E-01	1.87E-09	2.09E-02	2.11E-08	1.50E-01	3.16E-09	5.03E-09
Chlorobenzene	6.74E-01	4.43E-05	NA		5.41E+01	5.45E-05	NA		
Chloroethane	9.74E-02	1.42E-06	NA		1.04E+01	1.05E-05	NA		
Chloroform	4.40E-03	7.54E-08	3.10E-02	2.34E-09	3.44E-01	3.47E-07	3.10E-02	1.07E-08	1.31E-08
Chloromethane	7.40E-03	5.84E-08	NA		8.96E-01	9.02E-07	NA		
cis-1,2-Dichloroethene	1.37E+01	3.62E-04	NA		1.19E+03	1.20E-03	NA		
cis-1,3-Dichloropropene	4.20E-03	4.54E-08	1.00E-01	4.54E-09	3.45E-01	3.47E-07	1.00E-01	3.47E-08	3.92E-08
Cyclohexane	1.80E-02	3.47E-06	NA		1.70E+00	1.71E-06	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	NA	NA		NA	NA	NA		
Ethylbenzene	4.49E-01	4.85E-05	1.10E-02	5.33E-07	3.75E+01	3.77E-05	1.10E-02	4.15E-07	9.48E-07
Isopropyl ether	4.30E-01	NA	NA		NA	NA	NA		
Isopropylbenzene (cumene)	2.71E-02	4.88E-06	NA		NA	NA	NA		
Methyl acetate	2.25E-02	4.42E-08	NA		5.64E-01	5.68E-07	NA		
Methyl ethyl ketone	4.30E-01	1.01E-06	NA		1.34E+01	1.35E-05	NA		
Methyl isobutyl ketone	4.86E+00	3.22E-05	NA		2.96E+02	2.98E-04	NA		
Methyl tert-butyl ether	2.01E-02	1.05E-07	1.80E-03	1.90E-10	NA	NA	1.80E-03		1.90E-10
Methylcyclohexane	2.45E-02	5.08E-06	NA		2.15E+00	2.16E-06	NA		
Methylene chloride	8.19E-03	7.02E-08	1.40E-02	9.83E-10	7.49E-01	7.54E-07	1.40E-02	1.06E-08	1.15E-08
n-Butylbenzene	6.12E-03	NA	NA		4.56E-01	4.59E-07	NA		
n-Propylbenzene	5.61E-02	NA	NA		4.42E+00	4.45E-06	NA		
Phenol	4.80E-02	5.09E-07	NA		NA	NV	NA		
p-Cymene (p-isopropyltoluene)	7.86E-02	NA	NA		NA	NA	NA		
sec-Butylbenzene	5.64E-03	NA	NA		4.21E-01	4.23E-07	NA		
Styrene	1.39E-02	1.17E-06	NA		1.16E+00	1.17E-06	NA		
tert-Butylbenzene	2.10E-03	NA	NA		1.56E-01	1.58E-07	NA		
tert-Butyl alcohol	1.17E-01	NA	NA		NA	NA	NA		
Tetrachloroethene	1.20E-02	1.02E-06	5.40E-01	5.49E-07	8.06E-01	8.11E-07	5.40E-01	4.38E-07	9.87E-07
Toluene	6.11E+00	4.32E-04	NA		5.48E+02	5.51E-04	NA		

Risk Calculations										
		Exposure Route = Dermal			Exposure Route = Inhalation					
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Cancer Slope Factor, SF [mg/kg/day]-1	Cancer Risk [-]		Total Cancer Risk [-]
trans-1,2-Dichloroethene	4.01E-01	7.56E-06	NA		3.51E+01	3.53E-05	NA			
trans-1,3-Dichloropropene	4.10E-03	4.43E-08	1.00E-01	4.43E-09	3.36E-01	3.39E-07	1.00E-01	3.39E-08		3.83E-08
Trichloroethene	5.70E-02	1.73E-06	5.90E-03	1.02E-08	4.29E+00	4.32E-06	5.90E-03	2.55E-08		3.57E-08
Vinyl chloride	1.63E+00	2.18E-05	7.20E-01	1.57E-05	1.77E+02	1.78E-04	7.20E-01	1.28E-04		**1.44E-04**
m,p-Xylenes	9.44E-01	NA	NA		7.88E+01	7.93E-05	NA			
o-Xylene	4.45E-01	6.56E-05	NA		3.70E+01	3.72E-05	NA			
Xylenes, total	1.60E+00	1.85E-04	NA		1.33E+02	1.34E-04	NA			
Dioxans/Furans										
1,2,3,4,6,7,8-HpCDD	4.64E-07	2.12E-09	1.50E+03	3.18E-06	NA	NV	1.50E+03			**3.18E-06**
1,2,3,4,6,7,8-HpCDF	9.49E-08	3.91E-10	1.50E+03	5.87E-07	NA	NV	1.50E+03			5.87E-07
1,2,3,4,7,8,9-HpCDF	9.79E-09	4.04E-11	1.50E+03	6.05E-08	NA	NV	1.50E+03			6.05E-08
1,2,3,4,7,8-HxCDD	2.62E-09	9.60E-12	1.50E+04	1.44E-07	NA	NV	1.50E+04			1.44E-07
1,2,3,4,7,8-HxCDF	8.49E-09	2.80E-11	1.50E+04	4.21E-07	NA	NV	1.50E+04			4.21E-07
1,2,3,6,7,8-HxCDD	1.33E-08	4.87E-11	1.50E+04	7.30E-07	NA	NV	1.50E+04			7.30E-07
1,2,3,6,7,8-HxCDF	1.62E-09	5.34E-12	1.50E+04	8.01E-08	NA	NV	1.50E+04			8.01E-08
1,2,3,7,8,9-HxCDD	4.40E-09	1.61E-11	1.50E+04	2.42E-07	NA	NV	1.50E+04			2.42E-07
1,2,3,7,8,9-HxCDF	3.87E-09	1.28E-11	1.50E+04	1.91E-07	NA	NV	1.50E+04			1.91E-07
1,2,3,7,8-PeCDD	1.08E-09	3.16E-12	1.50E+05	4.74E-07	NA	NV	1.50E+05			4.74E-07
1,2,3,7,8-PeCDF	2.28E-09	6.03E-12	7.50E+03	4.52E-08	NA	NV	7.50E+03			4.52E-08
2,3,4,6,7,8-HxCDF	3.94E-09	1.30E-11	1.50E+04	1.95E-07	NA	NV	1.50E+04			1.95E-07
2,3,4,7,8-PeCDF	2.64E-09	6.97E-12	7.50E+04	5.23E-07	NA	NV	7.50E+04			5.23E-07
2,3,7,8-TCDF	1.68E-09	3.56E-12	1.50E+04	5.34E-08	NA	NV	1.50E+04			5.34E-08
OCDD	2.18E-06	1.24E-08	1.50E+01	1.87E-07	NA	NV	1.50E+01			1.87E-07
OCDF	7.44E-07	3.83E-09	1.50E+01	5.74E-08	NA	NV	1.50E+01			5.74E-08
			Total Risk:	6.50E-05			**Total Risk:**	1.36E-04		2.01E-04

Total Estimated Carcinogenic Risk Across All Exposure Routes : 2.0E-04

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 2-13
Risk Calculation Worksheet for Groundwater - Noncarcinogenic Effects - Construction Exposure Scenario - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Construction
	Scenario Timeframe:	Chronic
	Exposure Medium:	Groundwater
	Exposure Point:	OnSite
	Receptor Population:	Trench Worker
	Receptor Age:	Adult

Exposure Scenario/Exposure Area Description

Site Risks

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	90	day/yr
Exposure Duration	ED	1	yr
Exposure Time	ET	8	hr/day
Inhalation Rate (VOCs in Water Inhalation)	InRw	2.5	m3/hr
Skin Surface Area (Water Contact)	SA_w	5.70E+03	cm2 [water]
Body Weight	BW	70	kg
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	1	yr
Conversion Factor (L/cm^3)	CF	1.00E-03	L/cm3
Conversion Factor (yr/day)	CF	2.74E-03	yr/day
Conversion Factor (mg/ug)	CF	1.00E-03	mg/ug

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Metals									
Aluminum	9.40E+00	1.51E-03	1.00E+00	1.51E-03	NA	NV	1.00E+00		1.51E-03
Antimony	1.51E-03	2.43E-07	4.00E-04	6.07E-04	NA	NV	4.00E-04		6.07E-04
Arsenic	2.87E-01	4.61E-05	3.00E-04	1.54E-01	NA	NV	3.00E-04		1.54E-01
Barium	1.68E-01	2.69E-05	2.00E-01	1.35E-04	NA	NV	2.00E-01		1.35E-04
Beryllium	7.64E-04	1.23E-07	2.00E-03	6.14E-05	NA	NV	2.00E-03		6.14E-05
Boron	4.31E+00	6.92E-04	2.00E-01	3.46E-03	NA	NV	2.00E-01		3.46E-03
Cadmium	1.26E-03	2.02E-07	5.00E-04	4.03E-04	NA	NV	5.00E-04		4.03E-04
Chromium	3.57E-02	5.73E-06	NA		NA	NV	NA		
Chromium (VI)	3.50E-04	1.12E-07	3.00E-03	3.75E-05	NA	NV	3.00E-03		3.75E-05
Cobalt	8.89E-03	5.71E-07	3.00E-04	1.90E-03	NA	NV	3.00E-04		1.90E-03
Copper	4.66E-02	7.48E-06	4.00E-02	1.87E-04	NA	NV	4.00E-02		1.87E-04
Iron	5.35E+01	8.59E-03	7.00E-01	1.23E-02	NA	NV	7.00E-01		1.23E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Exposure Route = Inhalation: Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
Lead	4.00E-02	6.42E-07	NA		NA	NV	NA		
Manganese	4.33E+00	6.96E-04	2.40E-02	2.90E-02	NA	NV	2.40E-02		2.90E-02
Mercury	1.21E-04	1.94E-08	3.00E-04	6.48E-05	NA	NV	3.00E-04		6.48E-05
Molybdenum	5.64E-03	9.05E-07	5.00E-03	1.81E-04	NA	NV	5.00E-03		1.81E-04
Nickel	5.46E-02	1.75E-06	2.00E-02	8.77E-05	NA	NV	2.00E-02		8.77E-05
Selenium	1.89E-02	3.04E-06	5.00E-03	6.07E-04	NA	NV	5.00E-03		6.07E-04
Silver	1.20E-04	1.16E-08	5.00E-03	2.31E-06	NA	NV	5.00E-03		2.31E-06
Thallium	5.00E-05	8.03E-09	6.60E-05	1.22E-04	NA	NV	6.60E-05		1.22E-04
Vanadium	3.19E-02	5.13E-06	5.00E-03	1.03E-03	NA	NV	5.00E-03		1.03E-03
Zinc	3.03E-01	2.92E-05	3.00E-01	9.73E-05	NA	NV	3.00E-01		9.73E-05
Cyanide	6.29E-02	1.01E-05	2.00E-02	5.05E-04	NA	NV	2.00E-02		5.05E-04
Pesticides/PCBs									
4,4'-DDD	5.00E-03	2.88E-04	NA		NA	NV	NA		
4,4'-DDE	7.76E-04	3.93E-05	NA		NA	NV	NA		
4,4'-DDT	1.80E-04	1.71E-05	5.00E-04	3.42E-02	NA	NV	5.00E-04		3.42E-02
Aldrin	4.05E-04	3.03E-07	3.00E-05	1.01E-02	NA	NV	3.00E-05		1.01E-02
alpha-BHC	3.00E-04	1.10E-06	5.00E-04	2.19E-03	NA	NV	5.00E-04		2.19E-03
alpha-Chlordane	3.34E-04	5.69E-06	5.00E-04	1.14E-02	NA	NV	5.00E-04		1.14E-02
Atrazine	2.00E-03	2.35E-06	3.50E-02	6.70E-05	NA	NV	3.50E-02		6.70E-05
beta-BHC	3.69E-04	1.35E-06	NA		NA	NV	NA		
delta-BHC	1.60E-04	5.84E-07	NA		NA	NV	NA		
Diazinon	2.60E-04	9.63E-07	7.00E-04	1.38E-03	NA	NV	7.00E-04		1.38E-03
Dieldrin	9.24E-04	5.26E-06	5.00E-05	1.05E-01	NA	NV	5.00E-05		1.05E-01
Endosulfan I	3.31E-04	6.53E-07	6.00E-03	1.09E-04	NA	NV	6.00E-03		1.09E-04
Endosulfan II	2.30E-04	2.83E-07	6.00E-03	4.72E-05	NA	NA	6.00E-03		4.72E-05
Endosulfan sulfate	9.20E-05	NA	6.00E-03		NA	NV	6.00E-03		
Endrin	6.46E-04	3.68E-06	3.00E-04	1.23E-02	NA	NV	3.00E-04		1.23E-02
Endrin aldehyde	1.40E-04	NA	3.00E-04		NA	NV	3.00E-04		
Endrin ketone	1.70E-04	NA	3.00E-04		NA	NV	3.00E-04		
gamma-BHC	3.28E-04	1.20E-06	3.00E-04	3.99E-03	NA	NV	3.00E-04		3.99E-03
gamma-Chlordane	2.50E-04	4.26E-06	5.00E-04	8.52E-03	NA	NV	5.00E-04		8.52E-03
Heptachlor	1.11E-04	4.31E-07	3.00E-05	1.44E-02	NA	NV	3.00E-05		1.44E-02
Heptachlor epoxide	1.20E-04	1.52E-06	1.30E-05	1.17E-01	NA	NV	1.30E-05		1.17E-01
Methoxychlor	1.20E-04	2.35E-06	2.00E-05	1.17E-01	NA	NV	2.00E-05		1.17E-01
Aroclor-1260	9.63E-04	2.82E-04	2.00E-05	1.41E+01	NA	NV	2.00E-05		**1.41E+01**
SVOCs/VOCs									
1,4-Dioxane (p-dioxane)	7.80E-01	4.47E-05	1.00E-01	4.47E-04	NA	NV	1.00E-01		4.47E-04
2,4,6-Trichlorophenol	7.14E-03	4.97E-05	1.00E-03	4.97E-02	NA	NV	1.00E-03		4.97E-02
2,4-Dimethylphenol	7.87E-02	1.51E-04	2.00E-02	7.56E-03	NA	NV	2.00E-02		7.56E-03
2-Chlorophenol	4.30E-03	6.13E-06	5.00E-03	1.23E-03	2.86E-01	2.01E-05	5.00E-03	4.02E-03	5.25E-03
2-Methylnaphthalene	2.26E-01	3.03E-03	4.00E-03	7.57E-01	NA	NA	4.00E-03		7.57E-01

Risk Calculations

		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
2-Methylphenol	1.23E-01	1.64E-04	5.00E-02	3.28E-03	NA	NV	5.00E-02		3.28E-03
2-Nitroaniline	1.00E-02	8.13E-06	1.00E-02	8.13E-04	NA	NV	1.00E-02		8.13E-04
3,4-methylphenol	8.40E-01	1.12E-03	5.00E-03	2.24E-01	NA	NV	5.00E-03		2.24E-01
4-Chloro-3-methylphenol	2.38E-02	NA	NA		NA	NV	NA		
4-Methylphenol	1.94E-01	2.58E-04	5.00E-03	5.17E-02	NA	NV	5.00E-03		5.17E-02
Acenaphthene	4.50E-03	8.72E-05	6.00E-02	1.45E-03	2.32E-01	1.63E-05	6.00E-02	2.72E-04	1.73E-03
Acenaphthylene	9.54E-03	1.93E-04	NA		1.14E-01	8.01E-06	NA		
Anthracene	3.20E-03	1.09E-04	3.00E-01	3.63E-04	1.14E-01	8.01E-06	3.00E-01	2.67E-05	3.90E-04
Benzo(a)anthracene	9.00E-04	9.38E-05	NA		NA	NV	NA		
Benzo(a)pyrene	5.00E-04	8.93E-05	NA		NA	NV	NA		
Benzo(b)fluoranthene	7.60E-04	1.38E-04	NA		NA	NV	NA		
Benzo(g,h,i)perylene	2.00E-04	6.45E-05	NA		NA	NV	NA		
Benzo(k)fluoranthene	4.60E-04	7.86E-05	NA		NA	NV	NA		
Biphenyl (Diphenyl)	1.30E-03	1.85E-05	5.00E-02	3.70E-04	NA	NV	5.00E-02		3.70E-04
bis(2-Chloroethoxy)methane	2.00E-04	4.89E-08	3.00E-03	1.63E-05	NA	NA	3.00E-03		1.63E-05
bis(2-Ethylhexyl)phthalate	1.69E-02	2.68E-04	2.00E-02	1.34E-02	NA	NV	2.00E-02		1.34E-02
Bromoform	1.20E-02	7.12E-06	2.00E-02	3.56E-04	5.98E-01	4.21E-05	2.00E-02	2.11E-03	2.46E-03
Caprolactam	2.40E-03	4.30E-07	5.00E-01	8.59E-07	NA	NV	5.00E-01		8.59E-07
Carbazole	1.25E-02	1.13E-04	NA		NA	NV	NA		
Chrysene	1.10E-03	1.15E-04	NA		NA	NV	NA		
Dibenz(a,h)anthracene	4.50E-05	1.24E-05	NA		NA	NV	NA		
Diethylphthalate	1.03E-02	9.35E-06	8.00E-01	1.17E-05	NA	NV	8.00E-01		1.17E-05
Di-n-butyl phthalate	1.17E-02	7.69E-05	1.00E-01	7.69E-04	NA	NV	1.00E-01		7.69E-04
Fluoranthene	2.40E-03	9.43E-05	4.00E-02	2.36E-03	NA	NV	4.00E-02		2.36E-03
Fluorene	2.60E-03	6.54E-05	4.00E-02	1.63E-03	1.02E-01	7.21E-06	4.00E-02	1.80E-04	1.81E-03
Hexachloroethane	1.00E-03	7.24E-06	1.00E-03	7.24E-03	NA	NV	1.00E-03		7.24E-03
Indeno(1,2,3-c,d)pyrene	2.00E-04	3.63E-05	NA		NA	NV	NA		
Naphthalene	1.36E-01	1.02E-03	2.00E-02	5.12E-02	9.34E+00	6.58E-04	2.00E-02	3.29E-02	8.40E-02
Nitrobenzene	2.00E-03	1.92E-06	2.00E-03	9.60E-04	4.65E-02	3.27E-06	2.00E-03	1.64E-03	2.60E-03
N-Nitrosodi-n-propylamine	2.00E-03	8.50E-07	NA		NA	NV	NA		
N-Nitrosodiphenylamine	1.20E-03	6.33E-06	2.00E-02	3.16E-04	NA	NV	2.00E-02		3.16E-04
Pentachlorophenol	1.13E-02	1.12E-03	3.00E-02	3.74E-02	NA	NV	3.00E-02		3.74E-02
Phenanthrene	6.00E-03	1.35E-04	NA		NA	NV	NA		
Pyrene	2.40E-03	1.36E-04	3.00E-02	4.54E-03	2.53E-02	1.78E-06	3.00E-02	5.95E-05	4.60E-03
1,1-Dichloroethane	5.57E-01	6.42E-04	2.00E-01	3.21E-03	4.80E+01	3.38E-03	2.00E-01	1.69E-02	2.01E-02
1,1-Dichloroethene	4.16E-02	8.43E-05	5.00E-02	1.69E-03	3.65E+00	2.57E-04	5.00E-02	5.15E-03	6.83E-03
1,1,1-Trichloroethane	1.18E-01	2.71E-04	2.00E+00	1.36E-04	8.85E+00	6.23E-04	2.00E+00	3.12E-04	4.47E-04
1,1,2-Trichloroethane	1.33E-02	1.54E-05	4.00E-03	3.85E-03	9.44E-01	6.65E-05	4.00E-03	1.66E-02	2.05E-02
1,1,2,2-Tetrachloroethane	1.29E-02	1.72E-05	4.00E-03	4.31E-03	7.47E-01	5.26E-05	4.00E-03	1.32E-02	1.75E-02
1,2,3-Trichlorobenzene	2.72E-03	NA	NA		1.69E-01	1.19E-05	NA		
1,2,4-Trichlorobenzene	1.51E-02	1.77E-04	1.00E-02	1.77E-02	9.37E-01	6.60E-05	1.00E-02	6.60E-03	2.43E-02

Risk Calculations									
		Exposure Route = Dermal			Exposure Route = Inhalation				
Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Concentration in Air, Cair [ug/m3]	Chronic Daily Intake [mg/kg/day]	Reference Dose [mg/kg/day]	Hazard Quotient	Total Hazard Quotient [-]
1,2,4-Trimethylbenzene	2.78E-01	3.37E-03	7.00E-03	4.82E-01	2.17E+01	1.53E-03	7.00E-03	2.19E-01	7.01E-01
1,2-Dibromo-3-chloropropane	2.40E-03	4.01E-06	2.00E-04	2.00E-02	1.00E-01	7.06E-06	2.00E-04	3.53E-02	5.54E-02
1,2-Dichlorobenzene	7.34E-01	5.06E-03	9.00E-02	5.63E-02	5.10E+01	3.60E-03	9.00E-02	4.00E-02	9.62E-02
1,2-Dichloroethane	1.44E-02	1.66E-05	2.00E-02	8.28E-04	1.18E+00	8.32E-05	2.00E-02	4.16E-03	4.99E-03
1,2-Dichloropropane	5.10E-03	6.94E-06	9.00E-02	7.71E-05	4.08E-01	2.87E-05	9.00E-02	3.19E-04	3.96E-04
1,3-Dichlorobenzene	2.71E-02	2.54E-04	NA		1.88E+00	1.33E-04	NA		
1,3,5-Trimethylbenzene	1.10E-01	1.02E-03	1.00E-02	1.02E-01	8.65E+00	6.10E-04	1.00E-02	6.10E-02	1.63E-01
1,4-Dichlorobenzene	2.18E-01	1.54E-03	7.00E-02	2.19E-02	1.52E+01	1.07E-03	7.00E-02	1.53E-02	3.73E-02
2-Chlorotoluene	2.89E-03	NA	2.00E-02		NA	NA	2.00E-02		
2-Hexanone	2.35E-02	1.45E-05	5.00E-03	2.91E-03	NA	NA	5.00E-03		2.91E-03
2,2-Dichloropropane	5.00E-04	NA	NA		NA	NA	NA		
Acetone	4.85E-01	4.28E-05	9.00E-01	4.75E-05	2.07E+01	1.46E-03	9.00E-01	1.62E-03	1.67E-03
Benzene	4.00E-01	9.90E-04	4.00E-03	2.47E-01	3.88E+01	2.74E-03	4.00E-03	6.84E-01	9.31E-01
Carbon disulfide	3.10E-03	8.66E-06	1.00E-01	8.66E-05	3.08E-01	2.17E-05	1.00E-01	2.17E-04	3.03E-04
Carbon tetrachloride	3.00E-04	8.75E-07	4.00E-03	2.19E-04	2.09E-02	1.47E-06	4.00E-03	3.69E-04	5.87E-04
Chlorobenzene	6.74E-01	3.10E-03	2.00E-02	1.55E-01	5.41E+01	3.81E-03	2.00E-02	1.91E-01	3.46E-01
Chloroethane	9.74E-02	9.95E-05	NA		1.04E+01	7.34E-04	NA		
Chloroform	4.40E-03	5.28E-06	1.00E-02	5.28E-04	3.44E-01	2.43E-05	1.00E-02	2.43E-03	2.95E-03
Chloromethane	7.40E-03	4.09E-06	NA		8.96E-01	6.31E-05	NA		
cis-1,2-Dichloroethene	1.37E+01	2.53E-02	1.00E-02	2.53E+00	1.19E+03	8.39E-02	1.00E-02	8.39E+00	**1.09E+01**
cis-1,3-Dichloropropene	4.20E-03	3.18E-06	3.00E-02	1.06E-04	3.45E-01	2.43E-05	3.00E-02	8.09E-04	9.15E-04
Cyclohexane	1.80E-02	2.43E-04	NA		1.70E+00	1.20E-04	NA		
Ethyl tert-butyl ether (ETBE)	1.20E-03	NA	NA		NA	NA	NA		
Ethylbenzene	4.49E-01	3.39E-03	1.00E-01	3.39E-02	3.75E+01	2.64E-03	1.00E-01	2.64E-02	6.03E-02
Isopropyl ether	4.30E-01	NA	NA		NA	NA	NA		
Isopropylbenzene (cumene)	2.71E-02	3.41E-04	1.00E-01	3.41E-03	NA	NA	1.00E-01		3.41E-03
Methyl acetate	2.25E-02	3.09E-06	1.00E+00	3.09E-06	5.64E-01	3.97E-05	1.00E+00	3.97E-05	4.28E-05
Methyl ethyl ketone	4.30E-01	7.05E-05	6.00E-01	1.18E-04	1.34E+01	9.43E-04	6.00E-01	1.57E-03	1.69E-03
Methyl isobutyl ketone	4.86E+00	2.26E-03	8.00E-02	2.82E-02	2.96E+02	2.08E-02	8.00E-02	2.60E-01	2.89E-01
Methyl tert-butyl ether	2.01E-02	7.38E-06	NA		NA	NA	NA		
Methylcyclohexane	2.45E-02	3.55E-04	NA		2.15E+00	1.51E-04	NA		
Methylene chloride	8.19E-03	4.91E-06	6.00E-02	8.19E-05	7.49E-01	5.28E-05	6.00E-02	8.80E-04	9.62E-04
n-Butylbenzene	6.12E-03	NA	4.00E-02		4.56E-01	3.21E-05	4.00E-02	8.03E-04	8.03E-04
n-Propylbenzene	5.61E-02	NA	4.00E-02		4.42E+00	3.12E-04	4.00E-02	7.79E-03	7.79E-03
Phenol	4.80E-02	3.56E-05	3.00E-01	1.19E-04	NA	NV	3.00E-01		1.19E-04
p-Cymene (p-isopropyltoluene)	7.86E-02	NA	NA		NA	NA	NA		
sec-Butylbenzene	5.64E-03	NA	4.00E-02		4.21E-01	2.96E-05	4.00E-02	7.41E-04	7.41E-04
Styrene	1.39E-02	8.18E-05	2.00E-01	4.09E-04	1.16E+00	8.16E-05	2.00E-01	4.08E-04	8.17E-04
tert-Butylbenzene	2.10E-03	NA	4.00E-02		1.56E-01	1.10E-05	4.00E-02	2.76E-04	2.76E-04
tert-Butyl alcohol	1.17E-01	NA	1.00E-01		NA	NA	1.00E-01		
Tetrachloroethene	1.20E-02	7.11E-05	1.00E-02	7.11E-03	8.06E-01	5.68E-05	1.00E-02	5.68E-03	1.28E-02

Risk Calculations

Chemical of Potential Concern	RME Medium EPC Value, Cgw [mg/L]	Exposure Route = Dermal: Chronic Daily Intake [mg/kg/day]	Exposure Route = Dermal: Reference Dose [mg/kg/day]	Exposure Route = Dermal: Hazard Quotient	Exposure Route = Inhalation: Concentration in Air, Cair [ug/m3]	Exposure Route = Inhalation: Chronic Daily Intake [mg/kg/day]	Exposure Route = Inhalation: Reference Dose [mg/kg/day]	Exposure Route = Inhalation: Hazard Quotient	Total Hazard Quotient [-]
Toluene	6.11E+00	3.02E-02	8.00E-02	3.78E-01	5.48E+02	3.86E-02	8.00E-02	4.82E-01	8.60E-01
trans-1,2-Dichloroethene	4.01E-01	5.29E-04	2.00E-02	2.65E-02	3.51E+01	2.47E-03	2.00E-02	1.24E-01	1.50E-01
trans-1,3-Dichloropropene	4.10E-03	3.10E-06	3.00E-02	1.03E-04	3.36E-01	2.37E-05	3.00E-02	7.90E-04	8.93E-04
Trichloroethene	5.70E-02	1.21E-04	3.00E-04	4.03E-01	4.29E+00	3.02E-04	3.00E-04	1.01E+00	**1.41E+00**
Vinyl chloride	1.63E+00	1.53E-03	3.00E-03	5.09E-01	1.77E+02	1.25E-02	3.00E-03	4.16E+00	**4.67E+00**
m,p-Xylenes	9.44E-01	NA	2.00E-01		7.88E+01	5.55E-03	2.00E-01	2.78E-02	2.78E-02
o-Xylene	4.45E-01	4.59E-03	2.00E-01	2.29E-02	3.70E+01	2.61E-03	2.00E-01	1.30E-02	3.60E-02
Xylenes, total	1.60E+00	1.30E-02	2.00E-01	6.48E-02	1.33E+02	9.38E-03	2.00E-01	4.69E-02	1.12E-01
Dioxans/Furans									
1,2,3,4,6,7,8-HpCDD	4.64E-07	1.49E-07	NA		NA	NV	NA		
1,2,3,4,6,7,8-HpCDF	9.49E-08	2.74E-08	NA		NA	NV	NA		
1,2,3,4,7,8,9-HpCDF	9.79E-09	2.83E-09	NA		NA	NV	NA		
1,2,3,4,7,8-HxCDD	2.62E-09	6.72E-10	NA		NA	NV	NA		
1,2,3,4,7,8-HxCDF	8.49E-09	1.96E-09	NA		NA	NV	NA		
1,2,3,6,7,8-HxCDD	1.33E-08	3.41E-09	NA		NA	NV	NA		
1,2,3,6,7,8-HxCDF	1.62E-09	3.74E-10	NA		NA	NV	NA		
1,2,3,7,8,9-HxCDD	4.40E-09	1.13E-09	NA		NA	NV	NA		
1,2,3,7,8,9-HxCDF	3.87E-09	8.93E-10	NA		NA	NV	NA		
1,2,3,7,8-PeCDD	1.08E-09	2.21E-10	NA		NA	NV	NA		
1,2,3,7,8-PeCDF	2.28E-09	4.22E-10	NA		NA	NV	NA		
2,3,4,6,7,8-HxCDF	3.94E-09	9.11E-10	NA		NA	NA	NA		
2,3,4,7,8-PeCDF	2.64E-09	4.88E-10	NA		NA	NA	NA		
2,3,7,8-TCDF	1.68E-09	2.49E-10	NA		NA	NA	NA		
OCDD	2.18E-06	8.71E-07	NA		NA	NA	NA		
OCDF	7.44E-07	2.68E-07	NA		NA	NA	NA		
			Total Hazard Index:	2.11E+01			**Total Hazard Index:**	1.59E+01	**3.70E+01**

Total Estimated Non-carcinogenic Hazard Index Across All Exposure Routes : 37

Notes:

NA = One or more of the following: no toxicity value available in standard U.S. EPA toxicity value databases; no Kp value available; no Henry's Law constant.

Table 2-14
Cancer Risk Results Detailed Summary - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Carcinogenic Effects Risk Results - Excess Lifetime Cancer Risk Estimates				
Chemical of Potential Concern	Trench Worker Reasonable Maximum Exposure			
	Dermal	Inhalation	Total	%Contribution
Metals				
Arsenic	9.9E-07		9.9E-07	0%
Subtotal Metals	9.9E-07		9.9E-07	0%
Pesticides/PCBs				
Dieldrin	**1.2E-06**		**1.2E-06**	0.6%
Aroclor-1260	**8.1E-06**		**8.1E-06**	4%
Subtotal Pesticides/PCBs	**1.1E-05**		**1.1E-05**	6%
SVOCs/VOCs				
Benzo(a)anthracene	**1.6E-06**		**1.6E-06**	1%
Benzo(a)pyrene	**1.5E-05**		**1.5E-05**	8%
Benzo(b)fluoranthene	**2.4E-06**		**2.4E-06**	1.2%
Benzo(k)fluoranthene	**1.3E-06**		**1.3E-06**	1%
Dibenz(a,h)anthracene	**1.3E-06**		**1.3E-06**	1%
Naphthalene	**1.8E-06**	**1.1E-06**	**2.9E-06**	1%
Pentachlorophenol	**1.9E-06**		**1.9E-06**	1%
1,2-Dibromo-3-chloropropane	4.0E-07	7.1E-07	**1.1E-06**	1%
1,4-Dichlorobenzene	1.2E-07	8.3E-08	2.0E-07	0%
Benzene	**1.4E-06**	**3.9E-06**	**5.3E-06**	3%
Trichloroethene	1.0E-08	2.5E-08	3.6E-08	0%
Vinyl chloride	**1.6E-05**	**1.3E-04**	**1.4E-04**	72%
Subtotal SVOCs/VOCs	**4.6E-05**	**1.4E-04**	**1.8E-04**	90%
Dioxans/Furans				
1,2,3,4,6,7,8-HpCDD	**3.2E-06**		**3.2E-06**	2%
Subtotal Dioxans/Furans	**7.2E-06**		**7.2E-06**	4%
Total:	**6.5E-05**	**1.4E-04**	**2.0E-04**	

Total Estimated Cancer Risk Across All Exposure Routes: **2E-04**

Notes:
Subtotals and Total: Cumulative risk of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total cancer risk for all chemicals evaluated.

Table 2-15
Noncancer Risk Results Detailed Summary - Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Non-Carcinogenic Effects Risk Results - Hazard Quotients				
Chemical of Potential Concern	Trench Worker			
	Reasonable Maximum Exposure			
	Dermal	Inhalation	Total	%Contribution
Metals				
Arsenic	**1.5E-01**		**1.5E-01**	0.4%
Subtotal Metals	**2.1E-01**		**2.1E-01**	0.6%
Pesticides/PCBs				
Dieldrin	**1.1E-01**		**1.1E-01**	0.3%
Heptachlor epoxide	**1.2E-01**		**1.2E-01**	0.3%
Aroclor-1260	**1.4E+01**		**1.4E+01**	38%
Subtotal Pesticides/PCBs	**1.5E+01**		**1.5E+01**	39%
SVOCs/VOCs				
2-Methylnaphthalene	**7.6E-01**		**7.6E-01**	2%
Naphthalene	5.1E-02	3.3E-02	8.4E-02	0%
1,2,4-Trimethylbenzene	**4.8E-01**	**2.2E-01**	**7.0E-01**	2%
1,2-Dibromo-3-chloropropane	2.0E-02	3.5E-02	5.5E-02	0.1%
1,2-Dichlorobenzene	5.6E-02	4.0E-02	9.6E-02	0.3%
1,3,5-Trimethylbenzene	**1.0E-01**	6.1E-02	**1.6E-01**	0%
Benzene	**2.5E-01**	**6.8E-01**	**9.3E-01**	3%
Chlorobenzene	**1.5E-01**	**1.9E-01**	**3.5E-01**	1%
cis-1,2-Dichloroethene	**2.5E+00**	**8.4E+00**	**1.1E+01**	30%
Toluene	**3.8E-01**	**4.8E-01**	**8.6E-01**	2%
trans-1,2-Dichloroethene	2.6E-02	**1.2E-01**	**1.5E-01**	0.4%
Trichloroethene	**4.0E-01**	**1.0E+00**	**1.4E+00**	4%
Vinyl chloride	**5.1E-01**	**4.2E+00**	**4.7E+00**	13%
m,p-Xylenes		2.8E-02	2.8E-02	0.1%
o-Xylene	2.3E-02	1.3E-02	3.6E-02	0.1%
Xylenes, total	6.5E-02	4.7E-02	**1.1E-01**	0%
Subtotal SVOCs/VOCs	**6.3E+00**	**1.6E+01**	**2.2E+01**	60%
Total:	**21.1**	**15.9**	**37.0**	

Total Estimated Noncancer Hazard Across All Exposure Routes: **37**

Notes:
Subtotals and Total: Cumulative Hazard Index of all chemicals evaluated is summed.
% Contribution (Subtotal % Contribution) = Percent contribution of total hazard index for all chemicals evaluated.

Table 2-16
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Adult Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E

ORGANICS

If $t_{event} \le t^*$:

$$DA_{event\_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event\_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \le 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c$$

$$c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\, D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	*tau (τ)*	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.1416	
Exposure Time	t_event	0.58	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	24	year
Exposure Frequency	EF	350	days/year
Exposed Skin Surface Area	SA	18000	cm2
Body Weight	BW	70	kg
Averaging time - noncarcinogenic	AT_N	24	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
methodology (see equations A7 and A8, USEPA, 2001)	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.45E-06	NA	NA	5.45E-06
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	8.77E-10	NA	NA	8.77E-10
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.66E-07	NA	NA	1.66E-07
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.72E-08	NA	NA	9.72E-08
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.43E-10	NA	NA	4.43E-10
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.50E-06	NA	NA	2.50E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.28E-10	NA	NA	7.28E-10
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.07E-08	NA	NA	2.07E-08
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.06E-10	NA	NA	4.06E-10
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.06E-09	NA	NA	2.06E-09
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.70E-08	NA	NA	2.70E-08
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.10E-05	NA	NA	3.10E-05
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.32E-09	NA	NA	2.32E-09
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.51E-06	NA	NA	2.51E-06
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.02E-11	NA	NA	7.02E-11
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.27E-09	NA	NA	3.27E-09
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	6.33E-09	NA	NA	6.33E-09
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.10E-08	NA	NA	1.10E-08
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	4.18E-11	NA	NA	4.18E-11
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.90E-11	NA	NA	2.90E-11
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.85E-08	NA	NA	1.85E-08
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.05E-07	NA	NA	1.05E-07
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.65E-08	NA	NA	3.65E-08
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	3.87E-06	1.76E-05	3.87E-06
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	5.27E-07	2.29E-06	5.27E-07
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	2.29E-07	1.47E-06	2.29E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	4.07E-09	1.36E-08	4.07E-09
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.47E-08	3.34E-08	1.47E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	7.62E-08	4.18E-07	7.62E-08
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	2.84E-08	4.21E-08	2.84E-08
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.81E-08	4.11E-08	1.81E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	7.83E-09	1.78E-08	7.83E-09
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	1.29E-08	3.17E-08	1.29E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	7.06E-08	2.81E-07	7.06E-08
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	8.76E-09	3.85E-08	8.76E-09
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	3.80E-09	1.66E-08	3.80E-09
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	4.94E-08	1.97E-07	4.94E-08
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.60E-08	3.65E-08	1.60E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	5.71E-08	3.13E-07	5.71E-08
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	5.78E-09	2.15E-08	5.78E-09
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	2.04E-08	9.03E-08	2.04E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	3.15E-08	1.18E-07	3.15E-08
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	3.78E-06	3.84E-05	3.78E-06
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	3.10E-07	3.18E-07	3.10E-07
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	6.09E-07	9.15E-07	6.09E-07
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	1.30E-06	1.40E-06	1.30E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	5.38E-08	5.86E-08	5.38E-08
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	3.44E-05	4.48E-05	3.44E-05
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.30E-06	1.36E-06	1.30E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	7.39E-08	8.18E-08	7.39E-08
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	8.86E-06	9.29E-06	8.86E-06
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	2.04E-06	2.14E-06	2.04E-06
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	1.10E-06	1.63E-06	1.10E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	2.45E-06	3.61E-06	2.45E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	1.55E-06	2.94E-06	1.55E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.26E-06	3.90E-06	1.26E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	1.20E-06	4.60E-06	1.20E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	1.84E-06	7.19E-06	1.84E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	8.65E-07	4.19E-06	8.65E-07
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	1.05E-06	4.07E-06	1.05E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	2.20E-07	3.05E-07	2.20E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	5.11E-10	6.25E-10	5.11E-10
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	3.59E-06	1.65E-05	3.59E-06
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	9.19E-08	1.61E-07	9.19E-08

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	3.41E-09	3.58E-09	3.41E-09
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	1.32E-06	1.79E-06	1.32E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.54E-06	4.76E-06	1.54E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	1.66E-07	8.43E-07	1.66E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	1.15E-07	1.74E-07	1.15E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	1.03E-06	2.32E-06	1.03E-06
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	1.33E-06	2.92E-06	1.33E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	8.86E-07	1.47E-06	8.86E-07
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	9.42E-08	1.71E-07	9.42E-08
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	4.86E-07	2.33E-06	4.86E-07
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	9.99E-06	1.15E-05	9.99E-06
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	1.63E-08	1.75E-08	1.63E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	7.38E-09	8.00E-09	7.38E-09
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	7.64E-08	1.12E-07	7.64E-08
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	1.51E-05	5.79E-05	1.51E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	1.81E-06	3.08E-06	1.81E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	1.96E-06	4.71E-06	1.96E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	2.47E-06	2.75E-06	2.47E-06
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	1.80E-07	2.19E-07	1.80E-07
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	1.38E-07	1.51E-07	1.38E-07
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	4.82E-06	5.00E-06	4.82E-06
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	6.36E-07	6.59E-07	6.36E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	2.19E-06	3.30E-06	2.19E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	3.44E-05	4.06E-05	3.44E-05
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	5.08E-08	8.38E-08	5.08E-08
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	5.30E-05	6.47E-05	5.30E-05
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.24E-07	1.29E-07	1.24E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	5.63E-08	5.94E-08	5.63E-08
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	9.93E-06	1.14E-05	9.93E-06
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	2.77E-06	3.49E-06	2.77E-06
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	1.61E-05	1.97E-05	1.61E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	1.09E-07	1.13E-07	1.09E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	2.51E-07	2.59E-07	2.59E-07
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	6.78E-06	6.94E-06	6.78E-06
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	6.03E-08	6.18E-08	6.03E-08
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	8.83E-09	1.05E-08	8.83E-09
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	2.66E-05	2.87E-05	2.66E-05
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	6.15E-07	6.31E-07	6.31E-07
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	4.41E-08	4.71E-08	4.41E-08
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	2.31E-08	2.40E-08	2.40E-08
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	1.90E-04	1.97E-04	1.90E-04
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	2.52E-08	2.65E-08	2.52E-08
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	2.11E-06	2.26E-06	2.11E-06
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	2.98E-05	3.23E-05	2.98E-05
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	3.51E-06	4.16E-06	3.51E-06
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	1.99E-08	2.03E-08	1.99E-08
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	4.48E-07	4.59E-07	4.48E-07
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	1.68E-05	1.74E-05	1.68E-05
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	5.15E-08	5.28E-08	5.15E-08
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	3.40E-06	3.80E-06	3.40E-06
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	3.38E-08	3.47E-08	3.38E-08
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	2.59E-07	2.66E-07	2.59E-07
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	6.88E-07	7.35E-07	6.88E-07
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	7.87E-07	1.02E-06	7.87E-07
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	2.34E-04	2.44E-04	2.34E-04
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	3.94E-06	4.08E-06	3.94E-06
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	2.46E-08	2.58E-08	2.46E-08
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	1.09E-06	1.20E-06	1.09E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	9.30E-06	9.56E-06	9.56E-06
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	4.24E-05	4.70E-05	4.24E-05
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	1.15E-04	1.25E-04	1.15E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	1.99E-09	2.49E-08	1.99E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	3.67E-10	4.13E-09	3.67E-10
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	3.79E-11	4.26E-10	3.79E-11
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	9.01E-12	8.99E-11	9.01E-12
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	2.63E-11	2.36E-10	2.63E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	4.57E-11	4.55E-10	4.57E-11
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	5.01E-12	4.49E-11	5.01E-12
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.51E-11	1.51E-10	1.51E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.20E-11	1.07E-10	1.20E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	2.97E-12	2.36E-11	2.97E-12
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	5.66E-12	4.04E-11	5.66E-12
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.22E-11	1.10E-10	1.22E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	6.54E-12	4.67E-11	6.54E-12
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	3.34E-12	1.90E-11	3.34E-12
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	3.59E-09	5.07E-08	3.59E-09
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	1.17E-08	1.83E-07	1.17E-08

Table 2-17
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Future Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E

ORGANICS

If $t_{event} \le t^*$:

$$DA_{event\_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event\_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \le 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c$$

$$c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\, D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	tau (τ)	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.141592654	
Exposure Time	t_event	1	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	6	year
Exposure Frequency	EF	350	days/year
Exposed Skin Surface Area	SA	6600	cm2
Body Weight	BW	15	kg
Averaging time - noncarcinogenic	AT_N	6	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
methodology (see equations A7 and A8, USEPA, 2001)	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.40E-06	NA	NA	9.40E-06
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.51E-09	NA	NA	1.51E-09
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.87E-07	NA	NA	2.87E-07
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.68E-07	NA	NA	1.68E-07
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.64E-10	NA	NA	7.64E-10

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.31E-06	NA	NA	4.31E-06
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.26E-09	NA	NA	1.26E-09
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.57E-08	NA	NA	3.57E-08
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.00E-10	NA	NA	7.00E-10
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	3.56E-09	NA	NA	3.56E-09
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.66E-08	NA	NA	4.66E-08
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.35E-05	NA	NA	5.35E-05
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-09	NA	NA	4.00E-09
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.33E-06	NA	NA	4.33E-06
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.21E-10	NA	NA	1.21E-10
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.64E-09	NA	NA	5.64E-09
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.09E-08	NA	NA	1.09E-08
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.89E-08	NA	NA	1.89E-08
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	7.20E-11	NA	NA	7.20E-11
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.00E-11	NA	NA	5.00E-11
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.19E-08	NA	NA	3.19E-08
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.82E-07	NA	NA	1.82E-07
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	6.29E-08	NA	NA	6.29E-08
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	5.08E-06	1.77E-05	5.08E-06
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	6.92E-07	2.31E-06	6.92E-07
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	3.01E-07	1.47E-06	3.01E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	5.34E-09	1.39E-08	5.34E-09
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.93E-08	3.47E-08	1.93E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	1.00E-07	4.20E-07	1.00E-07
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	3.73E-08	4.63E-08	3.73E-08
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.37E-08	4.27E-08	2.37E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	1.03E-08	1.85E-08	1.03E-08
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	1.69E-08	3.27E-08	1.69E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	9.27E-08	2.84E-07	9.27E-08
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	1.15E-08	3.89E-08	1.15E-08
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	4.99E-09	1.68E-08	4.99E-09
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	6.48E-08	1.99E-07	6.48E-08
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.11E-08	3.79E-08	2.11E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	7.50E-08	3.15E-07	7.50E-08
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	7.59E-09	2.18E-08	7.59E-09
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	2.68E-08	9.12E-08	2.68E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	4.14E-08	1.19E-07	4.14E-08
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	4.97E-06	3.85E-05	4.97E-06
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	4.07E-07	4.26E-07	4.26E-07
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	8.00E-07	1.00E-06	8.00E-07
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	1.71E-06	1.75E-06	1.71E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	7.06E-08	7.25E-08	7.06E-08
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	4.52E-05	5.08E-05	4.52E-05
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.70E-06	1.74E-06	1.70E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	9.70E-08	1.00E-07	9.70E-08
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	1.16E-05	1.19E-05	1.16E-05
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	2.68E-06	2.75E-06	2.68E-06
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	1.45E-06	1.78E-06	1.45E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	3.22E-06	3.95E-06	3.22E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	2.04E-06	3.08E-06	2.04E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	1.65E-06	3.94E-06	1.65E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	1.57E-06	4.63E-06	1.57E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	2.42E-06	7.23E-06	2.42E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	1.14E-06	4.20E-06	1.14E-06
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	1.38E-06	4.10E-06	1.38E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	2.89E-07	3.40E-07	2.89E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	6.71E-10	7.28E-10	6.71E-10
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	4.71E-06	1.67E-05	4.71E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	1.21E-07	1.72E-07	1.21E-07
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	4.48E-09	4.59E-09	4.48E-09
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	1.73E-06	2.01E-06	1.73E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	2.02E-06	4.82E-06	2.02E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	2.18E-07	8.45E-07	2.18E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	1.51E-07	1.91E-07	1.51E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	1.35E-06	2.41E-06	1.35E-06
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	1.74E-06	3.02E-06	1.74E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	1.16E-06	1.57E-06	1.16E-06
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	1.24E-07	1.82E-07	1.24E-07
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	6.39E-07	2.34E-06	6.39E-07
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	1.31E-05	1.37E-05	1.31E-05
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	2.14E-08	2.19E-08	2.14E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	9.69E-09	9.94E-09	9.69E-09
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	1.00E-07	1.24E-07	1.00E-07
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	1.98E-05	5.84E-05	1.98E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	2.38E-06	3.29E-06	2.38E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	2.57E-06	4.83E-06	2.57E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	3.25E-06	3.36E-06	3.25E-06
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	2.36E-07	2.55E-07	2.36E-07
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	1.81E-07	1.86E-07	1.81E-07
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	6.33E-06	6.52E-06	6.52E-06
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	8.35E-07	8.60E-07	8.60E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	2.88E-06	3.61E-06	2.88E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	4.52E-05	4.78E-05	4.52E-05
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	6.68E-08	9.04E-08	6.68E-08
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	6.96E-05	7.53E-05	6.96E-05
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.63E-07	1.68E-07	1.68E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	7.39E-08	7.56E-08	7.39E-08
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	1.30E-05	1.36E-05	1.30E-05
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	3.63E-06	4.01E-06	3.63E-06
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	2.12E-05	2.29E-05	2.12E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	1.43E-07	1.47E-07	1.47E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	3.29E-07	3.65E-07	3.65E-07
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	8.90E-06	9.34E-06	9.34E-06
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	7.91E-08	8.27E-08	8.27E-08
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	1.16E-08	1.24E-08	1.16E-08
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	3.50E-05	3.58E-05	3.50E-05
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	8.07E-07	8.75E-07	8.75E-07
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	5.79E-08	5.93E-08	5.79E-08
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	3.03E-08	3.41E-08	3.41E-08
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	2.50E-04	2.57E-04	2.57E-04
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	3.31E-08	3.39E-08	3.31E-08
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	2.77E-06	2.81E-06	2.81E-06
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	3.91E-05	4.00E-05	4.00E-05
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	4.61E-06	4.88E-06	4.61E-06
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	2.61E-08	2.79E-08	2.79E-08
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	5.89E-07	6.32E-07	6.32E-07
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	2.21E-05	2.28E-05	2.28E-05
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	6.76E-08	7.06E-08	7.06E-08
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	4.46E-06	4.59E-06	4.59E-06
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	4.44E-08	4.65E-08	4.65E-08
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	3.40E-07	3.52E-07	3.52E-07
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	9.03E-07	9.24E-07	9.24E-07
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	1.03E-06	1.16E-06	1.03E-06
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	3.08E-04	3.15E-04	3.15E-04
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	5.17E-06	5.34E-06	5.34E-06
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	3.23E-08	3.31E-08	3.23E-08
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	1.43E-06	1.47E-06	1.43E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	1.22E-05	1.33E-05	1.33E-05
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	5.56E-05	5.72E-05	5.72E-05
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	1.51E-04	1.55E-04	1.55E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	2.62E-09	2.49E-08	2.62E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	4.82E-10	4.14E-09	4.82E-10
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	4.97E-11	4.27E-10	4.97E-11
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.18E-11	8.99E-11	1.18E-11
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	3.46E-11	2.36E-10	3.46E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	6.00E-11	4.56E-10	6.00E-11
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	6.58E-12	4.50E-11	6.58E-12
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.99E-11	1.51E-10	1.99E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.57E-11	1.08E-10	1.57E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	3.90E-12	2.36E-11	3.90E-12
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	7.43E-12	4.05E-11	7.43E-12
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.60E-11	1.10E-10	1.60E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	8.59E-12	4.68E-11	8.59E-12
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	4.38E-12	1.90E-11	4.38E-12
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	4.72E-09	5.08E-08	4.72E-09
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	1.53E-08	1.83E-07	1.53E-08

Table 2-18
Model for Estimating Dermal Exposure from Contact with Chemicals in Water - Adult Trench Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: EPA, 2004. RAGS Part E
ORGANICS

If $t_{event} \leq t^*$:

$$DA_{event\_1} = 2 \times FA \times K_p \times C_v \sqrt{\frac{6 \times tau \times t_{event}}{\Pi}}$$

If $t_{event} > t^*$:

$$DA_{event\_2} = FA \times K_p \times C_v \left[\frac{t_{event}}{1+B} + 2 \times tau \times \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

INORGANICS

$$DA_{event} = K_p \times C_v \times t_{event}$$

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365\, days/year}$$

$$\log K_p = -2.8 + 0.66 \log K_{ow} - 0.0056 MW$$

$$B = K_p \frac{\sqrt{MW}}{2.6}$$

$$If\ B \leq 0.6\ then\ t^* = 2.4\tau$$

$$If\ B > 0.6\ then\ t^* = 6\left(b - \sqrt{b^2 - c^2}\right)\tau$$

$$b = \frac{2}{\pi}(1+B)^2 - c$$

$$c = \frac{1+3B+3B^2}{3(1+B)}$$

$$\log \frac{D_{sc}}{l_{sc}} = -2.80 - 0.0056 MW$$

$$\tau = \frac{l_{sc}^2}{6\, D_{sc}}$$

Dermally-absorbed dose	DAD	calculated	mg/kg-day
Concentration in water	Conc (Cv)	chem-specific	mg/cm3
permeability coefficient	Kp	calculated	cm/hr
Lag time per event (hours)	tau (τ)	calculated	hours
Time to reach steady-state (hours)	t*	calculated	hours
Dimensionless coefficient	B	calculated	
Pi	π	3.1416	
Exposure Time	t_event	8	hr/event
Number of exposure events	EV	1	event/day
Exposure Duration	ED	1	year
Exposure Frequency	EF	90	days/year
Exposed Skin Surface Area	SA	5700	cm2
Body Weight	BW	70	kg
Averaging time - noncarcinogenic	AT_N	1	years
Averaging time - carcinogenic	AT_C	70	years
Conversion Factor		0.001	mg/ug

Thickness of stratum corneum	*lsc* (cm)	0.001
Molecular Weight	g/mol	chem-specific
log octanol-water partition coefficient	Log Kow	chem-specific
log permeability coefficient	log Kp	calculated
Permeability coefficient (cm/hr)	Kp	calculated
Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	B	calculated
across the stratum corneum (cm2/hr)	Dsc	calculated
Lag time per event (hours)	τ	calculated
Time to reach steady-state (hours)	t*	calculated
USEPA's methodology (see equations A7 and A8,	b,c	calculated

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Metals																		
Aluminum	9.4E+00	9.4E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	7.52E-05	NA	NA	7.52E-05
Antimony	1.5E-03	1.5E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.21E-08	NA	NA	1.21E-08
Arsenic	2.9E-01	2.9E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.29E-06	NA	NA	2.29E-06
Barium	1.7E-01	1.7E-04	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.34E-06	NA	NA	1.34E-06
Beryllium	7.6E-04	7.6E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	6.11E-09	NA	NA	6.11E-09
Boron	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.45E-05	NA	NA	3.45E-05
Cadmium	1.3E-03	1.3E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.00E-08	NA	NA	1.00E-08
Chromium	3.6E-02	3.6E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.86E-07	NA	NA	2.86E-07
Chromium (VI)	3.5E-04	3.5E-07	NA	1.0	NA	2.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.60E-09	NA	NA	5.60E-09
Cobalt	8.9E-03	8.9E-06	NA	1.0	NA	4.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	2.85E-08	NA	NA	2.85E-08
Copper	4.7E-02	4.7E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.73E-07	NA	NA	3.73E-07

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Iron	5.4E+01	5.4E-02	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.28E-04	NA	NA	4.28E-04
Lead	4.0E-02	4.0E-05	NA	1.0	NA	1.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	3.20E-08	NA	NA	3.20E-08
Manganese	4.3E+00	4.3E-03	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	3.46E-05	NA	NA	3.46E-05
Mercury	1.2E-04	1.2E-07	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	9.68E-10	NA	NA	9.68E-10
Molybdenum	5.6E-03	5.6E-06	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.51E-08	NA	NA	4.51E-08
Nickel	5.5E-02	5.5E-05	NA	1.0	NA	2.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	8.73E-08	NA	NA	8.73E-08
Selenium	1.9E-02	1.9E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	1.51E-07	NA	NA	1.51E-07
Silver	1.2E-04	1.2E-07	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	5.76E-10	NA	NA	5.76E-10
Thallium	5.0E-05	5.0E-08	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-10	NA	NA	4.00E-10
Vanadium	3.2E-02	3.2E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	2.56E-07	NA	NA	2.56E-07
Zinc	3.0E-01	3.0E-04	NA	1.0	NA	6.00E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.45E-06	NA	NA	1.45E-06
Cyanide	6.3E-02	6.3E-05	NA	1.0	NA	1.00E-03	NA	NA	NA	NA	NA	NA	NA	NA	5.03E-07	NA	NA	5.03E-07
Pesticides/PCBs																		
4,4'-DDD	5.0E-03	5.0E-06	3.2E+02	0.8	5.8E+00	1.80E-01	-7.64E-01	1.24E+00	2.56E-05	2.56E-08	6.51E+00	1.8	1.39	2.55E+01	NA	1.44E-05	2.00E-05	1.44E-05
4,4'-DDE	7.8E-04	7.8E-07	3.2E+02	0.8	5.7E+00	1.60E-01	-8.25E-01	1.10E+00	2.63E-05	2.63E-08	6.35E+00	1.5	1.26	2.46E+01	NA	1.96E-06	2.65E-06	1.96E-06
4,4'-DDT	1.8E-04	1.8E-07	3.6E+02	0.7	6.4E+00	2.70E-01	-5.90E-01	1.96E+00	1.63E-05	1.63E-08	1.02E+01	3.5	2.07	4.16E+01	NA	8.51E-07	1.55E-06	8.51E-07
Aldrin	4.0E-04	4.0E-07	3.7E+02	1.0	3.0E+00	1.40E-03	-2.86E+00	1.03E-02	1.43E-05	1.43E-08	1.16E+01	0.3	0.34	2.79E+01	NA	1.51E-08	1.78E-08	1.51E-08
alpha-BHC	3.0E-04	3.0E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	5.46E-08	5.63E-08	5.46E-08
alpha-Chlordane	3.3E-04	3.3E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	2.83E-07	4.64E-07	2.83E-07
Atrazine	2.0E-03	2.0E-06	2.2E+02	1.0	2.6E+00	5.18E-03	-2.29E+00	2.93E-02	9.82E-05	9.82E-08	1.70E+00	0.3	0.35	4.07E+00	NA	1.06E-07	1.17E-07	1.17E-07
beta-BHC	3.7E-04	3.7E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	6.70E-08	6.91E-08	6.70E-08
delta-BHC	1.6E-04	1.6E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	2.91E-08	3.00E-08	2.91E-08
Diazinon	2.6E-04	2.6E-07	3.0E+02	1.0	3.8E+00	1.02E-02	-1.99E+00	6.87E-02	3.13E-05	3.13E-08	5.32E+00	0.3	0.38	1.28E+01	NA	4.79E-08	5.01E-08	4.79E-08
Dieldrin	9.2E-04	9.2E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	2.62E-07	3.41E-07	2.62E-07
Endosulfan I	3.3E-04	3.3E-07	4.1E+02	1.0	3.8E+00	2.81E-03	-2.55E+00	2.18E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.35	4.80E+01	NA	3.25E-08	4.53E-08	3.25E-08
Endosulfan II	2.3E-04	2.3E-07	4.1E+02	1.0	3.5E+00	1.76E-03	-2.76E+00	1.36E-02	8.34E-06	8.34E-09	2.00E+01	0.3	0.34	4.80E+01	NA	1.41E-08	1.95E-08	1.41E-08
Endosulfan sulfate	9.2E-05	9.2E-08	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	6.5E-04	6.5E-07	3.8E+02	0.8	4.6E+00	1.20E-02	-1.92E+00	9.01E-02	1.17E-05	1.17E-08	1.43E+01	0.4	0.40	3.43E+01	NA	1.83E-07	2.39E-07	1.83E-07
Endrin aldehyde	1.4E-04	1.4E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	1.7E-04	1.7E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC	3.3E-04	3.3E-07	2.9E+02	1.0	4.1E+00	1.10E-02	-1.70E+00	7.22E-02	3.73E-05	3.73E-08	4.47E+00	0.3	0.38	1.07E+01	NA	5.96E-08	6.14E-08	5.96E-08
gamma-Chlordane	2.5E-04	2.5E-07	4.1E+02	0.7	5.5E+00	3.40E-02	-1.49E+00	2.65E-01	8.02E-06	8.02E-09	2.08E+01	0.5	0.53	4.99E+01	NA	2.12E-07	3.48E-07	2.12E-07
Heptachlor	1.1E-04	1.1E-07	3.7E+02	0.8	4.3E+00	8.60E-03	-2.07E+00	6.39E-02	1.28E-05	1.28E-08	1.30E+01	0.3	0.38	3.12E+01	NA	2.15E-08	2.68E-08	2.15E-08
Heptachlor epoxide	1.2E-04	1.2E-07	3.9E+02	1.0	5.0E+00	2.03E-02	-1.69E+00	1.54E-01	1.05E-05	1.05E-08	1.59E+01	0.4	0.44	3.82E+01	NA	7.58E-08	1.06E-07	7.58E-08
Methoxychlor	1.2E-04	1.2E-07	3.5E+02	1.0	5.1E+00	4.14E-02	-1.38E+00	2.96E-01	1.84E-05	1.84E-08	9.07E+00	0.5	0.55	2.18E+01	NA	1.17E-07	1.46E-07	1.17E-07
Aroclor-1260	9.6E-04	9.6E-07	4.0E+02	0.6	8.3E+00	7.50E-01	4.44E-01	5.74E+00	9.69E-06	9.69E-09	1.72E+01	23.1	5.78	7.60E+01	NA	1.40E-05	3.89E-05	1.40E-05
SVOCs/VOCs																		
1,4-Dioxane (p-dioxane)	7.8E-01	7.8E-04	8.8E+01	1.0	-2.7E-01	3.30E-04	-3.47E+00	1.19E-03	5.09E-04	5.09E-07	3.27E-01	0.3	0.33	7.86E-01	NA	1.15E-06	2.23E-06	2.23E-06
2,4,6-Trichlorophenol	7.1E-03	7.1E-06	2.0E+02	1.0	3.7E+00	3.50E-02	-1.47E+00	1.89E-01	1.24E-04	1.24E-07	1.34E+00	0.4	0.47	3.22E+00	NA	2.26E-06	2.47E-06	2.47E-06
2,4-Dimethylphenol	7.9E-02	7.9E-05	1.2E+02	1.0	2.3E+00	1.10E-02	-1.97E+00	4.68E-02	3.28E-04	3.28E-07	5.08E-01	0.3	0.37	1.22E+00	NA	4.82E-06	7.54E-06	7.54E-06
2-Chlorophenol	4.3E-03	4.3E-06	1.3E+02	1.0	2.2E+00	8.00E-03	-2.10E+00	3.49E-02	3.02E-04	3.02E-07	5.52E-01	0.3	0.36	1.33E+00	NA	2.00E-07	3.05E-07	3.05E-07
2-Methylnaphthalene	2.3E-01	2.3E-04	1.4E+02	1.0	3.9E+00	8.94E-02	-1.05E+00	4.10E-01	2.53E-04	2.53E-07	6.58E-01	0.6	0.65	1.58E+00	NA	1.28E-04	1.51E-04	1.51E-04
2-Methylphenol	1.2E-01	1.2E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	4.82E-06	8.17E-06	8.17E-06
2-Nitroaniline	1.0E-02	1.0E-05	1.4E+02	1.0	1.9E+00	4.44E-03	-2.35E+00	2.01E-02	2.67E-04	2.67E-07	6.24E-01	0.3	0.35	1.50E+00	NA	2.74E-07	4.05E-07	4.05E-07
3,4-methylphenol	8.4E-01	8.4E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	3.29E-05	5.58E-05	5.58E-05
4-Chloro-3-methylphenol	2.4E-02	2.4E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.9E-01	1.9E-04	1.1E+02	1.0	2.0E+00	7.70E-03	-2.12E+00	3.08E-02	3.93E-04	3.93E-07	4.24E-01	0.3	0.35	1.02E+00	NA	7.59E-06	1.29E-05	1.29E-05
Acenaphthene	4.5E-03	4.5E-06	1.5E+02	1.0	3.9E+00	1.33E-01	-1.08E+00	6.35E-01	2.17E-04	2.17E-07	7.68E-01	0.9	0.84	3.04E+00	NA	4.10E-06	4.34E-06	4.34E-06
Acenaphthylene	9.5E-03	9.5E-06	1.5E+02	1.0	3.9E+00	1.41E-01	-1.05E+00	6.69E-01	2.23E-04	2.23E-07	7.48E-01	0.9	0.87	2.93E+00	NA	9.09E-06	9.59E-06	9.59E-06
Anthracene	3.2E-03	3.2E-06	1.8E+02	1.0	4.5E+00	2.25E-01	-8.61E-01	1.16E+00	1.59E-04	1.59E-07	1.05E+00	1.6	1.31	4.07E+00	NA	5.76E-06	5.42E-06	5.42E-06
Benzo(a)anthracene	9.0E-04	9.0E-07	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	4.67E-06	4.74E-06	4.67E-06
Benzo(a)pyrene	5.0E-04	5.0E-07	2.5E+02	1.0	6.1E+00	7.00E-01	-1.74E-01	4.26E+00	6.31E-05	6.31E-08	2.64E+00	13.3	4.32	1.15E+01	NA	4.45E-06	5.09E-06	4.45E-06
Benzo(b)fluoranthene	7.6E-04	7.6E-07	2.5E+02	1.0	5.8E+00	6.99E-01	-3.98E-01	4.27E+00	6.12E-05	6.12E-08	2.72E+00	13.4	4.33	1.18E+01	NA	6.85E-06	7.94E-06	6.85E-06
Benzo(g,h,i)perylene	2.0E-04	2.0E-07	2.8E+02	1.0	6.6E+00	1.07E+00	2.83E-02	6.82E+00	4.49E-05	4.49E-08	3.71E+00	32.1	6.87	1.65E+01	NA	3.21E-06	4.39E-06	3.21E-06
Benzo(k)fluoranthene	4.6E-04	4.6E-07	2.5E+02	1.0	6.1E+00	6.60E-01	-1.80E-01	4.03E+00	6.12E-05	6.12E-08	2.72E+00	12.0	4.10	1.18E+01	NA	3.92E-06	4.52E-06	3.92E-06
Biphenyl (Diphenyl)	1.3E-03	1.3E-06	1.5E+02	1.0	4.0E+00	9.19E-02	-1.04E+00	4.39E-01	2.17E-04	2.17E-07	7.68E-01	0.6	0.67	1.84E+00	NA	8.18E-07	9.21E-07	9.21E-07
bis(2-Chloroethoxy)methane	2.0E-04	2.0E-07	1.7E+02	1.0	1.3E+00	1.23E-03	-2.91E+00	6.21E-03	1.70E-04	1.70E-07	9.79E-01	0.3	0.34	2.35E+00	NA	1.90E-09	2.44E-09	2.44E-09
bis(2-Ethylhexyl)phthalate	1.7E-02	1.7E-05	3.9E+02	1.0	5.1E+00	2.50E-02	-1.62E+00	1.90E-01	1.02E-05	1.02E-08	1.63E+01	0.4	0.47	3.91E+01	NA	1.33E-05	1.91E-05	1.33E-05
Bromoform	1.2E-02	1.2E-05	2.5E+02	1.0	2.4E+00	2.20E-03	-2.63E+00	1.35E-02	6.09E-05	6.09E-08	2.74E+00	0.3	0.34	6.56E+00	NA	3.41E-07	3.55E-07	3.55E-07
Caprolactam	2.4E-03	2.4E-06	1.1E+02	1.0	6.6E-01	1.00E-03	-3.00E+00	4.11E-03	3.68E-04	3.68E-07	4.52E-01	0.3	0.34	1.09E+00	NA	1.27E-08	2.14E-08	2.14E-08
Carbazole	1.3E-02	1.3E-05	1.7E+02	1.0	3.7E+00	5.23E-02	-1.28E+00	2.60E-01	1.83E-04	1.83E-07	9.08E-01	0.5	0.52	2.18E+00	NA	4.89E-06	5.65E-06	5.65E-06
Chrysene	1.1E-03	1.1E-06	2.3E+02	1.0	5.7E+00	4.70E-01	-3.43E-01	2.73E+00	8.35E-05	8.35E-08	2.00E+00	6.0	2.82	8.37E+00	NA	5.71E-06	5.79E-06	5.71E-06
Dibenz(a,h)anthracene	4.5E-05	4.5E-08	2.8E+02	0.6	6.5E+00	1.50E+00	-4.24E-02	9.63E+00	4.38E-05	4.38E-08	3.81E+00	62.2	9.66	1.72E+01	NA	6.18E-07	8.71E-07	6.18E-07
Diethylphthalate	1.0E-02	1.0E-05	2.2E+02	1.0	2.5E+00	3.90E-03	-2.41E+00	2.23E-02	9.05E-05	9.05E-08	1.84E+00	0.3	0.35	4.42E+00	NA	4.26E-07	4.66E-07	4.66E-07
Di-n-butyl phthalate	1.2E-02	1.2E-05	2.8E+02	0.9	4.1E+00	2.40E-02	-1.63E+00	1.54E-01	4.40E-05	4.40E-08	3.79E+00	0.4	0.44	9.10E+00	NA	3.83E-06	3.94E-06	3.83E-06

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
Fluoranthene	2.4E-03	2.4E-06	2.0E+02	1.0	5.0E+00	2.20E-01	-6.66E-01	1.20E+00	1.17E-04	1.17E-07	1.43E+00	1.7	1.35	5.57E+00	NA	4.93E-06	4.70E-06	4.70E-06
Fluorene	2.6E-03	2.6E-06	1.7E+02	1.0	4.2E+00	1.71E-01	-9.72E-01	8.48E-01	1.86E-04	1.86E-07	8.97E-01	1.1	1.03	3.45E+00	NA	3.29E-06	3.26E-06	3.26E-06
Hexachloroethane	1.0E-03	1.0E-06	2.4E+02	1.0	3.9E+00	3.00E-02	-1.53E+00	1.78E-01	7.49E-05	7.49E-08	2.23E+00	0.4	0.46	5.34E+00	NA	3.50E-07	3.60E-07	3.60E-07
Indeno(1,2,3-c,d)pyrene	2.0E-04	2.0E-07	2.8E+02	0.6	6.6E+00	1.00E+00	-4.48E-03	6.39E+00	4.49E-05	4.49E-08	3.71E+00	28.4	6.44	1.65E+01	NA	1.81E-06	2.45E-06	1.81E-06
Naphthalene	1.4E-01	1.4E-04	1.3E+02	1.0	3.3E+00	4.70E-02	-1.34E+00	2.05E-01	3.03E-04	3.03E-07	5.49E-01	0.4	0.48	1.32E+00	NA	3.71E-05	5.10E-05	5.10E-05
Nitrobenzene	2.0E-03	2.0E-06	1.2E+02	1.0	1.9E+00	5.39E-03	-2.27E+00	2.30E-02	3.24E-04	3.24E-07	5.14E-01	0.3	0.35	1.23E+00	NA	6.04E-08	9.56E-08	9.56E-08
N-Nitrosodi-n-propylamine	2.0E-03	2.0E-06	1.3E+02	1.0	1.4E+00	2.34E-03	-2.63E+00	1.03E-02	2.96E-04	2.96E-07	5.64E-01	0.3	0.34	1.35E+00	NA	2.74E-08	4.23E-08	4.23E-08
N-Nitrosodiphenylamine	1.2E-03	1.2E-06	2.0E+02	1.0	3.1E+00	2.60E-02	-1.84E+00	1.41E-01	1.23E-04	1.23E-07	1.35E+00	0.4	0.43	3.25E+00	NA	2.84E-07	3.15E-07	3.15E-07
Pentachlorophenol	1.1E-02	1.1E-05	2.7E+02	0.9	5.9E+00	3.90E-01	-4.24E-01	2.45E+00	5.11E-05	5.11E-08	3.26E+00	5.0	2.54	1.36E+01	NA	5.59E-05	6.64E-05	5.59E-05
Phenanthrene	6.0E-03	6.0E-06	1.8E+02	1.0	4.5E+00	1.40E-01	-8.54E-01	7.19E-01	1.59E-04	1.59E-07	1.05E+00	1.0	0.91	4.05E+00	NA	6.72E-06	6.71E-06	6.71E-06
Pyrene	2.4E-03	2.4E-06	2.0E+02	1.0	4.9E+00	3.24E-01	-7.12E-01	1.77E+00	1.17E-04	1.17E-07	1.43E+00	3.0	1.89	5.76E+00	NA	7.26E-06	6.79E-06	6.79E-06
1,1-Dichloroethane	5.6E-01	5.6E-04	9.9E+01	1.0	1.8E+00	6.70E-03	-2.17E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	1.79E-05	3.20E-05	3.20E-05
1,1-Dichloroethene	4.2E-02	4.2E-05	9.7E+01	1.0	2.1E+00	1.20E-02	-1.94E+00	4.54E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.80E-01	NA	2.36E-06	4.20E-06	4.20E-06
1,1,1-Trichloroethane	1.2E-01	1.2E-04	1.3E+02	1.0	2.5E+00	1.30E-02	-1.90E+00	5.77E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.37	1.41E+00	NA	9.19E-06	1.35E-05	1.35E-05
1,1,2-Trichloroethane	1.3E-02	1.3E-05	1.3E+02	1.0	2.1E+00	6.40E-03	-2.19E+00	2.84E-02	2.84E-04	2.84E-07	5.87E-01	0.3	0.35	1.41E+00	NA	5.11E-07	7.66E-07	7.66E-07
1,1,2,2-Tetrachloroethane	1.3E-02	1.3E-05	1.7E+02	1.0	2.4E+00	6.90E-03	-2.16E+00	3.44E-02	1.82E-04	1.82E-07	9.16E-01	0.3	0.36	2.20E+00	NA	6.67E-07	8.59E-07	8.59E-07
1,2,3-Trichlorobenzene	2.7E-03	2.7E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	1.5E-02	1.5E-05	1.8E+02	1.0	4.0E+00	6.60E-02	-1.19E+00	3.42E-01	1.53E-04	1.53E-07	1.09E+00	0.6	0.59	2.62E+00	NA	8.14E-06	8.81E-06	8.81E-06
1,2,4-Trimethylbenzene	2.8E-01	2.8E-04	1.2E+02	1.0	3.6E+00	8.37E-02	-1.08E+00	3.53E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.60	1.19E+00	NA	1.28E-04	1.68E-04	1.68E-04
1,2-Dibromo-3-chloropropane	2.4E-03	2.4E-06	2.4E+02	1.0	3.0E+00	6.76E-03	-2.17E+00	4.00E-02	7.53E-05	7.53E-08	2.21E+00	0.3	0.36	5.32E+00	NA	1.89E-07	2.00E-07	2.00E-07
1,2-Dichlorobenzene	7.3E-01	7.3E-04	1.5E+02	1.0	3.4E+00	4.10E-02	-1.39E+00	1.91E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	1.97E-04	2.52E-04	2.52E-04
1,2-Dichloroethane	1.4E-02	1.4E-05	9.9E+01	1.0	1.5E+00	6.70E-03	-2.38E+00	2.56E-02	4.42E-04	4.42E-07	3.77E-01	0.3	0.35	9.05E-01	NA	4.62E-07	8.25E-07	8.25E-07
1,2-Dichloropropane	5.1E-03	5.1E-06	1.1E+02	1.0	2.0E+00	7.80E-03	-2.11E+00	3.19E-02	3.69E-04	3.69E-07	4.51E-01	0.3	0.35	1.08E+00	NA	2.09E-07	3.45E-07	3.45E-07
1,3-Dichlorobenzene	2.7E-02	2.7E-05	1.5E+02	1.0	3.6E+00	5.80E-02	-1.25E+00	2.70E-01	2.38E-04	2.38E-07	7.00E-01	0.5	0.53	1.68E+00	NA	1.03E-05	1.27E-05	1.27E-05
1,3,5-Trimethylbenzene	1.1E-01	1.1E-04	1.2E+02	1.0	3.4E+00	6.08E-02	-1.22E+00	2.56E-01	3.36E-04	3.36E-07	4.95E-01	0.5	0.52	1.19E+00	NA	3.69E-05	5.10E-05	5.10E-05
1,4-Dichlorobenzene	2.2E-01	2.2E-04	1.5E+02	1.0	3.4E+00	4.20E-02	-1.39E+00	1.96E-01	2.38E-04	2.38E-07	7.00E-01	0.4	0.47	1.68E+00	NA	5.98E-05	7.65E-05	7.65E-05
2-Chlorotoluene	2.9E-03	2.9E-06	1.3E+02	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	2.4E-02	2.4E-05	1.0E+02	1.0	1.4E+00	3.55E-03	-2.45E+00	1.37E-02	4.36E-04	4.36E-07	3.83E-01	0.3	0.34	9.18E-01	NA	4.04E-07	7.24E-07	7.24E-07
2,2-Dichloropropane	5.0E-04	5.0E-07	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	4.9E-01	4.9E-04	5.8E+01	1.0	-2.4E-01	5.20E-04	-3.28E+00	1.53E-03	7.49E-04	7.49E-07	2.22E-01	0.3	0.33	5.34E-01	NA	9.31E-07	2.13E-06	2.13E-06
Benzene	4.0E-01	4.0E-04	7.8E+01	1.0	2.1E+00	1.50E-02	-1.83E+00	5.10E-02	5.79E-04	5.79E-07	2.88E-01	0.3	0.37	6.91E-01	NA	2.52E-05	4.93E-05	4.93E-05
Carbon disulfide	3.1E-03	3.1E-06	8.0E+01	1.0	2.2E+00	1.70E-02	-1.77E+00	5.85E-02	5.65E-04	5.65E-07	2.95E-01	0.3	0.37	7.08E-01	NA	2.24E-07	4.31E-07	4.31E-07
Carbon tetrachloride	3.0E-04	3.0E-07	1.5E+02	1.0	2.8E+00	1.60E-02	-1.79E+00	7.63E-02	2.18E-04	2.18E-07	7.64E-01	0.4	0.39	1.83E+00	NA	3.28E-08	4.36E-08	4.36E-08
Chlorobenzene	6.7E-01	6.7E-04	1.1E+02	1.0	2.8E+00	2.80E-02	-1.56E+00	1.14E-01	3.71E-04	3.71E-07	4.49E-01	0.4	0.41	1.08E+00	NA	9.89E-05	1.54E-04	1.54E-04
Chloroethane	9.7E-02	9.7E-05	6.5E+01	1.0	1.4E+00	6.10E-03	-2.22E+00	1.88E-02	6.90E-04	6.90E-07	2.42E-01	0.3	0.35	5.80E-01	NA	2.28E-06	4.96E-06	4.96E-06
Chloroform	4.4E-03	4.4E-06	1.2E+02	1.0	2.0E+00	6.80E-03	-2.17E+00	2.86E-02	3.40E-04	3.40E-07	4.90E-01	0.3	0.35	1.18E+00	NA	1.64E-07	2.63E-07	2.63E-07
Chloromethane	7.4E-03	7.4E-06	5.1E+01	1.0	9.1E-01	3.30E-03	-2.48E+00	9.02E-03	8.26E-04	8.26E-07	2.02E-01	0.3	0.34	4.84E-01	NA	8.57E-08	2.04E-07	2.04E-07
cis-1,2-Dichloroethene	1.4E+01	1.4E-02	9.7E+01	1.0	2.1E+00	1.09E-02	-1.96E+00	4.12E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.36	8.81E-01	NA	7.07E-04	1.26E-03	1.26E-03
cis-1,3-Dichloropropene	4.2E-03	4.2E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	9.37E-08	1.58E-07	1.58E-07
Cyclohexane	1.8E-02	1.8E-05	8.4E+01	1.0	3.4E+00	9.98E-02	-1.00E+00	3.52E-01	5.35E-04	5.35E-07	3.11E-01	0.6	0.60	7.47E-01	NA	7.83E-06	1.21E-05	1.21E-05
Ethyl tert-butyl ether (ETBE)	1.2E-03	1.2E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	4.5E-01	4.5E-04	1.1E+02	1.0	3.2E+00	4.90E-02	-1.32E+00	1.94E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.47	9.93E-01	NA	1.11E-04	1.69E-04	1.69E-04
Isopropyl ether	4.3E-01	4.3E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene (cumene)	2.7E-02	2.7E-05	1.2E+02	1.0	3.7E+00	8.76E-02	-1.06E+00	3.69E-01	3.36E-04	3.36E-07	4.95E-01	0.6	0.61	1.19E+00	NA	1.30E-05	1.70E-05	1.70E-05
Methyl acetate	2.3E-02	2.3E-05	7.4E+01	1.0	1.8E-01	8.02E-04	-3.10E+00	2.65E-03	6.10E-04	6.10E-07	2.73E-01	0.3	0.34	6.56E-01	NA	7.38E-08	1.54E-07	1.54E-07
Methyl ethyl ketone	4.3E-01	4.3E-04	7.2E+01	1.0	2.9E-01	9.60E-04	-3.01E+00	3.13E-03	6.26E-04	6.26E-07	2.66E-01	0.3	0.34	6.39E-01	NA	1.66E-06	3.51E-06	3.51E-06
Methyl isobutyl ketone	4.9E+00	4.9E-03	1.0E+02	1.0	1.2E+00	2.66E-03	-2.57E+00	1.02E-02	4.37E-04	4.37E-07	3.82E-01	0.3	0.34	9.16E-01	NA	6.25E-05	1.12E-04	1.12E-04
Methyl tert-butyl ether	2.0E-02	2.0E-05	8.8E+01	1.0	9.4E-01	2.12E-03	-2.67E+00	7.66E-03	5.09E-04	5.09E-07	3.28E-01	0.3	0.34	7.87E-01	NA	1.91E-07	3.67E-07	3.67E-07
Methylcyclohexane	2.5E-02	2.5E-05	9.8E+01	1.0	3.6E+00	1.08E-01	-9.67E-01	4.11E-01	4.47E-04	4.47E-07	3.73E-01	0.6	0.65	8.95E-01	NA	1.26E-05	1.77E-05	1.77E-05
Methylene chloride	8.2E-03	8.2E-06	8.5E+01	1.0	1.3E+00	3.50E-03	-2.45E+00	1.24E-02	5.30E-04	5.30E-07	3.14E-01	0.3	0.34	7.54E-01	NA	1.26E-07	2.45E-07	2.45E-07
n-Butylbenzene	6.1E-03	6.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	5.6E-02	5.6E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	4.8E-02	4.8E-05	9.4E+01	1.0	1.5E+00	4.30E-03	-2.36E+00	1.60E-02	4.71E-04	4.71E-07	3.54E-01	0.3	0.34	8.49E-01	NA	9.61E-07	1.77E-06	1.77E-06
p-Cymene (p-isopropyltoluene)	7.9E-02	7.9E-05	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	5.6E-03	5.6E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	1.4E-02	1.4E-05	1.0E+02	1.0	3.0E+00	3.70E-02	-1.44E+00	1.45E-01	4.14E-04	4.14E-07	4.03E-01	0.4	0.44	9.66E-01	NA	2.56E-06	4.07E-06	4.07E-06
tert-Butylbenzene	2.1E-03	2.1E-06	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert-Butyl alcohol	1.2E-01	1.2E-04	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.2E-02	1.2E-05	1.7E+02	1.0	3.4E+00	3.30E-02	-1.48E+00	1.63E-01	1.87E-04	1.87E-07	8.92E-01	0.4	0.45	2.14E+00	NA	2.92E-06	3.54E-06	3.54E-06
Toluene	6.1E+00	6.1E-03	9.2E+01	1.0	2.7E+00	3.10E-02	-1.51E+00	1.14E-01	4.83E-04	4.83E-07	3.45E-01	0.4	0.41	8.28E-01	NA	8.70E-04	1.51E-03	1.51E-03
trans-1,2-Dichloroethene	4.0E-01	4.0E-04	9.7E+01	1.0	1.9E+00	7.70E-03	-2.12E+00	2.92E-02	4.54E-04	4.54E-07	3.67E-01	0.3	0.35	8.80E-01	NA	1.46E-05	2.64E-05	2.64E-05
trans-1,3-Dichloropropene	4.1E-03	4.1E-06	1.1E+02	1.0	1.6E+00	4.30E-03	-2.37E+00	1.74E-02	3.79E-04	3.79E-07	4.40E-01	0.3	0.35	1.06E+00	NA	9.14E-08	1.54E-07	1.54E-07
Trichloroethene	5.7E-02	5.7E-05	1.3E+02	1.0	2.4E+00	1.20E-02	-1.94E+00	5.29E-02	2.91E-04	2.91E-07	5.72E-01	0.3	0.37	1.37E+00	NA	4.04E-06	6.02E-06	6.02E-06
Vinyl chloride	1.6E+00	1.6E-03	6.3E+01	1.0	1.4E+00	5.60E-03	-2.25E+00	1.70E-02	7.08E-04	7.08E-07	2.35E-01	0.3	0.34	5.65E-01	NA	3.46E-05	7.60E-05	7.60E-05
m,p-Xylene	9.4E-01	9.4E-04	1.1E+02	1.0	NA	5.30E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Constituent	Conc (mg/L)	Conc (mg/cm3)	MW	FA	Log Kow	Kp (cm/hr) Select	Log Kp	B	Dsc/lsc	Dsc (cm2/hr)	τ (hours)	b	c	t* (hours)	DA_inorg (mg/cm2-event)	DA_1 (mg/cm2-event)	DA_2 (mg/cm2-event)	Selected DA (mg/cm2-event)
o-Xylene	4.4E-01	4.4E-04	1.1E+02	1.0	3.1E+00	7.04E-02	-1.34E+00	2.79E-01	4.03E-04	4.03E-07	4.13E-01	0.5	0.54	9.92E-01	NA	1.57E-04	2.29E-04	2.29E-04
Xylenes, total	1.6E+00	1.6E-03	1.1E+02	1.0	3.2E+00	5.30E-02	-1.28E+00	2.10E-01	4.03E-04	4.03E-07	4.14E-01	0.4	0.49	9.93E-01	NA	4.26E-04	6.45E-04	6.45E-04
Dioxans/Furans																		
1,2,3,4,6,7,8-HpCDD	4.6E-07	4.6E-10	4.3E+02	0.5	8.2E+00	8.10E-01	2.30E-01	6.42E+00	6.58E-06	6.58E-09	2.53E+01	28.6	6.47	1.13E+02	NA	7.40E-09	2.51E-08	7.40E-09
1,2,3,4,6,7,8-HpCDF	9.5E-08	9.5E-11	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	1.36E-09	4.17E-09	1.36E-09
1,2,3,4,7,8,9-HpCDF	9.8E-09	9.8E-12	4.1E+02	0.5	7.9E+00	8.10E-01	1.35E-01	6.30E+00	8.09E-06	8.09E-09	2.06E+01	27.6	6.35	9.15E+01	NA	1.41E-10	4.30E-10	1.41E-10
1,2,3,4,7,8-HxCDD	2.6E-09	2.6E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	3.35E-11	9.10E-11	3.35E-11
1,2,3,4,7,8-HxCDF	8.5E-09	8.5E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	9.78E-11	2.40E-10	9.78E-11
1,2,3,6,7,8-HxCDD	1.3E-08	1.3E-11	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	1.70E-10	4.61E-10	1.70E-10
1,2,3,6,7,8-HxCDF	1.6E-09	1.6E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	1.86E-11	4.56E-11	1.86E-11
1,2,3,7,8,9-HxCDD	4.4E-09	4.4E-12	3.9E+02	0.5	8.2E+00	8.10E-01	4.30E-01	6.16E+00	1.03E-05	1.03E-08	1.62E+01	26.4	6.21	7.20E+01	NA	5.62E-11	1.53E-10	5.62E-11
1,2,3,7,8,9-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	4.45E-11	1.09E-10	4.45E-11
1,2,3,7,8-PeCDD	1.1E-09	1.1E-12	3.6E+02	0.5	6.3E+00	8.10E-01	-6.38E-01	5.88E+00	1.60E-05	1.60E-08	1.04E+01	24.2	5.93	4.61E+01	NA	1.10E-11	2.40E-11	1.10E-11
1,2,3,7,8-PeCDF	2.3E-09	2.3E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	2.10E-11	4.14E-11	2.10E-11
2,3,4,6,7,8-HxCDF	3.9E-09	3.9E-12	3.7E+02	0.5	7.6E+00	8.10E-01	1.04E-01	6.03E+00	1.26E-05	1.26E-08	1.32E+01	25.4	6.08	5.85E+01	NA	4.54E-11	1.11E-10	4.54E-11
2,3,4,7,8-PeCDF	2.6E-09	2.6E-12	3.4E+02	0.5	6.8E+00	8.10E-01	-2.25E-01	5.75E+00	1.97E-05	1.97E-08	8.48E+00	23.2	5.80	3.74E+01	NA	2.43E-11	4.79E-11	2.43E-11
2,3,7,8-TCDF	1.7E-09	1.7E-12	3.1E+02	0.5	6.5E+00	8.10E-01	-2.04E-01	5.45E+00	3.07E-05	3.07E-08	5.44E+00	21.0	5.50	2.39E+01	NA	1.24E-11	1.98E-11	1.24E-11
OCDD	2.2E-06	2.2E-09	4.6E+02	0.5	9.5E+00	8.10E-01	8.95E-01	6.68E+00	4.22E-06	4.22E-09	3.95E+01	30.8	6.72	1.76E+02	NA	4.34E-08	1.84E-07	4.34E-08
OCDF	7.4E-07	7.4E-10	4.4E+02	0.5	8.6E+00	8.10E-01	3.91E-01	6.56E+00	5.19E-06	5.19E-09	3.21E+01	29.8	6.61	1.43E+02	NA	1.33E-08	5.10E-08	1.33E-08

Table 2-19
Emissions to Air from Standing Water
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.
Emissions equation:

$$E_i = K_i \times A_w \times C_w$$

E_i	Emissions from liquid surface (mg/s)
K_i	Overall mass transfer coefficient (cm/s)
C_w	Concentration in liquid phase (mg/cm^3)
A_w	Bottom area of the trench covered with contaminated water (cm^2)

Overall Mass Transfer Coefficient:

$$\frac{1}{K_i} = \frac{1}{k_{iL}} + \frac{RT}{k_{iG}\, H_i}$$

K_i	overall mass transfer coefficient (cm/s)
k_{iL}	liquid-phase mass transfer coefficient (cm/s)
k_{iG}	gas-phase mass transfer coefficient (cm/s)
R	gas constant, 8.25x10^{-5} (atm-m^3/mol-K)
T	average temperature (K)
H_i	Henry's Law constant (atm-m^3/mol)

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	1/K_i	K_i (cm/s)	E (mg/s)
Metals								
Aluminum	9.40E+00	9.40E-03	NA	NA	NA	NA	NA	NA
Antimony	1.51E-03	1.51E-06	NA	NA	NA	NA	NA	NA
Arsenic	2.87E-01	2.87E-04	NA	NA	NA	NA	NA	NA
Barium	1.68E-01	1.68E-04	NA	NA	NA	NA	NA	NA
Beryllium	7.64E-04	7.64E-07	NA	NA	NA	NA	NA	NA
Boron	4.31E+00	4.31E-03	NA	NA	NA	NA	NA	NA
Cadmium	1.26E-03	1.26E-06	NA	NA	NA	NA	NA	NA
Chromium	3.57E-02	3.57E-05	NA	NA	NA	NA	NA	NA
Chromium (VI)	3.50E-04	3.50E-07	NA	NA	NA	NA	NA	NA
Cobalt	8.89E-03	8.89E-06	NA	NA	NA	NA	NA	NA
Copper	4.66E-02	4.66E-05	NA	NA	NA	NA	NA	NA
Iron	5.35E+01	5.35E-02	NA	NA	NA	NA	NA	NA
Lead	4.00E-02	4.00E-05	NA	NA	NA	NA	NA	NA
Manganese	4.33E+00	4.33E-03	NA	NA	NA	NA	NA	NA
Mercury	1.21E-04	1.21E-07	NA	NA	NA	NA	NA	NA
Molybdenum	5.64E-03	5.64E-06	NA	NA	NA	NA	NA	NA
Nickel	5.46E-02	5.46E-05	NA	NA	NA	NA	NA	NA
Selenium	1.89E-02	1.89E-05	NA	NA	NA	NA	NA	NA
Silver	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Thallium	5.00E-05	5.00E-08	NA	NA	NA	NA	NA	NA
Vanadium	3.19E-02	3.19E-05	NA	NA	NA	NA	NA	NA
Zinc	3.03E-01	3.03E-04	NA	NA	NA	NA	NA	NA
Cyanide	6.29E-02	6.29E-05	NA	NA	NA	NA	NA	NA
Pesticides/PCBs								
4,4'-DDD	5.00E-03	5.00E-06	NA	NA	NA	NA	NA	NA
4,4'-DDE	7.76E-04	7.76E-07	NA	NA	NA	NA	NA	NA
4,4'-DDT	1.80E-04	1.80E-07	NA	NA	NA	NA	NA	NA
Aldrin	4.05E-04	4.05E-07	NA	NA	NA	NA	NA	NA
alpha-BHC	3.00E-04	3.00E-07	NA	NA	NA	NA	NA	NA
alpha-Chlordane	3.34E-04	3.34E-07	NA	NA	NA	NA	NA	NA
Atrazine	2.00E-03	2.00E-06	NA	NA	NA	NA	NA	NA
beta-BHC	3.69E-04	3.69E-07	NA	NA	NA	NA	NA	NA
delta-BHC	1.60E-04	1.60E-07	NA	NA	NA	NA	NA	NA
Diazinon	2.60E-04	2.60E-07	NA	NA	NA	NA	NA	NA
Dieldrin	9.24E-04	9.24E-07	NA	NA	NA	NA	NA	NA
Endosulfan I	3.31E-04	3.31E-07	NA	NA	NA	NA	NA	NA
Endosulfan II	2.30E-04	2.30E-07	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	9.20E-05	9.20E-08	NA	NA	NA	NA	NA	NA
Endrin	6.46E-04	6.46E-07	NA	NA	NA	NA	NA	NA
Endrin aldehyde	1.40E-04	1.40E-07	NA	NA	NA	NA	NA	NA
Endrin ketone	1.70E-04	1.70E-07	NA	NA	NA	NA	NA	NA
gamma-BHC	3.28E-04	3.28E-07	NA	NA	NA	NA	NA	NA
gamma-Chlordane	2.50E-04	2.50E-07	NA	NA	NA	NA	NA	NA
Heptachlor	1.11E-04	1.11E-07	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Methoxychlor	1.20E-04	1.20E-07	NA	NA	NA	NA	NA	NA
Aroclor-1260	9.63E-04	9.63E-07	NA	NA	NA	NA	NA	NA
SVOCs/VOCs								
1,4-Dioxane (p-dioxane)	7.80E-01	7.80E-04	NA	NA	NA	NA	NA	NA

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	$1/K_i$	K_i (cm/s)	E (mg/s)
2,4,6-Trichlorophenol	7.14E-03	7.14E-06	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	7.87E-02	7.87E-05	NA	NA	NA	NA	NA	NA
2-Chlorophenol	4.30E-03	4.30E-06	3.91E-04	9.92E-04	4.30E-01	1.15E+03	0.00086642	2.42E-04
2-Methylnaphthalene	2.26E-01	2.26E-04	NA	9.49E-04	4.17E-01	NA	NA	NA
2-Methylphenol	1.23E-01	1.23E-04	NA	NA	NA	NA	NA	NA
2-Nitroaniline	1.00E-02	1.00E-05	NA	NA	NA	NA	NA	NA
3,4-methylphenol	8.40E-01	8.40E-04	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	2.38E-02	2.38E-05	NA	NA	NA	NA	NA	NA
4-Methylphenol	1.94E-01	1.94E-04	NA	NA	NA	NA	NA	NA
Acenaphthene	4.50E-03	4.50E-06	1.55E-04	9.11E-04	4.06E-01	1.49E+03	0.00067176	1.97E-04
Acenaphthylene	9.54E-03	9.54E-06	1.13E-05	9.17E-04	4.07E-01	6.43E+03	0.00015551	9.64E-05
Anthracene	3.20E-03	3.20E-06	6.50E-05	8.48E-04	3.87E-01	2.16E+03	0.00046348	9.65E-05
Benzo(a)anthracene	9.00E-04	9.00E-07	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	5.00E-04	5.00E-07	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	7.60E-04	7.60E-07	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	2.00E-04	2.00E-07	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4.60E-04	4.60E-07	NA	NA	NA	NA	NA	NA
Biphenyl (Diphenyl)	1.30E-03	1.30E-06	3.00E-04	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	2.00E-04	2.00E-07	NA	8.60E-04	3.90E-01	NA	NA	NA
bis(2-Ethylhexyl)phthalate	1.69E-02	1.69E-05	NA	NA	NA	NA	NA	NA
Bromoform	1.20E-02	1.20E-05	5.35E-04	7.12E-04	3.44E-01	1.54E+03	0.00064985	5.07E-04
Caprolactam	2.40E-03	2.40E-06	NA	NA	NA	NA	NA	NA
Carbazole	1.25E-02	1.25E-05	NA	NA	NA	NA	NA	NA
Chrysene	1.10E-03	1.10E-06	9.46E-05	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	4.50E-05	4.50E-08	NA	NA	NA	NA	NA	NA
Diethylphthalate	1.03E-02	1.03E-05	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	1.17E-02	1.17E-05	NA	NA	NA	NA	NA	NA
Fluoranthene	2.40E-03	2.40E-06	NA	NA	NA	NA	NA	NA
Fluorene	2.60E-03	2.60E-06	7.70E-05	8.78E-04	3.96E-01	1.95E+03	0.0005137	8.69E-05
Hexachloroethane	1.00E-03	1.00E-06	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	2.00E-04	2.00E-07	NA	NA	NA	NA	NA	NA
Naphthalene	1.36E-01	1.36E-04	4.83E-04	9.99E-04	4.32E-01	1.12E+03	0.000894	7.92E-03
Nitrobenzene	2.00E-03	2.00E-06	2.39E-05	1.03E-03	4.41E-01	3.30E+03	0.00030305	3.94E-05
N-Nitrosodi-n-propylamine	2.00E-03	2.00E-06	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	1.20E-03	1.20E-06	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1.13E-02	1.13E-05	NA	NA	NA	NA	NA	NA
Phenanthrene	6.00E-03	6.00E-06	NA	NA	NA	NA	NA	NA
Pyrene	2.40E-03	2.40E-06	1.10E-05	8.00E-04	3.72E-01	7.26E+03	0.00013772	2.15E-05
1,1-Dichloroethane	5.57E-01	5.57E-04	5.62E-03	1.14E-03	4.71E-01	8.89E+02	0.00112518	4.08E-02
1,1-Dichloroethene	4.16E-02	4.16E-05	2.61E-02	1.15E-03	4.74E-01	8.73E+02	0.00114612	3.10E-03
1,1,1-Trichloroethane	1.18E-01	1.18E-04	1.72E-02	9.81E-04	4.26E-01	1.02E+03	0.00097781	7.50E-03
1,1,2-Trichloroethane	1.33E-02	1.33E-05	9.13E-04	9.81E-04	4.26E-01	1.08E+03	0.00092377	8.01E-04
1,1,2,2-Tetrachloroethane	1.29E-02	1.29E-05	3.45E-04	8.73E-04	3.94E-01	1.33E+03	0.0007539	6.33E-04
1,2,3-Trichlorobenzene	2.72E-03	2.72E-06	1.42E-03	8.40E-04	3.84E-01	1.24E+03	0.00080926	1.43E-04
1,2,4-Trichlorobenzene	1.51E-02	1.51E-05	1.42E-03	8.41E-04	3.84E-01	1.23E+03	0.00081026	7.95E-04
1,2,4-Trimethylbenzene	2.78E-01	2.78E-04	5.70E-03	1.03E-03	4.41E-01	9.79E+02	0.00102167	1.84E-02
1,2-Dibromo-3-chloropropane	2.40E-03	2.40E-06	1.47E-04	7.36E-04	3.52E-01	1.83E+03	0.00054508	8.51E-05
1,2-Dichlorobenzene	7.34E-01	7.34E-04	1.90E-03	9.33E-04	4.12E-01	1.10E+03	0.00090658	4.33E-02
1,2-Dichloroethane	1.44E-02	1.44E-05	9.79E-04	1.14E-03	4.71E-01	9.33E+02	0.00107202	1.00E-03
1,2-Dichloropropane	5.10E-03	5.10E-06	2.80E-03	1.06E-03	4.50E-01	9.59E+02	0.00104266	3.46E-04
1,3-Dichlorobenzene	2.71E-02	2.71E-05	1.90E-03	9.33E-04	4.12E-01	1.10E+03	0.00090658	1.60E-03
1,3,5-Trimethylbenzene	1.10E-01	1.10E-04	7.71E-03	1.03E-03	4.41E-01	9.76E+02	0.00102433	7.34E-03
1,4-Dichlorobenzene	2.18E-01	2.18E-04	2.43E-03	9.33E-04	4.12E-01	1.10E+03	0.00091225	1.29E-02
2-Chlorotoluene	2.89E-03	2.89E-06	NA	1.01E-03	4.33E-01	NA	NA	NA
2-Hexanone	2.35E-02	2.35E-05	NA	1.13E-03	4.69E-01	NA	NA	NA
2,2-Dichloropropane	5.00E-04	5.00E-07	NA	1.06E-03	4.50E-01	NA	NA	NA
Acetone	4.85E-01	4.85E-04	3.88E-05	1.49E-03	5.63E-01	1.80E+03	0.00055591	1.75E-02
Benzene	4.00E-01	4.00E-04	5.55E-03	1.28E-03	5.09E-01	7.90E+02	0.00126611	3.29E-02
Carbon disulfide	3.10E-03	3.10E-06	3.03E-02	1.30E-03	5.14E-01	7.72E+02	0.00129512	2.61E-04
Carbon tetrachloride	3.00E-04	3.00E-07	3.04E-02	9.12E-04	4.06E-01	1.10E+03	0.00091003	1.78E-05
Chlorobenzene	6.74E-01	6.74E-04	3.70E-03	1.06E-03	4.50E-01	9.54E+02	0.00104784	4.59E-02
Chloroethane	9.74E-02	9.74E-05	1.10E-02	1.40E-03	5.42E-01	7.17E+02	0.00139522	8.84E-03
Chloroform	4.40E-03	4.40E-06	3.67E-03	1.04E-03	4.42E-01	9.79E+02	0.00102109	2.92E-04
Chloromethane	7.40E-03	7.40E-06	2.40E-02	1.58E-03	5.88E-01	6.33E+02	0.00157987	7.60E-04
cis-1,2-Dichloroethene	1.37E+01	1.37E-02	4.08E-03	1.15E-03	4.74E-01	8.83E+02	0.00113219	1.01E+00
cis-1,3-Dichloropropene	4.20E-03	4.20E-06	1.77E-02	1.07E-03	4.53E-01	9.34E+02	0.00107032	2.92E-04
Cyclohexane	1.80E-02	1.80E-05	2.00E-01	1.23E-03	4.97E-01	8.10E+02	0.00123405	1.44E-03
Ethyl tert-butyl ether (ETBE)	1.20E-03	1.20E-06	NA	1.12E-03	4.66E-01	NA	NA	NA
Ethylbenzene	4.49E-01	4.49E-04	7.88E-03	1.10E-03	4.60E-01	9.18E+02	0.00108973	3.18E-02
Isopropyl ether	4.30E-01	4.30E-04	NA	1.12E-03	4.66E-01	NA	NA	NA
Isopropylbenzene (cumene)	2.71E-02	2.71E-05	NA	1.03E-03	4.41E-01	NA	NA	NA
Methyl acetate	2.25E-02	2.25E-05	2.06E-05	1.31E-03	5.19E-01	3.06E+03	0.00032657	4.79E-04

Chemical	Concentration in Water (mg/L)	Concentration in Water (mg/cm^3)	Henry's Law Constant (atm-m^3/mol)	k_{iL}	k_{iG}	$1/K_i$	K_i (cm/s)	E (mg/s)
Methyl ethyl ketone	4.30E-01	4.30E-04	2.74E-05	1.33E-03	5.24E-01	2.46E+03	0.00040587	1.14E-02
Methyl isobutyl ketone	4.86E+00	4.86E-03	1.40E-04	1.13E-03	4.69E-01	1.26E+03	0.00079414	2.51E-01
Methyl tert-butyl ether	2.01E-02	2.01E-05	NA	1.21E-03	4.89E-01	NA	NA	NA
Methylcyclohexane	2.45E-02	2.45E-05	4.30E-01	1.14E-03	4.72E-01	8.76E+02	0.00114159	1.82E-03
Methylene chloride	8.19E-03	8.19E-06	2.19E-03	1.23E-03	4.95E-01	8.38E+02	0.00119393	6.36E-04
n-Butylbenzene	6.12E-03	6.12E-06	1.31E-02	9.77E-04	4.25E-01	1.03E+03	0.00097236	3.87E-04
n-Propylbenzene	5.61E-02	5.61E-05	1.31E-02	1.03E-03	4.41E-01	9.73E+02	0.00102747	3.75E-03
Phenol	4.80E-02	4.80E-05	NA	NA	NA	NA	NA	NA
p-Cymene (p-isopropyltoluene)	7.86E-02	7.86E-05	NA	9.77E-04	4.25E-01	NA	NA	NA
sec-Butylbenzene	5.64E-03	5.64E-06	1.87E-02	9.77E-04	4.25E-01	1.03E+03	0.00097361	3.57E-04
Styrene	1.39E-02	1.39E-05	2.75E-03	1.11E-03	4.63E-01	9.22E+02	0.00108509	9.83E-04
tert-Butylbenzene	2.10E-03	2.10E-06	1.26E-02	9.77E-04	4.25E-01	1.03E+03	0.0009722	1.33E-04
tert-Butyl alcohol	1.17E-01	1.17E-04	NA	1.31E-03	5.18E-01	NA	NA	NA
Tetrachloroethene	1.20E-02	1.20E-05	1.84E-02	8.79E-04	3.96E-01	1.14E+03	0.00087597	6.84E-04
Toluene	6.11E+00	6.11E-03	6.64E-03	1.18E-03	4.82E-01	8.55E+02	0.00116895	4.65E-01
trans-1,2-Dichloroethene	4.01E-01	4.01E-04	9.38E-03	1.15E-03	4.74E-01	8.76E+02	0.00114148	2.98E-02
trans-1,3-Dichloropropene	4.10E-03	4.10E-06	1.77E-02	1.07E-03	4.53E-01	9.34E+02	0.00107032	2.85E-04
Trichloroethene	5.70E-02	5.70E-05	1.03E-02	9.88E-04	4.28E-01	1.02E+03	0.00098307	3.64E-03
Vinyl chloride	1.63E+00	1.63E-03	2.70E-02	1.43E-03	5.47E-01	7.03E+02	0.00142202	1.50E-01
m,p-Xylene	9.44E-01	9.44E-04	7.34E-03	1.10E-03	4.60E-01	9.18E+02	0.00108914	6.69E-02
o-Xylene	4.45E-01	4.45E-04	5.19E-03	1.10E-03	4.60E-01	9.21E+02	0.00108557	3.14E-02
Xylenes, total	1.60E+00	1.60E-03	5.19E-03	1.10E-03	4.60E-01	9.21E+02	0.00108557	1.13E-01
Dioxans/Furans								
1,2,3,4,6,7,8-HpCDD	4.64E-07	4.64E-10	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	9.49E-08	9.49E-11	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	9.79E-09	9.79E-12	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	2.62E-09	2.62E-12	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	8.49E-09	8.49E-12	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	1.33E-08	1.33E-11	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	1.62E-09	1.62E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	4.40E-09	4.40E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	3.87E-09	3.87E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	1.08E-09	1.08E-12	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	2.28E-09	2.28E-12	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	3.94E-09	3.94E-12	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	2.64E-09	2.64E-12	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	1.68E-09	1.68E-12	NA	NA	NA	NA	NA	NA
OCDD	2.18E-06	2.18E-09	NA	NA	NA	NA	NA	NA
OCDF	7.44E-07	7.44E-10	NA	NA	NA	NA	NA	NA

Notes:

[a] Trench dimensions are assumed to be 10 ft x 10 ft with 70% water coverage in the bottom of the trench

- The Henry's Law Constant value for 1,2,4-trichlorobenzene was used for 1,2,3-trichlorobenzene.
- The Henry's Law Constant value for m-xylene was used for m,p-xylenes.
- The Henry's Law Constant value for 1,3-dichloropropene was used for cis-1,3-dichloropropene and trans-1,3-dichloropropene.

Table 2-20
Mass Transfer Coefficient Calculations - Water to Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.

Liquid-phase mass transfer coefficient

$$k_{iL} = \sqrt{\frac{MW_{O_2}}{MW_i}} \times \frac{T}{298} \times k_{L,O_2}$$

MW_{O2}	Molecular Weight of Oxygen, g/mol	3.20E+01
MW_i	Chemical specific molecular weight, g/mol	chemical specific
T^a	Average Temperature, K	298
$k_{L,O2}$	Liqiud-phase mass transfer coefficient for oxygen at 25°C, cm/s	0.002

[a] The average temperture is assumed to be 25°C.

Gas-phase mass transfer coefficient

$$k_{iG} = \left(\frac{MW_{H_2O}}{MW_i}\right)^{0.335} \times \left(\frac{T}{298}\right)^{1.005} \times k_{G,H_2O}$$

MW_{H2O}	Molecular weight of water, g/mol	18
MW_i	Chemical specific molecular weight, g/mol	chem specific
T^a	Average Temperature, K	298
$k_{G,H2O}$	Gas phase mass transfer coefficient for water vapor at 25°C, cm/s	8.33E-01

[a] The average temperture is assumed to be 25°C.

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
Metals				
Aluminum		NA	NA	NV
Antimony		NA	NA	NV
Arsenic		NA	NA	NV
Barium		NA	NA	NV
Beryllium		NA	NA	NV
Boron		NA	NA	NV
Cadmium		NA	NA	NV
Chromium		NA	NA	NV
Chromium (VI)		NA	NA	NV
Cobalt		NA	NA	NV
Copper		NA	NA	NV
Iron		NA	NA	NV
Lead		NA	NA	NV
Manganese		NA	NA	NV
Mercury		NA	NA	NV
Molybdenum		NA	NA	NV
Nickel		NA	NA	NV
Selenium		NA	NA	NV
Silver		NA	NA	NV
Thallium		NA	NA	NV
Vanadium		NA	NA	NV
Zinc		NA	NA	NV
Cyanide		NA	NA	NV
Pesticides/PCBs				
4,4'-DDD		NA	NA	NV

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
4,4'-DDE		NA	NA	NV
4,4'-DDT		NA	NA	NV
Aldrin		NA	NA	NV
alpha-BHC		NA	NA	NV
alpha-Chlordane		NA	NA	NV
Atrazine		NA	NA	NV
beta-BHC		NA	NA	NV
delta-BHC		NA	NA	NV
Diazinon		NA	NA	NV
Dieldrin		NA	NA	NV
Endosulfan I		NA	NA	NV
Endosulfan II		NA	NA	NV
Endosulfan sulfate		NA	NA	NV
Endrin		NA	NA	NV
Endrin aldehyde		NA	NA	NV
Endrin ketone		NA	NA	NV
gamma-BHC		NA	NA	NV
gamma-Chlordane		NA	NA	NV
Heptachlor		NA	NA	NV
Heptachlor epoxide		NA	NA	NV
Methoxychlor		NA	NA	NV
Aroclor-1260		NA	NA	NV
SVOCs/VOCs				
1,4-Dioxane (p-dioxane)		NA	NA	NV
2,4,6-Trichlorophenol		NA	NA	NV
2,4-Dimethylphenol		NA	NA	NV
2-Chlorophenol	130	9.92E-04	4.30E-01	V
2-Methylnaphthalene	142.2	9.49E-04	4.17E-01	V
2-Methylphenol		NA	NA	NV
2-Nitroaniline		NA	NA	NV
3,4-methylphenol		NA	NA	NV
4-Chloro-3-methylphenol		NA	NA	NV
4-Methylphenol		NA	NA	NV
Acenaphthene	154.21	9.11E-04	4.06E-01	V
Acenaphthylene	152.195	9.17E-04	4.07E-01	V
Anthracene	178	8.48E-04	3.87E-01	V
Benzo(a)anthracene		NA	NA	NV
Benzo(a)pyrene		NA	NA	NV
Benzo(b)fluoranthene		NA	NA	NV
Benzo(g,h,i)perylene		NA	NA	NV
Benzo(k)fluoranthene		NA	NA	NV
Biphenyl (Diphenyl)	150	NA	NA	NV
bis(2-Chloroethoxy)methane	173.0388	8.60E-04	3.90E-01	V
bis(2-Ethylhexyl)phthalate		NA	NA	NV
Bromoform	252.7309	7.12E-04	3.44E-01	V
Caprolactam		NA	NA	NV
Carbazole		NA	NA	NV
Chrysene	228.28	NA	NA	NV
Dibenz(a,h)anthracene		NA	NA	NV
Diethylphthalate		NA	NA	NV
Di-n-butyl phthalate		NA	NA	NV
Fluoranthene		NA	NA	NV
Fluorene	166.21	8.78E-04	3.96E-01	V
Hexachloroethane		NA	NA	NV
Indeno(1,2,3-c,d)pyrene		NA	NA	NV
Naphthalene	128.16	9.99E-04	4.32E-01	V
Nitrobenzene	120	1.03E-03	4.41E-01	V

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
N-Nitrosodi-n-propylamine		NA	NA	NV
N-Nitrosodiphenylamine		NA	NA	NV
Pentachlorophenol		NA	NA	NV
Phenanthrene		NA	NA	NV
Pyrene	200	8.00E-04	3.72E-01	0.00
1,1-Dichloroethane	99	1.14E-03	4.71E-01	V
1,1-Dichloroethene	97	1.15E-03	4.74E-01	V
1,1,1-Trichloroethane	133	9.81E-04	4.26E-01	V
1,1,2-Trichloroethane	133	9.81E-04	4.26E-01	V
1,1,2,2-Tetrachloroethane	168	8.73E-04	3.94E-01	V
1,2,3-Trichlorobenzene	181.45	8.40E-04	3.84E-01	V
1,2,4-Trichlorobenzene	181	8.41E-04	3.84E-01	V
1,2,4-Trimethylbenzene	120.19	1.03E-03	4.41E-01	V
1,2-Dibromo-3-chloropropane	236.36	7.36E-04	3.52E-01	V
1,2-Dichlorobenzene	147	9.33E-04	4.12E-01	V
1,2-Dichloroethane	99	1.14E-03	4.71E-01	V
1,2-Dichloropropane	113	1.06E-03	4.50E-01	V
1,3-Dichlorobenzene	147	9.33E-04	4.12E-01	V
1,3,5-Trimethylbenzene	120.19	1.03E-03	4.41E-01	V
1,4-Dichlorobenzene	147	9.33E-04	4.12E-01	V
2-Chlorotoluene	126.59	1.01E-03	4.33E-01	V
2-Hexanone	100.2	1.13E-03	4.69E-01	V
2,2-Dichloropropane	113	1.06E-03	4.50E-01	V
Acetone	58	1.49E-03	5.63E-01	V
Benzene	78.1	1.28E-03	5.09E-01	V
Carbon disulfide	76	1.30E-03	5.14E-01	V
Carbon tetrachloride	154	9.12E-04	4.06E-01	V
Chlorobenzene	113	1.06E-03	4.50E-01	V
Chloroethane	65	1.40E-03	5.42E-01	V
Chloroform	119	1.04E-03	4.42E-01	V
Chloromethane	51	1.58E-03	5.88E-01	V
cis-1,2-Dichloroethene	97	1.15E-03	4.74E-01	V
cis-1,3-Dichloropropene	111	1.07E-03	4.53E-01	V
Cyclohexane	84	1.23E-03	4.97E-01	V
Ethyl tert-butyl ether (ETBE)	102.18	1.12E-03	4.66E-01	V
Ethylbenzene	106.2	1.10E-03	4.60E-01	V
Isopropyl ether	102.18	1.12E-03	4.66E-01	V
Isopropylbenzene (cumene)	120.2	1.03E-03	4.41E-01	V
Methyl acetate	74.0792	1.31E-03	5.19E-01	V
Methyl ethyl ketone	72	1.33E-03	5.24E-01	V
Methyl isobutyl ketone	100.16	1.13E-03	4.69E-01	V
Methyl tert-butyl ether	88.15	1.21E-03	4.89E-01	V
Methylcyclohexane	98.19	1.14E-03	4.72E-01	V
Methylene chloride	85	1.23E-03	4.95E-01	V
n-Butylbenzene	134.22	9.77E-04	4.25E-01	V
n-Propylbenzene	120.19	1.03E-03	4.41E-01	V
Phenol		NA	NA	NV
p-Cymene (p-isopropyltoluene)	134.22	9.77E-04	4.25E-01	V
sec-Butylbenzene	134.22	9.77E-04	4.25E-01	V
Styrene	104.2	1.11E-03	4.63E-01	V
tert-Butylbenzene	134.22	9.77E-04	4.25E-01	V
tert-Butyl alcohol	74.12	1.31E-03	5.18E-01	V
Tetrachloroethene	165.83	8.79E-04	3.96E-01	V
Toluene	92	1.18E-03	4.82E-01	V
trans-1,2-Dichloroethene	97	1.15E-03	4.74E-01	V
trans-1,3-Dichloropropene	111	1.07E-03	4.53E-01	V
Trichloroethene	131	9.88E-04	4.28E-01	V

Chemical	Molecular Weight (g/mol)	k_{iL} (cm/s)	k_{iG} (cm/s)	V or NV
Vinyl chloride	63	1.43E-03	5.47E-01	V
m,p-Xylene	106.2	1.10E-03	4.60E-01	V
o-Xylene	106.2	1.10E-03	4.60E-01	V
Xylenes, total	106.2	1.10E-03	4.60E-01	V
Dioxans/Furans				
1,2,3,4,6,7,8-HpCDD		NA	NA	NV
1,2,3,4,6,7,8-HpCDF		NA	NA	NV
1,2,3,4,7,8,9-HpCDF		NA	NA	NV
1,2,3,4,7,8-HxCDD		NA	NA	NV
1,2,3,4,7,8-HxCDF		NA	NA	NV
1,2,3,6,7,8-HxCDD		NA	NA	NV
1,2,3,6,7,8-HxCDF		NA	NA	NV
1,2,3,7,8,9-HxCDD		NA	NA	NV
1,2,3,7,8,9-HxCDF		NA	NA	NV
1,2,3,7,8-PeCDD		NA	NA	NV
1,2,3,7,8-PeCDF		NA	NA	NV
2,3,4,6,7,8-HxCDF		NA	NA	NV
2,3,4,7,8-PeCDF		NA	NA	NV
2,3,7,8-TCDF		NA	NA	NV
OCDD		NA	NA	NV
OCDF		NA	NA	NV

Table 2-21
Calculation of Concentration in Air from Emissions from Water
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Source: CalEPA, DTSC, 2004.

Description	Symbol	Value	Units	Comments
Mixing Height (adult breating zone)	H	1.83	m	DTSC, 2006
Assumed velocity of air in the trench	u	0.152	m/s	DTSC, 2006
Width of trench perpendicular to wind direction	W	3.05	m	DTSC, 2006
Conversion factor	CF	1000	ug/mg	

$$C_{air} = \frac{E_i \times CF}{u \times H \times W}$$

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
Metals		
Aluminum	NA	NA
Antimony	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Beryllium	NA	NA
Boron	NA	NA
Cadmium	NA	NA
Chromium	NA	NA
Chromium (VI)	NA	NA
Cobalt	NA	NA
Copper	NA	NA
Iron	NA	NA
Lead	NA	NA
Manganese	NA	NA
Mercury	NA	NA
Molybdenum	NA	NA
Nickel	NA	NA
Selenium	NA	NA
Silver	NA	NA
Thallium	NA	NA
Vanadium	NA	NA
Zinc	NA	NA
Cyanide	NA	NA
Pesticides/PCBs		
4,4'-DDD	NA	NA
4,4'-DDE	NA	NA
4,4'-DDT	NA	NA
Aldrin	NA	NA
alpha-BHC	NA	NA
alpha-Chlordane	NA	NA
Atrazine	NA	NA
beta-BHC	NA	NA
delta-BHC	NA	NA
Diazinon	NA	NA
Dieldrin	NA	NA

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
Endosulfan I	NA	NA
Endosulfan II	NA	NA
Endosulfan sulfate	NA	NA
Endrin	NA	NA
Endrin aldehyde	NA	NA
Endrin ketone	NA	NA
gamma-BHC	NA	NA
gamma-Chlordane	NA	NA
Heptachlor	NA	NA
Heptachlor epoxide	NA	NA
Methoxychlor	NA	NA
Aroclor-1260	NA	NA
SVOCs/VOCs		
1,4-Dioxane (p-dioxane)	NA	NA
2,4,6-Trichlorophenol	NA	NA
2,4-Dimethylphenol	NA	NA
2-Chlorophenol	2.42E-04	2.86E-01
2-Methylnaphthalene	NA	NA
2-Methylphenol	NA	NA
2-Nitroaniline	NA	NA
3,4-methylphenol	NA	NA
4-Chloro-3-methylphenol	NA	NA
4-Methylphenol	NA	NA
Acenaphthene	1.97E-04	2.32E-01
Acenaphthylene	9.64E-05	1.14E-01
Anthracene	9.65E-05	1.14E-01
Benzo(a)anthracene	NA	NA
Benzo(a)pyrene	NA	NA
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	NA	NA
Biphenyl (Diphenyl)	NA	NA
bis(2-Chloroethoxy)methane	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA
Bromoform	5.07E-04	5.98E-01
Caprolactam	NA	NA
Carbazole	NA	NA
Chrysene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Diethylphthalate	NA	NA
Di-n-butyl phthalate	NA	NA
Fluoranthene	NA	NA
Fluorene	8.69E-05	1.02E-01
Hexachloroethane	NA	NA
Indeno(1,2,3-c,d)pyrene	NA	NA
Naphthalene	7.92E-03	9.34E+00
Nitrobenzene	3.94E-05	4.65E-02
N-Nitrosodi-n-propylamine	NA	NA
N-Nitrosodiphenylamine	NA	NA
Pentachlorophenol	NA	NA
Phenanthrene	NA	NA
Pyrene	2.15E-05	2.53E-02
1,1-Dichloroethane	4.08E-02	4.80E+01
1,1-Dichloroethene	3.10E-03	3.65E+00
1,1,1-Trichloroethane	7.50E-03	8.85E+00
1,1,2-Trichloroethane	8.01E-04	9.44E-01

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
1,1,2,2-Tetrachloroethane	6.33E-04	7.47E-01
1,2,3-Trichlorobenzene	1.43E-04	1.69E-01
1,2,4-Trichlorobenzene	7.95E-04	9.37E-01
1,2,4-Trimethylbenzene	1.84E-02	2.17E+01
1,2-Dibromo-3-chloropropane	8.51E-05	1.00E-01
1,2-Dichlorobenzene	4.33E-02	5.10E+01
1,2-Dichloroethane	1.00E-03	1.18E+00
1,2-Dichloropropane	3.46E-04	4.08E-01
1,3-Dichlorobenzene	1.60E-03	1.88E+00
1,3,5-Trimethylbenzene	7.34E-03	8.65E+00
1,4-Dichlorobenzene	1.29E-02	1.52E+01
2-Chlorotoluene	NA	NA
2-Hexanone	NA	NA
2,2-Dichloropropane	NA	NA
Acetone	1.75E-02	2.07E+01
Benzene	3.29E-02	3.88E+01
Carbon disulfide	2.61E-04	3.08E-01
Carbon tetrachloride	1.78E-05	2.09E-02
Chlorobenzene	4.59E-02	5.41E+01
Chloroethane	8.84E-03	1.04E+01
Chloroform	2.92E-04	3.44E-01
Chloromethane	7.60E-04	8.96E-01
cis-1,2-Dichloroethene	1.01E+00	1.19E+03
cis-1,3-Dichloropropene	2.92E-04	3.45E-01
Cyclohexane	1.44E-03	1.70E+00
Ethyl tert-butyl ether (ETBE)	NA	NA
Ethylbenzene	3.18E-02	3.75E+01
Isopropyl ether	NA	NA
Isopropylbenzene (cumene)	NA	NA
Methyl acetate	4.79E-04	5.64E-01
Methyl ethyl ketone	1.14E-02	1.34E+01
Methyl isobutyl ketone	2.51E-01	2.96E+02
Methyl tert-butyl ether	NA	NA
Methylcyclohexane	1.82E-03	2.15E+00
Methylene chloride	6.36E-04	7.49E-01
n-Butylbenzene	3.87E-04	4.56E-01
n-Propylbenzene	3.75E-03	4.42E+00
Phenol	NA	NA
p-Cymene (p-isopropyltoluene)	NA	NA
sec-Butylbenzene	3.57E-04	4.21E-01
Styrene	9.83E-04	1.16E+00
tert-Butylbenzene	1.33E-04	1.56E-01
tert-Butyl alcohol	NA	NA
Tetrachloroethene	6.84E-04	8.06E-01
Toluene	4.65E-01	5.48E+02
trans-1,2-Dichloroethene	2.98E-02	3.51E+01
trans-1,3-Dichloropropene	2.85E-04	3.36E-01
Trichloroethene	3.64E-03	4.29E+00
Vinyl chloride	1.50E-01	1.77E+02
m,p-Xylene	6.69E-02	7.88E+01
o-Xylene	3.14E-02	3.70E+01
Xylenes, total	1.13E-01	1.33E+02
Dioxans/Furans		
1,2,3,4,6,7,8-HpCDD	NA	NA
1,2,3,4,6,7,8-HpCDF	NA	NA
1,2,3,4,7,8,9-HpCDF	NA	NA

Chemical	Total emission rate, Ei (mg/s)	Concentration of VOCs in breathing zone, C_{air} (ug/m^3)
1,2,3,4,7,8-HxCDD	NA	NA
1,2,3,4,7,8-HxCDF	NA	NA
1,2,3,6,7,8-HxCDD	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA
1,2,3,7,8,9-HxCDD	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA
1,2,3,7,8-PeCDD	NA	NA
1,2,3,7,8-PeCDF	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA
2,3,4,7,8-PeCDF	NA	NA
2,3,7,8-TCDF	NA	NA
OCDD	NA	NA
OCDF	NA	NA

Table 2-22
Summary of Cancer Risks and Noncancer Hazards - Groundwater
Remedial Investigation Report
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer	Noncancer
Trench Worker	1E-04	34
Hypothetical Resident		
Future Adult Resident (24 years)	5E-02	262
Future Child Resident (6 years)	3E-02	628
Sum of Adult plus Child (30 years)	7E-02	

Table 2-23
Summary of Cancer Risks - Resident Receptors - Soil plus Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario/ Receptor	Cancer Risk			
	Former AMCO Chemical Facility	Parking Lot	Large Vacant Lot	Small Vacant Lot
Hypothetical Resident				
Shallow Soil plus Groundwater				
Adult (Soil)	1E-04	5E-05	6E-05	5E-05
Child (Soil)	2E-04	1E-04	1E-04	1E-04
Groundwater (Adult plus Child)	7E-02	7E-02	7E-02	7E-02
Combined Cancer Risk	7E-02	7E-02	7E-02	7E-02
Deep Soil plus Groundwater				
Adult (Soil)	1E-04	1E-04	4E-05	
Child (Soil)	2E-04	2E-04	9E-05	
Groundwater (Adult plus Child)	7E-02	7E-02	7E-02	7E-02
Combined Cancer Risk	7E-02	7E-02	7E-02	7E-02

Groundwater

Exposure Scenario/ Receptor	Cancer Risk
Hypothetical Resident	
Future Adult Resident (24 years)	5E-02
Future Child Resident (6 years)	3E-02
Sum of Adult plus Child (30 years)	7E-02

Table 2-24
Summary of Target Organ / Endpoint for Health Hazards
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Chemical	Target Organ / Endpoint	Source
1,2,4-Trimethylbenzene	Decreased body weight	PPRTV
1,3,5-Trimethylbenzene	Decreased body weight	PPRTV
2-Methylnaphthalene	Lungs	IRIS
Aroclor-1260*	Eyes	IRIS
Arsenic	Skin, Circulatory System	IRIS
Benzene	Immune system (decreased lymphocyte count)	IRIS
cis-1,2-Dichloroethene	Decreased hematocrit and hemoglobin (Blood)	PPRTV
Naphthalene	Decreased body weight	IRIS
Toluene	Kidney	IRIS
Trichloroethene	Nervous system	NCEA
Vinyl chloride	Liver	IRIS
Xylenes, total	Decreased body weight, increased mortality	IRIS

Notes
*Aroclor 1254 used as surrogate
PPRTV = Provisional Peer Reviewed Toxicity Value
IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment

Table 2-25

Noncancer Health Hazard - Target Organs/Endpoints for Future Adult Residents - Groundwater

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Aroclor-1260	48	18%	Eyes
cis-1,2-Dichloroethene	42	16%	Decreased hematocrit and hemoglobin (Blood)
Arsenic	26	10%	Skin, Circulatory System
Vinyl chloride	23	9%	Liver
Naphthalene	22	8%	Decreased body weight
Toluene	13	5%	Kidney
Benzene	10	4%	Immune system (decreased lymphocyte count)
Xylenes, total	8	3%	Decreased body weight, increased mortality
Chlorobenzene	8	3%	Liver
Trichloroethene	7	3%	Nervous system
Total Hazard Index1	**262**		

Notes

NA = Target organ data not available

1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.

2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 2-26
Noncancer Health Hazard - Target Organs/Endpoints for Future Child Residents - Groundwater
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	**Hazard Quotient**	**% Contribution**	**Target Organ/Endpoint**
Aroclor-1260	108	17%	Eyes
cis-1,2-Dichloroethene	99	16%	Decreased hematocrit and hemoglobin (Blood)
Arsenic	62	10%	Skin, Circulatory System
Vinyl chloride	55	9%	Liver
Naphthalene	52	8%	Decreased body weight
Toluene	30	5%	Kidney
Benzene	22	4%	Immune system (decreased lymphocyte count)
Xylenes, total	19	3%	Decreased body weight, increased mortality
Chlorobenzene	18	3%	Liver
Trichloroethene	16	3%	Nervous system
Total Hazard Index1	**628**		

Notes
NA = Target organ data not available
1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.
2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Table 2-27

Noncancer Health Hazard - Target Organs/Endpoints for Trenchworkers - Groundwater

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Primary Contributors	Hazard Quotient	% Contribution	Target Organ/Endpoint
Aroclor-1260	14	38%	Eyes
cis-1,2-Dichloroethene	11	30%	Decreased hematocrit and hemoglobin (Blood)
Vinyl chloride	5	13%	Liver
Trichloroethene	1	4%	Nervous system
Benzene	0.9	3%	Immune system (decreased lymphocyte count)
Toluene	0.9	2%	Kidney
2-Methylnaphthalene	0.8	2%	Lungs
1,2,4-Trimethylbenzene	0.7	2%	Decreased body weight
Chlorobenzene	0.3	1%	Liver
1,3,5-Trimethylbenzene	0.2	0.4%	Decreased body weight
Total Hazard Index1	**37**		

Notes

NA = Target organ data not available

1) Total Hazard Index includes all chemicals evaluated including those chemicals not shown. Only the top ten contributors are presented.

2) For chemicals having multiple target organ or system effects, only the first target organ/endpoint listed was used to calculate cumulative effects.

Attachment 3
Detailed Risk and Hazard Results for Vapor Intrusion Evaluation

Table of Contents for Detailed Risk Calculation Spreadsheets for the Vapor Intrusion Evaluation
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 3-1	Exposure Assumptions
Table 3-2	Summary Statistics for Crawlspace and Ambient Air Data from Properties Near and On Former AMCO Facility
Table 3-3	Exposure Point Concentrations for Crawlspace and Ambient Air
Table 3-4	Risk Calculation Worksheet for 1414 3rd St - Crawl Space Air - Occupational Exposure Scenario - Commercial/Industrial Worker
Table 3-5	Risk Calculation Worksheet for 1428 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-6	Risk Calculation Worksheet for 1428 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-7	Risk Calculation Worksheet for 1432 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-8	Risk Calculation Worksheet for 1432 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-9	Risk Calculation Worksheet for 1436 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-10	Risk Calculation Worksheet for 320 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-11	Risk Calculation Worksheet for 320 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-12	Risk Calculation Worksheet for 326 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-13	Risk Calculation Worksheet for 326 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-14	Risk Calculation Worksheet for 339 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-15	Risk Calculation Worksheet for 356 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-16	Risk Calculation Worksheet for 360 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-17	Risk Calculation Worksheet for 366 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-18	Risk Calculation Worksheet for Prescott Park - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-19	Risk Calculation Worksheet for Combined Background - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Table 3-20	Risk Summary

Table 3-1
Exposure Assumptions
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

			Reasonable Maximum Exposure (RME) Scenario					
Exposure Parameter	**Parameter Code**	**Units**	**Adult Industrial Worker**	**Source**	**Adult Future Resident**	**Source**	**Child Future Resident**	**Source**
Exposure Frequency	EF	days/yr	250	Site Specific	350	EPA, 1989	350	EPA, 1989
Exposure Time for inhalation of volatiles	ET_i	hr/day	8	CalEPA, 2005	24	EPA, 1991	24	EPA, 1991
Exposure Duration	ED	years	25	CalEPA, 2005	24	EPA, 1989	6	EPA, 1989
Body Weight	BW	kg	70	EPA, 1989	70	EPA, 1989	15	EPA, 1989
Averaging Time for carcinogens	ATc	yr	70	EPA, 1989	70	EPA, 1989	70	EPA, 1989
Averaging Time for noncarcinogens	ATnc	yr	25	CalEPA, 2005	24	EPA, 1989	6	EPA, 1989
Conversion Factor 1	CF1	mg/ug	0.001		0.001		0.001	
Constituent Specific Permeability Constant	Kp	cm/hr	Chemical Specific	EPA, 2004a	Chemical Specific	EPA, 2004a	Chemical Specific	EPA, 2004a

Notes:
ATc = 70 years x 365 days/year
ATnc = ED (years) x 365 days/year

Sources:
CalEPA, DTSC, HERD, 2005. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities.
EPA, 1989: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A).
EPA, 1991: Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). USEPA OERR.
EPA, 2004a: Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual. (Part E, Supplemental Guidance for Dermal Risk Assessment, Final). July.

Table 3-2
Summary Statistics for Crawlspace and Ambient Air Data from Properties Near and On Former AMCO Facility
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
1414 3rd St	CA	1,1,1-Trichloroethane	µg/m3	16	16	100	0.14	25	NA	NA	1414CAa		8.37	8.9	15.8	95% Approximate Gamma UCL	15.8	95% Approximate Gamma UCL
1414 3rd St	CA	1,1,2-Trichloroethane	µg/m3	1	16	6	0.041	0.041	0.076	0.49	CMI-CA01	J	0.0737	0.0592	0.138	Too Few Unique Detected Values *	0.041	Maximum Result
1414 3rd St	CA	1,1-Dichloroethane	µg/m3	16	16	100	0.16	33	NA	NA	1414CAa		11.3	12.1	21.3	95% Approximate Gamma UCL	21.3	95% Approximate Gamma UCL
1414 3rd St	CA	1,1-Dichloroethene	µg/m3	13	16	81	0.048	1.6	0.064	0.065	1414CAa		0.471	0.525	1.05	95% KM (Chebyshev) UCL	1.05	95% KM (Chebyshev) UCL
1414 3rd St	CA	1,2,4-Trimethylbenzene	µg/m3	16	16	100	0.16	9.6	NA	NA	1414CAa		1.26	2.26	2.14	95% H-UCL	2.14	95% H-UCL
1414 3rd St	CA	1,2-Dibromoethane	µg/m3	1	16	6	0.11	0.11	0.21	1.5	1414CAa	J	0.272	0.243	0.537	Too Few Unique Detected Values *	0.11	Maximum Result
1414 3rd St	CA	1,2-Dichloroethane	µg/m3	12	16	75	0.033	1.5	0.13	0.43	1414CAc		0.324	0.438	0.802	95% KM (Chebyshev) UCL	0.802	95% KM (Chebyshev) UCL
1414 3rd St	CA	1,2-Dichloropropane	µg/m3	4	16	25	0.034	0.14	0.064	0.89	1414CAc		0.117	0.135	0.0619	95% KM (t) UCL	0.0619	95% KM (t) UCL
1414 3rd St	CA	1,3,5-Trimethylbenzene	µg/m3	12	16	75	0.06	1	0.05	0.94	1414CAa		0.296	0.242	0.364	95% KM (Percentile Bootstrap) UCL	0.364	95% KM (Percentile Bootstrap) UCL
1414 3rd St	CA	1,4-Dichlorobenzene	µg/m3	5	16	31	0.26	0.96	0.049	1.2	1414CAc		0.275	0.268	0.417	95% KM (t) UCL	0.417	95% KM (t) UCL
1414 3rd St	CA	1,4-Dioxane (p-dioxane)	µg/m3	1	16	6	1.3	1.3	0.024	2	1414CAa	J	0.371	0.324	0.724	Too Few Unique Detected Values *	0.724	Too Few Unique Detected Values *
1414 3rd St	CA	Benzene	µg/m3	16	16	100	0.28	1.3	NA	NA	1414CAa	J	0.584	0.292	0.724	95% Approximate Gamma UCL	0.724	95% Approximate Gamma UCL
1414 3rd St	CA	Bromomethane	µg/m3	9	16	56	0.04	0.4	0.27	1.7	CMI-CA01	J	0.256	0.224	0.189	95% KM (t) UCL	0.189	95% KM (t) UCL
1414 3rd St	CA	Carbon tetrachloride	µg/m3	16	16	100	0.38	17	NA	NA	1414CAa		1.56	4.12	6.05	95% Chebyshev (Mean, Sd) UCL	6.05	95% Chebyshev (Mean, Sd) UCL
1414 3rd St	CA	Chlorobenzene	µg/m3	6	16	38	0.031	0.19	0.018	0.88	1414CAa		0.144	0.154	0.0878	95% KM (t) UCL	0.0878	95% KM (t) UCL
1414 3rd St	CA	Chloroethane	µg/m3	11	16	69	0.074	0.96	0.22	0.51	1414CAa		0.286	0.267	0.384	95% KM (Percentile Bootstrap) UCL	0.384	95% KM (Percentile Bootstrap) UCL
1414 3rd St	CA	Chloroform	µg/m3	15	16	94	0.13	3	0.94	0.94	1414CAa		0.597	0.693	1.35	95% KM (Chebyshev) UCL	1.35	95% KM (Chebyshev) UCL
1414 3rd St	CA	Chloromethane	µg/m3	14	16	88	0.59	46	0.39	0.4	1414CAb		5.07	12.2	24.2	97.5% KM (Chebyshev) UCL	24.2	97.5% KM (Chebyshev) UCL
1414 3rd St	CA	cis-1,2-Dichloroethene	µg/m3	16	16	100	0.67	440	NA	NA	1414CAa		132	158	272	95% Approximate Gamma UCL	272	95% Approximate Gamma UCL
1414 3rd St	CA	cis-1,3-Dichloropropene	µg/m3	2	16	13	0.056	0.056	0.13	0.87	1414CAc	J	0.159	0.144	0.635	95% KM (Chebyshev) UCL	0.056	Maximum Result
1414 3rd St	CA	Ethylbenzene	µg/m3	16	16	100	0.18	1.8	NA	NA	1414CAa		0.885	0.512	1.11	95% Student's-t UCL	1.11	95% Student's-t UCL
1414 3rd St	CA	Freon 11	µg/m3	16	16	100	1.2	4.8	NA	NA	1414CAa		2.19	1.12	2.68	95% Student's-t UCL	2.68	95% Student's-t UCL
1414 3rd St	CA	Freon 113	µg/m3	16	16	100	0.35	0.76	NA	NA	1414CAb		0.626	0.112	0.675	95% Student's-t UCL	0.675	95% Student's-t UCL
1414 3rd St	CA	Freon 12	µg/m3	16	16	100	1.6	13	NA	NA	1414CAb		3.05	2.69	4.23	95% Student's-t UCL	4.23	95% Student's-t UCL
1414 3rd St	CA	Methyl tert-butyl ether	µg/m3	6	16	38	0.014	0.14	0.58	2	1414CAc	J	0.292	0.297	0.0777	95% KM (t) UCL	0.0777	95% KM (t) UCL
1414 3rd St	CA	Methylene chloride	µg/m3	5	16	31	0.37	1.6	0.45	3.7	1414CAb		0.711	0.557	0.801	95% KM (t) UCL	0.801	95% KM (t) UCL
1414 3rd St	CA	Naphthalene	µg/m3	3	16	19	0.41	0.98	0.18	15	1414CAa	J	1.62	1.83	0.638	95% KM (t) UCL	0.638	95% KM (t) UCL
1414 3rd St	CA	Styrene	µg/m3	9	16	56	0.13	0.64	0.083	0.82	1414CAa		0.254	0.208	0.347	95% KM (t) UCL	0.347	95% KM (t) UCL
1414 3rd St	CA	Tetrachloroethene	µg/m3	16	16	100	1.2	19	NA	NA	1414CAa		6.35	5.36	9.47	95% Approximate Gamma UCL	9.47	95% Approximate Gamma UCL
1414 3rd St	CA	Toluene	µg/m3	16	16	100	1.2	16	NA	NA	1414CAc		7.39	4.36	9.3	95% Student's-t UCL	9.3	95% Student's-t UCL
1414 3rd St	CA	trans-1,2-Dichloroethene	µg/m3	12	16	75	0.048	1.1	0.021	0.65	1414CAa	J	0.304	0.317	0.635	95% KM (Chebyshev) UCL	0.635	95% KM (Chebyshev) UCL
1414 3rd St	CA	trans-1,3-Dichloropropene	µg/m3	2	16	13	0.051	0.057	0.13	0.87	1414CAa	J	0.159	0.144	0.0593	95% KM (t) UCL	0.057	Maximum Result
1414 3rd St	CA	Trichloroethene	µg/m3	16	16	100	0.49	28	NA	NA	CMI-CA01		8.46	8.62	13.6	95% Approximate Gamma UCL	13.6	95% Approximate Gamma UCL
1414 3rd St	CA	Vinyl chloride	µg/m3	10	16	63	0.021	7.6	0.042	0.14	1414CAb		0.719	1.89	1.61	95% KM (BCA) UCL	1.61	95% KM (BCA) UCL
1414 3rd St	CA	Xylenes, m & p	µg/m3	16	16	100	0.6	6.9	NA	NA	1414CAc		3.04	1.87	3.86	95% Student's-t UCL	3.86	95% Student's-t UCL
1414 3rd St	CA	Xylenes, o	µg/m3	16	16	100	0.22	1.5	NA	NA	1414CAa		0.796	0.433	0.985	95% Student's-t UCL	0.985	95% Student's-t UCL
1428 3rd St	AA	1,1,1-Trichloroethane	µg/m3	10	11	91	0.051	0.12	0.18	0.18	1428-OA01	J	0.0847	0.0194	0.0941	95% KM (t) UCL	0.0941	95% KM (t) UCL
1428 3rd St	AA	1,1,2,2-Tetrachloroethane	µg/m3	2	11	18	0.15	0.18	0.18	0.23	1428AA	J	0.118	0.0258	0.159	95% KM (t) UCL	0.159	95% KM (t) UCL
1428 3rd St	AA	1,2,4-Trimethylbenzene	µg/m3	11	11	100	0.13	23	NA	NA	1428AA		2.65	6.78	4.74	95% Chebyshev (MVUE) UCL	4.74	95% Chebyshev (MVUE) UCL
1428 3rd St	AA	1,2-Dichloroethane	µg/m3	8	11	73	0.033	0.27	0.12	0.13	1428AA		0.0912	0.076	0.126	95% KM (Percentile Bootstrap) UCL	0.126	95% KM (Percentile Bootstrap) UCL
1428 3rd St	AA	1,2-Dichloropropane	µg/m3	2	11	18	0.046	0.057	0.062	0.79	1428AA	J	0.109	0.141	0.0513	95% KM (t) UCL	0.0513	95% KM (t) UCL
1428 3rd St	AA	1,3,5-Trimethylbenzene	µg/m3	8	11	73	0.047	8	0.046	0.84	1428AA		0.987	2.34	4.09	95% KM (Chebyshev) UCL	4.09	95% KM (Chebyshev) UCL
1428 3rd St	AA	1,3-Dichlorobenzene	µg/m3	2	11	18	0.052	51	0.016	1	1428AA	J	4.78	15.3	66.8	99% KM (Chebyshev) UCL	51	Maximum Result
1428 3rd St	AA	1,4-Dichlorobenzene	µg/m3	3	11	27	0.17	3.5	0.031	1	1428AA	J	0.503	1.01	1.14	95% KM (t) UCL	1.14	95% KM (t) UCL
1428 3rd St	AA	Benzene	µg/m3	11	11	100	0.31	5.6	NA	NA	1428AA	J	1.14	1.57	3.2	95% Chebyshev (Mean, Sd) UCL	3.2	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	AA	Bromomethane	µg/m3	8	11	73	0.075	0.4	0.3	0.31	1428-OA01	J	0.194	0.111	0.244	95% KM (t) UCL	0.244	95% KM (t) UCL
1428 3rd St	AA	Carbon tetrachloride	µg/m3	11	11	100	0.42	0.7	NA	NA	1428AA		0.517	0.088	0.565	95% Student's-t UCL	0.565	95% Student's-t UCL
1428 3rd St	AA	Chlorobenzene	µg/m3	2	11	18	0.022	0.3	0.017	0.79	1428AA		0.137	0.147	0.31	97.5% KM (Chebyshev) UCL	0.3	Maximum Result
1428 3rd St	AA	Chloroethane	µg/m3	4	11	36	0.03	0.11	0.19	0.45	1428AA	J	0.113	0.06	0.089	95% KM (t) UCL	0.089	95% KM (t) UCL
1428 3rd St	AA	Chloroform	µg/m3	8	11	73	0.087	0.38	0.16	0.83	1428AA		0.201	0.132	0.208	95% KM (Percentile Bootstrap) UCL	0.208	95% KM (Percentile Bootstrap) UCL
1428 3rd St	AA	Chloromethane	µg/m3	11	11	100	0.87	1.5	NA	NA	1428AA		1.17	0.21	1.28	95% Student's-t UCL	1.28	95% Student's-t UCL
1428 3rd St	AA	cis-1,3-Dichloropropene	µg/m3	1	11	9	0.052	0.052	0.12	0.78	1428AA	J	0.124	0.129	0.294	Too Few Unique Detected Values *	0.052	Maximum Result
1428 3rd St	AA	Ethylbenzene	µg/m3	11	11	100	0.16	12	NA	NA	1428AA		1.6	3.49	12.1	99% Chebyshev (Mean, Sd) UCL	12	Maximum Result
1428 3rd St	AA	Freon 11	µg/m3	11	11	100	1.1	3.8	NA	NA	1428AA		1.67	0.74	2.08	95% Student's-t UCL	2.08	95% Student's-t UCL
1428 3rd St	AA	Freon 113	µg/m3	11	11	100	0.43	0.8	NA	NA	1428AA		0.613	0.109	0.672	95% Student's-t UCL	0.672	95% Student's-t UCL
1428 3rd St	AA	Freon 114	µg/m3	1	4	25	0.13	0.13	0.23	1.2	1428AA	J	0.361	0.276	NA	Fewer Than Five Samples	0.13	Maximum Result
1428 3rd St	AA	Freon 12	µg/m3	11	11	100	2	3.4	NA	NA	1428AA		2.45	0.461	2.71	95% Student's-t UCL	2.71	95% Student's-t UCL
1428 3rd St	AA	Methyl tert-butyl ether	µg/m3	2	11	18	0.0099	0.023	0.48	0.62	1428AA	J	0.236	0.11	0.0283	95% KM (t) UCL	0.023	Maximum Result
1428 3rd St	AA	Methylene chloride	µg/m3	4	11	36	0.31	21	0.31	1.2	1428AA		2.54	6.21	6.26	95% KM (t) UCL	6.26	95% KM (t) UCL
1428 3rd St	AA	Naphthalene	µg/m3	4	10	40	0.12	16	3.5	4.4	1428AA	J	2.92	4.65	5.18	95% KM (t) UCL	5.18	95% KM (t) UCL
1428 3rd St	AA	Styrene	µg/m3	8	11	73	0.047	6.8	0.031	0.72	1428AA		0.771	2	6.9	99% KM (Chebyshev) UCL	6.8	Maximum Result

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
1428 3rd St	AA	Tetrachloroethene	μg/m3	11	11	100	0.074	2.2	NA	NA	1428AA		0.338	0.622	1.16	95% Chebyshev (Mean, Sd) UCL	1.16	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	AA	Toluene	μg/m3	11	11	100	1	32	NA	NA	1428AA		5.95	9.17	12.5	95% Chebyshev (MVUE) UCL	12.5	95% Chebyshev (MVUE) UCL
1428 3rd St	AA	trans-1,2-Dichloroethene	μg/m3	1	11	9	0.042	0.042	0.013	0.68	1428AA	J	0.262	0.12	0.419	Too Few Unique Detected Values *	0.042	Maximum Result
1428 3rd St	AA	trans-1,3-Dichloropropene	μg/m3	1	11	9	0.041	0.041	0.12	0.78	1428AA	J	0.123	0.13	0.294	Too Few Unique Detected Values *	0.041	Maximum Result
1428 3rd St	AA	Trichloroethene	μg/m3	10	11	91	0.025	0.44	0.032	0.032	1428AA		0.106	0.118	0.261	95% KM (Chebyshev) UCL	0.261	95% KM (Chebyshev) UCL
1428 3rd St	AA	Vinyl chloride	μg/m3	1	11	9	0.058	0.058	0.034	0.044	1428AA		0.023	0.0117	0.0385	Too Few Unique Detected Values *	0.0385	Too Few Unique Detected Values *
1428 3rd St	AA	Xylenes, m & p	μg/m3	11	11	100	0.43	44	NA	NA	1428AA		5.85	12.8	44.4	99% Chebyshev (Mean, Sd) UCL	44	Maximum Result
1428 3rd St	AA	Xylenes, o	μg/m3	11	11	100	0.13	18	NA	NA	1428AA		2.18	5.28	18	99% Chebyshev (Mean, Sd) UCL	18	Maximum Result
1428 3rd St	CA	1,1,1-Trichloroethane	μg/m3	17	20	85	0.074	0.15	0.2	8.8	1428CAc	J	0.321	0.96	0.114	95% KM (t) UCL	0.114	95% KM (t) UCL
1428 3rd St	CA	1,1,2,2-Tetrachloroethane	μg/m3	1	20	5	0.074	0.074	0.06	11	1428CAd	J	0.37	1.21	1.55	Too Few Unique Detected Values *	0.074	Maximum Result
1428 3rd St	CA	1,1,2-Trichloroethane	μg/m3	1	20	5	0.065	0.065	0.077	8.8	1428CAd	J	0.275	0.971	1.22	Too Few Unique Detected Values *	0.065	Maximum Result
1428 3rd St	CA	1,1-Dichloroethane	μg/m3	2	20	10	0.015	0.026	0.11	6.5	1428CAa	J	0.22	0.713	0.03	95% KM (t) UCL	0.026	Maximum Result
1428 3rd St	CA	1,2,4-Trimethylbenzene	μg/m3	19	20	95	0.065	57	0.12	0.12	1428-CA01		4.68	13	33.5	99% KM (Chebyshev) UCL	33.5	99% KM (Chebyshev) UCL
1428 3rd St	CA	1,2-Dibromoethane	μg/m3	1	20	5	0.034	0.034	0.22	62	1428CAe	J	1.69	6.9	8.41	Too Few Unique Detected Values *	0.034	Maximum Result
1428 3rd St	CA	1,2-Dichloroethane	μg/m3	12	20	60	0.01	2.9	0.12	6.5	1428CAd		0.46	0.996	2.1	99% KM (Chebyshev) UCL	2.1	99% KM (Chebyshev) UCL
1428 3rd St	CA	1,2-Dichloropropane	μg/m3	5	20	25	0.021	0.3	0.065	37	1428CAd		1.01	4.12	0.0906	95% KM (t) UCL	0.0906	95% KM (t) UCL
1428 3rd St	CA	1,3,5-Trimethylbenzene	μg/m3	17	20	85	0.018	15	0.033	0.16	1428-CA01	J	1.41	3.6	9.46	99% KM (Chebyshev) UCL	9.46	99% KM (Chebyshev) UCL
1428 3rd St	CA	1,4-Dichlorobenzene	μg/m3	10	20	50	0.25	2	0.082	48	1428CAd		1.54	5.3	0.565	95% KM (t) UCL	0.565	95% KM (t) UCL
1428 3rd St	CA	Benzene	μg/m3	19	20	95	0.14	2.4	13	13	1428-CA02		0.878	1.42	1.1	95% KM (Chebyshev) UCL	1.1	95% KM (Chebyshev) UCL
1428 3rd St	CA	Bromomethane	μg/m3	3	20	15	0.13	0.45	0.27	31	1428-CA02	J	0.948	3.43	0.185	95% KM (t) UCL	0.185	95% KM (t) UCL
1428 3rd St	CA	Carbon tetrachloride	μg/m3	19	20	95	0.4	0.63	10	10	1428CAc	J	0.701	1.01	0.501	95% KM (BCA) UCL	0.501	95% KM (BCA) UCL
1428 3rd St	CA	Chlorobenzene	μg/m3	5	20	25	0.02	0.047	0.03	37	1428CAa	J	0.998	4.12	0.0372	95% KM (t) UCL	0.0372	95% KM (t) UCL
1428 3rd St	CA	Chloroethane	μg/m3	9	20	45	0.02	0.63	0.2	21	1428CAc		0.666	2.32	0.178	95% KM (BCA) UCL	0.178	95% KM (BCA) UCL
1428 3rd St	CA	Chloroform	μg/m3	19	20	95	0.19	6.6	39	39	1428CAd		1.98	4.36	2.53	95% KM (Chebyshev) UCL	2.53	95% KM (Chebyshev) UCL
1428 3rd St	CA	Chloromethane	μg/m3	19	20	95	0.2	19	17	17	1428CAc		2.63	4.93	8.88	97.5% KM (Chebyshev) UCL	8.88	97.5% KM (Chebyshev) UCL
1428 3rd St	CA	Ethylbenzene	μg/m3	20	20	100	0.11	4	NA	NA	1428-CA01	J	0.86	0.924	1.26	95% Approximate Gamma UCL	1.26	95% Approximate Gamma UCL
1428 3rd St	CA	Freon 11	μg/m3	19	20	95	1.2	4.7	45	45	1428CAc		3.04	4.67	2.95	95% KM (Chebyshev) UCL	2.95	95% KM (Chebyshev) UCL
1428 3rd St	CA	Freon 113	μg/m3	19	20	95	0.51	0.8	62	62	1428CAc		2.14	6.79	0.654	95% KM (t) UCL	0.654	95% KM (t) UCL
1428 3rd St	CA	Freon 12	μg/m3	19	20	95	1.7	3.1	40	40	1428CAc		3.28	3.95	2.54	95% KM (t) UCL	2.54	95% KM (t) UCL
1428 3rd St	CA	Methylene chloride	μg/m3	7	20	35	0.34	8.2	0.34	56	1428CAc		2.73	6.24	2.17	95% KM (t) UCL	2.17	95% KM (t) UCL
1428 3rd St	CA	Naphthalene	μg/m3	3	16	19	0.58	3	0.11	210	1428-CA02	J	7.99	25.9	1.09	95% KM (t) UCL	1.09	95% KM (t) UCL
1428 3rd St	CA	Styrene	μg/m3	18	20	90	0.04	0.78	0.13	34	1428CAd		1.1	3.75	0.498	95% KM (Chebyshev) UCL	0.498	95% KM (Chebyshev) UCL
1428 3rd St	CA	Tetrachloroethene	μg/m3	20	20	100	0.23	4.8	NA	NA	1428CAc		0.737	1.03	1.74	95% Chebyshev (Mean, Sd) UCL	1.74	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	CA	Toluene	μg/m3	20	20	100	0.46	33	NA	NA	1428-CA01		8.42	8.51	12.6	95% Approximate Gamma UCL	12.6	95% Approximate Gamma UCL
1428 3rd St	CA	trans-1,3-Dichloropropene	μg/m3	1	20	5	0.018	0.018	0.13	36	1428CAe	J	0.983	4.01	4.89	Too Few Unique Detected Values *	0.018	Maximum Result
1428 3rd St	CA	Trichloroethene	μg/m3	20	20	100	0.056	4.2	NA	NA	1428CAd		0.727	1.19	3.37	99% Chebyshev (Mean, Sd) UCL	3.37	99% Chebyshev (Mean, Sd) UCL
1428 3rd St	CA	Vinyl chloride	μg/m3	4	20	20	0.034	10	0.037	2	1428CAc		0.645	2.24	1.58	95% KM (t) UCL	1.58	95% KM (t) UCL
1428 3rd St	CA	Xylenes, m & p	μg/m3	20	20	100	0.15	18	NA	NA	1428-CA01		3.51	4.24	5.49	95% Approximate Gamma UCL	5.49	95% Approximate Gamma UCL
1428 3rd St	CA	Xylenes, o	μg/m3	20	20	100	0.068	11	NA	NA	1428-CA01		1.53	2.72	3.43	95% Chebyshev (MVUE) UCL	3.43	95% Chebyshev (MVUE) UCL
1430 3rd St	AA	1,1,1-Trichloroethane	μg/m3	1	1	100	0.051	0.051	NA	NA	1430-OA01	J	0.051	NA	NA	Fewer Than Five Samples	0.051	Maximum Result
1430 3rd St	AA	1,2,4-Trimethylbenzene	μg/m3	1	1	100	0.3	0.3	NA	NA	1430-OA01	J	0.3	NA	NA	Fewer Than Five Samples	0.3	Maximum Result
1430 3rd St	AA	1,2-Dichloroethane	μg/m3	1	1	100	0.066	0.066	NA	NA	1430-OA01	J	0.066	NA	NA	Fewer Than Five Samples	0.066	Maximum Result
1430 3rd St	AA	Benzene	μg/m3	1	1	100	0.34	0.34	NA	NA	1430-OA01		0.34	NA	NA	Fewer Than Five Samples	0.34	Maximum Result
1430 3rd St	AA	Bromomethane	μg/m3	1	1	100	0.31	0.31	NA	NA	1430-OA01	J	0.31	NA	NA	Fewer Than Five Samples	0.31	Maximum Result
1430 3rd St	AA	Carbon tetrachloride	μg/m3	1	1	100	0.42	0.42	NA	NA	1430-OA01		0.42	NA	NA	Fewer Than Five Samples	0.42	Maximum Result
1430 3rd St	AA	Chloromethane	μg/m3	1	1	100	1	1	NA	NA	1430-OA01		1	NA	NA	Fewer Than Five Samples	1	Maximum Result
1430 3rd St	AA	Ethylbenzene	μg/m3	1	1	100	0.24	0.24	NA	NA	1430-OA01		0.24	NA	NA	Fewer Than Five Samples	0.24	Maximum Result
1430 3rd St	AA	Freon 11	μg/m3	1	1	100	1.3	1.3	NA	NA	1430-OA01		1.3	NA	NA	Fewer Than Five Samples	1.3	Maximum Result
1430 3rd St	AA	Freon 113	μg/m3	1	1	100	0.43	0.43	NA	NA	1430-OA01	J	0.43	NA	NA	Fewer Than Five Samples	0.43	Maximum Result
1430 3rd St	AA	Freon 12	μg/m3	1	1	100	2.1	2.1	NA	NA	1430-OA01		2.1	NA	NA	Fewer Than Five Samples	2.1	Maximum Result
1430 3rd St	AA	Methylene chloride	μg/m3	1	1	100	0.31	0.31	NA	NA	1430-OA01	J	0.31	NA	NA	Fewer Than Five Samples	0.31	Maximum Result
1430 3rd St	AA	Tetrachloroethene	μg/m3	1	1	100	0.086	0.086	NA	NA	1430-OA01	J	0.086	NA	NA	Fewer Than Five Samples	0.086	Maximum Result
1430 3rd St	AA	Toluene	μg/m3	1	1	100	1.7	1.7	NA	NA	1430-OA01		1.7	NA	NA	Fewer Than Five Samples	1.7	Maximum Result
1430 3rd St	AA	Trichloroethene	μg/m3	1	1	100	0.025	0.025	NA	NA	1430-OA01	J	0.025	NA	NA	Fewer Than Five Samples	0.025	Maximum Result
1430 3rd St	AA	Xylenes, m & p	μg/m3	1	1	100	0.79	0.79	NA	NA	1430-OA01		0.79	NA	NA	Fewer Than Five Samples	0.79	Maximum Result
1430 3rd St	AA	Xylenes, o	μg/m3	1	1	100	0.27	0.27	NA	NA	1430-OA01		0.27	NA	NA	Fewer Than Five Samples	0.27	Maximum Result
1432 3rd St	AA	1,1,1-Trichloroethane	μg/m3	10	11	91	0.04	0.11	0.18	0.18	1432AA	J	0.0729	0.0211	0.0823	95% KM (t) UCL	0.0823	95% KM (t) UCL
1432 3rd St	AA	1,2,4-Trimethylbenzene	μg/m3	10	11	91	0.087	1.6	0.81	0.81	1432AA		0.423	0.429	0.983	95% KM (Chebyshev) UCL	0.983	95% KM (Chebyshev) UCL
1432 3rd St	AA	1,2-Dichlorobenzene	μg/m3	1	11	9	0.13	0.13	0.015	0.99	1432AA	J	0.163	0.167	0.382	Too Few Unique Detected Values *	0.13	Maximum Result
1432 3rd St	AA	1,2-Dichloroethane	μg/m3	9	11	82	0.028	0.069	0.13	0.14	1432AA	J	0.051	0.016	0.0557	95% KM (t) UCL	0.0557	95% KM (t) UCL
1432 3rd St	AA	1,2-Dichloropropane	μg/m3	2	11	18	0.025	0.064	0.065	0.76	1432AA	J	0.108	0.136	0.0438	95% KM (t) UCL	0.0438	95% KM (t) UCL
1432 3rd St	AA	1,3,5-Trimethylbenzene	μg/m3	8	11	73	0.035	0.6	0.16	0.81	1432AA		0.196	0.187	0.354	95% KM (Chebyshev) UCL	0.354	95% KM (Chebyshev) UCL
1432 3rd St	AA	1,3-Dichlorobenzene	μg/m3	1	11	9	0.092	0.092	0.17	0.99	1432AA	J	0.167	0.162	0.38	Too Few Unique Detected Values *	0.092	Maximum Result
1432 3rd St	AA	1,4-Dichlorobenzene	μg/m3	1	11	9	0.25	0.25	0.042	0.99	1432AA	J	0.162	0.176	0.394	Too Few Unique Detected Values *	0.25	Maximum Result
1432 3rd St	AA	Benzene	μg/m3	11	11	100	0.24	1.6	NA	NA	1432AA		0.586	0.405	0.852	95% Approximate Gamma UCL	0.852	95% Approximate Gamma UCL
1432 3rd St	AA	Bromomethane	μg/m3	8	11	73	0.057	1.8	0.27	0.35	1432-OA01	J	0.412	0.579	1.18	95% KM (Chebyshev) UCL	1.18	95% KM (Chebyshev) UCL

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
1432 3rd St	AA	Carbon tetrachloride	µg/m3	11	11	100	0.42	0.6	NA	NA	1432AA		0.491	0.0627	0.525	95% Student's-t UCL	0.525	95% Student's-t UCL
1432 3rd St	AA	Chlorobenzene	µg/m3	1	11	9	0.022	0.022	0.019	0.76	1432AA	J	0.117	0.132	0.291	Too Few Unique Detected Values *	0.022	Maximum Result
1432 3rd St	AA	Chloroethane	µg/m3	3	11	27	0.048	0.12	0.19	0.43	1432AA	J	0.119	0.0514	0.0991	95% KM (t) UCL	0.0991	95% KM (t) UCL
1432 3rd St	AA	Chloroform	µg/m3	9	11	82	0.088	0.36	0.8	0.8	1432AA		0.219	0.122	0.234	95% KM (t) UCL	0.234	95% KM (t) UCL
1432 3rd St	AA	Chloromethane	µg/m3	11	11	100	0.6	1.8	NA	NA	1432AA		1.03	0.319	1.21	95% Student's-t UCL	1.21	95% Student's-t UCL
1432 3rd St	AA	cis-1,3-Dichloropropene	µg/m3	1	11	9	0.051	0.051	0.13	0.74	1432AA	J	0.124	0.122	0.284	Too Few Unique Detected Values *	0.051	Maximum Result
1432 3rd St	AA	Ethylbenzene	µg/m3	11	11	100	0.1	1.5	NA	NA	1432AA		0.373	0.41	0.642	95% Approximate Gamma UCL	0.642	95% Approximate Gamma UCL
1432 3rd St	AA	Freon 11	µg/m3	11	11	100	1.1	3.8	NA	NA	1432AA		1.64	0.761	2.05	95% Student's-t UCL	2.05	95% Student's-t UCL
1432 3rd St	AA	Freon 113	µg/m3	11	11	100	0.38	0.72	NA	NA	1432AA		0.588	0.105	0.645	95% Student's-t UCL	0.645	95% Student's-t UCL
1432 3rd St	AA	Freon 114	µg/m3	1	4	25	0.13	0.13	0.22	1.1	1432AA	J	0.335	0.248	NA	Fewer Than Five Samples	0.13	Maximum Result
1432 3rd St	AA	Freon 12	µg/m3	11	11	100	1.5	2.9	NA	NA	1432AA		2.3	0.395	2.52	95% Student's-t UCL	2.52	95% Student's-t UCL
1432 3rd St	AA	Methyl tert-butyl ether	µg/m3	1	11	9	0.019	0.019	0.51	0.64	1432AA	J	0.264	0.0839	0.375	Too Few Unique Detected Values *	0.019	Maximum Result
1432 3rd St	AA	Methylene chloride	µg/m3	4	11	36	0.21	4.5	0.27	1.2	1432AA		0.955	1.47	1.78	95% KM (t) UCL	1.78	95% KM (t) UCL
1432 3rd St	AA	Naphthalene	µg/m3	4	10	40	0.27	0.74	3.7	4.3	1432AA	J	1.42	0.768	0.749	95% KM (t) UCL	0.74	Maximum Result
1432 3rd St	AA	Styrene	µg/m3	6	11	55	0.032	0.4	0.038	0.7	1432AA		0.148	0.145	0.193	95% KM (t) UCL	0.193	95% KM (t) UCL
1432 3rd St	AA	Tetrachloroethene	µg/m3	10	11	91	0.035	0.38	0.2	0.2	1432AA		0.172	0.124	0.239	95% KM (t) UCL	0.239	95% KM (t) UCL
1432 3rd St	AA	Toluene	µg/m3	11	11	100	0.48	9.9	NA	NA	1432AA		2.18	2.74	3.96	95% Approximate Gamma UCL	3.96	95% Approximate Gamma UCL
1432 3rd St	AA	trans-1,3-Dichloropropene	µg/m3	1	11	9	0.046	0.046	0.13	0.74	1432AA	J	0.124	0.122	0.284	Too Few Unique Detected Values *	0.046	Maximum Result
1432 3rd St	AA	Trichloroethene	µg/m3	7	11	64	0.02	0.23	0.023	0.18	1432AA		0.0695	0.0636	0.102	95% KM (t) UCL	0.102	95% KM (t) UCL
1432 3rd St	AA	Xylenes, m & p	µg/m3	11	11	100	0.29	5.2	NA	NA	1432AA		1.18	1.43	2.12	95% Approximate Gamma UCL	2.12	95% Approximate Gamma UCL
1432 3rd St	AA	Xylenes, o	µg/m3	11	11	100	0.088	1.7	NA	NA	1432AA		0.397	0.468	0.704	95% Approximate Gamma UCL	0.704	95% Approximate Gamma UCL
1432 3rd St	CA	1,1,1-Trichloroethane	µg/m3	10	11	91	0.046	0.12	0.18	0.18	1432CA	J	0.0835	0.026	0.0961	95% KM (t) UCL	0.0961	95% KM (t) UCL
1432 3rd St	CA	1,2,4-Trimethylbenzene	µg/m3	11	11	100	0.066	31	NA	NA	1432CA		3.25	9.21	30.9	99% Chebyshev (Mean, Sd) UCL	30.9	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	CA	1,2-Dichlorobenzene	µg/m3	1	11	9	0.16	0.16	0.0094	1.1	1432CA	J	0.165	0.183	0.405	Too Few Unique Detected Values *	0.16	Maximum Result
1432 3rd St	CA	1,2-Dichloroethane	µg/m3	9	11	82	0.03	0.91	0.13	0.14	1432CA		0.138	0.258	0.627	97.5% KM (Chebyshev) UCL	0.627	97.5% KM (Chebyshev) UCL
1432 3rd St	CA	1,2-Dichloropropane	µg/m3	3	11	27	0.03	0.11	0.067	0.86	1432CA		0.119	0.146	0.0615	95% KM (t) UCL	0.0615	95% KM (t) UCL
1432 3rd St	CA	1,3,5-Trimethylbenzene	µg/m3	9	11	82	0.047	11	0.16	0.82	1432CA		1.17	3.27	11.1	99% KM (Chebyshev) UCL	11	Maximum Result
1432 3rd St	CA	1,3-Dichlorobenzene	µg/m3	3	11	27	0.12	63	0.023	1	1432CA		5.88	18.9	72.3	99% KM (Chebyshev) UCL	63	Maximum Result
1432 3rd St	CA	1,4-Dichlorobenzene	µg/m3	4	11	36	0.29	4.8	0.059	1.1	1432CA		0.709	1.41	1.63	95% KM (t) UCL	1.63	95% KM (t) UCL
1432 3rd St	CA	1,4-Dioxane (p-dioxane)	µg/m3	1	11	9	0.26	0.26	0.025	0.67	1432CA	J	0.262	0.0854	0.374	Too Few Unique Detected Values *	0.26	Maximum Result
1432 3rd St	CA	Benzene	µg/m3	11	11	100	0.19	16	NA	NA	1432CA	J	2.03	4.67	16	99% Chebyshev (Mean, Sd) UCL	16	Maximum Result
1432 3rd St	CA	Bromomethane	µg/m3	6	11	55	0.041	0.78	0.28	0.73	1432CA		0.261	0.213	0.33	95% KM (t) UCL	0.33	95% KM (t) UCL
1432 3rd St	CA	Carbon tetrachloride	µg/m3	11	11	100	0.43	0.58	NA	NA	1432CA		0.501	0.0545	0.531	95% Student's-t UCL	0.531	95% Student's-t UCL
1432 3rd St	CA	Chlorobenzene	µg/m3	3	11	27	0.029	0.4	0.021	0.86	1432CA		0.144	0.169	0.146	95% KM (t) UCL	0.146	95% KM (t) UCL
1432 3rd St	CA	Chloroethane	µg/m3	5	11	45	0.032	0.37	0.19	0.44	1432CA		0.144	0.105	0.166	95% KM (t) UCL	0.166	95% KM (t) UCL
1432 3rd St	CA	Chloroform	µg/m3	9	11	82	0.18	0.65	0.82	0.91	1432CA		0.34	0.142	0.389	95% KM (t) UCL	0.389	95% KM (t) UCL
1432 3rd St	CA	Chloromethane	µg/m3	11	11	100	0.43	7.2	NA	NA	1432CA		1.57	2	3.07	95% H-UCL	3.07	95% H-UCL
1432 3rd St	CA	cis-1,3-Dichloropropene	µg/m3	1	11	9	0.036	0.036	0.12	0.85	1432CA	J	0.127	0.137	0.307	Too Few Unique Detected Values *	0.036	Maximum Result
1432 3rd St	CA	Ethylbenzene	µg/m3	11	11	100	0.046	20	NA	NA	1432CA		2.23	5.91	20	99% Chebyshev (Mean, Sd) UCL	20	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	CA	Freon 11	µg/m3	11	11	100	1.2	3.7	NA	NA	1432CA		1.78	0.682	2.16	95% Student's-t UCL	2.16	95% Student's-t UCL
1432 3rd St	CA	Freon 113	µg/m3	11	11	100	0.56	0.74	NA	NA	1432CA		0.643	0.06	0.676	95% Student's-t UCL	0.676	95% Student's-t UCL
1432 3rd St	CA	Freon 114	µg/m3	1	4	25	0.23	0.23	0.23	1.3	1432CA		0.399	0.266	NA	Fewer Than Five Samples	0.23	Maximum Result
1432 3rd St	CA	Freon 12	µg/m3	11	11	100	1.6	2.8	NA	NA	1432CA		2.34	0.367	2.54	95% Student's-t UCL	2.54	95% Student's-t UCL
1432 3rd St	CA	Methyl tert-butyl ether	µg/m3	1	11	9	0.019	0.019	0.53	0.67	1432CA	J	0.266	0.0841	0.376	Too Few Unique Detected Values *	0.019	Maximum Result
1432 3rd St	CA	Methylene chloride	µg/m3	4	11	36	0.3	3.3	0.35	1.2	1432CA		0.79	1.01	1.37	95% KM (t) UCL	1.37	95% KM (t) UCL
1432 3rd St	CA	Naphthalene	µg/m3	2	9	22	0.71	0.92	0.42	4.9	1432CA	J	1.42	0.893	0.882	95% KM (t) UCL	0.882	95% KM (t) UCL
1432 3rd St	CA	Styrene	µg/m3	8	11	73	0.05	11	0.14	0.8	1432CA		1.23	3.25	5.56	95% KM (Chebyshev) UCL	5.56	95% KM (Chebyshev) UCL
1432 3rd St	CA	Tetrachloroethene	µg/m3	10	11	91	0.06	3.2	0.2	0.2	1432CA		0.494	0.906	2.21	97.5% KM (Chebyshev) UCL	2.21	97.5% KM (Chebyshev) UCL
1432 3rd St	CA	Toluene	µg/m3	11	11	100	0.17	77	NA	NA	1432CA		11.6	22.5	30.6	95% Approximate Gamma UCL	30.6	95% Approximate Gamma UCL
1432 3rd St	CA	trans-1,3-Dichloropropene	µg/m3	1	11	9	0.04	0.04	0.12	0.85	1432CA	J	0.128	0.137	0.307	Too Few Unique Detected Values *	0.04	Maximum Result
1432 3rd St	CA	Trichloroethene	µg/m3	10	11	91	0.033	1.5	0.036	0.036	1432CA		0.304	0.441	0.886	95% KM (Chebyshev) UCL	0.886	95% KM (Chebyshev) UCL
1432 3rd St	CA	Vinyl chloride	µg/m3	6	11	55	0.032	2.8	0.037	0.042	1432CA		0.294	0.832	2.9	99% KM (Chebyshev) UCL	2.8	Maximum Result
1432 3rd St	CA	Xylenes, m & p	µg/m3	11	11	100	0.1	94	NA	NA	1432CA		9.97	27.9	93.7	99% Chebyshev (Mean, Sd) UCL	93.7	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	CA	Xylenes, o	µg/m3	11	11	100	0.059	33	NA	NA	1432CA		3.39	9.83	32.9	99% Chebyshev (Mean, Sd) UCL	32.9	99% Chebyshev (Mean, Sd) UCL
1436 3rd St	AA	1,1,1-Trichloroethane	µg/m3	5	6	83	0.055	0.11	0.17	0.17	1436AA	J	0.0837	0.0188	0.099	95% KM (t) UCL	0.099	95% KM (t) UCL
1436 3rd St	AA	1,2,4-Trimethylbenzene	µg/m3	6	6	100	0.15	2.4	NA	NA	1436AA		0.853	0.891	1.59	95% Student's-t UCL	1.59	95% Student's-t UCL
1436 3rd St	AA	1,2-Dichlorobenzene	µg/m3	1	6	17	0.1	0.1	0.17	1	1436AA	J	0.161	0.166	0.457	Too Few Unique Detected Values *	0.1	Maximum Result
1436 3rd St	AA	1,2-Dichloroethane	µg/m3	4	6	67	0.029	0.061	0.11	0.13	1436AA	J	0.0522	0.0127	0.061	95% KM (t) UCL	0.061	95% KM (t) UCL
1436 3rd St	AA	1,3,5-Trimethylbenzene	µg/m3	6	6	100	0.062	0.86	NA	NA	1436AA		0.286	0.305	0.537	95% Student's-t UCL	0.537	95% Student's-t UCL
1436 3rd St	AA	1,3-Dichlorobenzene	µg/m3	1	6	17	0.074	0.074	0.17	1	1436AA	J	0.157	0.168	0.456	Too Few Unique Detected Values *	0.074	Maximum Result
1436 3rd St	AA	1,4-Dichlorobenzene	µg/m3	2	6	33	0.14	0.23	0.19	1	1436AA		0.199	0.155	0.204	95% KM (t) UCL	0.204	95% KM (t) UCL
1436 3rd St	AA	1,4-Dioxane (p-dioxane)	µg/m3	1	6	17	0.22	0.22	0.5	0.6	1436AA	J	0.271	0.0299	0.324	Too Few Unique Detected Values *	0.22	Maximum Result
1436 3rd St	AA	Benzene	µg/m3	6	6	100	0.24	1.8	NA	NA	1436AA		0.862	0.561	1.32	95% Student's-t UCL	1.32	95% Student's-t UCL
1436 3rd St	AA	Bromomethane	µg/m3	4	6	67	0.051	0.34	0.31	0.65	1436AA		0.23	0.119	0.295	95% KM (t) UCL	0.295	95% KM (t) UCL
1436 3rd St	AA	Carbon tetrachloride	µg/m3	6	6	100	0.46	0.63	NA	NA	1436AA		0.515	0.0641	0.568	95% Student's-t UCL	0.568	95% Student's-t UCL
1436 3rd St	AA	Chlorobenzene	µg/m3	3	6	50	0.022	0.048	0.14	0.77	1436AA	J	0.104	0.139	0.0485	95% KM (t) UCL	0.048	Maximum Result

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
1436 3rd St	AA	Chloroethane	µg/m3	4	6	67	0.039	0.07	0.21	0.44	1436AA	J	0.09	0.0679	0.0689	95% KM (t) UCL	0.0689	95% KM (t) UCL
1436 3rd St	AA	Chloroform	µg/m3	5	6	83	0.09	0.39	0.82	0.82	1436AA		0.217	0.144	0.274	95% KM (BCA) UCL	0.274	95% KM (BCA) UCL
1436 3rd St	AA	Chloromethane	µg/m3	6	6	100	0.95	8	NA	NA	1436AA	J	2.26	2.82	7.27	95% Chebyshev (Mean, Sd) UCL	7.27	95% Chebyshev (Mean, Sd) UCL
1436 3rd St	AA	Ethylbenzene	µg/m3	6	6	100	0.13	2.2	NA	NA	1436AA		0.837	0.89	1.57	95% Student's-t UCL	1.57	95% Student's-t UCL
1436 3rd St	AA	Freon 11	µg/m3	6	6	100	1.3	2.4	NA	NA	1436AA		1.62	0.436	1.98	95% Student's-t UCL	1.98	95% Student's-t UCL
1436 3rd St	AA	Freon 113	µg/m3	6	6	100	0.58	0.74	NA	NA	1436AA		0.64	0.0636	0.692	95% Student's-t UCL	0.692	95% Student's-t UCL
1436 3rd St	AA	Freon 114	µg/m3	1	3	33	0.14	0.14	0.22	1.2	1436AA	J	0.283	0.275	NA	Fewer Than Five Samples	0.14	Maximum Result
1436 3rd St	AA	Freon 12	µg/m3	6	6	100	2.3	3	NA	NA	1436AA		2.58	0.271	2.81	95% Student's-t UCL	2.81	95% Student's-t UCL
1436 3rd St	AA	Methylene chloride	µg/m3	4	6	67	0.22	11	1.1	1.1	1436AA		3.44	4.13	6.99	95% KM (t) UCL	6.99	95% KM (t) UCL
1436 3rd St	AA	Naphthalene	µg/m3	2	5	40	0.069	0.62	3.6	4.4	1436AA	J	1.35	0.947	2.07	97.5% KM (Chebyshev) UCL	0.62	Maximum Result
1436 3rd St	AA	Styrene	µg/m3	4	6	67	0.037	0.34	0.13	0.72	1436AA		0.2	0.162	0.314	95% KM (t) UCL	0.314	95% KM (t) UCL
1436 3rd St	AA	Tetrachloroethene	µg/m3	4	6	67	0.065	0.31	0.21	0.21	1436AA		0.171	0.0972	0.252	95% KM (t) UCL	0.252	95% KM (t) UCL
1436 3rd St	AA	Toluene	µg/m3	6	6	100	0.68	14	NA	NA	1436AA		5.36	6.32	16.3	95% Chebyshev (MVUE) UCL	14	Maximum Result
1436 3rd St	AA	Trichloroethene	µg/m3	3	6	50	0.058	0.26	0.025	0.18	1436AA		0.102	0.0961	0.189	95% KM (t) UCL	0.189	95% KM (t) UCL
1436 3rd St	AA	Vinyl chloride	µg/m3	1	6	17	0.7	0.7	0.039	0.043	1436AA	J	0.134	0.278	0.627	Too Few Unique Detected Values *	0.627	Too Few Unique Detected Values *
1436 3rd St	AA	Xylenes, m & p	µg/m3	6	6	100	0.34	7.9	NA	NA	1436AA		2.81	3.26	9.67	95% Approximate Gamma UCL	7.9	Maximum Result
1436 3rd St	AA	Xylenes, o	µg/m3	6	6	100	0.11	2.5	NA	NA	1436AA		0.847	0.98	1.65	95% Student's-t UCL	1.65	95% Student's-t UCL
320 Center St	AA	1,1,1-Trichloroethane	µg/m3	5	5	100	0.053	0.096	NA	NA	320AA	J	0.0716	0.0159	0.0868	95% Student's-t UCL	0.0868	95% Student's-t UCL
320 Center St	AA	1,2,4-Trimethylbenzene	µg/m3	5	5	100	0.13	2.4	NA	NA	320AA		0.808	0.954	1.72	95% Student's-t UCL	1.72	95% Student's-t UCL
320 Center St	AA	1,2-Dichloroethane	µg/m3	5	5	100	0.031	0.09	NA	NA	320AA	J	0.0548	0.0249	0.0785	95% Student's-t UCL	0.0785	95% Student's-t UCL
320 Center St	AA	1,3,5-Trimethylbenzene	µg/m3	5	5	100	0.045	0.83	NA	NA	320AA		0.264	0.333	1.12	95% Approximate Gamma UCL	0.83	Maximum Result
320 Center St	AA	1,4-Dichlorobenzene	µg/m3	1	5	20	0.19	0.19	0.039	1.1	320AA		0.187	0.216	0.608	Too Few Unique Detected Values *	0.19	Maximum Result
320 Center St	AA	Benzene	µg/m3	5	5	100	0.26	1.8	NA	NA	320AA		0.74	0.641	1.35	95% Student's-t UCL	1.35	95% Student's-t UCL
320 Center St	AA	Bromomethane	µg/m3	3	5	60	0.047	0.18	0.3	0.7	320AA	J	0.177	0.109	0.189	95% KM (t) UCL	0.18	Maximum Result
320 Center St	AA	Carbon tetrachloride	µg/m3	5	5	100	0.47	0.56	NA	NA	320AA		0.508	0.0396	0.546	95% Student's-t UCL	0.546	95% Student's-t UCL
320 Center St	AA	Chlorobenzene	µg/m3	1	5	20	0.02	0.02	0.013	0.82	320AA	J	0.118	0.166	0.443	Too Few Unique Detected Values *	0.02	Maximum Result
320 Center St	AA	Chloroform	µg/m3	4	5	80	0.12	0.35	0.87	0.87	320AA		0.243	0.143	0.311	95% KM (t) UCL	0.311	95% KM (t) UCL
320 Center St	AA	Chloromethane	µg/m3	5	5	100	0.78	1.1	NA	NA	320AA		0.976	0.137	1.11	95% Student's-t UCL	1.1	Maximum Result
320 Center St	AA	cis-1,3-Dichloropropene	µg/m3	1	5	20	0.046	0.046	0.14	0.81	320AA	J	0.139	0.15	0.431	Too Few Unique Detected Values *	0.046	Maximum Result
320 Center St	AA	Ethylbenzene	µg/m3	5	5	100	0.13	1.8	NA	NA	320AA		0.604	0.701	1.27	95% Student's-t UCL	1.27	95% Student's-t UCL
320 Center St	AA	Freon 11	µg/m3	5	5	100	1.3	3.5	NA	NA	320AA		1.86	0.932	3.09	95% Approximate Gamma UCL	3.09	95% Approximate Gamma UCL
320 Center St	AA	Freon 113	µg/m3	4	5	80	0.56	0.8	1.4	1.4	320AA		0.654	0.101	0.736	95% KM (t) UCL	0.736	95% KM (t) UCL
320 Center St	AA	Freon 12	µg/m3	5	5	100	2.2	2.8	NA	NA	320AA		2.42	0.249	2.66	95% Student's-t UCL	2.66	95% Student's-t UCL
320 Center St	AA	Methylene chloride	µg/m3	3	5	60	0.3	4.2	0.36	0.43	320AA		1.2	1.72	3.01	95% KM (t) UCL	3.01	95% KM (t) UCL
320 Center St	AA	Naphthalene	µg/m3	1	5	20	1.9	1.9	0.17	4.8	320-OA01	J	1.02	1.06	3.08	Too Few Unique Detected Values *	1.9	Maximum Result
320 Center St	AA	Styrene	µg/m3	4	5	80	0.053	0.35	0.76	0.76	320AA		0.208	0.155	0.315	95% KM (t) UCL	0.315	95% KM (t) UCL
320 Center St	AA	Tetrachloroethene	µg/m3	5	5	100	0.063	0.27	NA	NA	320AA		0.15	0.105	0.348	95% Approximate Gamma UCL	0.27	Maximum Result
320 Center St	AA	Toluene	µg/m3	5	5	100	0.91	11	NA	NA	320AA		4.42	4.49	8.71	95% Student's-t UCL	8.71	95% Student's-t UCL
320 Center St	AA	trans-1,3-Dichloropropene	µg/m3	1	5	20	0.037	0.037	0.14	0.81	320AA	J	0.137	0.151	0.432	Too Few Unique Detected Values *	0.037	Maximum Result
320 Center St	AA	Trichloroethene	µg/m3	5	5	100	0.028	0.1	NA	NA	320AA		0.0572	0.0391	0.133	95% Chebyshev (Mean, Sd) UCL	0.1	Maximum Result
320 Center St	AA	Xylenes, m & p	µg/m3	5	5	100	0.41	6.4	NA	NA	320AA		2.04	2.5	7.68	95% Approximate Gamma UCL	6.4	Maximum Result
320 Center St	AA	Xylenes, o	µg/m3	5	5	100	0.14	2.2	NA	NA	320AA		0.702	0.851	2.56	95% Approximate Gamma UCL	2.2	Maximum Result
320 Center St	CA	1,1,1-Trichloroethane	µg/m3	6	6	100	0.052	0.14	NA	NA	320-CA01	J	0.089	0.0338	0.117	95% Student's-t UCL	0.117	95% Student's-t UCL
320 Center St	CA	1,2,4-Trimethylbenzene	µg/m3	6	6	100	0.22	2	NA	NA	320CA		0.64	0.672	1.94	95% H-UCL	1.94	95% H-UCL
320 Center St	CA	1,2-Dichloroethane	µg/m3	6	6	100	0.037	1.2	NA	NA	320CA		0.32	0.447	1.17	95% Approximate Gamma UCL	1.17	95% Approximate Gamma UCL
320 Center St	CA	1,2-Dichloropropane	µg/m3	1	6	17	0.14	0.14	0.061	0.84	320CA		0.171	0.177	0.486	Too Few Unique Detected Values *	0.14	Maximum Result
320 Center St	CA	1,3,5-Trimethylbenzene	µg/m3	6	6	100	0.069	0.74	NA	NA	320CA		0.232	0.251	0.678	95% Chebyshev (Mean, Sd) UCL	0.678	95% Chebyshev (Mean, Sd) UCL
320 Center St	CA	1,4-Dichlorobenzene	µg/m3	3	6	50	0.34	1.4	0.058	0.12	320CA		0.372	0.525	0.916	95% KM (t) UCL	0.916	95% KM (t) UCL
320 Center St	CA	Benzene	µg/m3	6	6	100	0.3	2	NA	NA	320CA		0.813	0.621	1.32	95% Student's-t UCL	1.32	95% Student's-t UCL
320 Center St	CA	Bromomethane	µg/m3	5	6	83	0.087	0.49	0.3	0.3	320-CA01	J	0.231	0.148	0.353	95% KM (t) UCL	0.353	95% KM (t) UCL
320 Center St	CA	Carbon tetrachloride	µg/m3	6	6	100	0.37	0.6	NA	NA	320CA		0.463	0.0896	0.537	95% Student's-t UCL	0.537	95% Student's-t UCL
320 Center St	CA	Chlorobenzene	µg/m3	1	6	17	0.032	0.032	0.016	0.84	320CA	J	0.159	0.183	0.485	Too Few Unique Detected Values *	0.032	Maximum Result
320 Center St	CA	Chloroethane	µg/m3	1	6	17	0.029	0.029	0.2	0.48	320CA	J	0.13	0.0792	0.271	Too Few Unique Detected Values *	0.029	Maximum Result
320 Center St	CA	Chloroform	µg/m3	4	6	67	0.14	0.56	0.77	0.89	320CA		0.307	0.181	0.353	95% KM (BCA) UCL	0.353	95% KM (BCA) UCL
320 Center St	CA	Chloromethane	µg/m3	6	6	100	0.83	1.1	NA	NA	320-CA01		0.957	0.0969	1.04	95% Student's-t UCL	1.04	95% Student's-t UCL
320 Center St	CA	cis-1,3-Dichloropropene	µg/m3	1	6	17	0.053	0.053	0.12	0.83	320CA	J	0.171	0.168	0.471	Too Few Unique Detected Values *	0.053	Maximum Result
320 Center St	CA	Ethylbenzene	µg/m3	6	6	100	0.36	1.8	NA	NA	320CA		0.698	0.545	1.67	95% Chebyshev (Mean, Sd) UCL	1.67	95% Chebyshev (Mean, Sd) UCL
320 Center St	CA	Freon 11	µg/m3	6	6	100	1.2	3.5	NA	NA	320CA		1.82	0.868	2.71	95% Approximate Gamma UCL	2.71	95% Approximate Gamma UCL
320 Center St	CA	Freon 113	µg/m3	6	6	100	0.43	0.72	NA	NA	320CA		0.55	0.11	0.64	95% Student's-t UCL	0.64	95% Student's-t UCL
320 Center St	CA	Freon 12	µg/m3	6	6	100	1.9	2.7	NA	NA	320CA		2.25	0.308	2.5	95% Student's-t UCL	2.5	95% Student's-t UCL
320 Center St	CA	Methyl tert-butyl ether	µg/m3	1	6	17	0.022	0.022	0.56	0.66	320CA	J	0.246	0.112	0.445	Too Few Unique Detected Values *	0.022	Maximum Result
320 Center St	CA	Methylene chloride	µg/m3	3	6	50	0.51	4.4	0.41	0.57	320CA		1.04	1.65	4.4	95% KM (BCA) UCL	4.4	95% KM (BCA) UCL
320 Center St	CA	Styrene	µg/m3	6	6	100	0.074	0.51	NA	NA	320CA		0.309	0.186	0.462	95% Student's-t UCL	0.462	95% Student's-t UCL
320 Center St	CA	Tetrachloroethene	µg/m3	6	6	100	0.14	0.71	NA	NA	320CA		0.292	0.214	0.539	95% Approximate Gamma UCL	0.539	95% Approximate Gamma UCL
320 Center St	CA	Toluene	µg/m3	6	6	100	3	17	NA	NA	320CA		8.82	6.43	14.1	95% Student's-t UCL	14.1	95% Student's-t UCL
320 Center St	CA	trans-1,3-Dichloropropene	µg/m3	1	6	17	0.047	0.047	0.12	0.83	320CA	J	0.17	0.169	0.472	Too Few Unique Detected Values *	0.047	Maximum Result

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
320 Center St	CA	Trichloroethene	μg/m3	6	6	100	0.051	1.8	NA	NA	320CA		0.618	0.695	1.19	95% Student's-t UCL	1.19	95% Student's-t UCL
320 Center St	CA	Vinyl chloride	μg/m3	2	6	33	0.019	0.021	0.034	0.04	320-CA01	J	0.0195	0.00138	0.0202	95% KM (t) UCL	0.0202	95% KM (t) UCL
320 Center St	CA	Xylenes, m & p	μg/m3	6	6	100	1.3	6.3	NA	NA	320CA		2.3	1.97	5.8	95% Chebyshev (Mean, Sd) UCL	5.8	95% Chebyshev (Mean, Sd) UCL
320 Center St	CA	Xylenes, o	μg/m3	6	6	100	0.25	2.2	NA	NA	320CA		0.69	0.744	2.02	95% Chebyshev (Mean, Sd) UCL	2.02	95% Chebyshev (Mean, Sd) UCL
326 Center St	AA	1,1,1-Trichloroethane	μg/m3	7	8	88	0.059	0.1	0.19	0.19	326AA	J	0.0789	0.0151	0.0861	95% KM (t) UCL	0.0861	95% KM (t) UCL
326 Center St	AA	1,2,4-Trimethylbenzene	μg/m3	8	8	100	0.11	1.1	NA	NA	326AA		0.338	0.322	0.612	95% Approximate Gamma UCL	0.612	95% Approximate Gamma UCL
326 Center St	AA	1,2-Dichlorobenzene	μg/m3	1	8	13	0.083	0.083	0.17	0.21	326AA	J	0.0929	0.00831	0.106	Too Few Unique Detected Values *	0.083	Maximum Result
326 Center St	AA	1,2-Dichloroethane	μg/m3	7	8	88	0.028	0.062	0.14	0.14	326AA	J	0.0464	0.0157	0.0526	95% KM (t) UCL	0.0526	95% KM (t) UCL
326 Center St	AA	1,3,5-Trimethylbenzene	μg/m3	7	8	88	0.032	0.71	0.17	0.17	326AA		0.163	0.224	0.511	95% KM (Chebyshev) UCL	0.511	95% KM (Chebyshev) UCL
326 Center St	AA	1,3-Dichlorobenzene	μg/m3	1	8	13	0.047	0.047	0.035	0.21	326AA	J	0.0787	0.0306	0.126	Too Few Unique Detected Values *	0.047	Maximum Result
326 Center St	AA	1,4-Dichlorobenzene	μg/m3	2	8	25	0.077	0.85	0.031	0.17	326AA		0.139	0.289	0.972	97.5% KM (Chebyshev) UCL	0.85	Maximum Result
326 Center St	AA	Benzene	μg/m3	8	8	100	0.25	1.8	NA	NA	326AA		0.605	0.505	1.01	95% Approximate Gamma UCL	1.01	95% Approximate Gamma UCL
326 Center St	AA	Bromomethane	μg/m3	5	8	63	0.06	0.58	0.3	0.34	326AA		0.176	0.171	0.269	95% KM (BCA) UCL	0.269	95% KM (BCA) UCL
326 Center St	AA	Carbon tetrachloride	μg/m3	8	8	100	0.43	0.56	NA	NA	326AA		0.485	0.0463	0.516	95% Student's-t UCL	0.516	95% Student's-t UCL
326 Center St	AA	Chlorobenzene	μg/m3	1	8	13	0.015	0.015	0.026	0.16	326AA	J	0.0566	0.0268	0.0979	Too Few Unique Detected Values *	0.015	Maximum Result
326 Center St	AA	Chloroethane	μg/m3	3	8	38	0.026	0.064	0.16	0.23	326AA	J	0.0795	0.0358	0.0629	95% KM (t) UCL	0.0629	95% KM (t) UCL
326 Center St	AA	Chloroform	μg/m3	7	8	88	0.07	0.33	0.17	0.17	326AA		0.123	0.0852	0.255	95% KM (Chebyshev) UCL	0.255	95% KM (Chebyshev) UCL
326 Center St	AA	Chloromethane	μg/m3	7	8	88	0.95	1.4	0.13	0.13	326AA		0.973	0.395	1.19	95% KM (t) UCL	1.19	95% KM (t) UCL
326 Center St	AA	cis-1,3-Dichloropropene	μg/m3	1	8	13	0.052	0.052	0.13	0.16	326AA	J	0.069	0.00859	0.0822	Too Few Unique Detected Values *	0.052	Maximum Result
326 Center St	AA	Ethylbenzene	μg/m3	8	8	100	0.11	1.5	NA	NA	326AA		0.496	0.539	1.06	95% Approximate Gamma UCL	1.06	95% Approximate Gamma UCL
326 Center St	AA	Freon 11	μg/m3	8	8	100	1.2	1.7	NA	NA	326AA		1.45	0.193	1.58	95% Student's-t UCL	1.58	95% Student's-t UCL
326 Center St	AA	Freon 113	μg/m3	8	8	100	0.54	0.68	NA	NA	326AA		0.625	0.0515	0.66	95% Student's-t UCL	0.66	95% Student's-t UCL
326 Center St	AA	Freon 12	μg/m3	7	8	88	2.1	2.7	0.12	0.12	326AA		2.18	0.883	2.61	95% KM (t) UCL	2.61	95% KM (t) UCL
326 Center St	AA	Methyl tert-butyl ether	μg/m3	2	8	25	0.01	0.023	0.45	0.63	326AA	J	0.217	0.126	0.0288	95% KM (t) UCL	0.023	Maximum Result
326 Center St	AA	Methylene chloride	μg/m3	1	8	13	4.5	4.5	0.31	1.2	326AA		0.863	1.48	3.14	Too Few Unique Detected Values *	3.14	Too Few Unique Detected Values *
326 Center St	AA	Naphthalene	μg/m3	1	7	14	0.036	0.036	3.3	4.4	326AA		1.68	0.754	2.93	Too Few Unique Detected Values *	0.036	Maximum Result
326 Center St	AA	Styrene	μg/m3	4	8	50	0.026	0.16	0.053	0.15	326AA		0.0606	0.0442	0.0831	95% KM (t) UCL	0.0831	95% KM (t) UCL
326 Center St	AA	Tetrachloroethene	μg/m3	6	8	75	0.084	0.41	0.19	0.24	326AA		0.18	0.12	0.26	95% KM (t) UCL	0.26	95% KM (t) UCL
326 Center St	AA	Toluene	μg/m3	8	8	100	0.7	10	NA	NA	326AA		2.98	3.47	10.5	95% H-UCL	10	Maximum Result
326 Center St	AA	trans-1,3-Dichloropropene	μg/m3	1	8	13	0.048	0.048	0.13	0.16	326AA	J	0.0685	0.00975	0.0835	Too Few Unique Detected Values *	0.048	Maximum Result
326 Center St	AA	Trichloroethene	μg/m3	4	8	50	0.022	0.15	0.022	0.03	326AA		0.0396	0.0471	0.0761	95% KM (t) UCL	0.0761	95% KM (t) UCL
326 Center St	AA	Xylenes, m & p	μg/m3	8	8	100	0.32	6.6	NA	NA	326AA		1.71	2.19	3.99	95% Approximate Gamma UCL	3.99	95% Approximate Gamma UCL
326 Center St	AA	Xylenes, o	μg/m3	8	8	100	0.098	2.3	NA	NA	326AA		0.569	0.741	1.31	95% Approximate Gamma UCL	1.31	95% Approximate Gamma UCL
326 Center St	CA	1,1,1-Trichloroethane	μg/m3	8	9	89	0.052	0.11	0.18	0.18	326CA	J	0.0774	0.0173	0.0864	95% KM (t) UCL	0.0864	95% KM (t) UCL
326 Center St	CA	1,1,2,2-Tetrachloroethane	μg/m3	1	9	11	0.58	0.58	0.18	0.26	326CA		0.161	0.158	0.39	Too Few Unique Detected Values *	0.39	Too Few Unique Detected Values *
326 Center St	CA	1,1,2-Trichloroethane	μg/m3	1	9	11	0.076	0.076	0.073	0.2	326CA	J	0.0628	0.0247	0.0986	Too Few Unique Detected Values *	0.076	Maximum Result
326 Center St	CA	1,1-Dichloroethane	μg/m3	1	9	11	0.015	0.015	0.11	0.15	326CA	J	0.0594	0.0178	0.0852	Too Few Unique Detected Values *	0.015	Maximum Result
326 Center St	CA	1,2,4-Trimethylbenzene	μg/m3	9	9	100	0.069	1.4	NA	NA	326CA		0.516	0.521	1.08	95% Approximate Gamma UCL	1.08	95% Approximate Gamma UCL
326 Center St	CA	1,2-Dichlorobenzene	μg/m3	1	9	11	0.13	0.13	0.013	1.1	326CA	J	0.131	0.162	0.366	Too Few Unique Detected Values *	0.13	Maximum Result
326 Center St	CA	1,2-Dichloroethane	μg/m3	8	9	89	0.03	1.9	0.13	0.13	326CA		0.298	0.608	1.57	97.5% KM (Chebyshev) UCL	1.57	97.5% KM (Chebyshev) UCL
326 Center St	CA	1,2-Dichloropropane	μg/m3	3	9	33	0.027	0.18	0.062	0.86	326CA		0.112	0.129	0.102	95% KM (t) UCL	0.102	95% KM (t) UCL
326 Center St	CA	1,3,5-Trimethylbenzene	μg/m3	7	9	78	0.04	0.39	0.16	0.92	326CA		0.175	0.157	0.22	95% KM (t) UCL	0.22	95% KM (t) UCL
326 Center St	CA	1,3-Dichlorobenzene	μg/m3	1	9	11	0.096	0.096	0.022	1.1	326CA	J	0.112	0.168	0.357	Too Few Unique Detected Values *	0.096	Maximum Result
326 Center St	CA	1,4-Dichlorobenzene	μg/m3	6	9	67	0.088	6	0.082	0.19	326CA		1.01	1.92	2.5	95% KM (BCA) UCL	2.5	95% KM (BCA) UCL
326 Center St	CA	1,4-Dioxane (p-dioxane)	μg/m3	1	9	11	0.18	0.18	0.11	0.67	326CA	J	0.255	0.0877	0.382	Too Few Unique Detected Values *	0.18	Maximum Result
326 Center St	CA	Benzene	μg/m3	9	9	100	0.28	1.7	NA	NA	326CA		0.707	0.437	0.978	95% Student's-t UCL	0.978	95% Student's-t UCL
326 Center St	CA	Bromomethane	μg/m3	6	9	67	0.047	0.38	0.29	0.73	326CA		0.174	0.127	0.204	95% KM (t) UCL	0.204	95% KM (t) UCL
326 Center St	CA	Carbon tetrachloride	μg/m3	9	9	100	0.42	0.55	NA	NA	326CA		0.49	0.0469	0.519	95% Student's-t UCL	0.519	95% Student's-t UCL
326 Center St	CA	Chlorobenzene	μg/m3	3	9	33	0.026	0.035	0.048	0.86	326CA	J	0.092	0.129	0.033	95% KM (t) UCL	0.033	95% KM (t) UCL
326 Center St	CA	Chloroethane	μg/m3	4	9	44	0.023	0.074	0.2	0.49	326CA	J	0.092	0.0687	0.0607	95% KM (t) UCL	0.0607	95% KM (t) UCL
326 Center St	CA	Chloroform	μg/m3	7	9	78	0.091	0.53	0.16	0.91	326CA		0.218	0.177	0.272	95% KM (BCA) UCL	0.272	95% KM (BCA) UCL
326 Center St	CA	Chloromethane	μg/m3	9	9	100	0.73	1.3	NA	NA	326CA		0.941	0.193	1.06	95% Student's-t UCL	1.06	95% Student's-t UCL
326 Center St	CA	cis-1,2-Dichloroethene	μg/m3	1	9	11	0.018	0.018	0.12	0.15	326CA	J	0.0598	0.0164	0.0837	Too Few Unique Detected Values *	0.018	Maximum Result
326 Center St	CA	cis-1,3-Dichloropropene	μg/m3	1	9	11	0.039	0.039	0.12	0.85	326CA	J	0.107	0.12	0.281	Too Few Unique Detected Values *	0.039	Maximum Result
326 Center St	CA	Ethylbenzene	μg/m3	9	9	100	0.11	1.5	NA	NA	326CA		0.702	0.483	1	95% Student's-t UCL	1	95% Student's-t UCL
326 Center St	CA	Freon 11	μg/m3	9	9	100	1.2	3.4	NA	NA	326CA		1.7	0.686	2.14	95% Approximate Gamma UCL	2.14	95% Approximate Gamma UCL
326 Center St	CA	Freon 113	μg/m3	9	9	100	0.53	0.7	NA	NA	326CA		0.629	0.0633	0.668	95% Student's-t UCL	0.668	95% Student's-t UCL
326 Center St	CA	Freon 114	μg/m3	1	3	33	0.11	0.11	0.23	1.3	326CA	J	0.292	0.31	NA	Fewer Than Five Samples	0.11	Maximum Result
326 Center St	CA	Freon 12	μg/m3	9	9	100	2.1	3.4	NA	NA	326CA		2.59	0.398	2.84	95% Student's-t UCL	2.84	95% Student's-t UCL
326 Center St	CA	Hexachlorobutadiene	μg/m3	1	9	11	0.68	0.68	1.4	10	326CA	J	1.28	1.4	3.31	Too Few Unique Detected Values *	0.68	Maximum Result
326 Center St	CA	Methyl tert-butyl ether	μg/m3	2	9	22	0.015	0.016	0.48	0.67	326CA	J	0.229	0.124	0.0164	95% KM (t) UCL	0.016	Maximum Result
326 Center St	CA	Methylene chloride	μg/m3	3	9	33	0.3	5.4	0.79	1.2	326CA		1.04	1.64	2.12	95% KM (t) UCL	2.12	95% KM (t) UCL
326 Center St	CA	Styrene	μg/m3	6	9	67	0.1	1.2	0.13	0.8	326CA		0.319	0.363	0.508	95% KM (BCA) UCL	0.508	95% KM (BCA) UCL
326 Center St	CA	Tetrachloroethene	μg/m3	8	9	89	0.075	0.73	0.23	0.23	326CA		0.328	0.229	0.469	95% KM (t) UCL	0.469	95% KM (t) UCL
326 Center St	CA	Toluene	μg/m3	9	9	100	1	28	NA	NA	326CA		10.1	9.78	16.2	95% Student's-t UCL	16.2	95% Student's-t UCL
326 Center St	CA	Trichloroethene	μg/m3	7	9	78	0.07	2.5	0.027	0.042	326CA		0.537	0.78	1.69	95% KM (Chebyshev) UCL	1.69	95% KM (Chebyshev) UCL

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
326 Center St	CA	Vinyl chloride	µg/m3	3	9	33	0.022	0.061	0.038	0.044	326CA		0.0257	0.0133	0.0357	95% KM (t) UCL	0.0357	95% KM (t) UCL
326 Center St	CA	Xylenes, m & p	µg/m3	9	9	100	0.16	6.8	NA	NA	326CA		2.52	2.04	3.78	95% Student's-t UCL	3.78	95% Student's-t UCL
326 Center St	CA	Xylenes, o	µg/m3	9	9	100	0.046	1.5	NA	NA	326CA		0.588	0.524	0.913	95% Student's-t UCL	0.913	95% Student's-t UCL
339 Center St	AA	1,1,1-Trichloroethane	µg/m3	1	1	100	0.062	0.062	NA	NA	339-OA01	J	0.062	NA	NA	Fewer Than Five Samples	0.062	Maximum Result
339 Center St	AA	1,1,2,2-Tetrachloroethane	µg/m3	1	1	100	0.18	0.18	NA	NA	339-OA01	J	0.18	NA	NA	Fewer Than Five Samples	0.18	Maximum Result
339 Center St	AA	1,1,2-Trichloroethane	µg/m3	1	1	100	0.033	0.033	NA	NA	339-OA01	J	0.033	NA	NA	Fewer Than Five Samples	0.033	Maximum Result
339 Center St	AA	1,2,4-Trimethylbenzene	µg/m3	1	1	100	0.37	0.37	NA	NA	339-OA01	J	0.37	NA	NA	Fewer Than Five Samples	0.37	Maximum Result
339 Center St	AA	1,2-Dichlorobenzene	µg/m3	1	1	100	0.22	0.22	NA	NA	339-OA01	J	0.22	NA	NA	Fewer Than Five Samples	0.22	Maximum Result
339 Center St	AA	1,2-Dichloroethane	µg/m3	1	1	100	0.067	0.067	NA	NA	339-OA01	J	0.067	NA	NA	Fewer Than Five Samples	0.067	Maximum Result
339 Center St	AA	1,3,5-Trimethylbenzene	µg/m3	1	1	100	0.16	0.16	NA	NA	339-OA01	J	0.16	NA	NA	Fewer Than Five Samples	0.16	Maximum Result
339 Center St	AA	1,3-Dichlorobenzene	µg/m3	1	1	100	0.19	0.19	NA	NA	339-OA01	J	0.19	NA	NA	Fewer Than Five Samples	0.19	Maximum Result
339 Center St	AA	1,4-Dichlorobenzene	µg/m3	1	1	100	0.24	0.24	NA	NA	339-OA01	J	0.24	NA	NA	Fewer Than Five Samples	0.24	Maximum Result
339 Center St	AA	Benzene	µg/m3	1	1	100	0.38	0.38	NA	NA	339-OA01		0.38	NA	NA	Fewer Than Five Samples	0.38	Maximum Result
339 Center St	AA	Bromomethane	µg/m3	1	1	100	0.41	0.41	NA	NA	339-OA01	J	0.41	NA	NA	Fewer Than Five Samples	0.41	Maximum Result
339 Center St	AA	Carbon tetrachloride	µg/m3	1	1	100	0.4	0.4	NA	NA	339-OA01		0.4	NA	NA	Fewer Than Five Samples	0.4	Maximum Result
339 Center St	AA	Chloromethane	µg/m3	1	1	100	0.92	0.92	NA	NA	339-OA01		0.92	NA	NA	Fewer Than Five Samples	0.92	Maximum Result
339 Center St	AA	Ethylbenzene	µg/m3	1	1	100	0.21	0.21	NA	NA	339-OA01		0.21	NA	NA	Fewer Than Five Samples	0.21	Maximum Result
339 Center St	AA	Freon 11	µg/m3	1	1	100	1.1	1.1	NA	NA	339-OA01		1.1	NA	NA	Fewer Than Five Samples	1.1	Maximum Result
339 Center St	AA	Freon 113	µg/m3	1	1	100	0.45	0.45	NA	NA	339-OA01	J	0.45	NA	NA	Fewer Than Five Samples	0.45	Maximum Result
339 Center St	AA	Freon 12	µg/m3	1	1	100	2	2	NA	NA	339-OA01		2	NA	NA	Fewer Than Five Samples	2	Maximum Result
339 Center St	AA	Methyl tert-butyl ether	µg/m3	1	1	100	0.03	0.03	NA	NA	339-OA01	J	0.03	NA	NA	Fewer Than Five Samples	0.03	Maximum Result
339 Center St	AA	Methylene chloride	µg/m3	1	1	100	0.46	0.46	NA	NA	339-OA01	J	0.46	NA	NA	Fewer Than Five Samples	0.46	Maximum Result
339 Center St	AA	Naphthalene	µg/m3	1	1	100	1.1	1.1	NA	NA	339-OA01	J	1.1	NA	NA	Fewer Than Five Samples	1.1	Maximum Result
339 Center St	AA	Tetrachloroethene	µg/m3	1	1	100	0.096	0.096	NA	NA	339-OA01	J	0.096	NA	NA	Fewer Than Five Samples	0.096	Maximum Result
339 Center St	AA	Toluene	µg/m3	1	1	100	1.2	1.2	NA	NA	339-OA01		1.2	NA	NA	Fewer Than Five Samples	1.2	Maximum Result
339 Center St	AA	Trichloroethene	µg/m3	1	1	100	0.13	0.13	NA	NA	339-OA01	J	0.13	NA	NA	Fewer Than Five Samples	0.13	Maximum Result
339 Center St	AA	Xylenes, m & p	µg/m3	1	1	100	0.67	0.67	NA	NA	339-OA01		0.67	NA	NA	Fewer Than Five Samples	0.67	Maximum Result
339 Center St	AA	Xylenes, o	µg/m3	1	1	100	0.28	0.28	NA	NA	339-OA01		0.28	NA	NA	Fewer Than Five Samples	0.28	Maximum Result
356 Center St	AA	1,1,1-Trichloroethane	µg/m3	1	1	100	0.065	0.065	NA	NA	356-OA01	J	0.065	NA	NA	Fewer Than Five Samples	0.065	Maximum Result
356 Center St	AA	1,2,4-Trimethylbenzene	µg/m3	1	1	100	0.79	0.79	NA	NA	356-OA01	J	0.79	NA	NA	Fewer Than Five Samples	0.79	Maximum Result
356 Center St	AA	1,2-Dichloroethane	µg/m3	1	1	100	0.054	0.054	NA	NA	356-OA01	J	0.054	NA	NA	Fewer Than Five Samples	0.054	Maximum Result
356 Center St	AA	1,3,5-Trimethylbenzene	µg/m3	1	1	100	0.19	0.19	NA	NA	356-OA01	J	0.19	NA	NA	Fewer Than Five Samples	0.19	Maximum Result
356 Center St	AA	1,4-Dichlorobenzene	µg/m3	1	1	100	0.62	0.62	NA	NA	356-OA01	J	0.62	NA	NA	Fewer Than Five Samples	0.62	Maximum Result
356 Center St	AA	1,4-Dioxane (p-dioxane)	µg/m3	1	1	100	0.89	0.89	NA	NA	356-OA01		0.89	NA	NA	Fewer Than Five Samples	0.89	Maximum Result
356 Center St	AA	Benzene	µg/m3	1	1	100	0.41	0.41	NA	NA	356-OA01		0.41	NA	NA	Fewer Than Five Samples	0.41	Maximum Result
356 Center St	AA	Bromomethane	µg/m3	1	1	100	0.36	0.36	NA	NA	356-OA01	J	0.36	NA	NA	Fewer Than Five Samples	0.36	Maximum Result
356 Center St	AA	Carbon tetrachloride	µg/m3	1	1	100	0.5	0.5	NA	NA	356-OA01	J	0.5	NA	NA	Fewer Than Five Samples	0.5	Maximum Result
356 Center St	AA	Chloromethane	µg/m3	1	1	100	0.98	0.98	NA	NA	356-OA01		0.98	NA	NA	Fewer Than Five Samples	0.98	Maximum Result
356 Center St	AA	cis-1,2-Dichloroethene	µg/m3	1	1	100	0.031	0.031	NA	NA	356-OA01	J	0.031	NA	NA	Fewer Than Five Samples	0.031	Maximum Result
356 Center St	AA	Ethylbenzene	µg/m3	1	1	100	0.53	0.53	NA	NA	356-OA01		0.53	NA	NA	Fewer Than Five Samples	0.53	Maximum Result
356 Center St	AA	Freon 11	µg/m3	1	1	100	1.2	1.2	NA	NA	356-OA01		1.2	NA	NA	Fewer Than Five Samples	1.2	Maximum Result
356 Center St	AA	Freon 113	µg/m3	1	1	100	0.68	0.68	NA	NA	356-OA01	J	0.68	NA	NA	Fewer Than Five Samples	0.68	Maximum Result
356 Center St	AA	Freon 12	µg/m3	1	1	100	2.4	2.4	NA	NA	356-OA01		2.4	NA	NA	Fewer Than Five Samples	2.4	Maximum Result
356 Center St	AA	Methylene chloride	µg/m3	1	1	100	0.6	0.6	NA	NA	356-OA01	J	0.6	NA	NA	Fewer Than Five Samples	0.6	Maximum Result
356 Center St	AA	Naphthalene	µg/m3	1	1	100	1.9	1.9	NA	NA	356-OA01	J	1.9	NA	NA	Fewer Than Five Samples	1.9	Maximum Result
356 Center St	AA	Tetrachloroethene	µg/m3	1	1	100	0.12	0.12	NA	NA	356-OA01	J	0.12	NA	NA	Fewer Than Five Samples	0.12	Maximum Result
356 Center St	AA	Toluene	µg/m3	1	1	100	2.1	2.1	NA	NA	356-OA01		2.1	NA	NA	Fewer Than Five Samples	2.1	Maximum Result
356 Center St	AA	Trichloroethene	µg/m3	1	1	100	0.034	0.034	NA	NA	356-OA01	J	0.034	NA	NA	Fewer Than Five Samples	0.034	Maximum Result
356 Center St	AA	Xylenes, m & p	µg/m3	1	1	100	1.2	1.2	NA	NA	356-OA01		1.2	NA	NA	Fewer Than Five Samples	1.2	Maximum Result
356 Center St	AA	Xylenes, o	µg/m3	1	1	100	0.57	0.57	NA	NA	356-OA01		0.57	NA	NA	Fewer Than Five Samples	0.57	Maximum Result
360 Center St	AA	1,1,1-Trichloroethane	µg/m3	5	6	83	0.048	0.12	0.2	0.2	360AA	J	0.0857	0.0242	0.103	95% KM (t) UCL	0.103	95% KM (t) UCL
360 Center St	AA	1,2,4-Trimethylbenzene	µg/m3	6	6	100	0.083	5.8	NA	NA	360AA		1.57	2.21	6.54	95% Approximate Gamma UCL	5.8	Maximum Result
360 Center St	AA	1,2-Dichloroethane	µg/m3	3	6	50	0.034	0.15	0.12	0.15	360-OA01		0.0758	0.0391	0.106	95% KM (t) UCL	0.106	95% KM (t) UCL
360 Center St	AA	1,3,5-Trimethylbenzene	µg/m3	5	6	83	0.03	1.9	0.18	0.18	360AA		0.518	0.725	1.12	95% KM (t) UCL	1.12	95% KM (t) UCL
360 Center St	AA	1,4-Dichlorobenzene	µg/m3	3	6	50	0.16	0.28	0.2	1.1	360AA	J	0.237	0.166	0.243	95% KM (t) UCL	0.243	95% KM (t) UCL
360 Center St	AA	1,4-Dioxane (p-dioxane)	µg/m3	1	6	17	0.36	0.36	0.55	0.67	360-OA01	J	0.31	0.0327	0.368	Too Few Unique Detected Values *	0.36	Maximum Result
360 Center St	AA	Benzene	µg/m3	5	6	83	0.28	2	0.59	0.59	360AA		0.889	0.697	1.47	95% KM (t) UCL	1.47	95% KM (t) UCL
360 Center St	AA	Bromomethane	µg/m3	3	6	50	0.043	0.5	0.3	0.36	360-OA01	J	0.203	0.154	0.311	95% KM (t) UCL	0.311	95% KM (t) UCL
360 Center St	AA	Carbon tetrachloride	µg/m3	6	6	100	0.41	0.83	NA	NA	360AA		0.543	0.149	0.666	95% Student's-t UCL	0.666	95% Student's-t UCL
360 Center St	AA	Chlorobenzene	µg/m3	2	6	33	0.031	0.052	0.14	0.82	360AA	J	0.121	0.143	0.0627	95% KM (t) UCL	0.052	Maximum Result
360 Center St	AA	Chloroethane	µg/m3	3	6	50	0.029	0.075	0.2	0.47	360AA	J	0.0983	0.0762	0.0752	95% KM (t) UCL	0.075	Maximum Result
360 Center St	AA	Chloroform	µg/m3	4	6	67	0.078	0.37	0.18	0.87	360AA		0.204	0.158	0.272	95% KM (t) UCL	0.272	95% KM (t) UCL
360 Center St	AA	Chloromethane	µg/m3	6	6	100	0.86	1.2	NA	NA	360AA		1.07	0.134	1.18	95% Student's-t UCL	1.18	95% Student's-t UCL
360 Center St	AA	Ethylbenzene	µg/m3	6	6	100	0.089	3.5	NA	NA	360AA		1.13	1.43	4.23	95% Approximate Gamma UCL	3.5	Maximum Result
360 Center St	AA	Freon 11	µg/m3	6	6	100	1.1	1.7	NA	NA	360AA		1.4	0.276	1.63	95% Student's-t UCL	1.63	95% Student's-t UCL
360 Center St	AA	Freon 113	µg/m3	6	6	100	0.45	0.63	NA	NA	360AA		0.573	0.0641	0.626	95% Student's-t UCL	0.626	95% Student's-t UCL

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
360 Center St	AA	Freon 114	μg/m3	1	3	33	0.12	0.12	0.26	1.2	360AA	J	0.283	0.274	NA	Fewer Than Five Samples	0.12	Maximum Result
360 Center St	AA	Freon 12	μg/m3	6	6	100	1.7	2.6	NA	NA	360AA		2.32	0.407	2.65	95% Student's-t UCL	2.6	Maximum Result
360 Center St	AA	Methylene chloride	μg/m3	3	6	50	0.42	5.1	1.1	1.3	360AA		1.59	1.84	3.25	95% KM (t) UCL	3.25	95% KM (t) UCL
360 Center St	AA	Naphthalene	μg/m3	1	5	20	0.041	0.041	0.82	4.7	360AA		1.45	1.13	3.65	Too Few Unique Detected Values *	0.041	Maximum Result
360 Center St	AA	Styrene	μg/m3	5	6	83	0.028	0.55	0.16	0.16	360AA		0.22	0.212	0.397	95% KM (t) UCL	0.397	95% KM (t) UCL
360 Center St	AA	Tetrachloroethene	μg/m3	4	6	67	0.093	0.4	0.23	0.25	360AA		0.212	0.129	0.322	95% KM (t) UCL	0.322	95% KM (t) UCL
360 Center St	AA	Toluene	μg/m3	6	6	100	0.54	34	NA	NA	360AA		9.46	13	36.2	95% Approximate Gamma UCL	34	Maximum Result
360 Center St	AA	Trichloroethene	μg/m3	3	6	50	0.026	0.23	0.027	0.032	360AA		0.0684	0.0875	0.151	95% KM (t) UCL	0.151	95% KM (t) UCL
360 Center St	AA	Xylenes, m & p	μg/m3	6	6	100	0.23	12	NA	NA	360AA		3.86	5.08	16.1	95% Approximate Gamma UCL	12	Maximum Result
360 Center St	AA	Xylenes, o	μg/m3	6	6	100	0.084	3.4	NA	NA	360AA		1.23	1.54	4.86	95% Approximate Gamma UCL	3.4	Maximum Result
366 Center St	AA	1,1,1-Trichloroethane	μg/m3	1	1	100	0.051	0.051	NA	NA	366-OA01	J	0.051	NA	NA	Fewer Than Five Samples	0.051	Maximum Result
366 Center St	AA	1,2,4-Trimethylbenzene	μg/m3	1	1	100	0.32	0.32	NA	NA	366-OA01	J	0.32	NA	NA	Fewer Than Five Samples	0.32	Maximum Result
366 Center St	AA	1,2-Dichloroethane	μg/m3	1	1	100	0.11	0.11	NA	NA	366-OA01	J	0.11	NA	NA	Fewer Than Five Samples	0.11	Maximum Result
366 Center St	AA	1,3,5-Trimethylbenzene	μg/m3	1	1	100	0.11	0.11	NA	NA	366-OA01	J	0.11	NA	NA	Fewer Than Five Samples	0.11	Maximum Result
366 Center St	AA	Benzene	μg/m3	1	1	100	0.42	0.42	NA	NA	366-OA01		0.42	NA	NA	Fewer Than Five Samples	0.42	Maximum Result
366 Center St	AA	Carbon tetrachloride	μg/m3	1	1	100	0.48	0.48	NA	NA	366-OA01		0.48	NA	NA	Fewer Than Five Samples	0.48	Maximum Result
366 Center St	AA	Chloromethane	μg/m3	1	1	100	1.2	1.2	NA	NA	366-OA01		1.2	NA	NA	Fewer Than Five Samples	1.2	Maximum Result
366 Center St	AA	Ethylbenzene	μg/m3	1	1	100	0.74	0.74	NA	NA	366-OA01		0.74	NA	NA	Fewer Than Five Samples	0.74	Maximum Result
366 Center St	AA	Freon 11	μg/m3	1	1	100	1.1	1.1	NA	NA	366-OA01		1.1	NA	NA	Fewer Than Five Samples	1.1	Maximum Result
366 Center St	AA	Freon 113	μg/m3	1	1	100	0.52	0.52	NA	NA	366-OA01	J	0.52	NA	NA	Fewer Than Five Samples	0.52	Maximum Result
366 Center St	AA	Freon 12	μg/m3	1	1	100	2	2	NA	NA	366-OA01		2	NA	NA	Fewer Than Five Samples	2	Maximum Result
366 Center St	AA	Methylene chloride	μg/m3	1	1	100	0.78	0.78	NA	NA	366-OA01	J	0.78	NA	NA	Fewer Than Five Samples	0.78	Maximum Result
366 Center St	AA	Styrene	μg/m3	1	1	100	0.23	0.23	NA	NA	366-OA01	J	0.23	NA	NA	Fewer Than Five Samples	0.23	Maximum Result
366 Center St	AA	Tetrachloroethene	μg/m3	1	1	100	0.26	0.26	NA	NA	366-OA01		0.26	NA	NA	Fewer Than Five Samples	0.26	Maximum Result
366 Center St	AA	Toluene	μg/m3	1	1	100	2	2	NA	NA	366-OA01		2	NA	NA	Fewer Than Five Samples	2	Maximum Result
366 Center St	AA	Trichloroethene	μg/m3	1	1	100	0.045	0.045	NA	NA	366-OA01	J	0.045	NA	NA	Fewer Than Five Samples	0.045	Maximum Result
366 Center St	AA	Xylenes, m & p	μg/m3	1	1	100	2.5	2.5	NA	NA	366-OA01		2.5	NA	NA	Fewer Than Five Samples	2.5	Maximum Result
366 Center St	AA	Xylenes, o	μg/m3	1	1	100	0.85	0.85	NA	NA	366-OA01		0.85	NA	NA	Fewer Than Five Samples	0.85	Maximum Result
Prescott Park	AA	1,1,1-Trichloroethane	μg/m3	6	6	100	0.045	0.11	NA	NA	PP-AA	J	0.0783	0.0243	0.0983	95% Student's-t UCL	0.0983	95% Student's-t UCL
Prescott Park	AA	1,1,2,2-Tetrachloroethane	μg/m3	1	6	17	0.024	0.024	0.21	0.25	PP-AA	J	0.0973	0.0367	0.163	Too Few Unique Detected Values *	0.024	Maximum Result
Prescott Park	AA	1,2,4-Trimethylbenzene	μg/m3	5	6	83	0.11	0.91	0.84	0.84	PP-AA		0.485	0.344	0.751	95% KM (t) UCL	0.751	95% KM (t) UCL
Prescott Park	AA	1,2-Dichloroethane	μg/m3	3	6	50	0.052	0.29	0.12	0.13	PP-BGA02		0.0988	0.0938	0.183	95% KM (t) UCL	0.183	95% KM (t) UCL
Prescott Park	AA	1,3,5-Trimethylbenzene	μg/m3	5	6	83	0.04	0.27	0.84	0.84	PP-AA		0.195	0.145	0.245	95% KM (t) UCL	0.245	95% KM (t) UCL
Prescott Park	AA	1,4-Dioxane (p-dioxane)	μg/m3	1	6	17	0.96	0.96	0.56	0.66	PP-AA		0.409	0.271	0.891	Too Few Unique Detected Values *	0.891	Too Few Unique Detected Values *
Prescott Park	AA	Benzene	μg/m3	6	6	100	0.23	1.3	NA	NA	PP-AA		0.61	0.397	0.937	95% Student's-t UCL	0.937	95% Student's-t UCL
Prescott Park	AA	Bromomethane	μg/m3	4	6	67	0.062	2	0.3	0.31	PP-BGA03	J	0.485	0.751	1.12	95% KM (t) UCL	1.12	95% KM (t) UCL
Prescott Park	AA	Carbon tetrachloride	μg/m3	6	6	100	0.43	0.64	NA	NA	PP-AA		0.515	0.0756	0.577	95% Student's-t UCL	0.577	95% Student's-t UCL
Prescott Park	AA	Chlorobenzene	μg/m3	2	6	33	0.024	0.034	0.14	0.84	PP-AA	J	0.169	0.186	0.0391	95% KM (t) UCL	0.034	Maximum Result
Prescott Park	AA	Chloroethane	μg/m3	4	6	67	0.021	0.1	0.45	0.48	PP-AA	J	0.109	0.0995	0.0833	95% KM (t) UCL	0.0833	95% KM (t) UCL
Prescott Park	AA	Chloroform	μg/m3	4	6	67	0.093	0.51	0.83	0.89	PP-AA		0.319	0.162	0.373	95% KM (t) UCL	0.373	95% KM (t) UCL
Prescott Park	AA	Chloromethane	μg/m3	6	6	100	0.62	1.2	NA	NA	PP-AA		1.07	0.235	1.26	95% Student's-t UCL	1.2	Maximum Result
Prescott Park	AA	cis-1,2-Dichloroethene	μg/m3	1	6	17	0.038	0.038	0.12	0.14	PP-AA	J	0.0597	0.0117	0.0805	Too Few Unique Detected Values *	0.038	Maximum Result
Prescott Park	AA	Ethylbenzene	μg/m3	6	6	100	0.084	0.86	NA	NA	PP-AA		0.396	0.31	0.651	95% Student's-t UCL	0.651	95% Student's-t UCL
Prescott Park	AA	Freon 11	μg/m3	6	6	100	1	2	NA	NA	PP-AA		1.55	0.356	1.84	95% Student's-t UCL	1.84	95% Student's-t UCL
Prescott Park	AA	Freon 113	μg/m3	6	6	100	0.45	0.73	NA	NA	PP-AA		0.63	0.108	0.719	95% Student's-t UCL	0.719	95% Student's-t UCL
Prescott Park	AA	Freon 12	μg/m3	6	6	100	1.9	3	NA	NA	PP-AA		2.43	0.45	2.8	95% Student's-t UCL	2.8	95% Student's-t UCL
Prescott Park	AA	Methyl tert-butyl ether	μg/m3	1	6	17	0.0097	0.0097	0.56	0.66	PP-AA	J	0.249	0.119	0.461	Too Few Unique Detected Values *	0.0097	Maximum Result
Prescott Park	AA	Methylene chloride	μg/m3	2	6	33	0.24	0.4	0.84	1.1	PP-BGA02	J	0.452	0.124	0.481	95% KM (t) UCL	0.4	Maximum Result
Prescott Park	AA	Styrene	μg/m3	5	6	83	0.048	0.24	0.73	0.73	PP-AA		0.184	0.121	0.231	95% KM (t) UCL	0.231	95% KM (t) UCL
Prescott Park	AA	Tetrachloroethene	μg/m3	6	6	100	0.046	0.42	NA	NA	PP-AA		0.195	0.144	0.314	95% Student's-t UCL	0.314	95% Student's-t UCL
Prescott Park	AA	Toluene	μg/m3	6	6	100	0.39	4.4	NA	NA	PP-AA		2.15	1.58	3.45	95% Student's-t UCL	3.45	95% Student's-t UCL
Prescott Park	AA	Trichloroethene	μg/m3	4	6	67	0.056	0.13	0.03	0.18	PP-AA		0.076	0.0384	0.105	95% KM (t) UCL	0.105	95% KM (t) UCL
Prescott Park	AA	Xylenes, m & p	μg/m3	6	6	100	0.26	2.7	NA	NA	PP-AA		1.15	0.988	1.96	95% Student's-t UCL	1.96	95% Student's-t UCL
Prescott Park	AA	Xylenes, o	μg/m3	6	6	100	0.091	0.92	NA	NA	PP-AA		0.404	0.346	0.688	95% Student's-t UCL	0.688	95% Student's-t UCL
Combined Background	AA	1,1,1-Trichloroethane	μg/m3	16	18	89	0.04	0.1	0.19	0.2	Background2	J	0.0759	0.0172	0.0797	95% KM (t) UCL	0.0797	95% KM (t) UCL
Combined Background	AA	1,1-Dichloroethane	μg/m3	1	18	6	0.011	0.011	0.1	0.15	Background1	J	0.0628	0.0146	0.0778	Too Few Unique Detected Values *	0.011	Maximum Result
Combined Background	AA	1,1-Dichloroethene	μg/m3	1	18	6	0.052	0.052	0.05	0.074	Background2	J	0.0331	0.00591	0.0392	Too Few Unique Detected Values *	0.0392	Too Few Unique Detected Values *
Combined Background	AA	1,2,4-Trimethylbenzene	μg/m3	18	18	100	0.098	1.4	NA	NA	Background1		0.404	0.384	0.639	95% H-UCL	0.639	95% H-UCL
Combined Background	AA	1,2-Dichloroethane	μg/m3	11	18	61	0.03	0.068	0.13	0.15	Background1	J	0.0558	0.016	0.0535	95% KM (t) UCL	0.0535	95% KM (t) UCL
Combined Background	AA	1,2-Dichloropropane	μg/m3	3	18	17	0.025	0.12	0.059	0.86	Background1		0.0899	0.115	0.0448	95% KM (t) UCL	0.0448	95% KM (t) UCL
Combined Background	AA	1,3,5-Trimethylbenzene	μg/m3	15	18	83	0.035	0.52	0.17	0.92	Background1		0.171	0.155	0.272	95% KM (Chebyshev) UCL	0.272	95% KM (Chebyshev) UCL
Combined Background	AA	1,4-Dichlorobenzene	μg/m3	3	18	17	0.069	0.19	0.027	1.1	Background2	J	0.117	0.152	0.0948	95% KM (t) UCL	0.0948	95% KM (t) UCL
Combined Background	AA	1,4-Dioxane (p-dioxane)	μg/m3	1	18	6	0.46	0.46	0.021	0.67	Background2	J	0.273	0.107	0.383	Too Few Unique Detected Values *	0.383	Too Few Unique Detected Values *
Combined Background	AA	Benzene	μg/m3	18	18	100	0.26	1.5	NA	NA	Background1		0.629	0.365	0.8	95% Approximate Gamma UCL	0.8	95% Approximate Gamma UCL
Combined Background	AA	Bromomethane	μg/m3	13	18	72	0.056	1.8	0.29	0.36	Background4	J	0.279	0.399	0.682	95% KM (Chebyshev) UCL	0.682	95% KM (Chebyshev) UCL
Combined Background	AA	Carbon tetrachloride	μg/m3	18	18	100	0.43	0.62	NA	NA	Background1		0.502	0.0583	0.526	95% Student's-t UCL	0.526	95% Student's-t UCL

Address	Matrix	Parameter	Units	Number of Detects	Number of Analyses	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum DL for Non-detects	Maximum DL for Non-detects	Location of Maximum Detected Concentration	Qualifier of Maximum Detected Concentration	Arithmetic Mean Value	Standard Deviation	Recommended UCL	Recommended UCL Basis	Smaller of UCL or Maximum Detect	Smaller of UCL or Maximum Detect Basis
Combined Background	AA	Chlorobenzene	μg/m3	2	18	11	0.019	0.029	0.017	0.86	Background1	J	0.0966	0.113	0.0268	95% KM (t) UCL	0.0268	95% KM (t) UCL
Combined Background	AA	Chloroethane	μg/m3	8	18	44	0.019	0.12	0.17	0.49	Background1	J	0.0924	0.0631	0.0484	95% KM (t) UCL	0.0484	95% KM (t) UCL
Combined Background	AA	Chloroform	μg/m3	15	18	83	0.064	0.32	0.17	0.91	Background1		0.16	0.112	0.154	95% KM (BCA) UCL	0.154	95% KM (BCA) UCL
Combined Background	AA	Chloromethane	μg/m3	18	18	100	0.56	1.4	NA	NA	Background1		1.08	0.193	1.16	95% Student's-t UCL	1.16	95% Student's-t UCL
Combined Background	AA	cis-1,2-Dichloroethene	μg/m3	1	18	6	0.025	0.025	0.1	0.15	Background1	J	0.0622	0.0119	0.0745	Too Few Unique Detected Values *	0.025	Maximum Result
Combined Background	AA	cis-1,3-Dichloropropene	μg/m3	2	18	11	0.057	0.06	0.12	0.85	Background1	J	0.107	0.105	0.0593	95% KM (t) UCL	0.0593	95% KM (t) UCL
Combined Background	AA	Ethylbenzene	μg/m3	18	18	100	0.12	1.5	NA	NA	Background1		0.401	0.365	0.582	95% H-UCL	0.582	95% H-UCL
Combined Background	AA	Freon 11	μg/m3	18	18	100	1	3.2	NA	NA	Background1		1.65	0.595	1.89	95% Student's-t UCL	1.89	95% Student's-t UCL
Combined Background	AA	Freon 113	μg/m3	18	18	100	0.46	0.8	NA	NA	Background3	J	0.636	0.0944	0.674	95% Student's-t UCL	0.674	95% Student's-t UCL
Combined Background	AA	Freon 114	μg/m3	2	6	33	0.12	0.12	0.25	1.3	Background2	J	0.282	0.249	2.56	95% Student's-t UCL	0.12	Maximum Result
Combined Background	AA	Freon 12	μg/m3	18	18	100	2	3.1	NA	NA	Background1		2.43	0.312	2.56	95% Student's-t UCL	2.56	95% Student's-t UCL
Combined Background	AA	Methyl tert-butyl ether	μg/m3	3	18	17	0.007	0.25	0.52	0.67	Background1	J	0.267	0.0947	0.23	95% KM (t) UCL	0.23	95% KM (t) UCL
Combined Background	AA	Methylene chloride	μg/m3	2	18	11	0.2	0.28	0.32	1.3	Background3	J	0.393	0.199	0.233	95% KM (t) UCL	0.233	95% KM (t) UCL
Combined Background	AA	Naphthalene	μg/m3	3	16	19	0.043	0.7	0.13	4.9	Background1	J	1.39	0.947	0.376	95% KM (t) UCL	0.376	95% KM (t) UCL
Combined Background	AA	Styrene	μg/m3	12	18	67	0.035	0.46	0.052	0.8	Background2		0.152	0.149	0.182	95% KM (BCA) UCL	0.182	95% KM (BCA) UCL
Combined Background	AA	Tetrachloroethene	μg/m3	16	18	89	0.05	0.76	0.2	0.24	Background1		0.215	0.177	0.286	95% KM (BCA) UCL	0.286	95% KM (BCA) UCL
Combined Background	AA	Toluene	μg/m3	18	18	100	0.56	9.4	NA	NA	Background1		2.29	2.16	3.31	95% H-UCL	3.31	95% H-UCL
Combined Background	AA	trans-1,3-Dichloropropene	μg/m3	2	18	11	0.051	0.056	0.12	0.85	Background1	J	0.106	0.105	0.0578	95% KM (t) UCL	0.056	Maximum Result
Combined Background	AA	Trichloroethene	μg/m3	12	18	67	0.016	0.22	0.023	0.2	Background2		0.0674	0.0612	0.089	95% KM (t) UCL	0.089	95% KM (t) UCL
Combined Background	AA	Xylenes, m & p	μg/m3	18	18	100	0.36	5.1	NA	NA	Background1		1.24	1.23	2.5	95% Chebyshev (Mean, Sd) UCL	2.5	95% Chebyshev (Mean, Sd) UCL
Combined Background	AA	Xylenes, o	μg/m3	18	18	100	0.13	1.7	NA	NA	Background1		0.422	0.419	0.853	95% Chebyshev (Mean, Sd) UCL	0.853	95% Chebyshev (Mean, Sd) UCL
1428/1430 3rd St	AA	1,1,1-Trichloroethane	μg/m3	10	11	91	0.051	0.12	0.18	0.18	1428-OA01	J	0.0847	0.0194	0.0941	95% KM (t) UCL	0.0941	95% KM (t) UCL
1428/1430 3rd St	AA	1,1,2,2-Tetrachloroethane	μg/m3	2	11	18	0.15	0.18	0.18	0.23	1428AA	J	0.118	0.0258	0.159	95% KM (t) UCL	0.159	95% KM (t) UCL
1428/1430 3rd St	AA	1,2,4-Trimethylbenzene	μg/m3	11	11	100	0.13	23	NA	NA	1428AA		2.65	6.78	4.74	95% Chebyshev (MVUE) UCL	4.74	95% Chebyshev (MVUE) UCL
1428/1430 3rd St	AA	1,2-Dichloroethane	μg/m3	8	11	73	0.033	0.27	0.12	0.13	1428AA		0.0912	0.076	0.126	95% KM (Percentile Bootstrap) UCL	0.126	95% KM (Percentile Bootstrap) UCL
1428/1430 3rd St	AA	1,2-Dichloropropane	μg/m3	2	11	18	0.046	0.057	0.062	0.79	1428AA	J	0.109	0.141	0.0513	95% KM (t) UCL	0.0513	95% KM (t) UCL
1428/1430 3rd St	AA	1,3,5-Trimethylbenzene	μg/m3	8	11	73	0.047	8	0.046	0.84	1428AA		0.987	2.34	4.09	95% KM (Chebyshev) UCL	4.09	95% KM (Chebyshev) UCL
1428/1430 3rd St	AA	1,3-Dichlorobenzene	μg/m3	2	11	18	0.052	51	0.016	1	1428AA	J	4.78	15.3	66.8	99% KM (Chebyshev) UCL	51	Maximum Result
1428/1430 3rd St	AA	1,4-Dichlorobenzene	μg/m3	3	11	27	0.17	3.5	0.031	1	1428AA	J	0.503	1.01	1.14	95% KM (t) UCL	1.14	95% KM (t) UCL
1428/1430 3rd St	AA	Benzene	μg/m3	11	11	100	0.31	5.6	NA	NA	1428AA	J	1.14	1.57	3.2	95% Chebyshev (Mean, Sd) UCL	3.2	95% Chebyshev (Mean, Sd) UCL
1428/1430 3rd St	AA	Bromomethane	μg/m3	8	11	73	0.075	0.4	0.3	0.31	1428-OA01	J	0.194	0.111	0.244	95% KM (t) UCL	0.244	95% KM (t) UCL
1428/1430 3rd St	AA	Carbon tetrachloride	μg/m3	11	11	100	0.42	0.7	NA	NA	1428AA		0.517	0.088	0.565	95% Student's-t UCL	0.565	95% Student's-t UCL
1428/1430 3rd St	AA	Chlorobenzene	μg/m3	2	11	18	0.022	0.3	0.017	0.79	1428AA		0.137	0.147	0.31	97.5% KM (Chebyshev) UCL	0.3	Maximum Result
1428/1430 3rd St	AA	Chloroethane	μg/m3	4	11	36	0.03	0.11	0.19	0.45	1428AA	J	0.113	0.06	0.089	95% KM (t) UCL	0.089	95% KM (t) UCL
1428/1430 3rd St	AA	Chloroform	μg/m3	8	11	73	0.087	0.38	0.16	0.83	1428AA		0.201	0.132	0.208	95% KM (Percentile Bootstrap) UCL	0.208	95% KM (Percentile Bootstrap) UCL
1428/1430 3rd St	AA	Chloromethane	μg/m3	11	11	100	0.87	1.5	NA	NA	1428AA		1.17	0.21	1.28	95% Student's-t UCL	1.28	95% Student's-t UCL
1428/1430 3rd St	AA	cis-1,3-Dichloropropene	μg/m3	1	11	9	0.052	0.052	0.12	0.78	1428AA	J	0.124	0.129	0.294	Too Few Unique Detected Values *	0.052	Maximum Result
1428/1430 3rd St	AA	Ethylbenzene	μg/m3	11	11	100	0.16	12	NA	NA	1428AA		1.6	3.49	12.1	99% Chebyshev (Mean, Sd) UCL	12	Maximum Result
1428/1430 3rd St	AA	Freon 11	μg/m3	11	11	100	1.1	3.8	NA	NA	1428AA		1.67	0.74	2.08	95% Student's-t UCL	2.08	95% Student's-t UCL
1428/1430 3rd St	AA	Freon 113	μg/m3	11	11	100	0.43	0.8	NA	NA	1428AA		0.613	0.109	0.672	95% Student's-t UCL	0.672	95% Student's-t UCL
1428/1430 3rd St	AA	Freon 114	μg/m3	1	4	25	0.13	0.13	0.23	1.2	1428AA	J	0.361	0.276	NA	Fewer Than Five Samples	0.13	Maximum Result
1428/1430 3rd St	AA	Freon 12	μg/m3	11	11	100	2	3.4	NA	NA	1428AA		2.45	0.461	2.71	95% Student's-t UCL	2.71	95% Student's-t UCL
1428/1430 3rd St	AA	Methyl tert-butyl ether	μg/m3	2	11	18	0.0099	0.023	0.48	0.62	1428AA	J	0.236	0.11	0.0283	95% KM (t) UCL	0.023	Maximum Result
1428/1430 3rd St	AA	Methylene chloride	μg/m3	4	11	36	0.31	21	0.31	1.2	1428AA		2.54	6.21	6.26	95% KM (t) UCL	6.26	95% KM (t) UCL
1428/1430 3rd St	AA	Naphthalene	μg/m3	4	10	40	0.12	16	3.5	4.4	1428AA	J	2.92	4.65	5.18	95% KM (t) UCL	5.18	95% KM (t) UCL
1428/1430 3rd St	AA	Styrene	μg/m3	8	11	73	0.047	6.8	0.031	0.72	1428AA		0.771	2	6.9	99% KM (Chebyshev) UCL	6.8	Maximum Result
1428/1430 3rd St	AA	Tetrachloroethene	μg/m3	11	11	100	0.074	2.2	NA	NA	1428AA		0.338	0.622	1.16	95% Chebyshev (Mean, Sd) UCL	1.16	95% Chebyshev (Mean, Sd) UCL
1428/1430 3rd St	AA	Toluene	μg/m3	11	11	100	1	32	NA	NA	1428AA		5.95	9.17	12.5	95% Chebyshev (MVUE) UCL	12.5	95% Chebyshev (MVUE) UCL
1428/1430 3rd St	AA	trans-1,2-Dichloroethene	μg/m3	1	11	9	0.042	0.042	0.013	0.68	1428AA	J	0.262	0.12	0.419	Too Few Unique Detected Values *	0.042	Maximum Result
1428/1430 3rd St	AA	trans-1,3-Dichloropropene	μg/m3	1	11	9	0.041	0.041	0.12	0.78	1428AA	J	0.123	0.13	0.294	Too Few Unique Detected Values *	0.041	Maximum Result
1428/1430 3rd St	AA	Trichloroethene	μg/m3	10	11	91	0.025	0.44	0.032	0.032	1428AA		0.106	0.118	0.261	95% KM (Chebyshev) UCL	0.261	95% KM (Chebyshev) UCL
1428/1430 3rd St	AA	Vinyl chloride	μg/m3	1	11	9	0.058	0.058	0.034	0.044	1428AA		0.023	0.0117	0.0385	Too Few Unique Detected Values *	0.0385	Too Few Unique Detected Values *
1428/1430 3rd St	AA	Xylenes, m & p	μg/m3	11	11	100	0.43	44	NA	NA	1428AA		5.85	12.8	44.4	99% Chebyshev (Mean, Sd) UCL	44	Maximum Result
1428/1430 3rd St	AA	Xylenes, o	μg/m3	11	11	100	0.13	18	NA	NA	1428AA		2.18	5.28	18	99% Chebyshev (Mean, Sd) UCL	18	Maximum Result

* ProUCL Version 4 does not offer a calculated UCL when there are too few unique detected results (one or sometimes more than one). A 95% Chebyshev UCL using a proxy value of 1/2 the detection limit for NDs was selected in these cases.

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1414 3rd St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	15.8	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.041	Maximum Result
1414 3rd St	Crawlspace Air	1,1-Dichloroethane	$\mu g/m^3$	21.3	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	1,1-Dichloroethene	$\mu g/m^3$	1.05	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	2.14	95% H-UCL
1414 3rd St	Crawlspace Air	1,2-Dibromoethane	$\mu g/m^3$	0.11	Maximum Result
1414 3rd St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	0.802	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.0619	95% KM (t) UCL
1414 3rd St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.364	95% KM (Percentile Bootstrap) UCL
1414 3rd St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.417	95% KM (t) UCL
1414 3rd St	Crawlspace Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.724	Too Few Unique Detected Values *
1414 3rd St	Crawlspace Air	Benzene	$\mu g/m^3$	0.724	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.189	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	6.05	95% Chebyshev (Mean, Sd) UCL
1414 3rd St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.0878	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.384	95% KM (Percentile Bootstrap) UCL
1414 3rd St	Crawlspace Air	Chloroform	$\mu g/m^3$	1.35	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	Chloromethane	$\mu g/m^3$	24.2	97.5% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	cis-1,2-Dichloroethene	$\mu g/m^3$	272	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.056	Maximum Result
1414 3rd St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	1.11	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.68	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.675	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Freon 12	$\mu g/m^3$	4.23	95% Student's-t UCL
1414 3rd St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.0777	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	0.801	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Naphthalene	$\mu g/m^3$	0.638	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Styrene	$\mu g/m^3$	0.347	95% KM (t) UCL
1414 3rd St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	9.47	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Toluene	$\mu g/m^3$	9.3	95% Student's-t UCL
1414 3rd St	Crawlspace Air	trans-1,2-Dichloroethene	$\mu g/m^3$	0.635	95% KM (Chebyshev) UCL
1414 3rd St	Crawlspace Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.057	Maximum Result
1414 3rd St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	13.6	95% Approximate Gamma UCL
1414 3rd St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	1.61	95% KM (BCA) UCL
1414 3rd St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	3.86	95% Student's-t UCL
1428 3rd St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	0.985	95% Student's-t UCL
1428 3rd St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0941	95% KM (t) UCL
1428 3rd St	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.159	95% KM (t) UCL
1428 3rd St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	4.74	95% Chebyshev (MVUE) UCL
1428 3rd St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.126	95% KM (Percentile Bootstrap) UCL
1428 3rd St	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0513	95% KM (t) UCL
1428 3rd St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	4.09	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	51	Maximum Result
1428 3rd St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	1.14	95% KM (t) UCL
1428 3rd St	Ambient Air	Benzene	$\mu g/m^3$	3.2	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Bromomethane	$\mu g/m^3$	0.244	95% KM (t) UCL
1428 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.565	95% Student's-t UCL
1428 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.3	Maximum Result
1428 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.089	95% KM (t) UCL
1428 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	0.208	95% KM (Percentile Bootstrap) UCL
1428 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	1.28	95% Student's-t UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1428 3rd St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.052	Maximum Result
1428 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	12	Maximum Result
1428 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	2.08	95% Student's-t UCL
1428 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.672	95% Student's-t UCL
1428 3rd St	Ambient Air	Freon 114	$\mu g/m^3$	0.13	Maximum Result
1428 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.71	95% Student's-t UCL
1428 3rd St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.023	Maximum Result
1428 3rd St	Ambient Air	Methylene chloride	$\mu g/m^3$	6.26	95% KM (t) UCL
1428 3rd St	Ambient Air	Naphthalene	$\mu g/m^3$	5.18	95% KM (t) UCL
1428 3rd St	Ambient Air	Styrene	$\mu g/m^3$	6.8	Maximum Result
1428 3rd St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	1.16	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Toluene	$\mu g/m^3$	12.5	95% Chebyshev (MVUE) UCL
1428 3rd St	Ambient Air	trans-1,2-Dichloroethene	$\mu g/m^3$	0.042	Maximum Result
1428 3rd St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.041	Maximum Result
1428 3rd St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.261	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Vinyl chloride	$\mu g/m^3$	0.0385	Too Few Unique Detected Values *
1428 3rd St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	44	Maximum Result
1428 3rd St	Ambient Air	Xylenes, o	$\mu g/m^3$	18	Maximum Result
1428 3rd St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.114	95% KM (t) UCL
1428 3rd St	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.074	Maximum Result
1428 3rd St	Ambient Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.065	Maximum Result
1428 3rd St	Ambient Air	1,1-Dichloroethane	$\mu g/m^3$	0.026	Maximum Result
1428 3rd St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	33.5	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,2-Dibromoethane	$\mu g/m^3$	0.034	Maximum Result
1428 3rd St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	2.1	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0906	95% KM (t) UCL
1428 3rd St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	9.46	99% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.565	95% KM (t) UCL
1428 3rd St	Ambient Air	Benzene	$\mu g/m^3$	1.1	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Bromomethane	$\mu g/m^3$	0.185	95% KM (t) UCL
1428 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.501	95% KM (BCA) UCL
1428 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.0372	95% KM (t) UCL
1428 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.178	95% KM (BCA) UCL
1428 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	2.53	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	8.88	97.5% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.26	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	2.95	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.654	95% KM (t) UCL
1428 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.54	95% KM (t) UCL
1428 3rd St	Ambient Air	Methylene chloride	$\mu g/m^3$	2.17	95% KM (t) UCL
1428 3rd St	Ambient Air	Naphthalene	$\mu g/m^3$	1.09	95% KM (t) UCL
1428 3rd St	Ambient Air	Styrene	$\mu g/m^3$	0.498	95% KM (Chebyshev) UCL
1428 3rd St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	1.74	95% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Toluene	$\mu g/m^3$	12.6	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.018	Maximum Result
1428 3rd St	Ambient Air	Trichloroethene	$\mu g/m^3$	3.37	99% Chebyshev (Mean, Sd) UCL
1428 3rd St	Ambient Air	Vinyl chloride	$\mu g/m^3$	1.58	95% KM (t) UCL
1428 3rd St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	5.49	95% Approximate Gamma UCL
1428 3rd St	Ambient Air	Xylenes, o	$\mu g/m^3$	3.43	95% Chebyshev (MVUE) UCL
1432 3rd St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0823	95% KM (t) UCL
1432 3rd St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.983	95% KM (Chebyshev) UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1432 3rd St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.13	Maximum Result
1432 3rd St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0557	95% KM (t) UCL
1432 3rd St	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0438	95% KM (t) UCL
1432 3rd St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.354	95% KM (Chebyshev) UCL
1432 3rd St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.092	Maximum Result
1432 3rd St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.25	Maximum Result
1432 3rd St	Ambient Air	Benzene	$\mu g/m^3$	0.852	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Bromomethane	$\mu g/m^3$	1.18	95% KM (Chebyshev) UCL
1432 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.525	95% Student's-t UCL
1432 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.022	Maximum Result
1432 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.0991	95% KM (t) UCL
1432 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	0.234	95% KM (t) UCL
1432 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	1.21	95% Student's-t UCL
1432 3rd St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.051	Maximum Result
1432 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.642	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	2.05	95% Student's-t UCL
1432 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.645	95% Student's-t UCL
1432 3rd St	Ambient Air	Freon 114	$\mu g/m^3$	0.13	Maximum Result
1432 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.52	95% Student's-t UCL
1432 3rd St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.019	Maximum Result
1432 3rd St	Ambient Air	Methylene chloride	$\mu g/m^3$	1.78	95% KM (t) UCL
1432 3rd St	Ambient Air	Naphthalene	$\mu g/m^3$	0.74	Maximum Result
1432 3rd St	Ambient Air	Styrene	$\mu g/m^3$	0.193	95% KM (t) UCL
1432 3rd St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.239	95% KM (t) UCL
1432 3rd St	Ambient Air	Toluene	$\mu g/m^3$	3.96	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.046	Maximum Result
1432 3rd St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.102	95% KM (t) UCL
1432 3rd St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	2.12	95% Approximate Gamma UCL
1432 3rd St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.704	95% Approximate Gamma UCL
1432 3rd St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0961	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	30.9	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.16	Maximum Result
1432 3rd St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	0.627	97.5% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.0615	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	11	Maximum Result
1432 3rd St	Crawlspace Air	1,3-Dichlorobenzene	$\mu g/m^3$	63	Maximum Result
1432 3rd St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	1.63	95% KM (t) UCL
1432 3rd St	Crawlspace Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.26	Maximum Result
1432 3rd St	Crawlspace Air	Benzene	$\mu g/m^3$	16	Maximum Result
1432 3rd St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.33	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	0.531	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.146	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.166	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloroform	$\mu g/m^3$	0.389	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Chloromethane	$\mu g/m^3$	3.07	95% H-UCL
1432 3rd St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.036	Maximum Result
1432 3rd St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	20	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.16	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.676	95% Student's-t UCL
1432 3rd St	Crawlspace Air	Freon 114	$\mu g/m^3$	0.23	Maximum Result
1432 3rd St	Crawlspace Air	Freon 12	$\mu g/m^3$	2.54	95% Student's-t UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
1432 3rd St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.019	Maximum Result
1432 3rd St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	1.37	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Naphthalene	$\mu g/m^3$	0.882	95% KM (t) UCL
1432 3rd St	Crawlspace Air	Styrene	$\mu g/m^3$	5.56	95% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	2.21	97.5% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Toluene	$\mu g/m^3$	30.6	95% Approximate Gamma UCL
1432 3rd St	Crawlspace Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.04	Maximum Result
1432 3rd St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	0.886	95% KM (Chebyshev) UCL
1432 3rd St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	2.8	Maximum Result
1432 3rd St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	93.7	99% Chebyshev (Mean, Sd) UCL
1432 3rd St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	32.9	99% Chebyshev (Mean, Sd) UCL
1436 3rd St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.099	95% KM (t) UCL
1436 3rd St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.59	95% Student's-t UCL
1436 3rd St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.1	Maximum Result
1436 3rd St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.061	95% KM (t) UCL
1436 3rd St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.537	95% Student's-t UCL
1436 3rd St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.074	Maximum Result
1436 3rd St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.204	95% KM (t) UCL
1436 3rd St	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.22	Maximum Result
1436 3rd St	Ambient Air	Benzene	$\mu g/m^3$	1.32	95% Student's-t UCL
1436 3rd St	Ambient Air	Bromomethane	$\mu g/m^3$	0.295	95% KM (t) UCL
1436 3rd St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.568	95% Student's-t UCL
1436 3rd St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.048	Maximum Result
1436 3rd St	Ambient Air	Chloroethane	$\mu g/m^3$	0.0689	95% KM (t) UCL
1436 3rd St	Ambient Air	Chloroform	$\mu g/m^3$	0.274	95% KM (BCA) UCL
1436 3rd St	Ambient Air	Chloromethane	$\mu g/m^3$	7.27	95% Chebyshev (Mean, Sd) UCL
1436 3rd St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.57	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 11	$\mu g/m^3$	1.98	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 113	$\mu g/m^3$	0.692	95% Student's-t UCL
1436 3rd St	Ambient Air	Freon 114	$\mu g/m^3$	0.14	Maximum Result
1436 3rd St	Ambient Air	Freon 12	$\mu g/m^3$	2.81	95% Student's-t UCL
1436 3rd St	Ambient Air	Methylene chloride	$\mu g/m^3$	6.99	95% KM (t) UCL
1436 3rd St	Ambient Air	Naphthalene	$\mu g/m^3$	0.62	Maximum Result
1436 3rd St	Ambient Air	Styrene	$\mu g/m^3$	0.314	95% KM (t) UCL
1436 3rd St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.252	95% KM (t) UCL
1436 3rd St	Ambient Air	Toluene	$\mu g/m^3$	14	Maximum Result
1436 3rd St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.189	95% KM (t) UCL
1436 3rd St	Ambient Air	Vinyl chloride	$\mu g/m^3$	0.627	Too Few Unique Detected Values *
1436 3rd St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	7.9	Maximum Result
1436 3rd St	Ambient Air	Xylenes, o	$\mu g/m^3$	1.65	95% Student's-t UCL
320 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0868	95% Student's-t UCL
320 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.72	95% Student's-t UCL
320 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0785	95% Student's-t UCL
320 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.83	Maximum Result
320 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.19	Maximum Result
320 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.35	95% Student's-t UCL
320 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.18	Maximum Result
320 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.546	95% Student's-t UCL
320 Center St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.02	Maximum Result
320 Center St	Ambient Air	Chloroform	$\mu g/m^3$	0.311	95% KM (t) UCL
320 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.1	Maximum Result

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
320 Center St	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.046	Maximum Result
320 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	1.27	95% Student's-t UCL
320 Center St	Ambient Air	Freon 11	$\mu g/m^3$	3.09	95% Approximate Gamma UCL
320 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.736	95% KM (t) UCL
320 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.66	95% Student's-t UCL
320 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	3.01	95% KM (t) UCL
320 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.9	Maximum Result
320 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.315	95% KM (t) UCL
320 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.27	Maximum Result
320 Center St	Ambient Air	Toluene	$\mu g/m^3$	8.71	95% Student's-t UCL
320 Center St	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.037	Maximum Result
320 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.1	Maximum Result
320 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	6.4	Maximum Result
320 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	2.2	Maximum Result
320 Center St	Crawlspace Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.117	95% Student's-t UCL
320 Center St	Crawlspace Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	1.94	95% H-UCL
320 Center St	Crawlspace Air	1,2-Dichloroethane	$\mu g/m^3$	1.17	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	1,2-Dichloropropane	$\mu g/m^3$	0.14	Maximum Result
320 Center St	Crawlspace Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.678	95% Chebyshev (Mean, Sd) UCL
320 Center St	Crawlspace Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.916	95% KM (t) UCL
320 Center St	Crawlspace Air	Benzene	$\mu g/m^3$	1.32	95% Student's-t UCL
320 Center St	Crawlspace Air	Bromomethane	$\mu g/m^3$	0.353	95% KM (t) UCL
320 Center St	Crawlspace Air	Carbon tetrachloride	$\mu g/m^3$	0.537	95% Student's-t UCL
320 Center St	Crawlspace Air	Chlorobenzene	$\mu g/m^3$	0.032	Maximum Result
320 Center St	Crawlspace Air	Chloroethane	$\mu g/m^3$	0.029	Maximum Result
320 Center St	Crawlspace Air	Chloroform	$\mu g/m^3$	0.353	95% KM (BCA) UCL
320 Center St	Crawlspace Air	Chloromethane	$\mu g/m^3$	1.04	95% Student's-t UCL
320 Center St	Crawlspace Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.053	Maximum Result
320 Center St	Crawlspace Air	Ethylbenzene	$\mu g/m^3$	1.67	95% Chebyshev (Mean, Sd) UCL
320 Center St	Crawlspace Air	Freon 11	$\mu g/m^3$	2.71	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	Freon 113	$\mu g/m^3$	0.64	95% Student's-t UCL
320 Center St	Crawlspace Air	Freon 12	$\mu g/m^3$	2.5	95% Student's-t UCL
320 Center St	Crawlspace Air	Methyl tert-butyl ether	$\mu g/m^3$	0.022	Maximum Result
320 Center St	Crawlspace Air	Methylene chloride	$\mu g/m^3$	4.4	95% KM (BCA) UCL
320 Center St	Crawlspace Air	Styrene	$\mu g/m^3$	0.462	95% Student's-t UCL
320 Center St	Crawlspace Air	Tetrachloroethene	$\mu g/m^3$	0.539	95% Approximate Gamma UCL
320 Center St	Crawlspace Air	Toluene	$\mu g/m^3$	14.1	95% Student's-t UCL
320 Center St	Crawlspace Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.047	Maximum Result
320 Center St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	1.19	95% Student's-t UCL
320 Center St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	0.0202	95% KM (t) UCL
326 Center St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	5.8	95% Chebyshev (Mean, Sd) UCL
326 Center St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	2.02	95% Chebyshev (Mean, Sd) UCL
326 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0861	95% KM (t) UCL
326 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.612	95% Approximate Gamma UCL
326 Center St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.083	Maximum Result
326 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0526	95% KM (t) UCL
326 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.511	95% KM (Chebyshev) UCL
326 Center St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.047	Maximum Result
326 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.85	Maximum Result
326 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.01	95% Approximate Gamma UCL
326 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.269	95% KM (BCA) UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
326 Center St	Ambient Air	Carbon tetrachloride	μg/m^3	0.516	95% Student's-t UCL
326 Center St	Ambient Air	Chlorobenzene	μg/m^3	0.015	Maximum Result
326 Center St	Ambient Air	Chloroethane	μg/m^3	0.0629	95% KM (t) UCL
326 Center St	Ambient Air	Chloroform	μg/m^3	0.255	95% KM (Chebyshev) UCL
326 Center St	Ambient Air	Chloromethane	μg/m^3	1.19	95% KM (t) UCL
326 Center St	Ambient Air	cis-1,3-Dichloropropene	μg/m^3	0.052	Maximum Result
326 Center St	Ambient Air	Ethylbenzene	μg/m^3	1.06	95% Approximate Gamma UCL
326 Center St	Ambient Air	Freon 11	μg/m^3	1.58	95% Student's-t UCL
326 Center St	Ambient Air	Freon 113	μg/m^3	0.66	95% Student's-t UCL
326 Center St	Ambient Air	Freon 12	μg/m^3	2.61	95% KM (t) UCL
326 Center St	Ambient Air	Methyl tert-butyl ether	μg/m^3	0.023	Maximum Result
326 Center St	Ambient Air	Methylene chloride	μg/m^3	3.14	Too Few Unique Detected Values *
326 Center St	Ambient Air	Naphthalene	μg/m^3	0.036	Maximum Result
326 Center St	Ambient Air	Styrene	μg/m^3	0.0831	95% KM (t) UCL
326 Center St	Ambient Air	Tetrachloroethene	μg/m^3	0.26	95% KM (t) UCL
326 Center St	Ambient Air	Toluene	μg/m^3	10	Maximum Result
326 Center St	Ambient Air	trans-1,3-Dichloropropene	μg/m^3	0.048	Maximum Result
326 Center St	Ambient Air	Trichloroethene	μg/m^3	0.0761	95% KM (t) UCL
326 Center St	Ambient Air	Xylenes, m & p	μg/m^3	3.99	95% Approximate Gamma UCL
326 Center St	Ambient Air	Xylenes, o	μg/m^3	1.31	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	1,1,1-Trichloroethane	μg/m^3	0.0864	95% KM (t) UCL
326 Center St	Crawlspace Air	1,1,2,2-Tetrachloroethane	μg/m^3	0.39	Too Few Unique Detected Values *
326 Center St	Crawlspace Air	1,1,2-Trichloroethane	μg/m^3	0.076	Maximum Result
326 Center St	Crawlspace Air	1,1-Dichloroethane	μg/m^3	0.015	Maximum Result
326 Center St	Crawlspace Air	1,2,4-Trimethylbenzene	μg/m^3	1.08	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	1,2-Dichlorobenzene	μg/m^3	0.13	Maximum Result
326 Center St	Crawlspace Air	1,2-Dichloroethane	μg/m^3	1.57	97.5% KM (Chebyshev) UCL
326 Center St	Crawlspace Air	1,2-Dichloropropane	μg/m^3	0.102	95% KM (t) UCL
326 Center St	Crawlspace Air	1,3,5-Trimethylbenzene	μg/m^3	0.22	95% KM (t) UCL
326 Center St	Crawlspace Air	1,3-Dichlorobenzene	μg/m^3	0.096	Maximum Result
326 Center St	Crawlspace Air	1,4-Dichlorobenzene	μg/m^3	2.5	95% KM (BCA) UCL
326 Center St	Crawlspace Air	1,4-Dioxane (p-dioxane)	μg/m^3	0.18	Maximum Result
326 Center St	Crawlspace Air	Benzene	μg/m^3	0.978	95% Student's-t UCL
326 Center St	Crawlspace Air	Bromomethane	μg/m^3	0.204	95% KM (t) UCL
326 Center St	Crawlspace Air	Carbon tetrachloride	μg/m^3	0.519	95% Student's-t UCL
326 Center St	Crawlspace Air	Chlorobenzene	μg/m^3	0.033	95% KM (t) UCL
326 Center St	Crawlspace Air	Chloroethane	μg/m^3	0.0607	95% KM (t) UCL
326 Center St	Crawlspace Air	Chloroform	μg/m^3	0.272	95% KM (BCA) UCL
326 Center St	Crawlspace Air	Chloromethane	μg/m^3	1.06	95% Student's-t UCL
326 Center St	Crawlspace Air	cis-1,2-Dichloroethene	μg/m^3	0.018	Maximum Result
326 Center St	Crawlspace Air	cis-1,3-Dichloropropene	μg/m^3	0.039	Maximum Result
326 Center St	Crawlspace Air	Ethylbenzene	μg/m^3	1	95% Student's-t UCL
326 Center St	Crawlspace Air	Freon 11	μg/m^3	2.14	95% Approximate Gamma UCL
326 Center St	Crawlspace Air	Freon 113	μg/m^3	0.668	95% Student's-t UCL
326 Center St	Crawlspace Air	Freon 114	μg/m^3	0.11	Maximum Result
326 Center St	Crawlspace Air	Freon 12	μg/m^3	2.84	95% Student's-t UCL
326 Center St	Crawlspace Air	Hexachlorobutadiene	μg/m^3	0.68	Maximum Result
326 Center St	Crawlspace Air	Methyl tert-butyl ether	μg/m^3	0.016	Maximum Result
326 Center St	Crawlspace Air	Methylene chloride	μg/m^3	2.12	95% KM (t) UCL
326 Center St	Crawlspace Air	Styrene	μg/m^3	0.508	95% KM (BCA) UCL
326 Center St	Crawlspace Air	Tetrachloroethene	μg/m^3	0.469	95% KM (t) UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
326 Center St	Crawlspace Air	Toluene	$\mu g/m^3$	16.2	95% Student's-t UCL
326 Center St	Crawlspace Air	Trichloroethene	$\mu g/m^3$	1.69	95% KM (Chebyshev) UCL
326 Center St	Crawlspace Air	Vinyl chloride	$\mu g/m^3$	0.0357	95% KM (t) UCL
326 Center St	Crawlspace Air	Xylenes, m & p	$\mu g/m^3$	3.78	95% Student's-t UCL
326 Center St	Crawlspace Air	Xylenes, o	$\mu g/m^3$	0.913	95% Student's-t UCL
339 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.062	Maximum Result
339 Center St	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.18	Maximum Result
339 Center St	Ambient Air	1,1,2-Trichloroethane	$\mu g/m^3$	0.033	Maximum Result
339 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.37	Maximum Result
339 Center St	Ambient Air	1,2-Dichlorobenzene	$\mu g/m^3$	0.22	Maximum Result
339 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.067	Maximum Result
339 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.16	Maximum Result
339 Center St	Ambient Air	1,3-Dichlorobenzene	$\mu g/m^3$	0.19	Maximum Result
339 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.24	Maximum Result
339 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.38	Maximum Result
339 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.41	Maximum Result
339 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.4	Maximum Result
339 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	0.92	Maximum Result
339 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.21	Maximum Result
339 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.1	Maximum Result
339 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.45	Maximum Result
339 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2	Maximum Result
339 Center St	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.03	Maximum Result
339 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.46	Maximum Result
339 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.1	Maximum Result
339 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.096	Maximum Result
339 Center St	Ambient Air	Toluene	$\mu g/m^3$	1.2	Maximum Result
339 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.13	Maximum Result
339 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	0.67	Maximum Result
339 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.28	Maximum Result
356 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.065	Maximum Result
356 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.79	Maximum Result
356 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.054	Maximum Result
356 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.19	Maximum Result
356 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.62	Maximum Result
356 Center St	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.89	Maximum Result
356 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.41	Maximum Result
356 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.36	Maximum Result
356 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.5	Maximum Result
356 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	0.98	Maximum Result
356 Center St	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.031	Maximum Result
356 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.53	Maximum Result
356 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.2	Maximum Result
356 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.68	Maximum Result
356 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.4	Maximum Result
356 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.6	Maximum Result
356 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	1.9	Maximum Result
356 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.12	Maximum Result
356 Center St	Ambient Air	Toluene	$\mu g/m^3$	2.1	Maximum Result
356 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.034	Maximum Result
356 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	1.2	Maximum Result

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
356 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.57	Maximum Result
360 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.103	95% KM (t) UCL
360 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	5.8	Maximum Result
360 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.106	95% KM (t) UCL
360 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	1.12	95% KM (t) UCL
360 Center St	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.243	95% KM (t) UCL
360 Center St	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.36	Maximum Result
360 Center St	Ambient Air	Benzene	$\mu g/m^3$	1.47	95% KM (t) UCL
360 Center St	Ambient Air	Bromomethane	$\mu g/m^3$	0.311	95% KM (t) UCL
360 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.666	95% Student's-t UCL
360 Center St	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.052	Maximum Result
360 Center St	Ambient Air	Chloroethane	$\mu g/m^3$	0.075	Maximum Result
360 Center St	Ambient Air	Chloroform	$\mu g/m^3$	0.272	95% KM (t) UCL
360 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.18	95% Student's-t UCL
360 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	3.5	Maximum Result
360 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.63	95% Student's-t UCL
360 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.626	95% Student's-t UCL
360 Center St	Ambient Air	Freon 114	$\mu g/m^3$	0.12	Maximum Result
360 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2.6	Maximum Result
360 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	3.25	95% KM (t) UCL
360 Center St	Ambient Air	Naphthalene	$\mu g/m^3$	0.041	Maximum Result
360 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.397	95% KM (t) UCL
360 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.322	95% KM (t) UCL
360 Center St	Ambient Air	Toluene	$\mu g/m^3$	34	Maximum Result
360 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.151	95% KM (t) UCL
360 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	12	Maximum Result
360 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	3.4	Maximum Result
366 Center St	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.051	Maximum Result
366 Center St	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.32	Maximum Result
366 Center St	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.11	Maximum Result
366 Center St	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.11	Maximum Result
366 Center St	Ambient Air	Benzene	$\mu g/m^3$	0.42	Maximum Result
366 Center St	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.48	Maximum Result
366 Center St	Ambient Air	Chloromethane	$\mu g/m^3$	1.2	Maximum Result
366 Center St	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.74	Maximum Result
366 Center St	Ambient Air	Freon 11	$\mu g/m^3$	1.1	Maximum Result
366 Center St	Ambient Air	Freon 113	$\mu g/m^3$	0.52	Maximum Result
366 Center St	Ambient Air	Freon 12	$\mu g/m^3$	2	Maximum Result
366 Center St	Ambient Air	Methylene chloride	$\mu g/m^3$	0.78	Maximum Result
366 Center St	Ambient Air	Styrene	$\mu g/m^3$	0.23	Maximum Result
366 Center St	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.26	Maximum Result
366 Center St	Ambient Air	Toluene	$\mu g/m^3$	2	Maximum Result
366 Center St	Ambient Air	Trichloroethene	$\mu g/m^3$	0.045	Maximum Result
366 Center St	Ambient Air	Xylenes, m & p	$\mu g/m^3$	2.5	Maximum Result
366 Center St	Ambient Air	Xylenes, o	$\mu g/m^3$	0.85	Maximum Result
Prescott Park	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0983	95% Student's-t UCL
Prescott Park	Ambient Air	1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.024	Maximum Result
Prescott Park	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.751	95% KM (t) UCL
Prescott Park	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.183	95% KM (t) UCL
Prescott Park	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.245	95% KM (t) UCL
Prescott Park	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.891	Too Few Unique Detected Values *

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
Prescott Park	Ambient Air	Benzene	$\mu g/m^3$	0.937	95% Student's-t UCL
Prescott Park	Ambient Air	Bromomethane	$\mu g/m^3$	1.12	95% KM (t) UCL
Prescott Park	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.577	95% Student's-t UCL
Prescott Park	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.034	Maximum Result
Prescott Park	Ambient Air	Chloroethane	$\mu g/m^3$	0.0833	95% KM (t) UCL
Prescott Park	Ambient Air	Chloroform	$\mu g/m^3$	0.373	95% KM (t) UCL
Prescott Park	Ambient Air	Chloromethane	$\mu g/m^3$	1.2	Maximum Result
Prescott Park	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.038	Maximum Result
Prescott Park	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.651	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 11	$\mu g/m^3$	1.84	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 113	$\mu g/m^3$	0.719	95% Student's-t UCL
Prescott Park	Ambient Air	Freon 12	$\mu g/m^3$	2.8	95% Student's-t UCL
Prescott Park	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.0097	Maximum Result
Prescott Park	Ambient Air	Methylene chloride	$\mu g/m^3$	0.4	Maximum Result
Prescott Park	Ambient Air	Styrene	$\mu g/m^3$	0.231	95% KM (t) UCL
Prescott Park	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.314	95% Student's-t UCL
Prescott Park	Ambient Air	Toluene	$\mu g/m^3$	3.45	95% Student's-t UCL
Prescott Park	Ambient Air	Trichloroethene	$\mu g/m^3$	0.105	95% KM (t) UCL
Prescott Park	Ambient Air	Xylenes, m & p	$\mu g/m^3$	1.96	95% Student's-t UCL
Prescott Park	Ambient Air	Xylenes, o	$\mu g/m^3$	0.688	95% Student's-t UCL
Combined Background	Ambient Air	1,1,1-Trichloroethane	$\mu g/m^3$	0.0797	95% KM (t) UCL
Combined Background	Ambient Air	1,1-Dichloroethane	$\mu g/m^3$	0.011	Maximum Result
Combined Background	Ambient Air	1,1-Dichloroethene	$\mu g/m^3$	0.0392	Too Few Unique Detected Values *
Combined Background	Ambient Air	1,2,4-Trimethylbenzene	$\mu g/m^3$	0.639	95% H-UCL
Combined Background	Ambient Air	1,2-Dichloroethane	$\mu g/m^3$	0.0535	95% KM (t) UCL
Combined Background	Ambient Air	1,2-Dichloropropane	$\mu g/m^3$	0.0448	95% KM (t) UCL
Combined Background	Ambient Air	1,3,5-Trimethylbenzene	$\mu g/m^3$	0.272	95% KM (Chebyshev) UCL
Combined Background	Ambient Air	1,4-Dichlorobenzene	$\mu g/m^3$	0.0948	95% KM (t) UCL
Combined Background	Ambient Air	1,4-Dioxane (p-dioxane)	$\mu g/m^3$	0.383	Too Few Unique Detected Values *
Combined Background	Ambient Air	Benzene	$\mu g/m^3$	0.8	95% Approximate Gamma UCL
Combined Background	Ambient Air	Bromomethane	$\mu g/m^3$	0.682	95% KM (Chebyshev) UCL
Combined Background	Ambient Air	Carbon tetrachloride	$\mu g/m^3$	0.526	95% Student's-t UCL
Combined Background	Ambient Air	Chlorobenzene	$\mu g/m^3$	0.0268	95% KM (t) UCL
Combined Background	Ambient Air	Chloroethane	$\mu g/m^3$	0.0484	95% KM (t) UCL
Combined Background	Ambient Air	Chloroform	$\mu g/m^3$	0.154	95% KM (BCA) UCL
Combined Background	Ambient Air	Chloromethane	$\mu g/m^3$	1.16	95% Student's-t UCL
Combined Background	Ambient Air	cis-1,2-Dichloroethene	$\mu g/m^3$	0.025	Maximum Result
Combined Background	Ambient Air	cis-1,3-Dichloropropene	$\mu g/m^3$	0.0593	95% KM (t) UCL
Combined Background	Ambient Air	Ethylbenzene	$\mu g/m^3$	0.582	95% H-UCL
Combined Background	Ambient Air	Freon 11	$\mu g/m^3$	1.89	95% Student's-t UCL
Combined Background	Ambient Air	Freon 113	$\mu g/m^3$	0.674	95% Student's-t UCL
Combined Background	Ambient Air	Freon 114	$\mu g/m^3$	0.12	Maximum Result
Combined Background	Ambient Air	Freon 12	$\mu g/m^3$	2.56	95% Student's-t UCL
Combined Background	Ambient Air	Methyl tert-butyl ether	$\mu g/m^3$	0.23	95% KM (t) UCL
Combined Background	Ambient Air	Methylene chloride	$\mu g/m^3$	0.233	95% KM (t) UCL
Combined Background	Ambient Air	Naphthalene	$\mu g/m^3$	0.376	95% KM (t) UCL
Combined Background	Ambient Air	Styrene	$\mu g/m^3$	0.182	95% KM (BCA) UCL
Combined Background	Ambient Air	Tetrachloroethene	$\mu g/m^3$	0.286	95% KM (BCA) UCL
Combined Background	Ambient Air	Toluene	$\mu g/m^3$	3.31	95% H-UCL
Combined Background	Ambient Air	trans-1,3-Dichloropropene	$\mu g/m^3$	0.056	Maximum Result
Combined Background	Ambient Air	Trichloroethene	$\mu g/m^3$	0.089	95% KM (t) UCL

Table 3-3
Exposure Point Concentrations for Crawlspace and Ambient Air
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Location	Matrix	Chemical	Units	Exposure Point Concentration	EPC Basis
Combined Background	Ambient Air	Xylenes, m & p	$\mu g/m^3$	2.5	95% Chebyshev (Mean, Sd) UCL
Combined Background	Ambient Air	Xylenes, o	$\mu g/m^3$	0.853	95% Chebyshev (Mean, Sd) UCL

Table 3-4

Risk Calculation Worksheet for 1414 3rd St - Crawl Space Air - Occupational Exposure Scenario - Commercial/Industrial Worker

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Commercial/Industrial Worker
	Receptor Age:	Adult

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	days/yr
Exposure Time for inhalation of vola	ET_i	8	hr/day
Exposure Duration	ED	25	years
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor 1	CF1	0.001	mg/ug

Risk Calculations

Adult Commercial/Industrial Worker Scenario

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
1,1,1-Trichloroethane	15.8	1.29E+00				3.61E+00	5.00E+00	7.21E-04	0.1%
1,1,2-Trichloroethane	0.041	3.34E-03	1.60E-05	5.35E-08	0.1%	9.36E-03			
1,1-Dichloroethane	21.3	1.74E+00	1.60E-06	**2.78E-06**	5%	4.86E+00			
1,1-Dichloroethene	1.05	8.56E-02				2.40E-01	7.00E-02	3.42E-03	0.6%
1,2,4-Trimethylbenzene	2.14	1.74E-01				4.89E-01	7.00E-03	6.98E-02	12%
1,2-Dibromoethane	0.11	8.97E-03	6.00E-04	**5.38E-06**	9%	2.51E-02	9.00E-03	2.79E-03	0.5%
1,2-Dichloroethane	0.802	6.54E-02	2.60E-05	**1.70E-06**	3%	1.83E-01	2.40E+00	7.63E-05	0.01%
1,2-Dichloropropane	0.0619	5.05E-03	1.00E-05	5.05E-08	0.09%	1.41E-02	4.00E-03	3.53E-03	0.6%
1,3,5-Trimethylbenzene	0.364	2.97E-02				8.31E-02	6.00E-03	1.39E-02	2.4%
1,4-Dichlorobenzene	0.417	3.40E-02	1.10E-05	3.74E-07	0.6%	9.52E-02	8.00E-01	1.19E-04	0.02%
1,4-Dioxane (p-dioxane)	0.724	5.90E-02	7.70E-06	4.55E-07	0.8%	1.65E-01	3.00E+00	5.51E-05	0.01%
Benzene	0.724	5.90E-02	2.90E-05	**1.71E-06**	3%	1.65E-01	3.00E-02	5.51E-03	1%
Bromomethane	0.189	1.54E-02				4.32E-02	5.00E-03	8.63E-03	1.5%
Carbon tetrachloride	6.05	4.93E-01	4.20E-05	**2.07E-05**	35%	1.38E+00	1.90E-01	7.27E-03	1.3%
Chlorobenzene	0.0878	7.16E-03				2.00E-02	5.00E-02	4.01E-04	0.07%
Chloroethane	0.384	3.13E-02				8.77E-02	1.00E+01	8.77E-06	0.002%
Chloroform	1.35	1.10E-01	2.30E-05	**2.53E-06**	4%	3.08E-01	9.80E-02	3.15E-03	0.6%

Table 3-4

Risk Calculation Worksheet for 1414 3rd St - Crawl Space Air - Occupational Exposure Scenario - Commercial/Industrial Worker

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Commercial/Industrial Worker
	Receptor Age:	Adult

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	days/yr
Exposure Time for inhalation of vola	ET_i	8	hr/day
Exposure Duration	ED	25	years
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor 1	CF1	0.001	mg/ug

Risk Calculations

Adult Commercial/Industrial Worker Scenario

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Chloromethane	24.2	1.97E+00	1.80E-06	**3.55E-06**	6%	5.53E+00	9.00E-02	6.14E-02	11%
cis-1,2-Dichloroethene	272	2.22E+01				6.21E+01			
cis-1,3-Dichloropropene	0.056	4.57E-03	1.60E-05	7.31E-08	0.1%	1.28E-02	2.00E-02	6.39E-04	0.1%
Ethylbenzene	1.11	9.05E-02	2.50E-06	2.26E-07	0.4%	2.53E-01	1.00E+00	2.53E-04	0.04%
Freon 11	2.68	2.19E-01				6.12E-01	7.00E-01	8.74E-04	0.2%
Freon 113	0.675	5.50E-02				1.54E-01	3.00E+01	5.14E-06	0.0009%
Freon 12	4.23	3.45E-01				9.66E-01	2.00E-01	4.83E-03	0.8%
Methyl tert-butyl ether	0.0777	6.34E-03	2.60E-07	1.65E-09	0.003%	1.77E-02	3.00E+00	5.91E-06	0.001%
Methylene chloride	0.801	6.53E-02	1.00E-06	6.53E-08	0.1%	1.83E-01	4.00E-01	4.57E-04	0.08%
Naphthalene	0.638	5.20E-02	3.40E-05	**1.77E-06**	3%	1.46E-01	3.00E-03	4.86E-02	9%
Styrene	0.347	2.83E-02				7.92E-02	9.00E-01	8.80E-05	0.02%
Tetrachloroethene	9.47	7.72E-01	5.90E-06	**4.56E-06**	8%	2.16E+00	2.70E-01	8.01E-03	1%
Toluene	9.3	7.58E-01				2.12E+00	3.00E-01	7.08E-03	1%
trans-1,2-Dichloroethene	0.635	5.18E-02				1.45E-01	6.00E-02	2.42E-03	0.4%
trans-1,3-Dichloropropene	0.057	4.65E-03	1.60E-05	7.44E-08	0.1%	1.30E-02	2.00E-02	6.51E-04	0.1%
Trichloroethene	13.6	1.11E+00	2.00E-06	**2.22E-06**	4%	3.11E+00	1.00E-02	3.11E-01	54%
Vinyl chloride	1.61	1.31E-01	7.80E-05	**1.02E-05**	17%	3.68E-01	1.00E-01	3.68E-03	0.6%

Table 3-4
Risk Calculation Worksheet for 1414 3rd St - Crawl Space Air - Occupational Exposure Scenario - Commercial/Industrial Worker
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Occupational
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Commercial/Industrial Worker
	Receptor Age:	Adult

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	250	days/yr
Exposure Time for inhalation of vola	ET_i	8	hr/day
Exposure Duration	ED	25	years
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens	ATnc	25	yr
Conversion Factor 1	CF1	0.001	mg/ug

Risk Calculations
Adult Commercial/Industrial Worker Scenario

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Xylenes, m & p	3.86	3.15E-01				8.81E-01	7.00E-01	1.26E-03	0.2%
Xylenes, o	0.985	8.03E-02				2.25E-01	7.00E-01	3.21E-04	0.06%
			Total Risk:	5.9E-05			**Total HI:**	5.7E-01	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-5

Risk Calculation Worksheet for 1428 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.114	4.68E-02				1.09E-01	5.00E+00	2.19E-05	0.0003%
1,1,2,2-Tetrachloroethane	0.074	3.04E-02	5.80E-05	**1.76E-06**	1%	7.10E-02			
1,1,2-Trichloroethane	0.065	2.67E-02	1.60E-05	4.27E-07	0.1%	6.23E-02			
1,1-Dichloroethane	0.026	1.07E-02	1.60E-06	1.71E-08	0.006%	2.49E-02			
1,2,4-Trimethylbenzene	33.5	1.38E+01				3.21E+01	7.00E-03	**4.59E+00**	65%
1,2-Dibromoethane	0.034	1.40E-02	6.00E-04	**8.38E-06**	3%	3.26E-02	9.00E-03	3.62E-03	0.1%
1,2-Dichloroethane	2.1	8.63E-01	2.60E-05	**2.24E-05**	8%	2.01E+00	2.40E+00	8.39E-04	0.01%
1,2-Dichloropropane	0.0906	3.72E-02	1.00E-05	3.72E-07	0.1%	8.69E-02	4.00E-03	2.17E-02	0.3%
1,3,5-Trimethylbenzene	9.46	3.89E+00				9.07E+00	6.00E-03	**1.51E+00**	21%
1,4-Dichlorobenzene	0.565	2.32E-01	1.10E-05	**2.55E-06**	0.9%	5.42E-01	8.00E-01	6.77E-04	0.01%
Benzene	1.1	4.52E-01	2.90E-05	**1.31E-05**	5%	1.05E+00	3.00E-02	3.52E-02	0.5%
Bromomethane	0.185	7.60E-02				1.77E-01	5.00E-03	3.55E-02	0.5%
Carbon tetrachloride	0.501	2.06E-01	4.20E-05	**8.65E-06**	3%	4.80E-01	1.90E-01	2.53E-03	0.04%
Chlorobenzene	0.0372	1.53E-02				3.57E-02	5.00E-02	7.13E-04	0.01%
Chloroethane	0.178	7.32E-02				1.71E-01	1.00E+01	1.71E-05	0.0002%
Chloroform	2.53	1.04E+00	2.30E-05	**2.39E-05**	8%	2.43E+00	9.80E-02	2.48E-02	0.3%
Chloromethane	8.88	3.65E+00	1.80E-06	**6.57E-06**	2%	8.52E+00	9.00E-02	9.46E-02	1.3%
Ethylbenzene	1.26	5.18E-01	2.50E-06	**1.29E-06**	0.5%	1.21E+00	1.00E+00	1.21E-03	0.02%
Freon 11	2.95	1.21E+00				2.83E+00	7.00E-01	4.04E-03	0.06%
Freon 113	0.654	2.69E-01				6.27E-01	3.00E+01	2.09E-05	0.0003%
Freon 12	2.54	1.04E+00				2.44E+00	2.00E-01	1.22E-02	0.17%

Table 3-5
Risk Calculation Worksheet for 1428 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Methylene chloride	2.17	8.92E-01	1.00E-06	8.92E-07	0.3%	2.08E+00	4.00E-01	5.20E-03	0.07%
Naphthalene	1.09	4.48E-01	3.40E-05	**1.52E-05**	5%	1.05E+00	3.00E-03	3.48E-01	5%
Styrene	0.498	2.05E-01				4.78E-01	9.00E-01	5.31E-04	0.007%
Tetrachloroethene	1.74	7.15E-01	5.90E-06	**4.22E-06**	1%	1.67E+00	2.70E-01	6.18E-03	0.09%
Toluene	12.6	5.18E+00				1.21E+01	3.00E-01	4.03E-02	0.6%
trans-1,3-Dichloropropene	0.018	7.40E-03	1.60E-05	1.18E-07	0.04%	1.73E-02	2.00E-02	8.63E-04	0.01%
Trichloroethene	3.37	1.38E+00	2.00E-06	**2.77E-06**	1%	3.23E+00	1.00E-02	3.23E-01	5%
Vinyl chloride	1.58	6.49E-01	7.80E-05	**1.74E-04**	61%	1.52E+00	1.00E-01	1.52E-02	0.2%
Xylenes, m & p	5.49	2.26E+00				5.26E+00	7.00E-01	7.52E-03	0.1%
Xylenes, o	3.43	1.41E+00				3.29E+00	7.00E-01	4.70E-03	0.07%
			Total Risk:	2.9E-04			**Total HI:**	7.1E+00	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-6
Risk Calculation Worksheet for 1428 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0941	3.87E-02				9.02E-02	5.00E+00	1.80E-05	0.0005%
1,1,2,2-Tetrachloroethane	0.159	6.53E-02	5.80E-05	**3.79E-06**	2%	1.52E-01			
1,2,4-Trimethylbenzene	4.74	1.95E+00				4.55E+00	7.00E-03	6.49E-01	18%
1,2-Dichloroethane	0.126	5.18E-02	2.60E-05	**1.35E-06**	0.9%	1.21E-01	2.40E+00	5.03E-05	0.0014%
1,2-Dichloropropane	0.0513	2.11E-02	1.00E-05	2.11E-07	0.1%	4.92E-02	4.00E-03	1.23E-02	0.3%
1,3,5-Trimethylbenzene	4.09	1.68E+00				3.92E+00	6.00E-03	6.54E-01	18%
1,3-Dichlorobenzene	51	2.10E+01				4.89E+01	2.00E-01	2.45E-01	7%
1,4-Dichlorobenzene	1.14	4.68E-01	1.10E-05	**5.15E-06**	3%	1.09E+00	8.00E-01	1.37E-03	0.04%
Benzene	3.2	1.32E+00	2.90E-05	**3.81E-05**	24%	3.07E+00	3.00E-02	1.02E-01	3%
Bromomethane	0.244	1.00E-01				2.34E-01	5.00E-03	4.68E-02	1.3%
Carbon tetrachloride	0.565	2.32E-01	4.20E-05	**9.75E-06**	6%	5.42E-01	1.90E-01	2.85E-03	0.08%
Chlorobenzene	0.3	1.23E-01				2.88E-01	5.00E-02	5.75E-03	0.2%
Chloroethane	0.089	3.66E-02				8.53E-02	1.00E+01	8.53E-06	0.0002%
Chloroform	0.208	8.55E-02	2.30E-05	**1.97E-06**	1%	1.99E-01	9.80E-02	2.04E-03	0.06%
Chloromethane	1.28	5.26E-01	1.80E-06	9.47E-07	0.6%	1.23E+00	9.00E-02	1.36E-02	0.4%
cis-1,3-Dichloropropene	0.052	2.14E-02	1.60E-05	3.42E-07	0.2%	4.99E-02	2.00E-02	2.49E-03	0.07%
Ethylbenzene	12	4.93E+00	2.50E-06	**1.23E-05**	8%	1.15E+01	1.00E+00	1.15E-02	0.32%
Freon 11	2.08	8.55E-01				1.99E+00	7.00E-01	2.85E-03	0.08%
Freon 113	0.672	2.76E-01				6.44E-01	3.00E+01	2.15E-05	0.0006%
Freon 114	0.13	5.34E-02				1.25E-01	3.00E+01	4.16E-06	0.00012%
Freon 12	2.71	1.11E+00				2.60E+00	2.00E-01	1.30E-02	0.4%

Table 3-6
Risk Calculation Worksheet for 1428 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	**RME Medium EPC Value, Cair [ug/m^3]**	**Exposure Concentration [ug/m^3]**	**Unit Risk Factor [ug/m^3]$^{-1}$**	**Cancer Risk [-]**	**Percent Contribution (%)**	**Exposure Concentration [ug/m^3]**	**Reference Concentration (RfC) [mg/m^3]**	**Hazard Quotient [-]**	**Percent Contribution (%)**
Methyl tert-butyl ether	0.023	9.45E-03	2.60E-07	2.46E-09	0.002%	2.21E-02	3.00E+00	7.35E-06	0.0002%
Methylene chloride	6.26	2.57E+00	1.00E-06	**2.57E-06**	2%	6.00E+00	4.00E-01	1.50E-02	0.4%
Naphthalene	5.18	2.13E+00	3.40E-05	**7.24E-05**	46%	4.97E+00	3.00E-03	**1.66E+00**	46%
Styrene	6.8	2.79E+00				6.52E+00	9.00E-01	7.25E-03	0.2%
Tetrachloroethene	1.16	4.77E-01	5.90E-06	**2.81E-06**	2%	1.11E+00	2.70E-01	4.12E-03	0.11%
Toluene	12.5	5.14E+00				1.20E+01	3.00E-01	4.00E-02	1.1%
trans-1,2-Dichloroethene	0.042	1.73E-02				4.03E-02	6.00E-02	6.71E-04	0.02%
trans-1,3-Dichloropropene	0.041	1.68E-02	1.60E-05	2.70E-07	0.2%	3.93E-02	2.00E-02	1.97E-03	0.05%
Trichloroethene	0.261	1.07E-01	2.00E-06	2.15E-07	0.1%	2.50E-01	1.00E-02	2.50E-02	0.7%
Vinyl chloride	0.0385	1.58E-02	7.80E-05	**4.24E-06**	3%	3.69E-02	1.00E-01	3.69E-04	0.01%
Xylenes, m & p	44	1.81E+01				4.22E+01	7.00E-01	6.03E-02	1.7%
Xylenes, o	18	7.40E+00				1.73E+01	7.00E-01	2.47E-02	0.7%
			Total Risk:	1.6E-04			**Total HI:**	3.6E+00	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-7

Risk Calculation Worksheet for 1432 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0961	3.95E-02				9.22E-02	5.00E+00	1.84E-05	0.0002%
1,2,4-Trimethylbenzene	30.9	1.27E+01				2.96E+01	7.00E-03	**4.23E+00**	55%
1,2-Dichlorobenzene	0.16	6.58E-02				1.53E-01	2.00E-01	7.67E-04	0.01%
1,2-Dichloroethane	0.627	2.58E-01	2.60E-05	**6.70E-06**	1%	6.01E-01	2.40E+00	2.51E-04	0.003%
1,2-Dichloropropane	0.0615	2.53E-02	1.00E-05	2.53E-07	0.04%	5.90E-02	4.00E-03	1.47E-02	0.2%
1,3,5-Trimethylbenzene	11	4.52E+00				1.05E+01	6.00E-03	**1.76E+00**	23%
1,3-Dichlorobenzene	63	2.59E+01				6.04E+01	2.00E-01	3.02E-01	4%
1,4-Dichlorobenzene	1.63	6.70E-01	1.10E-05	**7.37E-06**	1%	1.56E+00	8.00E-01	1.95E-03	0.03%
1,4-Dioxane (p-dioxane)	0.26	1.07E-01	7.70E-06	8.23E-07	0.1%	2.49E-01	3.00E+00	8.31E-05	0.001%
Benzene	16	6.58E+00	2.90E-05	**1.91E-04**	34%	1.53E+01	3.00E-02	5.11E-01	7%
Bromomethane	0.33	1.36E-01				3.16E-01	5.00E-03	6.33E-02	0.8%
Carbon tetrachloride	0.531	2.18E-01	4.20E-05	**9.17E-06**	2%	5.09E-01	1.90E-01	2.68E-03	0.04%
Chlorobenzene	0.146	6.00E-02				1.40E-01	5.00E-02	2.80E-03	0.04%
Chloroethane	0.166	6.82E-02				1.59E-01	1.00E+01	1.59E-05	0.0002%
Chloroform	0.389	1.60E-01	2.30E-05	**3.68E-06**	0.6%	3.73E-01	9.80E-02	3.81E-03	0.05%
Chloromethane	3.07	1.26E+00	1.80E-06	**2.27E-06**	0.4%	2.94E+00	9.00E-02	3.27E-02	0.4%
cis-1,3-Dichloropropene	0.036	1.48E-02	1.60E-05	2.37E-07	0.04%	3.45E-02	2.00E-02	1.73E-03	0.02%
Ethylbenzene	20	8.22E+00	2.50E-06	**2.05E-05**	4%	1.92E+01	1.00E+00	1.92E-02	0.3%
Freon 11	2.16	8.88E-01				2.07E+00	7.00E-01	2.96E-03	0.04%
Freon 113	0.676	2.78E-01				6.48E-01	3.00E+01	2.16E-05	0.0003%

Table 3-7
Risk Calculation Worksheet for 1432 3rd St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Freon 114	0.23	9.45E-02				2.21E-01	3.00E+01	7.35E-06	0.0001%
Freon 12	2.54	1.04E+00				2.44E+00	2.00E-01	1.22E-02	0.2%
Methyl tert-butyl ether	0.019	7.81E-03	2.60E-07	2.03E-09	0.0004%	1.82E-02	3.00E+00	6.07E-06	0.00008%
Methylene chloride	1.37	5.63E-01	1.00E-06	5.63E-07	0.1%	1.31E+00	4.00E-01	3.28E-03	0.04%
Naphthalene	0.882	3.62E-01	3.40E-05	**1.23E-05**	2%	8.46E-01	3.00E-03	2.82E-01	4%
Styrene	5.56	2.28E+00				5.33E+00	9.00E-01	5.92E-03	0.08%
Tetrachloroethene	2.21	9.08E-01	5.90E-06	**5.36E-06**	0.9%	2.12E+00	2.70E-01	7.85E-03	0.1%
Toluene	30.6	1.26E+01				2.93E+01	3.00E-01	9.78E-02	1.3%
trans-1,3-Dichloropropene	0.04	1.64E-02	1.60E-05	2.63E-07	0.05%	3.84E-02	2.00E-02	1.92E-03	0.03%
Trichloroethene	0.886	3.64E-01	2.00E-06	7.28E-07	0.13%	8.50E-01	1.00E-02	8.50E-02	1%
Vinyl chloride	2.8	1.15E+00	7.80E-05	**3.08E-04**	54%	2.68E+00	1.00E-01	2.68E-02	0.4%
Xylenes, m & p	93.7	3.85E+01				8.98E+01	7.00E-01	1.28E-01	2%
Xylenes, o	32.9	1.35E+01				3.15E+01	7.00E-01	4.51E-02	0.6%
			Total Risk:	5.7E-04			**Total HI:**	7.6E+00	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-8
Risk Calculation Worksheet for 1432 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0823	3.38E-02				7.89E-02	5.00E+00	1.58E-05	0.002%
1,2,4-Trimethylbenzene	0.983	4.04E-01				9.43E-01	7.00E-03	1.35E-01	18%
1,2-Dichlorobenzene	0.13	5.34E-02				1.25E-01	2.00E-01	6.23E-04	0.1%
1,2-Dichloroethane	0.0557	2.29E-02	2.60E-05	5.95E-07	2%	5.34E-02	2.40E+00	2.23E-05	0.003%
1,2-Dichloropropane	0.0438	1.80E-02	1.00E-05	1.80E-07	0.5%	4.20E-02	4.00E-03	1.05E-02	1%
1,3,5-Trimethylbenzene	0.354	1.45E-01				3.39E-01	6.00E-03	5.66E-02	7%
1,3-Dichlorobenzene	0.092	3.78E-02				8.82E-02	2.00E-01	4.41E-04	0.06%
1,4-Dichlorobenzene	0.25	1.03E-01	1.10E-05	**1.13E-06**	3%	2.40E-01	8.00E-01	3.00E-04	0.04%
Benzene	0.852	3.50E-01	2.90E-05	**1.02E-05**	27%	8.17E-01	3.00E-02	2.72E-02	4%
Bromomethane	1.18	4.85E-01				1.13E+00	5.00E-03	2.26E-01	30%
Carbon tetrachloride	0.525	2.16E-01	4.20E-05	**9.06E-06**	24%	5.03E-01	1.90E-01	2.65E-03	0.3%
Chlorobenzene	0.022	9.04E-03				2.11E-02	5.00E-02	4.22E-04	0.06%
Chloroethane	0.0991	4.07E-02				9.50E-02	1.00E+01	9.50E-06	0.001%
Chloroform	0.234	9.62E-02	2.30E-05	**2.21E-06**	6%	2.24E-01	9.80E-02	2.29E-03	0.3%
Chloromethane	1.21	4.97E-01	1.80E-06	8.95E-07	2%	1.16E+00	9.00E-02	1.29E-02	2%
cis-1,3-Dichloropropene	0.051	2.10E-02	1.60E-05	3.35E-07	0.9%	4.89E-02	2.00E-02	2.45E-03	0.3%
Ethylbenzene	0.642	2.64E-01	2.50E-06	6.60E-07	2%	6.16E-01	1.00E+00	6.16E-04	0.1%
Freon 11	2.05	8.42E-01				1.97E+00	7.00E-01	2.81E-03	0.4%
Freon 113	0.645	2.65E-01				6.18E-01	3.00E+01	2.06E-05	0.003%
Freon 114	0.13	5.34E-02				1.25E-01	3.00E+01	4.16E-06	0.0005%

Table 3-8
Risk Calculation Worksheet for 1432 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Freon 12	2.52	1.04E+00				2.42E+00	2.00E-01	1.21E-02	2%
Methyl tert-butyl ether	0.019	7.81E-03	2.60E-07	2.03E-09	0.005%	1.82E-02	3.00E+00	6.07E-06	0.001%
Methylene chloride	1.78	7.32E-01	1.00E-06	7.32E-07	2%	1.71E+00	4.00E-01	4.27E-03	1%
Naphthalene	0.74	3.04E-01	3.40E-05	**1.03E-05**	28%	7.10E-01	3.00E-03	2.37E-01	31%
Styrene	0.193	7.93E-02				1.85E-01	9.00E-01	2.06E-04	0.03%
Tetrachloroethene	0.239	9.82E-02	5.90E-06	5.79E-07	2%	2.29E-01	2.70E-01	8.49E-04	0.1%
Toluene	3.96	1.63E+00				3.80E+00	3.00E-01	1.27E-02	2%
trans-1,3-Dichloropropene	0.046	1.89E-02	1.60E-05	3.02E-07	0.8%	4.41E-02	2.00E-02	2.21E-03	0.3%
Trichloroethene	0.102	4.19E-02	2.00E-06	8.38E-08	0.2%	9.78E-02	1.00E-02	9.78E-03	1%
Xylenes, m & p	2.12	8.71E-01				2.03E+00	7.00E-01	2.90E-03	0.4%
Xylenes, o	0.704	2.89E-01				6.75E-01	7.00E-01	9.64E-04	0.1%
			Total Risk:	3.7E-05			**Total HI:**	7.6E-01	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-9
Risk Calculation Worksheet for 1436 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.099	4.07E-02				9.49E-02	5.00E+00	1.90E-05	0.002%
1,2,4-Trimethylbenzene	1.59	6.53E-01				1.52E+00	7.00E-03	2.18E-01	27%
1,2-Dichlorobenzene	0.1	4.11E-02				9.59E-02	2.00E-01	4.79E-04	0.06%
1,2-Dichloroethane	0.061	2.51E-02	2.60E-05	6.52E-07	0.5%	5.85E-02	2.40E+00	2.44E-05	0.003%
1,3,5-Trimethylbenzene	0.537	2.21E-01				5.15E-01	6.00E-03	8.58E-02	11%
1,3-Dichlorobenzene	0.074	3.04E-02				7.10E-02	2.00E-01	3.55E-04	0.04%
1,4-Dichlorobenzene	0.204	8.38E-02	1.10E-05	9.22E-07	0.8%	1.96E-01	8.00E-01	2.45E-04	0.03%
1,4-Dioxane (p-dioxane)	0.22	9.04E-02	7.70E-06	6.96E-07	0.6%	2.11E-01	3.00E+00	7.03E-05	0.009%
Benzene	1.32	5.42E-01	2.90E-05	**1.57E-05**	13%	1.27E+00	3.00E-02	4.22E-02	5%
Bromomethane	0.295	1.21E-01				2.83E-01	5.00E-03	5.66E-02	7%
Carbon tetrachloride	0.568	2.33E-01	4.20E-05	**9.80E-06**	8%	5.45E-01	1.90E-01	2.87E-03	0.4%
Chlorobenzene	0.048	1.97E-02				4.60E-02	5.00E-02	9.21E-04	0.11%
Chloroethane	0.0689	2.83E-02				6.61E-02	1.00E+01	6.61E-06	0.0008%
Chloroform	0.274	1.13E-01	2.30E-05	**2.59E-06**	2%	2.63E-01	9.80E-02	2.68E-03	0.3%
Chloromethane	7.27	2.99E+00	1.80E-06	**5.38E-06**	5%	6.97E+00	9.00E-02	7.75E-02	10%
Ethylbenzene	1.57	6.45E-01	2.50E-06	**1.61E-06**	1.4%	1.51E+00	1.00E+00	1.51E-03	0.2%
Freon 11	1.98	8.14E-01				1.90E+00	7.00E-01	2.71E-03	0.3%
Freon 113	0.692	2.84E-01				6.64E-01	3.00E+01	2.21E-05	0.003%
Freon 114	0.14	5.75E-02				1.34E-01	3.00E+01	4.47E-06	0.0006%
Freon 12	2.81	1.15E+00				2.69E+00	2.00E-01	1.35E-02	2%

Table 3-9
Risk Calculation Worksheet for 1436 3rd St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Methylene chloride	6.99	2.87E+00	1.00E-06	**2.87E-06**	2%	6.70E+00	4.00E-01	1.68E-02	2%
Naphthalene	0.62	2.55E-01	3.40E-05	**8.66E-06**	7%	5.95E-01	3.00E-03	1.98E-01	25%
Styrene	0.314	1.29E-01				3.01E-01	9.00E-01	3.35E-04	0.04%
Tetrachloroethene	0.252	1.04E-01	5.90E-06	6.11E-07	0.5%	2.42E-01	2.70E-01	8.95E-04	0.11%
Toluene	14	5.75E+00				1.34E+01	3.00E-01	4.47E-02	6%
Trichloroethene	0.189	7.77E-02	2.00E-06	1.55E-07	0.13%	1.81E-01	1.00E-02	1.81E-02	2%
Vinyl chloride	0.627	2.58E-01	7.80E-05	**6.90E-05**	58%	6.01E-01	1.00E-01	6.01E-03	0.7%
Xylenes, m & p	7.9	3.25E+00				7.58E+00	7.00E-01	1.08E-02	1.3%
Xylenes, o	1.65	6.78E-01				1.58E+00	7.00E-01	2.26E-03	0.3%
			Total Risk:	1.2E-04			**Total HI:**	8.0E-01	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-10

Risk Calculation Worksheet for 320 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.117	4.81E-02				1.12E-01	5.00E+00	2.24E-05	0.003%
1,2,4-Trimethylbenzene	1.94	7.97E-01				1.86E+00	7.00E-03	2.66E-01	36%
1,2-Dichloroethane	1.17	4.81E-01	2.60E-05	**1.25E-05**	23%	1.12E+00	2.40E+00	4.67E-04	0.06%
1,2-Dichloropropane	0.14	5.75E-02	1.00E-05	5.75E-07	1%	1.34E-01	4.00E-03	3.36E-02	5%
1,3,5-Trimethylbenzene	0.678	2.79E-01				6.50E-01	6.00E-03	1.08E-01	15%
1,4-Dichlorobenzene	0.916	3.76E-01	1.10E-05	**4.14E-06**	8%	8.78E-01	8.00E-01	1.10E-03	0.15%
Benzene	1.32	5.42E-01	2.90E-05	**1.57E-05**	29%	1.27E+00	3.00E-02	4.22E-02	6%
Bromomethane	0.353	1.45E-01				3.38E-01	5.00E-03	6.77E-02	9%
Carbon tetrachloride	0.537	2.21E-01	4.20E-05	**9.27E-06**	17%	5.15E-01	1.90E-01	2.71E-03	0.4%
Chlorobenzene	0.032	1.32E-02				3.07E-02	5.00E-02	6.14E-04	0.08%
Chloroethane	0.029	1.19E-02				2.78E-02	1.00E+01	2.78E-06	0.0004%
Chloroform	0.353	1.45E-01	2.30E-05	**3.34E-06**	6%	3.38E-01	9.80E-02	3.45E-03	0.5%
Chloromethane	1.04	4.27E-01	1.80E-06	7.69E-07	1.4%	9.97E-01	9.00E-02	1.11E-02	1.5%
cis-1,3-Dichloropropene	0.053	2.18E-02	1.60E-05	3.48E-07	0.6%	5.08E-02	2.00E-02	2.54E-03	0.3%
Ethylbenzene	1.67	6.86E-01	2.50E-06	**1.72E-06**	3%	1.60E+00	1.00E+00	1.60E-03	0.2%
Freon 11	2.71	1.11E+00				2.60E+00	7.00E-01	3.71E-03	0.5%
Freon 113	0.64	2.63E-01				6.14E-01	3.00E+01	2.05E-05	0.003%
Freon 12	2.5	1.03E+00				2.40E+00	2.00E-01	1.20E-02	2%
Methyl tert-butyl ether	0.022	9.04E-03	2.60E-07	2.35E-09	0.004%	2.11E-02	3.00E+00	7.03E-06	0.0009%
Methylene chloride	4.4	1.81E+00	1.00E-06	**1.81E-06**	3%	4.22E+00	4.00E-01	1.05E-02	1.4%
Styrene	0.462	1.90E-01				4.43E-01	9.00E-01	4.92E-04	0.07%

Table 3-10

Risk Calculation Worksheet for 320 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Tetrachloroethene	0.539	2.22E-01	5.90E-06	**1.31E-06**	2%	5.17E-01	2.70E-01	1.91E-03	0.3%
Toluene	14.1	5.79E+00				1.35E+01	3.00E-01	4.51E-02	6%
trans-1,3-Dichloropropene	0.047	1.93E-02	1.60E-05	3.09E-07	0.6%	4.51E-02	2.00E-02	2.25E-03	0.3%
Trichloroethene	1.19	4.89E-01	2.00E-06	9.78E-07	2%	1.14E+00	1.00E-02	1.14E-01	15%
Vinyl chloride	0.0202	8.30E-03	7.80E-05	**2.22E-06**	4%	1.94E-02	1.00E-01	1.94E-04	0.03%
Xylenes, m & p	5.8	2.38E+00				5.56E+00	7.00E-01	7.95E-03	1.1%
Xylenes, o	2.02	8.30E-01				1.94E+00	7.00E-01	2.77E-03	0.4%
			Total Risk:	5.5E-05			**Total HI:**	7.4E-01	

Notes:

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 3-11

Risk Calculation Worksheet for 320 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0868	3.57E-02				8.32E-02	5.00E+00	1.66E-05	0.001%
1,2,4-Trimethylbenzene	1.72	7.07E-01				1.65E+00	7.00E-03	2.36E-01	20%
1,2-Dichloroethane	0.0785	3.23E-02	2.60E-05	8.39E-07	1%	7.53E-02	2.40E+00	3.14E-05	0.003%
1,3,5-Trimethylbenzene	0.83	3.41E-01				7.96E-01	6.00E-03	1.33E-01	12%
1,4-Dichlorobenzene	0.19	7.81E-02	1.10E-05	8.59E-07	1%	1.82E-01	8.00E-01	2.28E-04	0.02%
Benzene	1.35	5.55E-01	2.90E-05	**1.61E-05**	26%	1.29E+00	3.00E-02	4.32E-02	4%
Bromomethane	0.18	7.40E-02				1.73E-01	5.00E-03	3.45E-02	3%
Carbon tetrachloride	0.546	2.24E-01	4.20E-05	**9.42E-06**	15%	5.24E-01	1.90E-01	2.76E-03	0.2%
Chlorobenzene	0.02	8.22E-03				1.92E-02	5.00E-02	3.84E-04	0.03%
Chloroform	0.311	1.28E-01	2.30E-05	**2.94E-06**	5%	2.98E-01	9.80E-02	3.04E-03	0.3%
Chloromethane	1.1	4.52E-01	1.80E-06	8.14E-07	1%	1.05E+00	9.00E-02	1.17E-02	1%
cis-1,3-Dichloropropene	0.046	1.89E-02	1.60E-05	3.02E-07	0.5%	4.41E-02	2.00E-02	2.21E-03	0.2%
Ethylbenzene	1.27	5.22E-01	2.50E-06	**1.30E-06**	2%	1.22E+00	1.00E+00	1.22E-03	0.1%
Freon 11	3.09	1.27E+00				2.96E+00	7.00E-01	4.23E-03	0.4%
Freon 113	0.736	3.02E-01				7.06E-01	3.00E+01	2.35E-05	0.002%
Freon 12	2.66	1.09E+00				2.55E+00	2.00E-01	1.28E-02	1%
Methylene chloride	3.01	1.24E+00	1.00E-06	**1.24E-06**	2%	2.89E+00	4.00E-01	7.22E-03	0.6%
Naphthalene	1.9	7.81E-01	3.40E-05	**2.65E-05**	43%	1.82E+00	3.00E-03	6.07E-01	53%
Styrene	0.315	1.29E-01				3.02E-01	9.00E-01	3.36E-04	0.03%
Tetrachloroethene	0.27	1.11E-01	5.90E-06	6.55E-07	1%	2.59E-01	2.70E-01	9.59E-04	0.1%

Table 3-11
Risk Calculation Worksheet for 320 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Toluene	8.71	3.58E+00				8.35E+00	3.00E-01	2.78E-02	2%
trans-1,3-Dichloropropene	0.037	1.52E-02	1.60E-05	2.43E-07	0.4%	3.55E-02	2.00E-02	1.77E-03	0.2%
Trichloroethene	0.1	4.11E-02	2.00E-06	8.22E-08	0.1%	9.59E-02	1.00E-02	9.59E-03	1%
Xylenes, m & p	6.4	2.63E+00				6.14E+00	7.00E-01	8.77E-03	1%
Xylenes, o	2.2	9.04E-01				2.11E+00	7.00E-01	3.01E-03	0.3%
			Total Risk:	6.1E-05			**Total HI:**	1.2E+00	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-12
Risk Calculation Worksheet for 326 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0864	3.55E-02				8.28E-02	5.00E+00	1.66E-05	0.003%
1,1,2,2-Tetrachloroethane	0.39	1.60E-01	5.80E-05	**9.30E-06**	12%	3.74E-01			
1,1,2-Trichloroethane	0.076	3.12E-02	1.60E-05	5.00E-07	0.6%	7.29E-02			
1,1-Dichloroethane	0.015	6.16E-03	1.60E-06	9.86E-09	0.013%	1.44E-02			
1,2,4-Trimethylbenzene	1.08	4.44E-01				1.04E+00	7.00E-03	1.48E-01	27%
1,2-Dichlorobenzene	0.13	5.34E-02				1.25E-01	2.00E-01	6.23E-04	0.11%
1,2-Dichloroethane	1.57	6.45E-01	2.60E-05	**1.68E-05**	22%	1.51E+00	2.40E+00	6.27E-04	0.11%
1,2-Dichloropropane	0.102	4.19E-02	1.00E-05	4.19E-07	0.5%	9.78E-02	4.00E-03	2.45E-02	4%
1,3,5-Trimethylbenzene	0.22	9.04E-02				2.11E-01	6.00E-03	3.52E-02	6%
1,3-Dichlorobenzene	0.096	3.95E-02				9.21E-02	2.00E-01	4.60E-04	0.08%
1,4-Dichlorobenzene	2.5	1.03E+00	1.10E-05	**1.13E-05**	15%	2.40E+00	8.00E-01	3.00E-03	0.5%
1,4-Dioxane (p-dioxane)	0.18	7.40E-02	7.70E-06	5.70E-07	0.7%	1.73E-01	3.00E+00	5.75E-05	0.011%
Benzene	0.978	4.02E-01	2.90E-05	**1.17E-05**	15%	9.38E-01	3.00E-02	3.13E-02	6%
Bromomethane	0.204	8.38E-02				1.96E-01	5.00E-03	3.91E-02	7%
Carbon tetrachloride	0.519	2.13E-01	4.20E-05	**8.96E-06**	12%	4.98E-01	1.90E-01	2.62E-03	0.5%
Chlorobenzene	0.033	1.36E-02				3.16E-02	5.00E-02	6.33E-04	0.12%
Chloroethane	0.0607	2.49E-02				5.82E-02	1.00E+01	5.82E-06	0.0011%
Chloroform	0.272	1.12E-01	2.30E-05	**2.57E-06**	3%	2.61E-01	9.80E-02	2.66E-03	0.5%
Chloromethane	1.06	4.36E-01	1.80E-06	7.84E-07	1%	1.02E+00	9.00E-02	1.13E-02	2%
cis-1,2-Dichloroethene	0.018	7.40E-03				1.73E-02			
cis-1,3-Dichloropropene	0.039	1.60E-02	1.60E-05	2.56E-07	0.3%	3.74E-02	2.00E-02	1.87E-03	0.3%
Ethylbenzene	1	4.11E-01	2.50E-06	**1.03E-06**	1%	9.59E-01	1.00E+00	9.59E-04	0.2%
Freon 11	2.14	8.79E-01				2.05E+00	7.00E-01	2.93E-03	0.5%

Table 3-12
Risk Calculation Worksheet for 326 Center St - Crawl Space Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Crawl Space Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Freon 113	0.668	2.75E-01				6.41E-01	3.00E+01	2.14E-05	0.004%
Freon 114	0.11	4.52E-02				1.05E-01	3.00E+01	3.52E-06	0.0006%
Freon 12	2.84	1.17E+00				2.72E+00	2.00E-01	1.36E-02	2%
Hexachlorobutadiene	0.68	2.79E-01	2.20E-05	**6.15E-06**	8%	6.52E-01			
Methyl tert-butyl ether	0.016	6.58E-03	2.60E-07	1.71E-09	0.002%	1.53E-02	3.00E+00	5.11E-06	0.0009%
Methylene chloride	2.12	8.71E-01	1.00E-06	8.71E-07	1%	2.03E+00	4.00E-01	5.08E-03	0.9%
Styrene	0.508	2.09E-01				4.87E-01	9.00E-01	5.41E-04	0.10%
Tetrachloroethene	0.469	1.93E-01	5.90E-06	**1.14E-06**	1%	4.50E-01	2.70E-01	1.67E-03	0.3%
Toluene	16.2	6.66E+00				1.55E+01	3.00E-01	5.18E-02	9%
Trichloroethene	1.69	6.95E-01	2.00E-06	**1.39E-06**	2%	1.62E+00	1.00E-02	1.62E-01	30%
Vinyl chloride	0.0357	1.47E-02	7.80E-05	**3.93E-06**	5%	3.42E-02	1.00E-01	3.42E-04	0.06%
Xylenes, m & p	3.78	1.55E+00				3.62E+00	7.00E-01	5.18E-03	0.9%
Xylenes, o	0.913	3.75E-01				8.75E-01	7.00E-01	1.25E-03	0.2%
			Total Risk:	7.8E-05			**Total HI:**	5.5E-01	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-13
Risk Calculation Worksheet for 326 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0861	3.54E-02				8.26E-02	5.00E+00	1.65E-05	0.005%
1,2,4-Trimethylbenzene	0.612	2.52E-01				5.87E-01	7.00E-03	8.38E-02	24%
1,2-Dichlorobenzene	0.083	3.41E-02				7.96E-02	2.00E-01	3.98E-04	0.1%
1,2-Dichloroethane	0.0526	2.16E-02	2.60E-05	5.62E-07	2%	5.04E-02	2.40E+00	2.10E-05	0.006%
1,3,5-Trimethylbenzene	0.511	2.10E-01				4.90E-01	6.00E-03	8.17E-02	23%
1,3-Dichlorobenzene	0.047	1.93E-02				4.51E-02	2.00E-01	2.25E-04	0.06%
1,4-Dichlorobenzene	0.85	3.49E-01	1.10E-05	**3.84E-06**	12%	8.15E-01	8.00E-01	1.02E-03	0.3%
Benzene	1.01	4.15E-01	2.90E-05	**1.20E-05**	37%	9.68E-01	3.00E-02	3.23E-02	9%
Bromomethane	0.269	1.11E-01				2.58E-01	5.00E-03	5.16E-02	14%
Carbon tetrachloride	0.516	2.12E-01	4.20E-05	**8.91E-06**	27%	4.95E-01	1.90E-01	2.60E-03	0.7%
Chlorobenzene	0.015	6.16E-03				1.44E-02	5.00E-02	2.88E-04	0.08%
Chloroethane	0.0629	2.58E-02				6.03E-02	1.00E+01	6.03E-06	0.002%
Chloroform	0.255	1.05E-01	2.30E-05	**2.41E-06**	7%	2.45E-01	9.80E-02	2.50E-03	0.7%
Chloromethane	1.19	4.89E-01	1.80E-06	8.80E-07	3%	1.14E+00	9.00E-02	1.27E-02	4%
cis-1,3-Dichloropropene	0.052	2.14E-02	1.60E-05	3.42E-07	1%	4.99E-02	2.00E-02	2.49E-03	0.7%
Ethylbenzene	1.06	4.36E-01	2.50E-06	**1.09E-06**	3%	1.02E+00	1.00E+00	1.02E-03	0.3%
Freon 11	1.58	6.49E-01				1.52E+00	7.00E-01	2.16E-03	0.6%
Freon 113	0.66	2.71E-01				6.33E-01	3.00E+01	2.11E-05	0.006%
Freon 12	2.61	1.07E+00				2.50E+00	2.00E-01	1.25E-02	4%
Methyl tert-butyl ether	0.023	9.45E-03	2.60E-07	2.46E-09	0.007%	2.21E-02	3.00E+00	7.35E-06	0.002%

Table 3-13

Risk Calculation Worksheet for 326 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Methylene chloride	3.14	1.29E+00	1.00E-06	**1.29E-06**	4%	3.01E+00	4.00E-01	7.53E-03	2%
Naphthalene	0.036	1.48E-02	3.40E-05	5.03E-07	2%	3.45E-02	3.00E-03	1.15E-02	3%
Styrene	0.0831	3.42E-02				7.97E-02	9.00E-01	8.85E-05	0.0%
Tetrachloroethene	0.26	1.07E-01	5.90E-06	6.30E-07	2%	2.49E-01	2.70E-01	9.23E-04	0.3%
Toluene	10	4.11E+00				9.59E+00	3.00E-01	3.20E-02	9%
trans-1,3-Dichloropropene	0.048	1.97E-02	1.60E-05	3.16E-07	1%	4.60E-02	2.00E-02	2.30E-03	0.6%
Trichloroethene	0.0761	3.13E-02	2.00E-06	6.25E-08	0.2%	7.30E-02	1.00E-02	7.30E-03	2%
Xylenes, m & p	3.99	1.64E+00				3.83E+00	7.00E-01	5.47E-03	2%
Xylenes, o	1.31	5.38E-01				1.26E+00	7.00E-01	1.79E-03	0.5%
			Total Risk:	3.3E-05			**Total HI:**	3.6E-01	

Notes:

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 3-14

Risk Calculation Worksheet for 339 Center St - Outdoor Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Outdoor Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.096	3.95E-02				9.21E-02	5.00E+00	1.84E-05	0.003%
1,2,4-Trimethylbenzene	2.4	9.86E-01				2.30E+00	7.00E-03	3.29E-01	50%
1,2-Dichloroethane	0.09	3.70E-02	2.60E-05	9.62E-07	2%	8.63E-02	2.40E+00	3.60E-05	0.005%
1,3,5-Trimethylbenzene	0.83	3.41E-01				7.96E-01	6.00E-03	1.33E-01	20%
1,4-Dichlorobenzene	0.19	7.81E-02	1.10E-05	8.59E-07	2%	1.82E-01	8.00E-01	2.28E-04	0.03%
Benzene	1.8	7.40E-01	2.90E-05	**2.15E-05**	51%	1.73E+00	3.00E-02	5.75E-02	9%
Bromomethane	0.18	7.40E-02				1.73E-01	5.00E-03	3.45E-02	5%
Carbon tetrachloride	0.56	2.30E-01	4.20E-05	**9.67E-06**	23%	5.37E-01	1.90E-01	2.83E-03	0.4%
Chlorobenzene	0.02	8.22E-03				1.92E-02	5.00E-02	3.84E-04	0.06%
Chloroform	0.35	1.44E-01	2.30E-05	**3.31E-06**	8%	3.36E-01	9.80E-02	3.42E-03	0.5%
Chloromethane	1.1	4.52E-01	1.80E-06	8.14E-07	2%	1.05E+00	9.00E-02	1.17E-02	1.8%
cis-1,3-Dichloropropene	0.046	1.89E-02	1.60E-05	3.02E-07	0.7%	4.41E-02	2.00E-02	2.21E-03	0.3%
Ethylbenzene	1.8	7.40E-01	2.50E-06	**1.85E-06**	4%	1.73E+00	1.00E+00	1.73E-03	0.3%
Freon 11	3.5	1.44E+00				3.36E+00	7.00E-01	4.79E-03	0.7%
Freon 113	0.8	3.29E-01				7.67E-01	3.00E+01	2.56E-05	0.004%
Freon 12	2.8	1.15E+00				2.68E+00	2.00E-01	1.34E-02	2.0%
Methylene chloride	4.2	1.73E+00	1.00E-06	**1.73E-06**	4%	4.03E+00	4.00E-01	1.01E-02	1.5%
Styrene	0.35	1.44E-01				3.36E-01	9.00E-01	3.73E-04	0.06%
Tetrachloroethene	0.27	1.11E-01	5.90E-06	6.55E-07	2%	2.59E-01	2.70E-01	9.59E-04	0.14%
Toluene	11	4.52E+00				1.05E+01	3.00E-01	3.52E-02	5.3%

Table 3-14

Risk Calculation Worksheet for 339 Center St - Outdoor Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Outdoor Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
trans-1,3-Dichloropropene	0.037	1.52E-02	1.60E-05	2.43E-07	0.6%	3.55E-02	2.00E-02	1.77E-03	0.3%
Trichloroethene	0.1	4.11E-02	2.00E-06	8.22E-08	0.2%	9.59E-02	1.00E-02	9.59E-03	1.4%
Xylenes, m & p	6.4	2.63E+00				6.14E+00	7.00E-01	8.77E-03	1.3%
Xylenes, o	2.2	9.04E-01				2.11E+00	7.00E-01	3.01E-03	0.5%
			Total Risk:	4.2E-05			**Total HI:**	0.7	

Notes:

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 3-15
Risk Calculation Worksheet for 356 Center St - Outdoor Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Outdoor Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.065	2.67E-02				6.23E-02	5.00E+00	1.25E-05	0.001%
1,2,4-Trimethylbenzene	0.79	3.25E-01				7.58E-01	7.00E-03	1.08E-01	12%
1,2-Dichloroethane	0.054	2.22E-02	2.60E-05	5.77E-07	1.2%	5.18E-02	2.40E+00	2.16E-05	0.002%
1,3,5-Trimethylbenzene	0.19	7.81E-02				1.82E-01	6.00E-03	3.04E-02	3%
1,4-Dichlorobenzene	0.62	2.55E-01	1.10E-05	**2.80E-06**	6%	5.95E-01	8.00E-01	7.43E-04	0.1%
1,4-Dioxane (p-dioxane)	0.89	3.66E-01	7.70E-06	**2.82E-06**	6%	8.53E-01	3.00E+00	2.84E-04	0.03%
Benzene	0.41	1.68E-01	2.90E-05	**4.89E-06**	10%	3.93E-01	3.00E-02	1.31E-02	1.5%
Bromomethane	0.36	1.48E-01				3.45E-01	5.00E-03	6.90E-02	8%
Carbon tetrachloride	0.5	2.05E-01	4.20E-05	**8.63E-06**	18%	4.79E-01	1.90E-01	2.52E-03	0.3%
Chloromethane	0.98	4.03E-01	1.80E-06	7.25E-07	1.5%	9.40E-01	9.00E-02	1.04E-02	1.2%
cis-1,2-Dichloroethene	0.031	1.27E-02				2.97E-02			
Ethylbenzene	0.53	2.18E-01	2.50E-06	5.45E-07	1.1%	5.08E-01	1.00E+00	5.08E-04	0.06%
Freon 11	1.2	4.93E-01				1.15E+00	7.00E-01	1.64E-03	0.2%
Freon 113	0.68	2.79E-01				6.52E-01	3.00E+01	2.17E-05	0.002%
Freon 12	2.4	9.86E-01				2.30E+00	2.00E-01	1.15E-02	1.3%
Methylene chloride	0.6	2.47E-01	1.00E-06	2.47E-07	0.5%	5.75E-01	4.00E-01	1.44E-03	0.2%
Naphthalene	1.9	7.81E-01	3.40E-05	**2.65E-05**	55%	1.82E+00	3.00E-03	6.07E-01	70%
Tetrachloroethene	0.12	4.93E-02	5.90E-06	2.91E-07	0.6%	1.15E-01	2.70E-01	4.26E-04	0.05%
Toluene	2.1	8.63E-01				2.01E+00	3.00E-01	6.71E-03	0.8%
Trichloroethene	0.034	1.40E-02	2.00E-06	2.79E-08	0.06%	3.26E-02	1.00E-02	3.26E-03	0.4%
Xylenes, m & p	1.2	4.93E-01				1.15E+00	7.00E-01	1.64E-03	0.2%
Xylenes, o	0.57	2.34E-01				5.47E-01	7.00E-01	7.81E-04	0.09%
			Total Risk:	4.8E-05			**Total HI:**	0.9	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-16

Risk Calculation Worksheet for 360 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.103	4.23E-02				9.88E-02	5.00E+00	1.98E-05	0.002%
1,2,4-Trimethylbenzene	5.8	2.38E+00				5.56E+00	7.00E-03	7.95E-01	62%
1,2-Dichloroethane	0.106	4.36E-02	2.60E-05	**1.13E-06**	3%	1.02E-01	2.40E+00	4.24E-05	0.003%
1,3,5-Trimethylbenzene	1.12	4.60E-01				1.07E+00	6.00E-03	1.79E-01	14%
1,4-Dichlorobenzene	0.243	9.99E-02	1.10E-05	**1.10E-06**	3%	2.33E-01	8.00E-01	2.91E-04	0.02%
1,4-Dioxane (p-dioxane)	0.36	1.48E-01	7.70E-06	**1.14E-06**	3%	3.45E-01	3.00E+00	1.15E-04	0.01%
Benzene	1.47	6.04E-01	2.90E-05	**1.75E-05**	41%	1.41E+00	3.00E-02	4.70E-02	4%
Bromomethane	0.311	1.28E-01				2.98E-01	5.00E-03	5.96E-02	5%
Carbon tetrachloride	0.666	2.74E-01	4.20E-05	**1.15E-05**	27%	6.39E-01	1.90E-01	3.36E-03	0.3%
Chlorobenzene	0.052	2.14E-02				4.99E-02	5.00E-02	9.97E-04	0.08%
Chloroethane	0.075	3.08E-02				7.19E-02	1.00E+01	7.19E-06	0.0006%
Chloroform	0.272	1.12E-01	2.30E-05	**2.57E-06**	6%	2.61E-01	9.80E-02	2.66E-03	0.2%
Chloromethane	1.18	4.85E-01	1.80E-06	8.73E-07	2%	1.13E+00	9.00E-02	1.26E-02	1%
Ethylbenzene	3.5	1.44E+00	2.50E-06	**3.60E-06**	9%	3.36E+00	1.00E+00	3.36E-03	0.3%
Freon 11	1.63	6.70E-01				1.56E+00	7.00E-01	2.23E-03	0.2%
Freon 113	0.626	2.57E-01				6.00E-01	3.00E+01	2.00E-05	0.002%
Freon 12	2.6	1.07E+00				2.49E+00	2.00E-01	1.25E-02	1%
Freon 114	0.12	4.93E-02				1.15E-01	3.00E+01	3.84E-06	0.0003%
Methylene chloride	3.25	1.34E+00	1.00E-06	**1.34E-06**	3%	3.12E+00	4.00E-01	7.79E-03	0.6%
Naphthalene	0.041	1.68E-02	3.40E-05	5.73E-07	1%	3.93E-02	3.00E-03	1.31E-02	1%

Table 3-16
Risk Calculation Worksheet for 360 Center St - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	**Variable**	**Value**	**Units**
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				**Inhalation Noncancer**			
Chemical of Potential Concern	**RME Medium EPC Value, Cair [ug/m^3]**	**Exposure Concentration [ug/m^3]**	**Unit Risk Factor [ug/m^3]$^{-1}$**	**Cancer Risk [-]**	**Percent Contribution (%)**	**Exposure Concentration [ug/m^3]**	**Reference Concentration (RfC) [mg/m^3]**	**Hazard Quotient [-]**	**Percent Contribution (%)**
Styrene	0.397	1.63E-01				3.81E-01	9.00E-01	4.23E-04	0.03%
Tetrachloroethene	0.322	1.32E-01	5.90E-06	7.81E-07	2%	3.09E-01	2.70E-01	1.14E-03	0.1%
Toluene	34	1.40E+01				3.26E+01	3.00E-01	1.09E-01	8%
Trichloroethene	0.151	6.21E-02	2.00E-06	1.24E-07	0.3%	1.45E-01	1.00E-02	1.45E-02	1%
Xylenes, m & p	12	4.93E+00				1.15E+01	7.00E-01	1.64E-02	1%
Xylenes, o	3.4	1.40E+00				3.26E+00	7.00E-01	4.66E-03	0.4%
			Total Risk:	4.2E-05			**Total HI:**	1.3E+00	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-17
Risk Calculation Worksheet for 366 Center St - Outdoor Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Outdoor Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.051	2.10E-02				4.89E-02	5.00E+00	9.78E-06	0.008%
1,1-Difluoroethane	59	2.42E+01				5.66E+01			
1,2,4-Trimethylbenzene	0.32	1.32E-01				3.07E-01	7.00E-03	4.38E-02	36%
1,2-Dichloroethane	0.11	4.52E-02	2.60E-05	**1.18E-06**	7%	1.05E-01	2.40E+00	4.39E-05	0.04%
1,3,5-Trimethylbenzene	0.11	4.52E-02				1.05E-01	6.00E-03	1.76E-02	15%
Benzene	0.42	1.73E-01	2.90E-05	**5.01E-06**	29%	4.03E-01	3.00E-02	1.34E-02	11%
Carbon tetrachloride	0.48	1.97E-01	4.20E-05	**8.28E-06**	48%	4.60E-01	1.90E-01	2.42E-03	2.0%
Chloromethane	1.2	4.93E-01	1.80E-06	8.88E-07	5%	1.15E+00	9.00E-02	1.28E-02	11%
Ethylbenzene	0.74	3.04E-01	2.50E-06	7.60E-07	4%	7.10E-01	1.00E+00	7.10E-04	0.6%
Freon 11	1.1	4.52E-01				1.05E+00	7.00E-01	1.51E-03	1.3%
Freon 113	0.52	2.14E-01				4.99E-01	3.00E+01	1.66E-05	0.01%
Freon 12	2	8.22E-01				1.92E+00	2.00E-01	9.59E-03	8.0%
Methylene chloride	0.78	3.21E-01	1.00E-06	3.21E-07	2%	7.48E-01	4.00E-01	1.87E-03	1.6%
Styrene	0.23	9.45E-02				2.21E-01	9.00E-01	2.45E-04	0.20%
Tetrachloroethene	0.26	1.07E-01	5.90E-06	6.30E-07	4%	2.49E-01	2.70E-01	9.23E-04	0.8%
Toluene	2	8.22E-01				1.92E+00	3.00E-01	6.39E-03	5.3%
Trichloroethene	0.045	1.85E-02	2.00E-06	3.70E-08	0.2%	4.32E-02	1.00E-02	4.32E-03	3.6%
Xylenes, m & p	2.5	1.03E+00				2.40E+00	7.00E-01	3.42E-03	2.8%
Xylenes, o	0.85	3.49E-01				8.15E-01	7.00E-01	1.16E-03	1.0%
			Total Risk:	1.7E-05			**Total HI:**	0.1	

Notes:
RME = Reasonable maximum exposure.
EPC = Exposure point concentration.

Table 3-18

Risk Calculation Worksheet for Prescott Park - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0983	4.04E-02				9.43E-02	5.00E+00	1.89E-05	0.004%
1,1,2,2-Tetrachloroethane	0.024	9.86E-03	5.80E-05	5.72E-07	2%	2.30E-02			
1,2,4-Trimethylbenzene	0.751	3.09E-01				7.20E-01	7.00E-03	1.03E-01	23%
1,2-Dichloroethane	0.183	7.52E-02	2.60E-05	**1.96E-06**	6%	1.75E-01	2.40E+00	7.31E-05	0.02%
1,3,5-Trimethylbenzene	0.245	1.01E-01				2.35E-01	6.00E-03	3.92E-02	9%
1,4-Dioxane (p-dioxane)	0.891	3.66E-01	7.70E-06	**2.82E-06**	9%	8.54E-01	3.00E+00	2.85E-04	0.06%
Benzene	0.937	3.85E-01	2.90E-05	**1.12E-05**	34%	8.98E-01	3.00E-02	2.99E-02	7%
Bromomethane	1.12	4.60E-01				1.07E+00	5.00E-03	2.15E-01	48%
Carbon tetrachloride	0.577	2.37E-01	4.20E-05	**9.96E-06**	31%	5.53E-01	1.90E-01	2.91E-03	0.6%
Chlorobenzene	0.034	1.40E-02				3.26E-02	5.00E-02	6.52E-04	0.1%
Chloroethane	0.0833	3.42E-02				7.99E-02	1.00E+01	7.99E-06	0.002%
Chloroform	0.373	1.53E-01	2.30E-05	**3.53E-06**	11%	3.58E-01	9.80E-02	3.65E-03	1%
Chloromethane	1.2	4.93E-01	1.80E-06	8.88E-07	3%	1.15E+00	9.00E-02	1.28E-02	3%
cis-1,2-Dichloroethene	0.038	1.56E-02				3.64E-02			
Ethylbenzene	0.651	2.68E-01	2.50E-06	6.69E-07	2%	6.24E-01	1.00E+00	6.24E-04	0.14%
Freon 11	1.84	7.56E-01				1.76E+00	7.00E-01	2.52E-03	0.6%
Freon 113	0.719	2.95E-01				6.89E-01	3.00E+01	2.30E-05	0.005%
Freon 12	2.8	1.15E+00				2.68E+00	2.00E-01	1.34E-02	3%
Methyl tert-butyl ether	0.0097	3.99E-03	2.60E-07	1.04E-09	0.003%	9.30E-03	3.00E+00	3.10E-06	0.0007%
Methylene chloride	0.4	1.64E-01	1.00E-06	1.64E-07	0.5%	3.84E-01	4.00E-01	9.59E-04	0.21%
Styrene	0.231	9.49E-02				2.22E-01	9.00E-01	2.46E-04	0.05%

Table 3-18

Risk Calculation Worksheet for Prescott Park - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Tetrachloroethene	0.314	1.29E-01	5.90E-06	7.61E-07	2%	3.01E-01	2.70E-01	1.12E-03	0.2%
Toluene	3.45	1.42E+00				3.31E+00	3.00E-01	1.10E-02	2%
Trichloroethene	0.105	4.32E-02	2.00E-06	8.63E-08	0.3%	1.01E-01	1.00E-02	1.01E-02	2%
Xylenes, m & p	1.96	8.05E-01				1.88E+00	7.00E-01	2.68E-03	0.6%
Xylenes, o	0.688	2.83E-01				6.60E-01	7.00E-01	9.42E-04	0.2%
			Total Risk:	3.3E-05			**Total HI:**	4.5E-01	

Notes:

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 3-19
Risk Calculation Worksheet for Combined Background - Ambient Air - Residential Exposure Scenario - Adult/Child Resident
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Combined Adult/Child Receptor									
1,1,1-Trichloroethane	0.0797	3.28E-02				7.64E-02	5.00E+00	1.53E-05	0.003%
1,1-Dichloroethane	0.011	4.52E-03	1.60E-06	7.23E-09	0.02%	1.05E-02			
1,1-Dichloroethene	0.0392	1.61E-02				3.76E-02	7.00E-02	5.37E-04	0.1%
1,2,4-Trimethylbenzene	0.639	2.63E-01				6.13E-01	7.00E-03	8.75E-02	18%
1,2-Dichloroethane	0.0535	2.20E-02	2.60E-05	5.72E-07	2%	5.13E-02	2.40E+00	2.14E-05	0.004%
1,2-Dichloropropane	0.0448	1.84E-02	1.00E-05	1.84E-07	0.6%	4.30E-02	4.00E-03	1.07E-02	2%
1,3,5-Trimethylbenzene	0.272	1.12E-01				2.61E-01	6.00E-03	4.35E-02	9%
1,4-Dichlorobenzene	0.0948	3.90E-02	1.10E-05	4.29E-07	1%	9.09E-02	8.00E-01	1.14E-04	0.02%
1,4-Dioxane (p-dioxane)	0.383	1.57E-01	7.70E-06	**1.21E-06**	4%	3.67E-01	3.00E+00	1.22E-04	0.03%
Benzene	0.8	3.29E-01	2.90E-05	**9.53E-06**	31%	7.67E-01	3.00E-02	2.56E-02	5.3%
Bromomethane	0.682	2.80E-01				6.54E-01	5.00E-03	1.31E-01	27%
Carbon tetrachloride	0.526	2.16E-01	4.20E-05	**9.08E-06**	29%	5.04E-01	1.90E-01	2.65E-03	0.6%
Chlorobenzene	0.0268	1.10E-02				2.57E-02	5.00E-02	5.14E-04	0.11%
Chloroethane	0.0484	1.99E-02				4.64E-02	1.00E+01	4.64E-06	0.001%
Chloroform	0.154	6.33E-02	2.30E-05	**1.46E-06**	5%	1.48E-01	9.80E-02	1.51E-03	0.3%
Chloromethane	1.16	4.77E-01	1.80E-06	8.58E-07	3%	1.11E+00	9.00E-02	1.24E-02	2.6%
cis-1,2-Dichloroethene	0.025	1.03E-02				2.40E-02			
cis-1,3-Dichloropropene	0.0593	2.44E-02	1.60E-05	3.90E-07	1%	5.69E-02	2.00E-02	2.84E-03	0.6%
Ethylbenzene	0.582	2.39E-01	2.50E-06	5.98E-07	2%	5.58E-01	1.00E+00	5.58E-04	0.12%
Freon 11	1.89	7.77E-01				1.81E+00	7.00E-01	2.59E-03	0.5%
Freon 113	0.674	2.77E-01				6.46E-01	3.00E+01	2.15E-05	0.004%

Table 3-19

Risk Calculation Worksheet for Combined Background - Ambient Air - Residential Exposure Scenario - Adult/Child Resident

Baseline Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Exposure Scenario Information		
	Exposure Scenario:	Residential
	Scenario Timeframe:	Chronic
	Exposure Medium:	Ambient Air
	Exposure Point:	OnSite
	Receptor Population:	Adult/Child Resident
	Receptor Age:	Adult/Child

Exposure Parameter	Variable	Value	Units
Exposure Frequency	EF	350	days/yr
Exposure Time for inhalation of volatiles	ETi	24	hr/day
Exposure Duration - Adult	ED	24	yr
Exposure Duration - Child	ED	6	yr
Averaging Time for carcinogens	ATc	70	yr
Averaging Time for noncarcinogens - Adult	ATnc	24	yr
Averaging Time for noncarcinogens - Child	ATnc	6	yr
Conversion Factor 1	CF1	0.001	mg/ug

		Inhalation Cancer				Inhalation Noncancer			
Chemical of Potential Concern	RME Medium EPC Value, Cair [ug/m^3]	Exposure Concentration [ug/m^3]	Unit Risk Factor [ug/m^3]$^{-1}$	Cancer Risk [-]	Percent Contribution (%)	Exposure Concentration [ug/m^3]	Reference Concentration (RfC) [mg/m^3]	Hazard Quotient [-]	Percent Contribution (%)
Freon 114	0.12	4.93E-02				1.15E-01	3.00E+01	3.84E-06	0.0008%
Freon 12	2.56	1.05E+00				2.45E+00	2.00E-01	1.23E-02	3%
Methyl tert-butyl ether	0.23	9.45E-02	2.60E-07	2.46E-08	0.08%	2.21E-01	3.00E+00	7.35E-05	0.02%
Methylene chloride	0.233	9.58E-02	1.00E-06	9.58E-08	0.3%	2.23E-01	4.00E-01	5.59E-04	0.12%
Naphthalene	0.376	1.55E-01	3.40E-05	**5.25E-06**	17%	3.61E-01	3.00E-03	1.20E-01	25%
Styrene	0.182	7.48E-02				1.75E-01	9.00E-01	1.94E-04	0.04%
Tetrachloroethene	0.286	1.18E-01	5.90E-06	6.93E-07	2%	2.74E-01	2.70E-01	1.02E-03	0.2%
Toluene	3.31	1.36E+00				3.17E+00	3.00E-01	1.06E-02	2%
trans-1,3-Dichloropropene	0.056	2.30E-02	1.60E-05	3.68E-07	1%	5.37E-02	2.00E-02	2.68E-03	0.6%
Trichloroethene	0.089	3.66E-02	2.00E-06	7.32E-08	0.2%	8.53E-02	1.00E-02	8.53E-03	2%
Xylenes, m & p	2.5	1.03E+00				2.40E+00	7.00E-01	3.42E-03	0.7%
Xylenes, o	0.853	3.51E-01				8.18E-01	7.00E-01	1.17E-03	0.2%
			Total Risk:	3.1E-05			**Total HI:**	4.8E-01	

Notes:

RME = Reasonable maximum exposure.

EPC = Exposure point concentration.

Table 3-20
Risk Summary
Baseline Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Including
Jun-09
Data

	Crawlspace Air		Outdoor Air	
Location	**Cancer Risk**	**Noncancer HI**	**Cancer Risk**	**Noncancer HI**
Commercial/Industrial Scenario				
1414 3rd St	6E-05	0.6		
Residential Scenario				
1428 3rd St	3E-04	7	2E-04	4
1432 3rd St	6E-04	8	4E-05	0.8
1436 3rd St			1E-04	0.8
320 Center St	6E-05	0.7	6E-05	1
326 Center St	8E-05	0.5	3E-05	0.4
339 Center St			4E-05	0.7
356 Center St			5E-05	0.9
360 Center St			4E-05	1
366 Center St			2E-05	0.1
Prescott Park			3E-05	0.5
Combined Background			3E-05	0.5

Attachment 4
Residential Neighborhood Screening Tables

Attachment 4
Table of Contents - Residential Neighborhood Screening Tables
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 4-1	1414 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Table 4-2	1414 3rd Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Table 4-3	1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-4	1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Table 4-5	1428 and 1430 3rd Street Analytical Results - Comparison of Historical 1428 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data
Table 4-6	1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-7	1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-8	1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Table 4-9	1432 and 1434 3rd Street Analytical Results - Comparison of Historical 1432 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data
Table 4-10	1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-11	1436 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-12	1436 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-13	320 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-14	320 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Table 4-15	320 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Table 4-16	320 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-17	326 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Table 4-18	326 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Table 4-19	356 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-20	360 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-21	360 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-22	Prescott Park Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Table 4-23	Prescott Park Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Table 4-24	Background Outdoor Air - Comparison of Historical EPCs and June 2009 Background Outdoor Air Data
Table 4-25	1436 and 1438 3rd Street Analytical Results - Air (June 2009)

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Attachment 4
Table of Contents - Residential Neighborhood Screening Tables
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Table No.	Title
Table 4-26	337 and 339 Center Street Analytical Results - Air (June 2009)
Table 4-27	356 Center Street Analytical Results - Air (June 2009)
Table 4-28	366 Center Street Analytical Results - Air (June 2009)
Table 4-29	Soil Screening Levels
Table 4-30	1428 3rd Street Analytical Results - Soil (October 2006)
Table 4-31	1432 3rd Street Analytical Results - Soil (October 2006)
Table 4-32	1436 3rd Street Analytical Results - Soil (October 2006)
Table 4-33	326 Center Street Analytical Results - Soil (October 2006)
Table 4-34	356 Center Street Analytical Results - Soil (October 2006)
Table 4-35	360 Center Street Analytical Results - Soil (October 2006)
Table 4-36	Residential Soil Results Summary (October 2006)
Table 4-37	Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (All Analyses)
Table 4-38	Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Organics Only)
Table 4-39	Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Total Petroleum Hydrocarbons Only)
Table 4-40	Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Table 4-41	Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Table 4-42	Residential Soil Results Summary (October 2009)
Table 4-43	1432 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Table 4-44	1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Table 4-45	356 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Table 4-46	360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Table 4-47	Residential Produce and Adjacent Soil Results Summary (October 2006)

TABLE 4-1

1414 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Industrial RSL [1]	Acute REL [2]	Chronic REL [2]	West Oakland Background Air Results [3]	2006 through 2008 Crawl Space Air Results [4] Min	Max	EPC [5]	CMI-CA01 (1414CAb)	CMI-CA02 (1414CAc)
1,1,1-Trichloroethane	µg/m³	22,000	68,000	1,000	ND (0.27)	0.14 J	25	15.8	21	0.96
1,1,2,2-Tetrachloroethane	µg/m³	0.21	NE	NE	NE	ND (0.19)	ND (1.2)	ND	ND (0.26)	ND (0.26)
1,1,2-Trichloroethane	µg/m³	0.77	NE	NE	NE	ND (0.076)	ND (0.49)	0.041	0.041 J	ND (0.21)
1,1-Dichloroethane	µg/m³	7.7	NE	NE	NE	0.16	**33**	**21.3**	**24**	0.97
1,1-Dichloroethene	µg/m³	880	NE	70	NE	0.062 J	1.6	1.05	0.73	0.048 J
1,2,4-Trichlorobenzene	µg/m³	8.8	NE	NE	NE	ND (0.092) J	ND (6.6)	ND	ND (6.9)	ND (7.1)
1,2,4-Trimethylbenzene	µg/m³	31	NE	NE	NE	0.16 J	9.6	2.14	0.3 J	0.41 J
1,2-Dibromoethane	µg/m³	0.02	NE	0.8	NE	**0.11 J**	**0.11 J**	**0.11**	ND (1.4)	ND (1.5)
1,2-Dichlorobenzene	µg/m³	880	NE	NE	NE	ND (0.02) J	ND (1.1)	ND	ND (1.1)	ND (1.2)
1,2-Dichloroethane	µg/m³	0.47	NE	400	ND (0.40)	0.033 J	**1.5**	**0.802**	0.13 J	ND (0.16)
1,2-Dichloropropane	µg/m³	1.2	NE	NE	NE	0.034 J	0.14	0.0619	ND (0.86)	ND (0.89)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	0.06 J	1	0.365	ND (0.92)	ND (0.94)
1,3-Dichlorobenzene	µg/m³	880	NE	NE	NE	ND (0.032) J	ND (1.1)	ND	ND (1.1)	ND (1.2)
1,4-Dichlorobenzene	µg/m³	1.1	NE	800	NE	0.26	0.96	0.417	ND (1.1)	ND (1.2)
1,4-Dioxane (p-dioxane)	µg/m³	1.6	3,000	3,000	NE	1.3 J	1.3 J	0.724	ND (0.67)	ND (0.69)
Benzene	µg/m³	1.6	1,300	60	0.96	0.28	1.3 J	0.724	0.3 J	0.31
Bromomethane	µg/m³	22	3,900	5	NE	0.04 J	0.25 J	0.189	0.4 J	ND (0.74)
Carbon tetrachloride	µg/m³	0.82	1,900	40	0.69	0.38	**17**	**6.05**	**0.84**	0.53
Chlorobenzene	µg/m³	220	NE	1,000	NE	0.031 J	0.19	0.0878	ND (0.86)	ND (0.88)
Chloroethane	µg/m³	44,000	NE	30,000	NE	0.074 J	0.96	0.393	0.3 J	ND (0.51)
Chloroform	µg/m³	0.53	150	300	ND (0.10)	0.13 J	**3**	**1.35**	0.52 J	ND (0.94)
Chloromethane	µg/m³	390	NE	NE	NE	0.59	46	24.2	ND (0.39)	ND (0.4)
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	0.67	440	272	260	7.1
cis-1,3-Dichloropropene	µg/m³	3.1	NE	NE	NE	0.056 J	0.056 J	0.056	ND (0.85)	ND (0.87)
Ethylbenzene	µg/m³	4.9	NE	2,000	NE	0.31	1.8	1.11	0.38	0.18
Freon 11	µg/m³	3,100	NE	NE	NE	1.3 J	4.8	2.68	1.2	1.5
Freon 12	µg/m³	880	NE	NE	NE	1.6	13	4.23	1.8	2.2 J
Freon 113	µg/m³	130,000	NE	NE	NE	0.45	0.76	0.675	0.35 J	0.53 J
Freon 114	µg/m³	130,000	NE	NE	NE	---	---	---	ND (1.3)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.56	NE	NE	NE	ND (0.051) J	ND (9.5)	ND	ND (10)	ND (10)
Methyl tert-butyl ether	µg/m³	47	NE	8,000	ND (1.8)	0.014 J	0.14 J	0.0777	ND (0.67)	ND (0.69)
Methylene chloride	µg/m³	26	14,000	400	ND (1.74)	1.2	1.6	0.801	0.37 J	0.44 J
Naphthalene	µg/m³	0.36	NE	9	NE	**0.41 J**	**0.98 J**	**0.638**	ND (4.9) J	ND (5) J
Styrene	µg/m³	4,400	21,000	900	NE	0.13 J	0.64	0.347	0.16 J	ND (0.82)
Tetrachloroethene	µg/m³	2.1	20,000	35	ND (0.47)	1.2	**19**	**9.47**	**14**	**2.7**
Toluene	µg/m³	22,000	37,000	300	ND (3.0)	2.2	16	9.3	1.5	1.2
trans-1,2-Dichloroethene	µg/m³	260	NE	NE	NE	0.079 J	1.1 J	0.635	0.23 J	0.048 J

TABLE 4-1

1414 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Industrial RSL [1]	Acute REL [2]	Chronic REL [2]	West Oakland Background Air Results [3]	2006 through 2008 Crawl Space Air Results [4]		EPC [5]	CMI-CA01 (1414CAb)	CMI-CA02 (1414CAc)
						Min	Max			
trans-1,3-Dichloropropene	µg/m³	3.1	NE	NE	NE	0.051 J	0.057 J	0.057	ND (0.85)	ND (0.87)
Trichloroethene	µg/m³	6.1	NE	600	ND (0.43)	0.49	**26**	**13.6**	**28**	2
Vinyl chloride	µg/m³	2.8	180,000	NE	ND (0.77)	0.021 J	**7.6**	1.62	ND (0.048)	ND (0.049)
Xylenes, m & p	µg/m³	3,100	22,000	700	NE	0.78	6.9	3.86	1.4	0.6
Xylenes, o	µg/m³	3,100	22,000	700	NE	0.22	1.5	0.985	0.59	0.23

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from November 2006 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 1414 3rd St November 2006 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-2

1414 3rd Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Industrial RSL [1]	Acute [2] REL	Chronic [2] REL	West Oakland [3] Background Air Results	EPC [4]	CMI-IA01	CMI-IA02
1,1,1-Trichloroethane	µg/m³	22,000	68,000	1,000	ND (0.27)	15.8	0.15 J	0.23
1,1,2,2-Tetrachloroethane	µg/m³	0.21	NE	NE	NE	ND	ND (0.31)	ND (0.25)
1,1,2-Trichloroethane	µg/m³	0.77	NE	NE	NE	0.041	ND (0.24)	ND (0.2)
1,1-Dichloroethane	µg/m³	7.7	NE	NE	NE	**21.3**	0.14 J	0.22
1,1-Dichloroethene	µg/m³	880	NE	70	NE	1.05	ND (0.088)	ND (0.072)
1,2,4-Trichlorobenzene	µg/m³	8.8	NE	NE	NE	ND	ND (8.3)	ND (6.8)
1,2,4-Trimethylbenzene	µg/m³	31	NE	NE	NE	2.14	0.51 J	0.55 J
1,2-Dibromoethane	µg/m³	0.02	NE	0.8	NE	**0.11**	ND (1.7)	ND (1.4)
1,2-Dichlorobenzene	µg/m³	880	NE	NE	NE	ND	ND (1.3)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.47	NE	400	ND (0.40)	**0.802**	0.14 J	0.12 J
1,2-Dichloropropane	µg/m³	1.2	NE	NE	NE	0.0619	ND (1)	ND (0.84)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	0.365	0.17 J	0.17 J
1,3-Dichlorobenzene	µg/m³	880	NE	NE	NE	ND	ND (1.3)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	1.1	NE	800	NE	0.417	ND (1.3)	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	1.6	3,000	3,000	NE	0.724	ND (0.8)	ND (0.66)
Benzene	µg/m³	1.6	1,300	60	0.96	0.724	0.36	0.33
Bromomethane	µg/m³	22	3,900	5	NE	0.189	0.43 J	0.43 J
Carbon tetrachloride	µg/m³	0.82	1,900	40	0.69	**6.05**	0.36	0.37
Chlorobenzene	µg/m³	220	NE	1,000	NE	0.0878	ND (1)	ND (0.84)
Chloroethane	µg/m³	44,000	NE	30,000	NE	0.393	ND (0.59)	ND (0.48)
Chloroform	µg/m³	0.53	150	300	ND (0.10)	**1.35**	ND (1.1)	ND (0.89)
Chloromethane	µg/m³	390	NE	NE	NE	24.2	1	0.9
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	272	1.2	2
cis-1,3-Dichloropropene	µg/m³	3.1	NE	NE	NE	0.056	ND (1)	ND (0.83)
Ethylbenzene	µg/m³	4.9	NE	2,000	NE	1.11	0.49	0.46
Freon 11	µg/m³	3,100	NE	NE	NE	2.68	1.1 J	1.1
Freon 12	µg/m³	880	NE	NE	NE	4.23	1.7	1.9
Freon 113	µg/m³	130,000	NE	NE	NE	0.675	0.36 J	0.35 J
Freon 114	µg/m³	130,000	NE	NE	NE	---	ND (1.6)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.56	NE	NE	NE	ND	ND (12)	ND (9.8)
Methyl tert-butyl ether	µg/m³	47	NE	8,000	ND (1.8)	0.0777	ND (0.8)	ND (0.66)
Methylene chloride	µg/m³	26	14,000	400	ND (1.74)	0.801	ND (1.5)	ND (1.3)
Naphthalene	µg/m³	0.36	NE	9	NE	**0.638**	ND (5.8) J	ND (4.8) J
Styrene	µg/m³	4,400	21,000	900	NE	0.347	0.22 J	0.21 J
Tetrachloroethene	µg/m³	2.1	20,000	35	ND (0.47)	**9.47**	1.2	**2.2**
Toluene	µg/m³	22,000	37,000	300	ND (3.0)	9.3	2.3	2.2
trans-1,2-Dichloroethene	µg/m³	260	NE	NE	NE	0.635	ND (0.88)	ND (0.72)

TABLE 4-2

1414 3rd Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Industrial RSL [1]	Acute REL [2]	Chronic REL [2]	West Oakland Background Air Results [3]	EPC [4]	CMI-IA01	CMI-IA02
trans-1,3-Dichloropropene	µg/m³	3.1	NE	NE	NE	0.057	ND (1)	ND (0.83)
Trichloroethene	µg/m³	6.1	NE	600	ND (0.43)	**13.6**	0.25	0.36
Vinyl chloride	µg/m³	2.8	180,000	NE	ND (0.77)	1.62	ND (0.057)	0.016 J
Xylenes, m & p	µg/m³	3,100	22,000	700	NE	3.86	1.8	1.6
Xylenes, o	µg/m³	3,100	22,000	700	NE	0.985	0.68	0.64

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 1414 3rd St November 2006 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-3

1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical[2] Soil Gas Results Min	Historical[2] Soil Gas Results Max	1428-SG01	1428-SG02
1,1,1-Trichloroethane	µg/m³	52,000	12	58	16	2
1,1,2,2-Tetrachloroethane	µg/m³	0.42	0.032 J	0.032 J	ND (0.23)	ND (0.22)
1,1,2-Trichloroethane	µg/m³	1.5	0.34	0.36	ND (0.18)	ND (0.18)
1,1-Dichloroethane	µg/m³	15	4.9	**47**	7.4	0.021 J
1,1-Dichloroethene	µg/m³	2,100	ND (0.53)	ND (2.7)	ND (0.067)	ND (0.064)
1,2,4-Trichlorobenzene	µg/m³	42	ND (5)	ND (20)	ND (6.2)	ND (6)
1,2,4-Trimethylbenzene	µg/m³	73	0.13 J	0.13 J	ND (0.82)	0.1 J
1,2-Dibromoethane	µg/m³	0.041	ND (0.42)	ND (2.2)	ND (1.3)	ND (1.2)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.8) J	ND (4.1)	ND (1)	ND (0.97)
1,2-Dichloroethane	µg/m³	0.94	0.029 J	0.029 J	ND (0.14)	ND (0.13)
1,2-Dichloropropane	µg/m³	2.4	ND (0.25)	ND (1.4)	ND (0.78)	ND (0.74)
1,3,5-Trimethylbenzene	µg/m³	63	0.18 J	0.18 J	1.6	0.11 J
1,3-Dichlorobenzene	µg/m³	2,100	ND (0.8)	ND (4.1)	ND (1)	ND (0.97)
1,4-Dichlorobenzene	µg/m³	2.2	ND (0.8)	ND (4.1)	ND (1)	ND (0.97)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.48)	ND (9.8)	ND (0.6)	ND (0.58)
Benzene	µg/m³	3.1	0.46 J	0.94	0.77	0.44
Bromomethane	µg/m³	52	ND (0.52)	ND (2.6)	ND (0.65)	0.24 J
Carbon tetrachloride	µg/m³	1.6	ND (0.34)	ND (1.8)	0.27	0.23
Chlorobenzene	µg/m³	520	ND (0.62)	ND (3.1)	ND (0.77)	ND (0.74)
Chloroethane	µg/m³	100,000	0.2 J	0.22 J	ND (0.44)	ND (0.42)
Chloroform	µg/m³	1.1	**6.7**	**22**	**23**	**48**
Chloromethane	µg/m³	940	0.77	0.79	ND (0.35)	0.22 J
cis-1,2-Dichloroethene	µg/m³	NE	4.4	160	3.2	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.61)	ND (3.1)	ND (0.76)	ND (0.73)
Ethylbenzene	µg/m³	9.7	0.082 J	0.34 J	0.12 J	0.073 J
Freon 11	µg/m³	7,300	3.3	14	2.6	0.75 J
Freon 12	µg/m³	2,100	1.5	2.2 J	0.93	1
Freon 113	µg/m³	310,000	0.6 J	1	0.34 J	0.74 J
Freon 114	µg/m³	310,000	ND (4.8)	ND (4.8)	ND (1.2)	ND (1.1)
Hexachlorobutadiene	µg/m³	1.1	ND (2.9)	ND (16)	ND (9)	ND (8.6)
Methyl tert-butyl ether	µg/m³	94	ND (0.48)	ND (2.4)	ND (0.6)	ND (0.58)
Methylene chloride	µg/m³	52	0.36 J	0.95 J	ND (1.2)	ND (1.1)
Naphthalene	µg/m³	0.72	ND (3.5) J	ND (7.7)	ND (4.4)	ND (4.2)
Styrene	µg/m³	10,000	ND (0.57)	ND (2.9)	ND (0.72)	ND (0.68)
Tetrachloroethene	µg/m³	4.1	**42**	**210**	**22**	**5**
Toluene	µg/m³	52,000	0.31 J	16	0.76	0.64
trans-1,2-Dichloroethene	µg/m³	630	3.1	47	1	ND (0.64)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.61)	ND (3.1)	ND (0.76)	ND (0.73)
Trichloroethene	µg/m³	12	**98**	**480**	**36**	0.034 J
Vinyl chloride	µg/m³	1.6	0.0094 J	0.0094 J	ND (0.043)	ND (0.041)
Xylenes, m & p	µg/m³	7,300	0.21 J	0.62 J	0.16 J	0.16 J
Xylenes, o	µg/m³	7,300	ND (0.58)	ND (3)	0.094 J	0.075 J

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Historical results are from samples collected from September 2004 through October 2008

--- not analyzed

ND not detected above the laboratory's reporting limit shown in parentheses

NE not established

J estimated value

µg/m³ micrograms per cubic meter

TABLE 4-4

1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Historical[4] Crawl Space Air Results Min	Historical[4] Crawl Space Air Results Max	EPC[5]	1428-CA01 (1428CAd)	1428-CA02 (1428CAe)	1428-CA02 (FD) (1428CAe)
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.08 J	0.15 J	0.114	ND (8.8)	0.074 J	0.074 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	**0.074 J**	**0.074 J**	**0.074**	ND (11)	ND (0.23)	ND (0.27)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	0.065 J	0.065 J	0.065	ND (8.8)	ND (0.19)	ND (0.21)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	0.015 J	0.026 J	0.026	ND (6.5)	ND (0.14)	ND (0.16)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.056)	ND (0.078)	ND	ND (3.2)	ND (0.068)	ND (0.078)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (0.065) J	ND (1.4) J	ND	ND (300)	ND (6.3)	ND (7.3)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.065 J	**14**	**33.5**	**57**	0.26 J	2.5
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	**0.034 J**	**0.034 J**	**0.034**	ND (62)	ND (1.3)	ND (1.5)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.014) J	ND (0.22) J	ND	ND (48)	ND (1)	ND (1.2)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.01 J	**2.9**	**2.1**	ND (6.5)	ND (0.14)	ND (0.16)
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.021 J	**0.3**	0.0906	ND (37)	ND (0.79)	ND (0.9)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.018 J	5.6	**9.46**	**15 J**	ND (0.84)	0.72 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.036) J	ND (0.25)	ND	ND (48)	ND (1)	ND (1.2)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**0.25 J**	**2**	**0.565**	ND (48)	**0.35 J**	**0.36 J**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.51) J	ND (0.71)	ND	ND (29)	ND (0.62)	ND (0.71)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.14 J	**1.2 J**	**1.1**	ND (13)	0.13 J	**2.4**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.13 J	0.19 J	0.185	ND (31)	0.4 J	0.45 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.4**	**0.63 J**	**0.502**	ND (10)	**0.39**	**0.4**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.02 J	0.047 J	0.0372	ND (37)	ND (0.79)	ND (0.9)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.02 J	0.63	0.189	ND (21)	ND (0.45)	0.46 J
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.19**	**6.6**	**2.53**	ND (39)	**0.38 J**	ND (0.96)
Chloromethane	µg/m³	94	NE	NE	NE	0.18 J	19	8.88	ND (17)	0.32 J	0.35 J
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.11)	ND (0.16)	ND	ND (6.4)	ND (0.14)	ND (0.16)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.13)	ND (0.18)	ND	ND (36)	ND (0.78)	ND (0.89)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.11 J	**1.9**	**1.26**	**4 J**	0.17	**1.4**
Freon 11	µg/m³	730	NE	NE	NE	1.2	4.7	2.95	ND (45)	1.3	1.3
Freon 12	µg/m³	210	NE	NE	NE	1.7	3.1	2.54	ND (40)	2	1.8
Freon 113	µg/m³	31,000	NE	NE	NE	0.54	0.8	0.654	ND (62)	0.51 J	0.48 J
Freon 114	µg/m³	31,000	NE	NE	NE	ND (0.22)	ND (0.26)	ND	ND (56)	ND (1.2)	ND (1.4)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (0.051) J	ND (2)	ND	ND (430)	ND (9.1)	ND (10)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	ND (0.51)	ND (0.71)	ND	ND (29)	ND (0.62)	ND (0.71)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	1.8	**8.2**	2.17	ND (56)	ND (1.2)	0.34 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.58 J**	**0.64 J**	**1.09**	ND (210)	ND (4.5)	**3 J**
Styrene	µg/m³	1,000	21,000	900	NE	0.04 J	0.78	0.498	ND (34)	0.12 J	0.21 J
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.17 J	**4.8**	**1.74**	**1.4 J**	**1.7**	**1.7**
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.46	24	12.6	33	0.62	4.7
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.56)	ND (0.78)	ND	ND (32)	ND (0.68)	ND (0.78)

TABLE 4-4

1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Historical[4] Crawl Space Air Results Min	Historical[4] Crawl Space Air Results Max	EPC[5]	1428-CA01 (1428CAd)	1428-CA02 (1428CAe)	1428-CA02 (FD) (1428CAe)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.018 J	0.018 J	0.018	ND (36)	ND (0.78)	ND (0.89)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.067	**4.2**	**3.37**	**2.9 J**	0.054 J	0.056 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.034 J	**10**	**1.58**	ND (2)	ND (0.044)	ND (0.05)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.15 J	7.9	5.49	18	0.57	6.3
Xylenes, o	µg/m³	730	22,000	700	NE	0.068 J	5.5	3.43	11	0.16	2.4

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 1428 3rd St from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-5

1428 and 1430 3rd Street Analytical Results - Comparison of Historical 1428 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	(Downstairs)	1428-IA01 (FD) (Downstairs)	(Downstairs)	(Downstairs)	(Downstairs)	(Upstairs)	(Upstairs)	(Upstairs)	(Upstairs)
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.114	0.053 J	0.059 J	0.062 J	0.054 J	0.065 J	0.056 J	0.052 J	0.051 J	0.048 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	**0.074**	ND (0.23)	ND (0.25)	ND (0.23)	ND (0.22)	ND (0.22)	ND (0.26)	ND (0.24)	ND (0.26)	ND (0.25)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	0.065	ND (0.19)	ND (0.2)	ND (0.19)	ND (0.18)	ND (0.18)	ND (0.2)	ND (0.2)	ND (0.21)	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	0.026	ND (0.14)	ND (0.15)	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.15)	ND (0.14)	ND (0.15)	ND (0.15)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND	ND (0.068)	ND (0.072)	ND (0.068)	ND (0.065)	ND (0.065)	ND (0.074)	ND (0.071)	ND (0.076)	ND (0.072)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND	ND (6.3) J	ND (6.8) J	ND (6.3)	ND (6.1) J	ND (6.1)	ND (6.9)	ND (6.6)	ND (7.1)	ND (6.8)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	**33.5**	0.54 J	0.77 J	0.89	3	0.89	0.31 J	0.83 J	0.46 J	0.42 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	**0.034**	ND (1.3)	ND (1.4)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.4)	ND (1.4)	ND (1.5)	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (1)	ND (1.1)	ND (1)	ND (0.99)	ND (0.99)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	**2.1**	**0.36**	**0.36**	**0.14**	**0.37**	**0.38**	ND (0.071) J	**0.43**	**0.11 J**	**0.1 J**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.0906	ND (0.79)	ND (0.84)	ND (0.79)	ND (0.76)	ND (0.76)	ND (0.86)	ND (0.83)	ND (0.88)	ND (0.84)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	9.46	0.16 J	0.2 J	0.17 J	0.6 J	0.17 J	0.11 J	0.18 J	ND (0.94)	ND (0.9)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (1)	ND (1.1)	ND (1)	ND (0.99)	ND (0.99)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**0.565**	0.17 J	**0.3 J**	ND (0.25) J	**0.34 J**	ND (0.17) J	ND (1.1)	ND (0.32) J	ND (1.1)	ND (0.17) J
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND	ND (0.62)	ND (0.66)	ND (0.62)	ND (0.59)	ND (0.59)	ND (0.67)	ND (0.64)	ND (0.69)	ND (0.66)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**1.1**	**1**	**1.1**	**0.65**	**0.72**	**0.78**	**0.62**	**0.99**	**0.61**	**1.2**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.185	ND (0.41) J	ND (0.47) J	0.49 J	ND (0.28) J	0.34 J	ND (0.73)	0.37 J	ND (0.74) J	0.42 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.502**	**0.4**	**0.41**	**0.52**	**0.42**	**0.42**	**0.45**	**0.38**	**0.56**	**0.41**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.0372	ND (0.79)	ND (0.84)	ND (0.79)	ND (0.76)	ND (0.76)	ND (0.86)	ND (0.82)	ND (0.88)	ND (0.84)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.189	ND (0.45)	ND (0.48)	ND (0.45)	ND (0.43)	ND (0.43)	ND (0.49)	ND (0.47)	ND (0.5)	ND (0.48)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**2.53**	**2.4**	**2.7**	**1.2**	**2.4**	**2.7**	**1.5**	**0.88**	**1**	**2.9**
Chloromethane	µg/m³	94	NE	NE	NE	8.88	1.1	1.2	0.83	0.97	1.1	0.95	1	1.3	1
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.15)	ND (0.14)	ND (0.15)	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND	ND (0.78)	ND (0.83)	ND (0.78)	ND (0.74)	ND (0.74)	ND (0.85)	ND (0.81)	ND (0.87)	ND (0.83)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	**1.26**	0.79	0.93	**3.2**	**1**	0.78	0.36	0.71	0.41	0.45
Freon 11	µg/m³	730	NE	NE	NE	2.95	1.4	1.4	1.2	0.94	1.4	1.1	1.2	1.1	1.2
Freon 12	µg/m³	210	NE	NE	NE	2.54	1.8	1.9	1.8	1.4	2	2	2	2.1	1.8
Freon 113	µg/m³	31,000	NE	NE	NE	0.654	0.45 J	0.44 J	0.43 J	0.34 J	0.43 J	ND (1.4)	0.38 J	0.41 J	0.45 J
Freon 114	µg/m³	31,000	NE	NE	NE	ND	ND (1.2)	ND (1.3)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.3)	ND (1.2)	ND (1.3)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND	ND (9.1)	ND (9.8)	ND (9.1)	ND (8.7)	ND (8.7)	ND (10)	ND (9.5)	ND (10)	ND (9.8)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	ND	ND (0.62)	ND (0.66)	ND (0.62)	ND (0.59)	ND (0.59)	ND (0.67)	0.24 J	ND (0.69)	ND (0.66)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	2.17	0.42 J	0.39 J	0.36 J	0.3 J	0.44 J	0.3 J	0.47 J	0.47 J	0.46 J
Naphthalene	µg/m³	0.072	NE	9	NE	**1.09**	ND (4.5) J	ND (4.8) J	ND (0.73) J	**0.79 J**	ND (0.88) J	ND (4.9)	ND (1.4) J	ND (0.73) J	ND (1.1) J
Styrene	µg/m³	1,000	21,000	900	NE	0.498	0.28 J	0.37 J	0.46 J	0.42 J	0.29 J	ND (0.8)	0.49 J	0.26 J	0.27 J
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	**1.74**	**3.6**	**3.4**	**58**	**2.8**	**3.1**	0.38	**0.64**	**0.6**	0.35
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	12.6	5.8	6.7	6.6	4.8	6	2.6	13	5.2	3.8
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND	ND (0.68)	ND (0.72)	ND (0.68)	ND (0.65)	ND (0.65)	ND (0.74)	ND (0.71)	ND (0.76)	ND (0.72)

TABLE 4-5

1428 and 1430 3rd Street Analytical Results - Comparison of Historical 1428 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	(Downstairs)	1428-IA01 (FD) (Downstairs)	(Downstairs)	(Downstairs)	(Downstairs)	(Upstairs)	(Upstairs)	(Upstairs)	(Upstairs)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.018	ND (0.78)	ND (0.83)	ND (0.78)	ND (0.74)	ND (0.74)	ND (0.85)	ND (0.81)	ND (0.87)	ND (0.83)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	**3.37**	0.026 J	0.043 J	ND (0.055) J	0.04 J	ND (0.027) J	ND (0.045) J	ND (0.031) J	ND (0.048) J	ND (0.03) J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	**1.58**	ND (0.044) J	ND (0.047) J	ND (0.044) J	ND (0.042) J	ND (0.042) J	ND (0.048) J	ND (0.046) J	ND (0.049) J	ND (0.047) J
Xylenes, m & p	µg/m³	730	22,000	700	NE	5.49	2.5	2.8	3.8	2.9	2.4	0.97	1.6	1.2	1.2
Xylenes, o	µg/m³	730	22,000	700	NE	3.43	0.75	0.86	1.5	0.98	0.75	0.41	0.82	0.46	0.51

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

[3] West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

[4] An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Crawl Space Air data collected from 1428 3rd St from September 2004 through June 2009.

--- not analyzed

ND not detected above the laboratory's reporting limit shown in parentheses

NE not established

J estimated value

µg/m³ micrograms per cubic meter

TABLE 4-6

1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	1428-OA01 (1428AA)	1430-OA01
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.062 J	0.11 J	0.0941	0.12 J	0.051 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	**0.15 J**	**0.18 J**	**0.159**	ND (0.23)	ND (0.23)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.073) J	ND (0.18)	ND	ND (0.19)	ND (0.18)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.11) J	ND (0.14)	ND	ND (0.14)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.053) J	ND (0.067)	ND	ND (0.068)	ND (0.067)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (0.18) J	ND (1.2) J	ND	ND (6.3)	ND (6.2)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.12 J	**23**	4.74	0.4 J	0.3 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.017) J	ND (0.26)	ND	ND (1.3)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.011) J	ND (0.2) J	ND	ND (1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.029 J	**0.27**	**0.129**	**0.21**	0.066 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.046 J	0.057 J	0.0513	ND (0.79)	ND (0.78)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.039 J	**8**	4.09	ND (0.84)	ND (0.82)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.052 J	51 J	51	ND (1)	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.17 J	**3.5 J**	**1.14**	ND (1)	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.02) J	ND (0.6)	ND	ND (0.62)	ND (0.6)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.29	**5.6 J**	**3.2**	0.31	**0.34**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.063 J	0.35	0.244	0.4 J	0.31 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.42**	**0.7**	**0.565**	**0.62**	**0.42**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.016 J	0.3	0.3	ND (0.79)	ND (0.77)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.026 J	0.11 J	0.089	ND (0.45)	ND (0.44)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.078 J	**0.38**	**0.207**	ND (0.83)	ND (0.82)
Chloromethane	µg/m³	94	NE	NE	NE	0.84	1.5	1.28	1	1
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.11) J	ND (0.13)	ND	ND (0.14)	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.049 J	0.052 J	0.052	ND (0.78)	ND (0.76)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.12	**12**	**12**	0.26	0.24
Freon 11	µg/m³	730	NE	NE	NE	1.1	3.8	2.08	1.2	1.3
Freon 12	µg/m³	210	NE	NE	NE	2	3.4	2.71	2	2.1
Freon 113	µg/m³	31,000	NE	NE	NE	0.55	0.8	0.672	0.48 J	0.43 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.12 J	0.13 J	0.13	ND (1.2)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (0.1) J	ND (1.8) J	ND	ND (9.1)	ND (9)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.0099 J	0.023 J	0.023	ND (0.62)	ND (0.6)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	3.6	**21**	**6.26**	0.34 J	0.31 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.1**	**16 J**	**5.18**	**0.76 J**	ND (4.4)
Styrene	µg/m³	1,000	21,000	900	NE	0.042 J	6.8	6.8	0.16 J	ND (0.72)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.063 J	**2.2**	**1.16**	0.074 J	0.086 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	1	32	12.5	2.5	1.7
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	0.042 J	0.042 J	0.042	ND (0.68)	ND (0.67)

TABLE 4-6

1428 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results		EPC[5]	1428-OA01 (1428AA)	1430-OA01
						Min	Max			
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.039 J	0.041 J	0.041	ND (0.78)	ND (0.76)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.023 J	0.44	0.261	0.056 J	0.025 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.058	0.058	0.0385	ND (0.044)	ND (0.043)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.35	44	44	0.68	0.79
Xylenes, o	µg/m³	730	22,000	700	NE	0.11 J	18	18	0.26	0.27

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Outdoor Air data collected from 1428 3rd St from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-7

1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical[2] Soil Gas Results Min	Historical[2] Soil Gas Results Max	1432-SG01 (PropA1SGa)	1432-SG02
1,1,1-Trichloroethane	µg/m³	52,000	0.26 J	4	23	0.93
1,1,2,2-Tetrachloroethane	µg/m³	0.42	ND (0.18)	ND (0.25)	ND (0.22)	ND (0.24)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.14)	ND (0.2)	ND (0.18)	ND (0.2)
1,1-Dichloroethane	µg/m³	15	0.023 J	0.23	0.39	ND (0.14)
1,1-Dichloroethene	µg/m³	2,100	ND (0.52)	ND (2.7)	0.061 J	ND (0.071)
1,2,4-Trichlorobenzene	µg/m³	42	ND (4.9)	ND (20)	ND (6.1)	ND (6.6)
1,2,4-Trimethylbenzene	µg/m³	73	0.2 J	6.5	0.15 J	0.17 J
1,2-Dibromoethane	µg/m³	0.041	ND (0.21)	ND (1.4)	ND (1.3)	ND (1.4)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.79)	ND (4.1)	ND (0.99)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.94	0.024 J	0.16	ND (0.13)	0.037 J
1,2-Dichloropropane	µg/m³	2.4	ND (0.12)	ND (0.84)	ND (0.76)	ND (0.83)
1,3,5-Trimethylbenzene	µg/m³	63	0.2 J	6	0.13 J	0.24 J
1,3-Dichlorobenzene	µg/m³	2,100	15	15	ND (0.99)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	2.2	ND (0.79)	ND (4.1)	ND (0.99)	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.48)	ND (9.8)	ND (0.59)	ND (0.64)
Benzene	µg/m³	3.1	0.32	0.99	0.49	1
Bromomethane	µg/m³	52	1	1	ND (0.64)	ND (0.7)
Carbon tetrachloride	µg/m³	1.6	0.43 J	0.43 J	0.17 J	0.25
Chlorobenzene	µg/m³	520	ND (0.61)	ND (3.1)	ND (0.76)	ND (0.82)
Chloroethane	µg/m³	100,000	ND (0.35)	ND (1.8)	ND (0.43)	0.32 J
Chloroform	µg/m³	1.1	0.26 J	**12**	**280**	**13**
Chloromethane	µg/m³	940	0.21 J	0.92	0.32 J	2
cis-1,2-Dichloroethene	µg/m³	NE	0.11	0.11	0.14	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.6)	ND (3.1)	ND (0.74)	ND (0.81)
Ethylbenzene	µg/m³	9.7	0.084 J	0.38	0.44	0.2
Freon 11	µg/m³	7,300	1.2	12	6.5	2.2
Freon 12	µg/m³	2,100	1.1	2.2	0.92	0.81 J
Freon 113	µg/m³	310,000	0.44 J	0.88 J	0.63 J	0.97 J
Freon 114	µg/m³	310,000	ND (4.8)	ND (4.8)	ND (1.1)	ND (1.2)
Hexachlorobutadiene	µg/m³	1.1	ND (1.4)	ND (9.8)	ND (8.7)	ND (9.5)
Methyl tert-butyl ether	µg/m³	94	ND (0.48)	ND (2.4)	ND (0.59)	ND (0.64)
Methylene chloride	µg/m³	52	0.28 J	0.37 J	ND (1.1)	0.4 J
Naphthalene	µg/m³	0.72	0.59 J	**1.6 J**	ND (4.3)	ND (4.7)
Styrene	µg/m³	10,000	ND (0.56)	ND (2.9)	ND (0.7)	ND (0.76)
Tetrachloroethene	µg/m³	4.1	0.22	**11**	**5.1**	1.9
Toluene	µg/m³	52,000	0.47 J	4.7	1.2	2.6
trans-1,2-Dichloroethene	µg/m³	630	ND (0.52)	ND (2.7)	ND (0.65)	ND (0.71)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.6)	ND (3.1)	ND (0.74)	ND (0.81)
Trichloroethene	µg/m³	12	0.05 J	0.55	0.31	0.061 J
Vinyl chloride	µg/m³	1.6	0.014 J	1.1	ND (0.042)	0.024 J
Xylenes, m & p	µg/m³	7,300	0.23 J	8.2	0.48	0.41
Xylenes, o	µg/m³	7,300	0.3 J	3.4	0.24	0.21

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Historical results are from samples collected from September 2004 through October 2008

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-8

1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Crawl Space Air Results Min	Max	EPC[5]	1432-CA01 (PropA1CA)	1432-CA02
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.062 J	0.12 J	0.0961	0.046 J	0.047 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.025) J	ND (0.23)	ND	ND (0.26)	ND (0.23)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.073)	ND (0.18)	ND	ND (0.2)	ND (0.18)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.11)	ND (0.14)	ND	ND (0.15)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.053)	ND (0.067)	ND	ND (0.074)	ND (0.067)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (0.28) J	ND (1.2) J	ND	ND (6.9)	ND (6.2)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.066 J	**31**	**30.9**	0.8 J	0.11 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.2)	ND (0.26)	ND	ND (1.4)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.11 J	0.16 J	0.16	ND (1.1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.028 J	**0.91**	**0.627**	0.06 J	0.064 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.027 J	0.11	0.0615	ND (0.86)	ND (0.78)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.047 J	**11**	**11**	0.22 J	ND (0.82)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.077 J	63	63	0.61 J	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**0.3 J**	**4.8**	**1.63**	ND (1.1)	**0.29 J**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	0.26 J	0.26 J	0.26	ND (0.67)	ND (0.6)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.11 J	**16 J**	**16**	**0.52**	**0.35**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.041 J	0.78	0.33	ND (0.73)	ND (0.65)
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.41**	**0.58**	**0.531**	**0.47**	**0.43**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.029 J	0.4	0.146	ND (0.86)	ND (0.77)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.029 J	0.37	0.166	0.29 J	ND (0.44)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.16**	**0.65**	**0.389**	ND (0.91)	ND (0.82)
Chloromethane	µg/m³	94	NE	NE	NE	0.35	7.2	3.07	3	0.64
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.11)	ND (0.13)	ND	ND (0.15)	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.035 J	0.036 J	0.036	ND (0.85)	ND (0.76)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.043 J	**20**	**20**	0.28	0.16
Freon 11	µg/m³	730	NE	NE	NE	1.3	3.7	2.16	1.8	1.2
Freon 12	µg/m³	210	NE	NE	NE	1.6	2.8	2.54	2.1	2.1
Freon 113	µg/m³	31,000	NE	NE	NE	0.54	0.74	0.676	0.67 J	0.6 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.23	0.23	0.23	ND (1.3)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.4)	ND (1.8)	ND	ND (10)	ND (9)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.017 J	0.019 J	0.019	ND (0.67)	ND (0.6)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	2.2	3.3	1.37	0.36 J	0.3 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.7 J**	**0.92 J**	**0.882**	ND (4.9)	ND (4.4)
Styrene	µg/m³	1,000	21,000	900	NE	0.05 J	11	5.56	ND (0.8)	ND (0.72)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.14 J	**3.2**	**2.21**	0.06 J	0.1 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.17	77	30.6	1.3	6.5
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.53)	ND (0.67)	ND	ND (0.74)	ND (0.67)

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TABLE 4-8

1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Crawl Space Air Results Min	Max	EPC[5]	1432-CA01 (PropA1CA)	1432-CA02
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.036 J	0.04 J	0.04	ND (0.85)	ND (0.76)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.033	**1.5**	0.886	0.033 J	0.66
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.03 J	**2.8**	**2.8**	0.074	0.037 J
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.08 J	94	93.7	1	0.68
Xylenes, o	µg/m³	730	22,000	700	NE	0.027 J	33	32.9	0.37	0.085 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 1432 3rd Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-9

1432 and 1434 3rd Street Analytical Results - Comparison of Historical 1432 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	1432-IA01 (Downstairs)	1432-IA01 (FD) (Downstairs)	1432-IA03 (Downstairs)	1434-IA01 (Upstairs)
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.0961	0.051 J	0.065 J	0.04 J	0.043 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND	ND (0.22)	ND (0.24)	ND (0.24)	ND (0.24)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND	ND (0.18)	ND (0.19)	ND (0.19)	ND (0.19)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND	ND (0.064)	ND (0.069)	ND (0.069)	ND (0.069)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND	ND (6)	ND (6.5)	ND (6.5)	ND (6.5)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	**30.9**	0.62 J	0.48 J	0.28 J	0.29 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND	ND (1.2)	ND (1.3)	ND (1.3)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.16	ND (0.97)	ND (1)	ND (1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	**0.627**	**0.12 J**	ND (0.11) J	0.077 J	**0.11 J**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.0615	ND (0.74)	ND (0.81)	ND (0.81)	ND (0.81)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	11	ND (0.79)	0.14 J	ND (0.86)	ND (0.86)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	63	ND (0.97)	ND (1)	ND (1)	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**1.63**	**2.4**	**2.8**	ND (1)	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	0.26	ND (0.58)	ND (0.63)	ND (0.63)	ND (0.63)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**16**	0.31	**0.32**	0.26 J	0.25 J
Bromomethane	µg/m³	5.2	3,900	5	NE	0.33	ND (1.9) J	ND (0.68)	ND (2.4) J	ND (1.8) J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.531**	**0.43**	**0.52**	**0.45**	**0.49**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.146	ND (0.74)	ND (0.8)	ND (0.8)	ND (0.8)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.166	ND (0.42)	ND (0.46)	ND (0.46)	ND (0.46)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.389**	**2.7**	**2.8**	**0.29 J**	**0.21 J**
Chloromethane	µg/m³	94	NE	NE	NE	3.07	0.88	1.2	0.65	0.7
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.036	ND (0.73)	ND (0.79)	ND (0.79)	ND (0.79)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	**20**	0.26	0.24	0.35	0.18
Freon 11	µg/m³	730	NE	NE	NE	2.16	1.1	1.1	1	1
Freon 12	µg/m³	210	NE	NE	NE	2.54	2	2	2	2
Freon 113	µg/m³	31,000	NE	NE	NE	0.676	0.44 J	0.61 J	0.41 J	0.41 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.23	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND	ND (8.6)	ND (9.3)	ND (9.3)	ND (9.3)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.019	ND (0.58)	ND (0.63)	ND (0.63)	ND (0.63)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	1.37	0.7 J	0.35 J	0.32 J	0.34 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.882**	**75**	**110**	**0.79 J**	**1.6 J**
Styrene	µg/m³	1,000	21,000	900	NE	5.56	0.39 J	0.35 J	0.42 J	ND (0.74)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	**2.21**	0.17 J	0.075 J	0.057 J	0.047 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	30.6	2	1.9	1.1	1
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND	ND (0.64)	ND (0.69)	ND (0.69)	ND (0.69)

TABLE 4-9

1432 and 1434 3rd Street Analytical Results - Comparison of Historical 1432 3rd Street Crawl Space EPCs and June 2009 Indoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	1432-IA01 (Downstairs)	1432-IA01 (FD) (Downstairs)	1432-IA03 (Downstairs)	1434-IA01 (Upstairs)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.04	ND (0.73)	ND (0.79)	ND (0.79)	ND (0.79)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.886	0.027 J	ND (0.036) J	ND (0.19)	ND (0.19)
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	**2.8**	ND (0.041) J	ND (0.045) J	ND (0.045) J	ND (0.045) J
Xylenes, m & p	µg/m³	730	22,000	700	NE	93.7	0.6	0.54	0.48	0.42
Xylenes, o	µg/m³	730	22,000	700	NE	32.9	0.27	0.25	0.23	0.2

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

[3] West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

[4] An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 1432 Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-10

1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results		EPC[5]	1432-OA01	1432-OA02
						Min	Max			
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.058 J	0.11 J	0.0823	0.042 J	0.04 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.033) J	ND (0.24)	ND	ND (0.22)	ND (0.22)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.077)	ND (0.18)	ND	ND (0.18)	ND (0.18)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.11)	ND (0.14)	ND	ND (0.13)	ND (0.13)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.056)	ND (0.071)	ND	ND (0.065)	ND (0.065)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (1)	ND (1.3)	ND	ND (6.1)	ND (6.1)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.087 J	1.6	0.983	ND (0.81)	0.2 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.22)	ND (0.28)	ND	ND (1.3)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.13 J	0.13 J	0.13	ND (0.99)	ND (0.99)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.028 J	0.069 J	0.0557	0.053 J	0.054 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.025 J	0.064 J	0.0438	ND (0.76)	ND (0.76)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.035 J	0.6	0.354	ND (0.81)	ND (0.81)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.092 J	0.092 J	0.092	ND (0.99)	ND (0.99)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**0.25 J**	**0.25 J**	**0.25**	ND (0.99)	ND (0.99)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.025) J	ND (0.64)	ND	ND (0.59)	ND (0.59)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.24	**1.6**	**0.852**	**0.34**	0.24 J
Bromomethane	µg/m³	5.2	3,900	5	NE	0.057 J	0.35	1.18	1.8 J	1.3 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.43**	**0.6**	**0.525**	**0.43**	**0.42**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.022 J	0.022 J	0.022	ND (0.76)	ND (0.76)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.048 J	0.12 J	0.0991	ND (0.43)	ND (0.43)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.088 J	**0.36**	**0.234**	ND (0.8)	ND (0.8)
Chloromethane	µg/m³	94	NE	NE	NE	0.92	1.8	1.21	0.6	0.64
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.11)	ND (0.14)	ND	ND (0.13)	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.051 J	0.051 J	0.051	ND (0.74)	ND (0.74)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.11 J	**1.5**	0.642	0.1 J	0.1 J
Freon 11	µg/m³	730	NE	NE	NE	1.2	3.8	2.05	1.1	1.1
Freon 12	µg/m³	210	NE	NE	NE	1.5	2.9	2.52	2.1	2
Freon 113	µg/m³	31,000	NE	NE	NE	0.52	0.72	0.645	0.46 J	0.38 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.13 J	0.13 J	0.13	ND (1.1)	ND (1.1)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.5)	ND (1.9) J	ND	ND (8.7)	ND (8.7)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.019 J	0.019 J	0.019	ND (0.59)	ND (0.59)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	3.2	4.5	1.78	0.26 J	0.21 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.27**	**0.74 J**	**0.74**	ND (4.3)	ND (4.3)
Styrene	µg/m³	1,000	21,000	900	NE	0.032 J	0.4	0.193	0.35 J	ND (0.7)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.062 J	0.38	0.239	0.035 J	0.077 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.6	9.9	3.96	0.5	0.48
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.56)	ND (0.71)	ND	ND (0.65)	ND (0.65)

TABLE 4-10

1432 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	1432-OA01	1432-OA02
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.046 J	0.046 J	0.046	ND (0.74)	ND (0.74)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.02 J	0.23	0.102	ND (0.18)	0.12 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND (0.036)	ND (0.046)	ND	ND (0.042)	ND (0.042)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.31	5.2	2.12	0.29	0.3
Xylenes, o	µg/m³	730	22,000	700	NE	0.088 J	1.7	0.704	0.12 J	0.11 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Outdoor Air data collected from 1432 3rd Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-11

1436 3rd Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical [2] Soil Gas Results Min	Max	1436-SG01
1,1,1-Trichloroethane	µg/m³	52,000	0.28 J	0.46 J	0.22
1,1,2,2-Tetrachloroethane	µg/m³	0.42	ND (0.19)	ND (0.23)	ND (0.19)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.15)	ND (0.18)	ND (0.15)
1,1-Dichloroethane	µg/m³	15	0.045 J	0.045 J	ND (0.11)
1,1-Dichloroethene	µg/m³	2,100	ND (0.59)	ND (2.7)	ND (0.055)
1,2,4-Trichlorobenzene	µg/m³	42	ND (5.5)	ND (20)	ND (5.2)
1,2,4-Trimethylbenzene	µg/m³	73	0.34 J	1	1.7
1,2-Dibromoethane	µg/m³	0.041	ND (0.21)	ND (1.3)	ND (1.1)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.9) J	ND (4.1)	ND (0.84)
1,2-Dichloroethane	µg/m³	0.94	0.026 J	0.098 J	0.075 J
1,2-Dichloropropane	µg/m³	2.4	ND (0.12)	ND (0.78)	ND (0.64)
1,3,5-Trimethylbenzene	µg/m³	63	0.14 J	0.36 J	0.36 J
1,3-Dichlorobenzene	µg/m³	2,100	ND (0.9)	ND (4.1)	ND (0.84)
1,4-Dichlorobenzene	µg/m³	2.2	ND (0.9)	ND (4.1)	ND (0.84)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	0.67	0.67	ND (0.5)
Benzene	µg/m³	3.1	0.72	1.2	0.61
Bromomethane	µg/m³	52	1.4	1.4	0.39 J
Carbon tetrachloride	µg/m³	1.6	0.54 J	0.54 J	0.3
Chlorobenzene	µg/m³	520	0.12 J	0.12 J	ND (0.64)
Chloroethane	µg/m³	100,000	ND (0.39)	ND (1.8)	ND (0.37)
Chloroform	µg/m³	1.1	**1.6**	**2.9**	**7.6**
Chloromethane	µg/m³	940	1.4	2.6 J	0.3
cis-1,2-Dichloroethene	µg/m³	NE	ND (0.12)	ND (2.7)	ND (0.11)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.68)	ND (3.1)	ND (0.63)
Ethylbenzene	µg/m³	9.7	0.17	0.73	0.45
Freon 11	µg/m³	7,300	3.5	16	2.2
Freon 12	µg/m³	2,100	2.3	3.2	1.2
Freon 113	µg/m³	310,000	0.74 J	0.87 J	0.54 J
Freon 114	µg/m³	310,000	ND (4.8)	ND (4.8)	ND (0.97)
Hexachlorobutadiene	µg/m³	1.1	ND (1.4)	ND (9)	ND (7.4)
Methyl tert-butyl ether	µg/m³	94	ND (0.54)	ND (2.4)	ND (0.5)
Methylene chloride	µg/m³	52	0.4 J	0.59 J	ND (0.96)
Naphthalene	µg/m³	0.72	**1.3 J**	**1.3 J**	ND (3.6)
Styrene	µg/m³	10,000	0.14 J	0.14 J	0.23 J
Tetrachloroethene	µg/m³	4.1	0.4	**5.2**	1.7
Toluene	µg/m³	52,000	1.1	4.8	1.6
trans-1,2-Dichloroethene	µg/m³	630	ND (0.59)	ND (2.7)	ND (0.55)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.68)	ND (3.1)	ND (0.63)
Trichloroethene	µg/m³	12	0.039 J	0.21	0.045 J
Vinyl chloride	µg/m³	1.6	1.1	1.1	ND (0.036)
Xylenes, m & p	µg/m³	7,300	0.47 J	2	1.8
Xylenes, o	µg/m³	7,300	0.22 J	0.74	0.6

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Historical results are from samples collected from September 2004 through October 2008

--- not analyzed

ND not detected above the laboratory's reporting limit shown in parentheses

NE not established

J estimated value

µg/m³ micrograms per cubic meter

TABLE 4-12

1436 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	2004 through 2008[4] Outdoor Air Results Max	EPC[5]	1436-OA01
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.073 J	0.11 J	0.099	0.055 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.19)	ND (0.22) J	ND	ND (0.23)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.076)	ND (0.17)	ND	ND (0.18)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.11)	ND (0.13)	ND	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.055)	ND (0.063)	ND	ND (0.067)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (1)	ND (1.2) J	ND	ND (6.2) J
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.15 J	2.4	1.59	0.2 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.21)	ND (0.24)	ND	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.1 J	0.1 J	0.1	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.029 J	0.061 J	0.061	0.054 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.064)	ND (0.15)	ND	ND (0.78)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.062 J	0.86	0.537	0.099 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.074 J	0.074 J	0.074	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.14 J	**0.23**	0.204	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	0.22 J	0.22 J	0.22	ND (0.6)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.24 J	**1.8**	**1.32**	**0.66**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.051 J	0.34	0.295	ND (0.65)
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.47**	**0.63**	**0.568**	**0.46 J**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.022 J	0.048 J	0.048	ND (0.77)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.036 J	0.07 J	0.0689	ND (0.44)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.09 J	**0.39**	**0.284**	ND (0.82)
Chloromethane	µg/m³	94	NE	NE	NE	1	8 J	7.27	0.95
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.11)	ND (0.12)	ND	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.13)	ND (0.14)	ND	ND (0.76)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.13 J	**2.2**	**1.57**	0.2
Freon 11	µg/m³	730	NE	NE	NE	1.3	2.4	1.98	1.3
Freon 12	µg/m³	210	NE	NE	NE	1.8 J	3	2.81	2.4
Freon 113	µg/m³	31,000	NE	NE	NE	0.55	0.74	0.692	0.69 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.14 J	0.14 J	0.14	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.5)	ND (1.7) J	ND	ND (9) J
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	ND (0.5)	ND (0.57)	ND	ND (0.6)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	1.3 J	**11**	**6.99**	0.22 J
Naphthalene	µg/m³	0.072	NE	9	NE	0.069	**0.62 J**	**0.62**	ND (4.4) J
Styrene	µg/m³	1,000	21,000	900	NE	0.037 J	0.34	0.314	ND (0.72)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.18 J	0.31	0.252	0.065 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.68	14	14	1.5
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.55)	ND (0.63)	ND	ND (0.67)

TABLE 4-12

1436 3rd Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	1436-OA01
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.13)	ND (0.14)	ND	ND (0.76)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.058	0.26	0.189	ND (0.18)
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	**0.7 J**	**0.7 J**	**0.627**	ND (0.043)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.34	7.9	7.9	0.53
Xylenes, o	µg/m³	730	22,000	700	NE	0.11 J	2.5	1.65	0.26

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through October 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Outdoor Air data collected from 1436 3rd Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-13

320 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical [2] Soil Gas Results Min	Historical [2] Soil Gas Results Max	320-SG01
1,1,1-Trichloroethane	µg/m³	52,000	ND (0.73)	ND (0.73)	0.084 J
1,1,2,2-Tetrachloroethane	µg/m³	0.42	ND (0.18)	ND (0.18)	ND (0.22)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.15)	ND (0.15)	ND (0.18)
1,1-Dichloroethane	µg/m³	15	0.17	0.17	ND (0.13)
1,1-Dichloroethene	µg/m³	2,100	ND (0.53)	ND (0.53)	ND (0.064)
1,2,4-Trichlorobenzene	µg/m³	42	ND (5)	ND (5)	ND (6)
1,2,4-Trimethylbenzene	µg/m³	73	0.9	0.9	ND (0.79)
1,2-Dibromoethane	µg/m³	0.041	ND (1)	ND (1)	ND (1.2)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.8)	ND (0.8)	ND (0.97)
1,2-Dichloroethane	µg/m³	0.94	0.026 J	0.026 J	ND (0.13)
1,2-Dichloropropane	µg/m³	2.4	ND (0.62)	ND (0.62)	ND (0.74)
1,3,5-Trimethylbenzene	µg/m³	63	0.2 J	0.2 J	ND (0.79)
1,3-Dichlorobenzene	µg/m³	2,100	ND (0.8)	ND (0.8)	ND (0.97)
1,4-Dichlorobenzene	µg/m³	2.2	ND (0.8)	ND (0.8)	ND (0.97)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.48)	ND (0.48)	ND (0.58)
Benzene	µg/m³	3.1	1.1	1.1	0.61
Bromomethane	µg/m³	52	1.4	1.4	0.36 J
Carbon tetrachloride	µg/m³	1.6	ND (0.84)	ND (0.84)	0.21
Chlorobenzene	µg/m³	520	ND (0.62)	ND (0.62)	ND (0.74)
Chloroethane	µg/m³	100,000	ND (0.35)	ND (0.35)	ND (0.42)
Chloroform	µg/m³	1.1	1.1	1.1	0.81
Chloromethane	µg/m³	940	1.1	1.1	0.62
cis-1,2-Dichloroethene	µg/m³	NE	ND (0.11)	ND (0.11)	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.61)	ND (0.61)	ND (0.73)
Ethylbenzene	µg/m³	9.7	0.28	0.28	0.065 J
Freon 11	µg/m³	7,300	1.3	1.3	1.4
Freon 12	µg/m³	2,100	1.5	1.5	1.2
Freon 113	µg/m³	310,000	0.55 J	0.55 J	0.37 J
Freon 114	µg/m³	310,000	---	---	ND (1.1)
Hexachlorobutadiene	µg/m³	1.1	ND (7.1)	ND (7.1)	ND (8.6)
Methyl tert-butyl ether	µg/m³	94	ND (0.48)	ND (0.48)	ND (0.58)
Methylene chloride	µg/m³	52	ND (0.93) J	ND (0.93) J	ND (1.1)
Naphthalene	µg/m³	0.72	ND (3.5)	ND (3.5)	ND (4.2) J
Styrene	µg/m³	10,000	ND (0.57)	ND (0.57)	ND (0.68)
Tetrachloroethene	µg/m³	4.1	**5.5**	**5.5**	0.99
Toluene	µg/m³	52,000	1.4	1.4	0.7
trans-1,2-Dichloroethene	µg/m³	630	ND (0.53)	ND (0.53)	ND (0.64)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.61)	ND (0.61)	ND (0.73)
Trichloroethene	µg/m³	12	0.19	0.19	0.016 J
Vinyl chloride	µg/m³	1.6	**4.4**	**4.4**	ND (0.041)
Xylenes, m & p	µg/m³	7,300	0.79	0.79	0.12 J
Xylenes, o	µg/m³	7,300	0.29 J	0.29 J	0.054 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Historical results are from samples collected from October 2008 through October 2008

--- not analyzed

ND not detected above the laboratory's reporting limit shown in parentheses

NE not established

J estimated value

µg/m³ micrograms per cubic meter

TABLE 4-14

320 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2008[4] Crawl Space Air Results Min	2008[4] Crawl Space Air Results Max	EPC[5]	320-CA01	320-CA02
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.068 J	0.12 J	0.117	0.14 J	0.052 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.058) J	ND (0.21)	ND	ND (0.25)	ND (0.22)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.072)	ND (0.084)	ND	ND (0.2)	ND (0.17)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.11)	ND (0.12)	ND	ND (0.15)	ND (0.13)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.052)	ND (0.061)	ND	ND (0.072)	ND (0.063)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (0.24) J	ND (1.2) J	ND	ND (6.8)	ND (5.9)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.22 J	2	1.94	0.37 J	0.45 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.2)	ND (0.24)	ND	ND (1.4)	ND (1.2)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.054) J	ND (0.19)	ND	ND (1.1)	ND (0.95)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.037 J	**1.2**	**1.17**	**0.26**	**0.31**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.14	0.14	0.14	ND (0.84)	ND (0.73)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.069 J	0.74	0.678	0.14 J	0.14 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.018) J	ND (0.19)	ND	ND (1.1)	ND (0.95)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**1.4**	**1.4**	**0.916**	**0.35 J**	**0.34 J**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.48)	ND (0.56)	ND	ND (0.66)	ND (0.57)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.3	**2**	**1.32**	**0.66**	**0.54**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.087 J	0.18 J	0.353	0.49 J	0.32 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.44**	**0.6**	**0.537**	**0.37**	**0.37**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.032 J	0.032 J	0.032	ND (0.84)	ND (0.73)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.029 J	0.029 J	0.029	ND (0.48)	ND (0.42)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.14**	**0.56**	**0.352**	ND (0.89)	ND (0.77)
Chloromethane	µg/m³	94	NE	NE	NE	0.88	1	1.04	1.1	0.83
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.1)	ND (0.12)	ND	ND (0.14)	ND (0.12)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.053 J	0.053 J	0.053	ND (0.83)	ND (0.72)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.36	**1.8**	**1.67**	0.45	0.47
Freon 11	µg/m³	730	NE	NE	NE	1.4	3.5	2.71	1.2	1.2
Freon 12	µg/m³	210	NE	NE	NE	2.1	2.7	2.5	1.9	2
Freon 113	µg/m³	31,000	NE	NE	NE	0.53	0.72	0.64	0.45 J	0.43 J
Freon 114	µg/m³	31,000	NE	NE	NE	---	---	---	ND (1.3)	ND (1.1)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.4)	ND (1.6) J	ND	ND (9.8)	ND (8.4)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.022 J	0.022 J	0.022	ND (0.66)	ND (0.57)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	4.4	4.4	4.4	0.57 J	0.51 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND (0.22) J	ND (4.1) J	ND	ND (4.8)	ND (4.1)
Styrene	µg/m³	1,000	21,000	900	NE	0.074 J	0.51	0.462	0.31 J	0.35 J
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.14 J	**0.71**	**0.539**	0.28	0.21 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	3	17	14.1	16	9.6
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.52)	ND (0.61)	ND	ND (0.72)	ND (0.63)

TABLE 4-14

320 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2008[4] Crawl Space Air Results Min	2008[4] Crawl Space Air Results Max	EPC[5]	320-CA01	320-CA02
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.047 J	0.047 J	0.047	ND (0.83)	ND (0.72)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.051	**1.8**	1.19	0.99	0.68
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND (0.034)	ND (0.04)	0.0202	0.021 J	0.019 J
Xylenes, m & p	µg/m³	730	22,000	700	NE	1.3	6.3	5.8	1.4	1.4
Xylenes, o	µg/m³	730	22,000	700	NE	0.25	2.2	2.02	0.35	0.4

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from August 2008 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 320 Center Street from August 2008 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-15

320 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	320-IA01 (One unit)	320-IA02 (One unit)	320-IA03 (One unit)	320-IA04 (One unit)	320-IA05 (One unit)
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.117	0.34	0.34	0.39	0.3	0.53
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND	ND (0.24)	ND (0.31)	ND (0.26)	ND (0.26)	ND (0.25)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND	ND (0.19)	ND (0.24)	ND (0.2)	ND (0.2)	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND	ND (0.14)	ND (0.18)	ND (0.15)	ND (0.15)	ND (0.15)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND	ND (0.069)	ND (0.088)	ND (0.074)	ND (0.074)	ND (0.072)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND	ND (6.5) J	ND (8.3) J	ND (6.9) J	ND (6.9)	ND (6.8) J
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	1.94	0.57 J	0.74 J	0.62 J	0.66 J	0.59 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND	ND (1.3)	ND (1.7)	ND (1.4)	ND (1.4)	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (1)	ND (1.3)	ND (1.1)	ND (1.1)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	**1.17**	**2**	**2**	**1.6**	**1.9**	**1.6**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.14	ND (0.81)	ND (1)	ND (0.86)	ND (0.86)	ND (0.84)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	0.678	0.19 J	0.2 J	0.18 J	0.17 J	0.15 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (1)	ND (1.3)	ND (1.1)	ND (1.1)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**0.916**	**5.4**	**5.5**	**7.6**	**5.9**	**7.3**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND	ND (0.63)	ND (0.8)	ND (0.67)	ND (0.67)	ND (0.66)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**1.32**	**1.3**	**1.5**	**1.6**	**1.6**	**1.5**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.353	0.51 J	0.49 J	0.67 J	0.52 J	0.44 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.537**	**0.56**	**0.41**	**0.44**	**0.38**	**0.43**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.032	ND (0.8)	ND (1)	ND (0.86)	ND (0.86)	ND (0.84)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.029	ND (0.46)	ND (0.59)	ND (0.49)	ND (0.49)	ND (0.48)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.352**	**4.5**	**6.4**	**5.4**	**4.3**	**5.8**
Chloromethane	µg/m³	94	NE	NE	NE	1.04	1.2	1.5	1.3	1.2	1.3
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND	ND (0.14)	ND (0.18)	ND (0.15)	ND (0.15)	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.053	ND (0.79)	ND (1)	ND (0.85)	ND (0.85)	ND (0.83)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	**1.67**	0.65	0.81	0.81	0.68	0.72
Freon 11	µg/m³	730	NE	NE	NE	2.71	1.1	1.2 J	1 J	1.3	1.2
Freon 12	µg/m³	210	NE	NE	NE	2.5	2	1.9	2	1.9	1.8
Freon 113	µg/m³	31,000	NE	NE	NE	0.64	0.52 J	0.42 J	0.36 J	0.4 J	0.42 J
Freon 114	µg/m³	31,000	NE	NE	NE	---	ND (1.2)	ND (1.6)	ND (1.3)	ND (1.3)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND	ND (9.3)	ND (12)	ND (10)	ND (10)	ND (9.8)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.022	ND (0.63)	ND (0.8)	ND (0.67)	ND (0.67)	ND (0.66)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	4.4	0.56 J	0.58 J	0.54 J	0.4 J	0.41 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND	**0.96 J**	**0.87 J**	**0.88 J**	**0.82 J**	ND (4.8) J
Styrene	µg/m³	1,000	21,000	900	NE	0.462	0.86	1.2	0.93	0.78 J	0.82
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	**0.539**	0.25	0.41	0.36	0.23 J	0.24 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	14.1	11	9.3	8.5	9.4	9.4
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND	ND (0.69)	ND (0.88)	ND (0.74)	ND (0.74)	ND (0.72)

TABLE 4-15

320 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	320-IA01 (One unit)	320-IA02 (One unit)	320-IA03 (One unit)	320-IA04 (One unit)	320-IA05 (One unit)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.047	ND (0.79)	ND (1)	ND (0.85)	ND (0.85)	ND (0.83)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	1.19	0.037 J	0.085 J	0.12 J	0.037 J	0.044 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.0202	ND (0.045)	ND (0.057)	ND (0.048)	ND (0.048)	ND (0.047)
Xylenes, m & p	µg/m³	730	22,000	700	NE	5.8	2.1	2.3	2.5	2.2	2.3
Xylenes, o	µg/m³	730	22,000	700	NE	2.02	0.74	0.84	0.82	0.73	0.78

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Crawl Space Air data collected from 320 Center Street from August 2008 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-16

320 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2008[4] Outdoor Air Results Min	2008[4] Outdoor Air Results Max	EPC[5]	320-OA01
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.065 J	0.096 J	0.0868	0.053 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.03) J	ND (0.28)	ND	ND (0.24)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.083)	ND (0.11)	ND	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.12)	ND (0.16)	ND	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.06)	ND (0.08)	ND	ND (0.071)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (1.1) J	ND (1.5)	ND	ND (6.6) J
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.13 J	2.4	1.72	0.99
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.23)	ND (0.31)	ND	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.18)	ND (0.24)	ND	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.031 J	0.09 J	0.0785	0.054 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.07)	ND (0.093)	ND	ND (0.83)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.045 J	0.83	0.83	0.3 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.18)	ND (0.24)	ND	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.19	0.19	0.19	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.55)	ND (0.72)	ND	ND (0.64)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.26 J	**1.8**	**1.35**	0.31
Bromomethane	µg/m³	5.2	3,900	5	NE	0.047 J	0.18 J	0.18	ND (0.7)
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.47**	**0.56**	**0.546**	**0.48 J**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.02 J	0.02 J	0.02	ND (0.82)
Chloroethane	µg/m³	10,000	NE	30,000	NE	ND (0.2)	ND (0.26)	ND	ND (0.47)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.12 J**	**0.35**	**0.311**	ND (0.87)
Chloromethane	µg/m³	94	NE	NE	NE	0.78	1.1	1.1	0.9
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.12)	ND (0.16)	ND	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.046 J	0.046 J	0.046	ND (0.81)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.13 J	**1.8**	**1.27**	0.18
Freon 11	µg/m³	730	NE	NE	NE	1.3	3.5	3.09	1.3
Freon 12	µg/m³	210	NE	NE	NE	2.2	2.8	2.66	2.4
Freon 113	µg/m³	31,000	NE	NE	NE	0.56 J	0.8	0.736	ND (1.4)
Freon 114	µg/m³	31,000	NE	NE	NE	---	---	---	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.6) J	ND (2.1) J	ND	ND (9.5) J
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	ND (0.55)	ND (0.72) J	ND	ND (0.64)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	1.1	4.2	3.01	0.3 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND (0.17) J	ND (4.8)	**1.9**	**1.9 J**
Styrene	µg/m³	1,000	21,000	900	NE	0.053 J	0.35	0.315	ND (0.76)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.078 J	0.27	0.27	0.063 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.91	11	8.71	1.1
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.6)	ND (0.8)	ND	ND (0.71)

TABLE 4-16

320 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2008[4] Outdoor Air Results Min	Max	EPC[5]	320-OA01
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.037 J	0.037 J	0.037	ND (0.81)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.028 J	0.1	0.1	0.029 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND (0.039)	ND (0.051)	ND	ND (0.046)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.41	6.4	6.4	0.78
Xylenes, o	µg/m³	730	22,000	700	NE	0.14 J	2.2	2.2	0.47

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from August 2008 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Outdoor Air data collected from 320 Center Street from August 2008 through June 2009.

--- not analyzed

ND not detected above the laboratory's reporting limit shown in parentheses

NE not established

J estimated value

µg/m³ micrograms per cubic meter

TABLE 4-17

326 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Crawl Space Air Results		EPC[5]	326-CA01
						Min	Max		
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.061 J	0.11 J	0.0864	0.052 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	**0.58**	**0.58**	**0.39**	ND (0.26)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	0.076 J	0.076 J	0.076	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	0.015 J	0.015 J	0.015	ND (0.15)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.053)	ND (0.068)	ND	ND (0.074)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (0.15) J	ND (1.2) J	ND	ND (6.9)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.069 J	1.4	1.08	0.12 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.2)	ND (0.26)	ND	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.13 J	0.13 J	0.13	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.03 J	**1.9**	**1.57**	0.068 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.027 J	0.18	0.102	ND (0.86)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.04 J	0.39	0.22	ND (0.92)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.096 J	0.096 J	0.096	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.088 J	**6**	**2.31**	**0.27 J**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	0.18 J	0.18 J	0.18	ND (0.67)
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.28	**1.7**	**0.978**	**0.34**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.047 J	0.38	0.204	ND (0.73)
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.42**	**0.55**	**0.519**	**0.51 J**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.026 J	0.035 J	0.033	ND (0.86)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.023 J	0.074 J	0.0607	ND (0.49)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.091 J	**0.53**	**0.278**	ND (0.91)
Chloromethane	µg/m³	94	NE	NE	NE	0.73	1.3	1.06	0.83
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	0.018 J	0.018 J	0.018	ND (0.15)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.039 J	0.039 J	0.039	ND (0.85)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.11 J	**1.5**	**1**	0.16
Freon 11	µg/m³	730	NE	NE	NE	1.2	3.4	2.14	1.4
Freon 12	µg/m³	210	NE	NE	NE	2.1	3.4	2.84	2.3
Freon 113	µg/m³	31,000	NE	NE	NE	0.53	0.7	0.668	0.64 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.11 J	0.11 J	0.11	ND (1.3)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	**0.68 J**	**0.68 J**	**0.68**	ND (10)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.015 J	0.016 J	0.016	ND (0.67) J
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	0.72 J	**5.4**	2.12	0.3 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND (0.28) J	ND (4.5) J	ND	ND (4.9)
Styrene	µg/m³	1,000	21,000	900	NE	0.1 J	1.2	0.541	ND (0.8)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.19	**0.73**	**0.469**	0.075 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	1	28	16.2	4
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.53)	ND (0.68)	ND	ND (0.74)

TABLE 4-17

326 Center Street Analytical Results - Comparison of Historical and June 2009 Crawl Space Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Crawl Space Air Results Min	Max	EPC[5]	326-CA01
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.12)	ND (0.16)	ND	ND (0.85)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.07	**2.5**	**1.69**	0.35
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.022 J	0.061	0.0357	0.023 J
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.16 J	6.8	3.78	0.54
Xylenes, o	µg/m³	730	22,000	700	NE	0.046 J	1.5	0.913	0.1 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through December 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 326 Center Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-18

326 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	326-IA01 (Upstairs)	326-IA02 (Upstairs)	326-IA03 (Upstairs)	326-IA04 (Upstairs)
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.0864	0.053 J	0.067 J	0.054 J	0.048 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	**0.39**	ND (0.26)	ND (0.46)	ND (0.23)	**0.058 J**
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	0.076	ND (0.2)	ND (0.37)	ND (0.19)	ND (0.21)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	0.015	ND (0.15)	ND (0.27)	ND (0.14)	ND (0.15)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND	ND (0.074)	ND (0.13)	ND (0.068)	ND (0.076)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND	ND (6.9) J	ND (12) J	ND (6.3) J	ND (7.1)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	1.08	0.23 J	0.21 J	0.26 J	0.22 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND	ND (1.4)	ND (2.6)	ND (1.3)	ND (1.5)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.13	ND (1.1)	ND (2)	ND (1)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	**1.57**	**0.14 J**	**0.16 J**	**0.14**	**0.12 J**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.102	ND (0.86)	ND (1.6)	ND (0.79)	ND (0.88)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	0.22	ND (0.92)	ND (1.6)	ND (0.84)	ND (0.94)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	0.096	ND (1.1)	ND (2)	ND (1)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	**2.31**	**0.26 J**	ND (2)	**0.57 J**	0.22 J
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	0.18	ND (0.67)	ND (1.2)	ND (0.62)	ND (0.69)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**0.978**	**0.34**	**0.42 J**	**0.37**	**0.35**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.204	ND (0.73)	ND (1.3)	ND (0.66)	ND (0.74)
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.519**	**0.52 J**	**0.43 J**	**0.57 J**	**0.51 J**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.033	ND (0.86)	ND (1.5)	ND (0.79)	ND (0.88)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.0607	ND (0.49)	ND (0.89)	ND (0.45)	ND (0.5)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.278**	**0.97**	**0.8 J**	**1**	**1.3**
Chloromethane	µg/m³	94	NE	NE	NE	1.06	1.1	0.99	1.1	1
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	0.018	ND (0.15)	ND (0.27)	ND (0.14)	ND (0.15)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.039	ND (0.85)	ND (1.5)	ND (0.78)	ND (0.87)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	**1**	0.19	0.18 J	0.18	0.19
Freon 11	µg/m³	730	NE	NE	NE	2.14	1.4	1.4 J	1.6	1.5
Freon 12	µg/m³	210	NE	NE	NE	2.84	2.4	2.6	2.4	2.4
Freon 113	µg/m³	31,000	NE	NE	NE	0.668	0.66 J	ND (2.6)	ND (1.3)	ND (1.5)
Freon 114	µg/m³	31,000	NE	NE	NE	0.11	ND (1.3)	ND (2.3)	ND (1.2)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	**0.68**	ND (10) J	ND (18) J	ND (9.1) J	ND (10)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.016	ND (0.67)	ND (1.2)	ND (0.62)	ND (0.69) J
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	2.12	0.27 J	ND (2.3)	0.25 J	0.34 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND	ND (4.9) J	ND (8.8) J	ND (4.5) J	ND (5)
Styrene	µg/m³	1,000	21,000	900	NE	0.541	ND (0.8)	ND (1.4)	ND (0.73)	ND (0.81)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	**0.469**	0.098 J	0.083 J	0.092 J	0.077 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	16.2	2.6	4.6	2.2	1.8
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND	ND (0.74)	ND (1.3)	ND (0.68)	ND (0.76)

TABLE 4-18

326 Center Street Analytical Results - Comparison of Historical Crawl Space EPCs and June 2009 Indoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	326-IA01 (Upstairs)	326-IA02 (Upstairs)	326-IA03 (Upstairs)	326-IA04 (Upstairs)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND	ND (0.85)	ND (1.5)	ND (0.78)	ND (0.87)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	**1.69**	0.09 J	0.05 J	0.064 J	0.064 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	0.0357	ND (0.048)	ND (0.086)	ND (0.044)	ND (0.049)
Xylenes, m & p	µg/m³	730	22,000	700	NE	3.78	0.5	0.39 J	0.46	0.51
Xylenes, o	µg/m³	730	22,000	700	NE	0.913	0.17	0.16 J	0.14 J	0.17

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Crawl Space Air data collected from 326 Center Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-19

356 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical [2] Soil Gas Results Min	Historical [2] Soil Gas Results Max	356-SG01
1,1,1-Trichloroethane	µg/m³	52,000	ND (0.77)	ND (14)	0.056 J
1,1,2,2-Tetrachloroethane	µg/m³	0.42	ND (0.19)	ND (0.52)	ND (0.4)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.15)	ND (0.42)	ND (0.32)
1,1-Dichloroethane	µg/m³	15	0.018 J	0.018 J	ND (0.24)
1,1-Dichloroethene	µg/m³	2,100	ND (0.56)	ND (9.9)	ND (0.12)
1,2,4-Trichlorobenzene	µg/m³	42	ND (5.2)	ND (74)	ND (11)
1,2,4-Trimethylbenzene	µg/m³	73	0.28 J	8	0.36 J
1,2-Dibromoethane	µg/m³	0.041	ND (0.21)	ND (1.2)	ND (2.2)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.85) J	ND (15)	ND (1.8)
1,2-Dichloroethane	µg/m³	0.94	0.018 J	0.047 J	0.072 J
1,2-Dichloropropane	µg/m³	2.4	ND (0.12)	ND (0.7)	ND (1.3)
1,3,5-Trimethylbenzene	µg/m³	63	ND (0.69)	ND (12)	ND (1.4)
1,3-Dichlorobenzene	µg/m³	2,100	21	21	ND (1.8)
1,4-Dichlorobenzene	µg/m³	2.2	ND (0.85)	ND (15)	ND (1.8)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.51)	ND (36)	ND (1)
Benzene	µg/m³	3.1	0.5	2.4	0.72
Bromomethane	µg/m³	52	ND (0.55)	ND (9.7)	0.58 J
Carbon tetrachloride	µg/m³	1.6	0.3 J	0.51	0.31 J
Chlorobenzene	µg/m³	520	ND (0.65)	ND (11)	ND (1.3)
Chloroethane	µg/m³	100,000	0.69	0.69	ND (0.77)
Chloroform	µg/m³	1.1	0.98	**1.2**	ND (1.4)
Chloromethane	µg/m³	940	0.7 J	6.9 J	0.79
cis-1,2-Dichloroethene	µg/m³	NE	ND (0.11)	ND (9.9)	ND (0.23)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.64)	ND (11)	ND (1.3)
Ethylbenzene	µg/m³	9.7	0.11 J	3.5	0.22 J
Freon 11	µg/m³	7,300	1.1	4.8	1.2 J
Freon 12	µg/m³	2,100	1.7	2.3	2
Freon 113	µg/m³	310,000	0.65 J	0.65 J	0.43 J
Freon 114	µg/m³	310,000	ND (4.8)	ND (17)	ND (2)
Hexachlorobutadiene	µg/m³	1.1	ND (1.4)	ND (8.1)	ND (16)
Methyl tert-butyl ether	µg/m³	94	ND (0.51)	ND (9)	ND (1)
Methylene chloride	µg/m³	52	0.34 J	0.72 J	ND (2)
Naphthalene	µg/m³	0.72	0.57 J	**0.75 J**	ND (7.6) J
Styrene	µg/m³	10,000	0.12 J	0.12 J	ND (1.2)
Tetrachloroethene	µg/m³	4.1	0.13 J	3.3	0.37 J
Toluene	µg/m³	52,000	0.78	9.9	1.3
trans-1,2-Dichloroethene	µg/m³	630	ND (0.56)	ND (9.9)	ND (1.2)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.64)	ND (11)	ND (1.3)
Trichloroethene	µg/m³	12	0.02 J	0.13 J	0.053 J
Vinyl chloride	µg/m³	1.6	ND (0.035)	ND (0.098)	ND (0.075)
Xylenes, m & p	µg/m³	7,300	0.34 J	13	0.64
Xylenes, o	µg/m³	7,300	0.24 J	4.8	0.26

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Historical results are from samples collected from September 2004 through September 2007

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-20
360 Center Street Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical[2] Soil Gas Results Min	Historical[2] Soil Gas Results Max	360-SG01 (PropFSGb)
1,1,1-Trichloroethane	µg/m³	52,000	ND (0.72)	ND (4.5)	0.078 J
1,1,2,2-Tetrachloroethane	µg/m³	0.42	0.076 J	0.34	ND (0.26)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.14)	ND (0.37)	ND (0.21)
1,1-Dichloroethane	µg/m³	15	0.022 J	0.066 J	ND (0.15)
1,1-Dichloroethene	µg/m³	2,100	ND (0.52)	ND (3.2)	ND (0.076)
1,2,4-Trichlorobenzene	µg/m³	42	ND (4.9)	ND (24)	ND (7.1)
1,2,4-Trimethylbenzene	µg/m³	73	0.21 J	5.7	0.33 J
1,2-Dibromoethane	µg/m³	0.041	ND (0.21)	ND (2.6)	ND (1.5)
1,2-Dichlorobenzene	µg/m³	2,100	0.71 J	0.71 J	ND (1.1)
1,2-Dichloroethane	µg/m³	0.94	0.028 J	0.14	ND (0.15)
1,2-Dichloropropane	µg/m³	2.4	ND (0.12)	ND (1.6)	ND (0.88)
1,3,5-Trimethylbenzene	µg/m³	63	0.23 J	0.69 J	ND (0.94)
1,3-Dichlorobenzene	µg/m³	2,100	26	26	ND (1.1)
1,4-Dichlorobenzene	µg/m³	2.2	0.32 J	0.32 J	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.48)	ND (12)	0.56 J
Benzene	µg/m³	3.1	0.36	**3.6**	1
Bromomethane	µg/m³	52	0.4 J	1.4	0.6 J
Carbon tetrachloride	µg/m³	1.6	0.22	0.73 J	0.22 J
Chlorobenzene	µg/m³	520	ND (0.61)	ND (3.8)	ND (0.88)
Chloroethane	µg/m³	100,000	0.25 J	1.4	ND (0.5)
Chloroform	µg/m³	1.1	0.28 J	**9.4**	**6.9**
Chloromethane	µg/m³	940	0.4	10 J	0.9
cis-1,2-Dichloroethene	µg/m³	NE	ND (0.1)	ND (3.2)	ND (0.15)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.6) J	ND (3.7)	ND (0.87)
Ethylbenzene	µg/m³	9.7	0.14	1.1	0.18
Freon 11	µg/m³	7,300	1	4.5	1.4
Freon 12	µg/m³	2,100	0.83 J	3.2 J	1.1
Freon 113	µg/m³	310,000	0.5 J	0.76 J	0.42 J
Freon 114	µg/m³	310,000	ND (4.8)	ND (5.7)	ND (1.3)
Hexachlorobutadiene	µg/m³	1.1	ND (1.4)	ND (18)	ND (10)
Methyl tert-butyl ether	µg/m³	94	ND (0.48)	ND (3)	ND (0.69)
Methylene chloride	µg/m³	52	0.19 J	0.43 J	0.36 J
Naphthalene	µg/m³	0.72	**0.81 J**	**1.3 J**	**0.97 J**
Styrene	µg/m³	10,000	0.15 J	0.77	0.21 J
Tetrachloroethene	µg/m³	4.1	0.06 J	1.7	**4.7**
Toluene	µg/m³	52,000	0.58	10	1
trans-1,2-Dichloroethene	µg/m³	630	0.09 J	0.09 J	ND (0.76)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.6)	ND (3.7)	ND (0.87)
Trichloroethene	µg/m³	12	0.022 J	0.2	0.11 J
Vinyl chloride	µg/m³	1.6	0.018 J	**2**	ND (0.049)
Xylenes, m & p	µg/m³	7,300	0.4 J	8.3	0.42
Xylenes, o	µg/m³	7,300	0.18 J	3	0.25

Notes:
Results greater than the screening level are bolded.
1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.
2 Historical results are from samples collected from September 2004 through October 2008

--- not analyzed
ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-21

360 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	360-OA01
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.075 J	0.12 J	0.103	0.048 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.21)	ND (0.26)	ND	ND (0.24)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.084)	ND (0.2)	ND	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.12)	ND (0.15)	ND	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.06)	ND (0.074)	ND	ND (0.071)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (1.1) J	ND (1.4) J	ND	ND (6.6)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.083 J	5.8	5.8	0.87 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.23)	ND (0.28)	ND	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.18) J	ND (0.22) J	ND	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.034 J	0.066 J	**0.106**	**0.15**
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.072)	ND (0.17)	ND	ND (0.83)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.03 J	1.9	1.12	0.28 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.18)	ND (0.22) J	ND	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.16 J	**0.28 J**	**0.243**	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	ND (0.55)	ND (0.67)	**0.36**	**0.36 J**
Benzene	µg/m³	0.31	1,300	60	**0.96**	0.28	**2**	**1.47**	**0.36**
Bromomethane	µg/m³	5.2	3,900	5	NE	0.043 J	0.18 J	0.311	0.5 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.46**	**0.83**	**0.666**	**0.41**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.031 J	0.052 J	0.052	ND (0.82)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.029 J	0.075 J	0.075	ND (0.47)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.078 J	**0.37**	**0.272**	ND (0.87)
Chloromethane	µg/m³	94	NE	NE	NE	0.97	1.2	1.18	0.86
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.12)	ND (0.15)	ND	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.14)	ND (0.17)	ND	ND (0.81)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.089 J	**3.5**	**3.5**	0.35
Freon 11	µg/m³	730	NE	NE	NE	1.1	1.7	1.63	1.1
Freon 12	µg/m³	210	NE	NE	NE	1.7 J	2.6	2.6	1.9
Freon 113	µg/m³	31,000	NE	NE	NE	0.57	0.63	0.626	0.45 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.12 J	0.12 J	0.12	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.6) J	ND (2)	ND	ND (9.5)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	ND (0.55)	ND (0.67)	ND	ND (0.64)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	2.2	5.1	3.25	0.42 J
Naphthalene	µg/m³	0.072	NE	9	NE	0.041	0.041	0.041	ND (4.7) J
Styrene	µg/m³	1,000	21,000	900	NE	0.028 J	0.55	0.397	0.18 J
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.2 J	0.4	0.322	0.093 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	0.54	34	34	3.3
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.6)	ND (0.74)	ND	ND (0.71)

TABLE 4-21

360 Center Street Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2004 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	360-OA01
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.14)	ND (0.17)	ND	ND (0.81)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.11	0.23	0.151	0.026 J
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND (0.039)	ND (0.048)	ND	ND (0.046)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.23 J	12	12	1.1
Xylenes, o	µg/m³	730	22,000	700	NE	0.084 J	3.4	3.4	0.43

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from September 2004 through October 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower. These EPCs includes Crawl Space Air data collected from 360 Center Street from September 2004 through June 2009.

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-22
Prescott Park Analytical Results - Comparison of Historical and June 2009 Soil Gas Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Historical[2] Soil Gas Results Min	Historical[2] Soil Gas Results Max	Park-SG01	Park-SG02 (PP-SG-02)
1,1,1-Trichloroethane	µg/m³	52,000	7.8	7.8	0.078 J	0.23
1,1,2,2-Tetrachloroethane	µg/m³	0.42	0.14 J	0.17 J	ND (0.22)	ND (0.23)
1,1,2-Trichloroethane	µg/m³	1.5	ND (0.11)	ND (0.68)	ND (0.18)	ND (0.19)
1,1-Dichloroethane	µg/m³	15	0.032 J	1	ND (0.13)	0.06 J
1,1-Dichloroethene	µg/m³	2,100	ND (0.4)	ND (8.5)	ND (0.065)	ND (0.068)
1,2,4-Trichlorobenzene	µg/m³	42	ND (3.7)	ND (64)	ND (6.1)	ND (6.3)
1,2,4-Trimethylbenzene	µg/m³	73	0.19 J	8.9	0.31 J	ND (0.84)
1,2-Dibromoethane	µg/m³	0.041	ND (0.2)	ND (4.8)	ND (1.3)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	2,100	ND (0.6)	ND (13)	ND (0.99)	ND (1)
1,2-Dichloroethane	µg/m³	0.94	0.017 J	0.21	ND (0.13)	0.026 J
1,2-Dichloropropane	µg/m³	2.4	ND (0.12)	ND (2.9)	ND (0.76)	ND (0.79)
1,3,5-Trimethylbenzene	µg/m³	63	0.11 J	1.9	ND (0.81)	ND (0.84)
1,3-Dichlorobenzene	µg/m³	2,100	ND (0.6)	ND (13)	ND (0.99)	ND (1)
1,4-Dichlorobenzene	µg/m³	2.2	0.31 J	0.31 J	ND (0.99)	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	3.2	ND (0.36)	ND (31)	ND (0.59)	ND (0.62)
Benzene	µg/m³	3.1	0.4	**14**	0.8	0.8
Bromomethane	µg/m³	52	1.2	2.3	2.1 J	1.8 J
Carbon tetrachloride	µg/m³	1.6	0.056 J	0.56 J	0.36	0.24
Chlorobenzene	µg/m³	520	ND (0.46)	ND (9.9)	ND (0.76)	ND (0.79)
Chloroethane	µg/m³	100,000	0.35 J	0.35 J	ND (0.43)	ND (0.45)
Chloroform	µg/m³	1.1	0.66 J	**590**	**14**	**94**
Chloromethane	µg/m³	940	0.45	1.4	0.3 J	0.35
cis-1,2-Dichloroethene	µg/m³	NE	0.019 J	20	ND (0.13)	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	6.1	ND (0.45) J	ND (9.8)	ND (0.74)	ND (0.78)
Ethylbenzene	µg/m³	9.7	0.18	1.4	0.17	0.11 J
Freon 11	µg/m³	7,300	0.94	11	1.7	2
Freon 12	µg/m³	2,100	0.94	2.3 J	1.9	2
Freon 113	µg/m³	310,000	0.46 J	0.83 J	0.47 J	0.47 J
Freon 114	µg/m³	310,000	ND (4.7)	ND (15) J	ND (1.1)	ND (1.2)
Hexachlorobutadiene	µg/m³	1.1	ND (1.4) J	ND (33)	ND (8.7)	ND (9.1)
Methyl tert-butyl ether	µg/m³	94	ND (0.36)	ND (7.8)	ND (0.59)	ND (0.62)
Methylene chloride	µg/m³	52	0.43 J	5.8	0.31 J	0.3 J
Naphthalene	µg/m³	0.72	0.36 J	**29**	ND (4.3)	ND (4.5)
Styrene	µg/m³	10,000	0.14 J	0.85	ND (0.7)	ND (0.73)
Tetrachloroethene	µg/m³	4.1	0.041 J	**60**	**41**	3
Toluene	µg/m³	52,000	0.6	38	1.4	1.2
trans-1,2-Dichloroethene	µg/m³	630	0.039 J	0.14 J	ND (0.65)	ND (0.68)
trans-1,3-Dichloropropene	µg/m³	6.1	ND (0.45)	ND (9.8)	ND (0.74)	ND (0.78)
Trichloroethene	µg/m³	12	0.029 J	4.5	0.082 J	0.31
Vinyl chloride	µg/m³	1.6	0.012 J	**2.7**	ND (0.042)	ND (0.044)
Xylenes, m & p	µg/m³	7,300	0.41 J	11	0.46	0.27 J
Xylenes, o	µg/m³	7,300	0.17 J	2.4	0.23	0.16

Notes:

Results greater than the screening level are bolded.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Historical results are from samples collected from September 2004 through October 2008

--- not analyzed
ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-23

Prescott Park Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2005 through 2008[4] Outdoor Air Results Min	Max	EPC[5]	PP-BGA02	PP-BGA03
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.08 J	0.11 J	0.0983	0.056 J	0.045 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	0.024 J	0.024 J	0.024	ND (0.25)	ND (0.23)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.084)	ND (0.17)	ND	ND (0.2)	ND (0.19)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.12)	ND (0.13)	ND	ND (0.15)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.061)	ND (0.065)	ND	ND (0.072)	ND (0.068)
1,2,4-Trichlorobenzene	µg/m³	4.2	NE	NE	NE	ND (1.2) J	ND (1.2) J	ND	ND (6.8)	ND (6.3)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.11 J	0.91	0.751	0.48 J	ND (0.84)
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND (0.24)	ND (0.25) J	ND	ND (1.4)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.19) J	ND (0.2) J	ND	ND (1.1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.061 J	0.061 J	**0.183**	**0.29**	0.052 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.072)	ND (0.15)	ND	ND (0.84)	ND (0.79)
1,3,5-Trimethylbenzene	µg/m³	6.3	NE	NE	NE	0.04 J	0.27	0.245	0.15 J	ND (0.84)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.19) J	ND (0.2) J	ND	ND (1.1)	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	ND (0.088) J	ND (0.2) J	ND	ND (1.1)	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	**0.96**	**0.96**	**0.891**	ND (0.66)	ND (0.62)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**0.4**	**1.3**	**0.937**	**0.41**	0.23 J
Bromomethane	µg/m³	5.2	3,900	5	NE	0.062 J	0.15 J	1.12	0.39 J	2 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.46**	**0.64**	**0.577**	**0.53**	**0.43**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.024 J	0.034 J	0.034	ND (0.84)	ND (0.79)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.021 J	0.1 J	0.0833	ND (0.48)	ND (0.45)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	0.093 J	**0.51**	**0.373**	ND (0.89)	ND (0.83)
Chloromethane	µg/m³	94	NE	NE	NE	1.2	1.2	1.2	1	0.62
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	0.038 J	0.038 J	0.038	ND (0.14)	ND (0.14)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.14)	ND (0.15) J	ND	ND (0.83)	ND (0.78)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.16	0.86	0.651	0.4	0.084 J
Freon 11	µg/m³	730	NE	NE	NE	1.4	2	1.84	1.4	1
Freon 12	µg/m³	210	NE	NE	NE	2.4	3	2.8	1.9 J	2
Freon 113	µg/m³	31,000	NE	NE	NE	0.58	0.73	0.719	0.72 J	0.45 J
Freon 114	µg/m³	31,000	NE	NE	NE	ND (0.22)	ND (0.22)	ND	ND (1.3)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (1.6) J	ND (1.7) J	ND	ND (9.8)	ND (9.1)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.0097 J	0.0097 J	0.0097	ND (0.66)	ND (0.62)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	ND (0.84) J	ND (1.1) J	0.4	0.4 J	0.24 J
Naphthalene	µg/m³	0.072	NE	9	NE	ND (4.1)	ND (4.3)	ND	ND (4.8) J	ND (4.5)
Styrene	µg/m³	1,000	21,000	900	NE	0.048 J	0.24	0.231	0.24 J	ND (0.73)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.065 J	**0.42**	0.314	0.3	0.046 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	1.1	4.4	3.45	2.3	0.39
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.61)	ND (0.65)	ND	ND (0.72)	ND (0.68)

TABLE 4-23

Prescott Park Analytical Results - Comparison of Historical and June 2009 Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	2005 through 2008[4] Outdoor Air Results Min	2005 through 2008[4] Outdoor Air Results Max	EPC[5]	PP-BGA02	PP-BGA03
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.14)	ND (0.15)	ND	ND (0.83)	ND (0.78)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.056	0.13	0.105	0.078 J	ND (0.18)
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND (0.04)	ND (0.042)	ND	ND (0.047)	ND (0.044)
Xylenes, m & p	µg/m³	730	22,000	700	NE	0.42	2.7	1.96	1	0.26 J
Xylenes, o	µg/m³	730	22,000	700	NE	0.13 J	0.92	0.92	0.4	0.091 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Historical results are from samples collected from May 2005 through October 2008

5 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Outdoor Air Air data collected from Prescott Park from May 2005 through June 2009.

--- not analyzed
ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-24

Background Outdoor Air - Comparison of Historical EPCs and June 2009 Background Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	BGA01	BGA02
1,1,1-Trichloroethane	µg/m³	5,200	68,000	1,000	ND (0.27)	0.0797	0.06 J	0.04 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND	ND (0.22)	ND (0.26)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND	ND (0.17)	ND (0.2)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	0.011	ND (0.13)	ND (0.15)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	0.0392	ND (0.063)	ND (0.074)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND	ND (5.9)	ND (6.9)
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.639	0.29 J	0.24 J
1,2-Dibromoethane	µg/m³	0.0041	NE	0.8	NE	ND	ND (1.2)	ND (1.4)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (0.95)	ND (1.1)
1,2-Dichloroethane	µg/m³	0.094	NE	400	ND (0.40)	0.0535	ND (0.13)	0.061 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	0.0448	ND (0.73)	ND (0.86)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	0.272	ND (0.78)	ND (0.92)
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND	ND (0.95)	ND (1.1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	800	NE	0.0948	ND (0.95)	ND (1.1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	3,000	3,000	NE	**0.383**	ND (0.57)	ND (0.67)
Benzene	µg/m³	0.31	1,300	60	**0.96**	**0.8**	0.31	0.26 J
Bromomethane	µg/m³	5.2	3,900	5	NE	0.682	0.39 J	1.8 J
Carbon tetrachloride	µg/m³	0.16	1,900	40	**0.69**	**0.526**	**0.51**	**0.47**
Chlorobenzene	µg/m³	52	NE	1,000	NE	0.0268	ND (0.73)	ND (0.86)
Chloroethane	µg/m³	10,000	NE	30,000	NE	0.0484	ND (0.42)	ND (0.49)
Chloroform	µg/m³	0.11	150	300	ND (0.10)	**0.155**	ND (0.77)	ND (0.91)
Chloromethane	µg/m³	94	NE	NE	NE	1.16	1	0.56
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	0.025	ND (0.12)	ND (0.15)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.0593	ND (0.72)	ND (0.85)
Ethylbenzene	µg/m³	0.97	NE	2,000	NE	0.582	0.15	0.12 J
Freon 11	µg/m³	730	NE	NE	NE	1.89	1.4	1 J
Freon 12	µg/m³	210	NE	NE	NE	2.56	2.4 J	2
Freon 113	µg/m³	31,000	NE	NE	NE	0.674	0.8 J	0.46 J
Freon 114	µg/m³	31,000	NE	NE	NE	0.12	ND (1.1)	ND (1.3)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND	ND (8.4)	ND (10)
Methyl tert-butyl ether	µg/m³	9.4	NE	8,000	ND (1.8)	0.23	ND (0.57)	ND (0.67)
Methylene chloride	µg/m³	5.2	14,000	400	ND (1.74)	0.233	0.28 J	0.2 J
Naphthalene	µg/m³	0.072	NE	9	NE	**0.376**	ND (4.1) J	ND (4.9)
Styrene	µg/m³	1,000	21,000	900	NE	0.175	ND (0.67)	ND (0.8)
Tetrachloroethene	µg/m³	0.41	20,000	35	ND (0.47)	0.288	0.15 J	0.052 J
Toluene	µg/m³	5,200	37,000	300	ND (3.0)	3.31	0.99	0.56
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND	ND (0.63)	ND (0.74)

TABLE 4-24

Background Outdoor Air - Comparison of Historical EPCs and June 2009 Background Outdoor Air Data
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	EPC[4]	BGA01	BGA02
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	0.056	ND (0.72)	ND (0.85)
Trichloroethene	µg/m³	1.2	NE	600	ND (0.43)	0.089	0.05 J	ND (0.2)
Vinyl chloride	µg/m³	0.16	180,000	NE	ND (0.77)	ND	ND (0.04)	ND (0.048)
Xylenes, m & p	µg/m³	730	22,000	700	NE	2.5	0.5	0.36
Xylenes, o	µg/m³	730	22,000	700	NE	0.853	0.19	0.13 J

Notes:

Results greater than the screening level are bolded.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. The screening level used to compare to soil gas concentrations are 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 An Exposure Point Concentration (EPC) is a measure of exposure appropriate for use in a risk assessment based on an average concentration of a contaminant throughout an area to which humans are exposed. A conservative estimate of the average concentration of a chemical across an exposure area is the 95 percent Upper Confidence Limit (UCL) on the mean. The EPCs shown are either the 95% UCL or the maximum detection concentration, whichever is lower.
These EPCs includes Outdoor Air data from September 2004 through June 2009 from 322 and 329 Lewis Street

---	not analyzed
ND	not detected above the laboratory's reporting limit shown in parentheses
NE	not established
J	estimated value
µg/m³	micrograms per cubic meter

TABLE 4-25
1436 and 1438 3rd Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	BGA02	Soil Gas 1436-SG01	Downstairs Indoor Air 1436-IA01	Indoor Air 1436-IA01 (FD)	Downstairs Indoor Air 1436-IA03	Downstairs Indoor Air 1436-IA04	Downstairs * Indoor Air 1436-IA05	Upstairs Indoor Air 1438-IA01	Upstairs Indoor Air 1438-IA02	Upstairs Indoor Air 1438-IA03	Upstairs Indoor Air 1438-IA04	Outdoor Air 1436-OA01
1,1,1-Trichloroethane	µg/m³	5,200	**68,000**	1,000	ND (0.27)	0.06 J	0.04 J	0.22	0.53	0.052 J	0.052 J	0.059 J	0.061 J	0.048 J	0.049 J	0.056 J	0.056 J	0.055 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.22)	ND (0.26)	ND (0.19)	ND (0.27)	ND (0.26)	ND (0.25)	ND (0.26)	ND (0.23)	ND (0.26)	ND (0.18) J	ND (0.25)	ND (0.23)	ND (0.23)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.17)	ND (0.2)	ND (0.15)	ND (0.21)	ND (0.2)	ND (0.2)	ND (0.21)	ND (0.19)	ND (0.21)	ND (0.2)	ND (0.2)	ND (0.18)	ND (0.18)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.13)	ND (0.15)	ND (0.11)	0.046 J	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.14)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.14)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.063)	ND (0.074)	ND (0.055)	0.18	ND (0.074)	ND (0.072)	ND (0.076)	ND (0.068)	ND (0.076)	ND (0.074)	ND (0.072)	ND (0.067)	ND (0.067)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND (5.9)	ND (6.9)	ND (5.2)	ND (7.3)	ND (6.9)	ND (6.8)	ND (7.1)	ND (6.3)	ND (7.1)	ND (6.9)	ND (6.8)	ND (6.2)	ND (6.2) J
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.29 J	0.24 J	1.7	1.6	1.3	1.3	1.8	0.59 J	0.4 J	0.4 J	0.42 J	0.48 J	0.2 J
1,2-Dibromoethane	µg/m³	0.0041	NE	**0.8**	NE	ND (1.2)	ND (1.4)	ND (1.1)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.5)	ND (1.3)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.3)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (0.84)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	**400**	ND (0.40)	ND (0.13)	0.061 J	0.075 J	**1.1**	**0.35**	**0.38**	**0.34**	ND (0.14)	**0.15**	**0.2**	**0.25**	**0.23**	0.054 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.73)	ND (0.86)	ND (0.64)	ND (0.9)	ND (0.86)	ND (0.84)	ND (0.88)	ND (0.79)	ND (0.88)	ND (0.86)	ND (0.84)	ND (0.78)	ND (0.78)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	ND (0.78)	ND (0.92)	0.36 J	0.4 J	0.32 J	0.33 J	0.44 J	0.18 J	ND (0.94)	ND (0.92)	ND (0.9)	0.14 J	0.099 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (0.84)	ND (1.2)	ND (1.1)	0.11 J	ND (1.1)	ND (1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1)	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	**800**	NE	ND (0.95)	ND (1.1)	ND (0.84)	**0.67 J**	**0.54 J**	**0.75 J**	**0.58 J**	**2.2**	ND (1.1)	ND (0.17) J	ND (1.1)	ND (1)	ND (1)
1,4-Dioxane (p-dioxane)	µg/m³	0.32	**3,000**	**3,000**	NE	ND (0.57)	ND (0.67)	ND (0.5)	**0.36 J**	ND (0.67)	**0.47 J**	0.3 J	ND (0.62)	ND (0.69)	ND (0.67)	ND (0.66)	ND (0.6)	ND (0.6)
Benzene	µg/m³	0.31	**1,300**	**60**	**0.96**	0.31	0.26 J	0.61	**0.5**	**0.54**	**0.49**	**0.47**	**0.84**	**0.36**	**0.4**	**0.48**	**0.4**	**0.66**
Bromomethane	µg/m³	5.2	**3,900**	5	NE	0.39 J	1.8 J	0.39 J	ND (0.46) J	0.7 J	0.36 J	0.58 J	ND (0.52) J	0.48 J	0.43 J	0.5 J	0.44 J	ND (0.65)
Carbon tetrachloride	µg/m³	0.16	**1,900**	**40**	**0.69**	**0.51**	**0.47**	0.3	**0.45**	**0.5**	**0.5**	**0.48**	**0.45**	**0.37**	**0.41**	**0.37**	**0.39**	**0.46 J**
Chlorobenzene	µg/m³	52	NE	**1,000**	NE	ND (0.73)	ND (0.86)	ND (0.64)	ND (0.9)	ND (0.86)	ND (0.84)	ND (0.88)	ND (0.79)	ND (0.88)	ND (0.86)	ND (0.84)	ND (0.77)	ND (0.77)
Chloroethane	µg/m³	10,000	NE	**30,000**	NE	ND (0.42)	ND (0.49)	ND (0.37)	ND (0.52)	ND (0.49)	ND (0.48)	ND (0.5)	ND (0.45)	ND (0.5)	ND (0.49)	ND (0.48)	ND (0.44)	ND (0.44)
Chloroform	µg/m³	0.11	**150**	**300**	ND (0.10)	ND (0.77)	ND (0.91)	**7.6**	**1.6**	**1.7**	**1.7**	**1.8**	**3**	ND (0.93)	**0.48 J**	**0.43 J**	**0.41 J**	ND (0.82)
Chloromethane	µg/m³	94	NE	NE	NE	1	0.56	0.3	1.3	1.4	1.2	1.1	1.6	1.4	0.86	1	1.1	0.95
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.12)	ND (0.15)	ND (0.11)	ND (0.16)	ND (0.15)	ND (0.14)	ND (0.15)	ND (0.14)	ND (0.15)	ND (0.15)	0.54	0.043 J	ND (0.13)
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.63)	ND (0.89)	ND (0.85)	ND (0.83)	ND (0.87)	ND (0.78)	ND (0.87)	ND (0.85)	ND (0.83)	ND (0.76)	ND (0.76)
Ethylbenzene	µg/m³	0.97	NE	**2,000**	NE	0.15	0.12 J	0.45	**1**	0.86	0.73	0.78	0.49	0.37	0.25	0.28	0.53	0.2
Freon 11	µg/m³	730	NE	NE	NE	1.4	1 J	2.2	1.3	1.4	1.3	1.1	1.5	1.1	0.88 J	1.1	1.2	1.3
Freon 12	µg/m³	210	NE	NE	NE	2.4 J	2	1.2	2	1.8	2.4	1.6	1.8	2	1.6	1.8	2.2	2.4
Freon 113	µg/m³	31,000	NE	NE	NE	0.8 J	0.46 J	0.54 J	0.5 J	0.45 J	0.46 J	0.35 J	0.47 J	0.42 J	0.39 J	0.39 J	0.72 J	0.69 J
Freon 114	µg/m³	31,000	NE	NE	NE	ND (1.1)	ND (1.3)	ND (0.97)	ND (1.4)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.2)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.2)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (8.4)	ND (10)	ND (7.4)	ND (10)	ND (10)	ND (9.8)	ND (10)	ND (9.1)	ND (10)	ND (10)	ND (9.8)	ND (9)	ND (9) J
Methyl tert-butyl ether	µg/m³	9.4	NE	**8,000**	ND (1.8)	ND (0.57)	ND (0.67)	ND (0.5)	ND (0.71)	ND (0.67)	ND (0.66)	ND (0.69)	ND (0.62)	ND (0.69)	ND (0.67)	ND (0.66)	ND (0.6)	ND (0.6)
Methylene chloride	µg/m³	5.2	**14,000**	**400**	ND (1.74)	0.28 J	0.2 J	ND (0.96)	0.71 J	0.57 J	0.59 J	0.62 J	0.42 J	ND (1.3)	ND (1.3)	0.4 J	0.57 J	0.22 J
Naphthalene	µg/m³	0.072	NE	**9**	NE	ND (4.1) J	ND (4.9)	ND (3.6)	**1 J**	ND (4.9) J	**1.2 J**	**0.76 J**	**0.63 J**	ND (5) J	ND (4.9) J	ND (4.8) J	ND (4.4) J	ND (4.4) J
Styrene	µg/m³	1,000	**21,000**	900	NE	ND (0.67)	ND (0.8)	0.23 J	0.81 J	0.61 J	0.72 J	0.69 J	0.47 J	0.15 J	0.19 J	ND (0.78)	1.4	ND (0.72)
Tetrachloroethene	µg/m³	0.41	**20,000**	**35**	ND (0.47)	0.15 J	0.052 J	1.7	**0.95**	0.14 J	0.12 J	**0.48**	0.1 J	0.085 J	0.095 J	0.14 J	0.35	0.065 J

TABLE 4-25
1436 and 1438 3rd Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	BGA02	Soil Gas 1436-SG01	Downstairs Indoor Air 1436-IA01	Indoor Air 1436-IA01 (FD)	Downstairs Indoor Air 1436-IA03	Downstairs Indoor Air 1436-IA04	Downstairs * Indoor Air 1436-IA05	Upstairs Indoor Air 1438-IA01	Upstairs Indoor Air 1438-IA02	Upstairs Indoor Air 1438-IA03	Upstairs Indoor Air 1438-IA04	Outdoor Air 1436-OA01
Toluene	µg/m³	5,200	**37,000**	300	ND (3.0)	0.99	0.56	1.6	10	11	10	8.2	4.5	1.6	1.3	1.8	4.5	1.5
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.63)	ND (0.74)	ND (0.55)	ND (0.78)	ND (0.74)	ND (0.72)	ND (0.76)	ND (0.68)	ND (0.76)	ND (0.74)	ND (0.72)	0.079 J	ND (0.67)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.63)	ND (0.89)	ND (0.85)	ND (0.83)	ND (0.87)	ND (0.78)	ND (0.87)	ND (0.85)	ND (0.83)	ND (0.76)	ND (0.76)
Trichloroethene	µg/m³	1.2	NE	**600**	ND (0.43)	0.05 J	ND (0.2)	0.045 J	0.91	ND (0.045) J	ND (0.048) J	ND (0.061) J	0.027 J	ND (0.026) J	ND (0.045) J	0.093 J	0.18 J	ND (0.18)
Vinyl chloride	µg/m³	0.16	**180,000**	NE	ND (0.77)	ND (0.04)	ND (0.048)	ND (0.036)	ND (0.05) J	ND (0.048) J	ND (0.047) J	ND (0.049) J	ND (0.044) J	ND (0.049) J	ND (0.048) J	ND (0.047) J	ND (0.043) J	ND (0.043)
Xylenes, m & p	µg/m³	730	**22,000**	700	NE	0.5	0.36	1.8	2.1	1.9	1.8	1.9	1.4	0.9	0.66	0.78	1.2	0.53
Xylenes, o	µg/m³	730	**22,000**	700	NE	0.19	0.13 J	0.6	1	0.85	0.79	0.89	0.56	0.4	0.28	0.34	0.48	0.26

Notes:
Results greater than the screening level are bolded. Crawlspace air, indoor air, and outdoor air data is compared to the residential air RSL and soil gas data is compared to the residential air RSL multiplied by an attenuation factor of 10.
1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. A screening level to compare to soil gas concentrations may be 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.
2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.
3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.
4 Neighborhood background results are from samples collected at 323 Lewis Street (upwind of the AMCO site) in June 2009.
* Sample taken from back house unit

ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-26
337 and 339 Center Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	BGA02	Soil Gas 339-SG01	Downstairs Indoor Air 337-IA01	Downstairs Indoor Air 337-IA02	Upstairs Indoor Air 339-IA01	Upstairs Indoor Air 339-IA02	Outdoor Air 339-OA01
1,1,1-Trichloroethane	µg/m^3	5,200	**68,000**	1,000	ND (0.27)	0.06 J	0.04 J	0.068 J	0.059 J	0.061 J	0.075 J	0.058 J	0.062 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.042	NE	NE	NE	ND (0.22)	ND (0.26)	ND (0.28)	ND (0.22)	ND (0.24)	ND (0.26)	ND (0.26)	**0.18 J**
1,1,2-Trichloroethane	µg/m^3	0.15	NE	NE	NE	ND (0.17)	ND (0.2)	ND (0.22)	ND (0.18)	ND (0.19)	0.12 J	0.065 J	0.033 J
1,1-Dichloroethane	µg/m^3	1.5	NE	NE	NE	ND (0.13)	ND (0.15)	ND (0.16)	ND (0.13)	ND (0.14)	0.03 J	0.028 J	ND (0.14)
1,1-Dichloroethene	µg/m^3	210	NE	70	NE	ND (0.063)	ND (0.074)	ND (0.08)	ND (0.064)	ND (0.069)	ND (0.074)	ND (0.074)	ND (0.069)
1,2,4-Trichlorobenzene	µg/m^3	2.1	NE	NE	NE	ND (5.9)	ND (6.9)	ND (7.4)	ND (6) J	ND (6.5) J	ND (6.9) J	ND (6.9) J	ND (6.5)
1,2,4-Trimethylbenzene	µg/m^3	7.3	NE	NE	NE	0.29 J	0.24 J	0.18 J	1.3	1.1	3.1	0.54 J	0.37 J
1,2-Dibromoethane	µg/m^3	0.0041	NE	**0.8**	NE	ND (1.2)	ND (1.4)	ND (1.5)	ND (1.2)	ND (1.3)	ND (1.4)	ND (1.4)	ND (1.3)
1,2-Dichlorobenzene	µg/m^3	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1.2)	ND (0.97)	ND (1)	ND (1.1)	ND (1.1)	0.22 J
1,2-Dichloroethane	µg/m^3	0.094	NE	**400**	ND (0.40)	ND (0.13)	0.061 J	ND (0.16)	**0.76**	**0.52**	**0.1 J**	**0.095 J**	0.067 J
1,2-Dichloropropane	µg/m^3	0.24	NE	NE	NE	ND (0.73)	ND (0.86)	ND (0.93)	**0.53 J**	**0.81 J**	ND (0.86)	ND (0.86)	ND (0.81)
1,3,5-Trimethylbenzene	µg/m^3	NE	NE	NE	NE	ND (0.78)	ND (0.92)	ND (0.99)	0.32 J	0.3 J	0.5 J	ND (0.92)	0.16 J
1,3-Dichlorobenzene	µg/m^3	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1.2)	ND (0.97)	0.1 J	ND (1.1)	ND (1.1)	0.19 J
1,4-Dichlorobenzene	µg/m^3	0.22	NE	**800**	NE	ND (0.95)	ND (1.1)	ND (1.2)	**1**	**1.5**	**0.26 J**	0.21 J	**0.24 J**
1,4-Dioxane (p-dioxane)	µg/m^3	0.32	**3,000**	**3,000**	NE	ND (0.57)	ND (0.67)	ND (0.72)	ND (0.58)	ND (0.63)	ND (0.67)	ND (0.67)	ND (0.63)
Benzene	µg/m^3	0.31	**1,300**	**60**	**0.96**	0.31	0.26 J	0.77	**0.82**	**0.87**	**0.6**	**0.42**	**0.38**
Bromomethane	µg/m^3	5.2	**3,900**	5	NE	0.39 J	1.8 J	0.31 J	ND (0.62)	0.44 J	0.39 J	0.48 J	0.41 J
Carbon tetrachloride	µg/m^3	0.16	**1,900**	**40**	**0.69**	**0.51**	**0.47**	0.25	**0.56 J**	**0.43**	**0.4**	**0.39**	**0.4**
Chlorobenzene	µg/m^3	52	NE	**1,000**	NE	ND (0.73)	ND (0.86)	ND (0.92)	ND (0.74)	ND (0.8)	ND (0.86)	ND (0.86)	ND (0.8)
Chloroethane	µg/m^3	10,000	NE	**30,000**	NE	ND (0.42)	ND (0.49)	ND (0.53)	ND (0.42)	ND (0.46)	ND (0.49)	ND (0.49)	ND (0.46)
Chloroform	µg/m^3	0.11	**150**	**300**	ND (0.10)	ND (0.77)	ND (0.91)	**4.7**	**1.3**	**1.5**	**0.83 J**	**0.46 J**	ND (0.85)
Chloromethane	µg/m^3	94	NE	NE	NE	1	0.56	ND (0.42)	1.2	1.3	1.1	1.3	0.92
cis-1,2-Dichloroethene	µg/m^3	NE	NE	NE	NE	ND (0.12)	ND (0.15)	ND (0.16)	ND (0.13)	ND (0.14)	ND (0.15)	ND (0.15)	ND (0.14)
cis-1,3-Dichloropropene	µg/m^3	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.91)	ND (0.73)	ND (0.79)	ND (0.85)	ND (0.85)	ND (0.79)
Ethylbenzene	µg/m^3	0.97	NE	**2,000**	NE	0.15	0.12 J	0.12 J	**1.9**	0.97	0.81	0.4	0.21
Freon 11	µg/m^3	730	NE	NE	NE	1.4	1 J	1.8	2.8	1.2	1.1	1.3	1.1
Freon 12	µg/m^3	210	NE	NE	NE	2.4 J	2	1.4	2.2	1.9	1.9	2.1	2
Freon 113	µg/m^3	31,000	NE	NE	NE	0.8 J	0.46 J	0.42 J	ND (1.2)	0.49 J	0.36 J	0.42 J	0.45 J
Freon 114	µg/m^3	31,000	NE	NE	NE	ND (1.1)	ND (1.3)	ND (1.4)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.3)	ND (1.2)
Hexachlorobutadiene	µg/m^3	0.11	NE	NE	NE	ND (8.4)	ND (10)	ND (11)	ND (8.6) J	ND (9.3)	ND (10)	ND (10)	ND (9.3)
Methyl tert-butyl ether	µg/m^3	9.4	NE	**8,000**	ND (1.8)	ND (0.57)	ND (0.67)	ND (0.72)	ND (0.58)	0.039 J	0.024 J	ND (0.67)	0.03 J
Methylene chloride	µg/m^3	5.2	**14,000**	**400**	ND (1.74)	0.28 J	0.2 J	ND (1.4)	0.79 J	0.94 J	0.53 J	0.52 J	0.46 J
Naphthalene	µg/m^3	0.072	NE	**9**	NE	ND (4.1) J	ND (4.9)	ND (5.3) J	**2.6 J**	**5.2 J**	**7 J**	**1.6 J**	**1.1 J**
Styrene	µg/m^3	1,000	**21,000**	900	NE	ND (0.67)	ND (0.8)	0.45 J	3.5	1.5	0.41 J	0.48 J	ND (0.74)
Tetrachloroethene	µg/m^3	0.41	**20,000**	**35**	ND (0.47)	0.15 J	0.052 J	0.38	**0.68**	**0.83**	0.13 J	0.11 J	0.096 J

TABLE 4-26
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Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	Neighborhood[4] Background Air Results BGA02	Soil Gas 339-SG01	Downstairs Indoor Air 337-IA01	Downstairs Indoor Air 337-IA02	Upstairs Indoor Air 339-IA01	Upstairs Indoor Air 339-IA02	Outdoor Air 339-OA01
Toluene	µg/m³	5,200	**37,000**	300	ND (3.0)	0.99	0.56	1.4	20	19	3.4	3.4	1.2
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.63)	ND (0.74)	ND (0.8)	ND (0.64)	ND (0.69)	ND (0.74)	ND (0.74)	ND (0.69)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.91)	ND (0.73)	ND (0.79)	ND (0.85)	ND (0.85)	ND (0.79)
Trichloroethene	µg/m³	1.2	NE	**600**	ND (0.43)	0.05 J	ND (0.2)	0.088 J	0.11 J	0.18 J	ND (0.078) J	ND (0.048) J	0.13 J
Vinyl chloride	µg/m³	0.16	**180,000**	NE	ND (0.77)	ND (0.04)	ND (0.048)	ND (0.051)	0.036 J	0.046	ND (0.048) J	ND (0.048) J	ND (0.045)
Xylenes, m & p	µg/m³	730	**22,000**	700	NE	0.5	0.36	0.35	2.9	2.3	3.1	0.96	0.67
Xylenes, o	µg/m³	730	**22,000**	700	NE	0.19	0.13 J	0.14 J	1.2	1	1	0.44	0.28

Notes:

Results greater than the screening level are bolded. Indoor air and outdoor air data are compared to the residential air RSL and soil gas data is compared to the residential air RSL multiplied by an attenuation factor of 10.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. A screening level to compare to soil gas concentrations may be 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Neighborhood background results are from samples collected at 323 Lewis Street (upwind of the AMCO site) in June 2009.

ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-27
356 Center Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	BGA02	Soil Gas 356-SG01	One unit Indoor Air 356-IA01	One unit Indoor Air 356-IA02	One unit Indoor Air 356-IA03	One unit Indoor Air 356-IA04	One unit Indoor Air 356-IA05	One unit Indoor Air 356-IA06	Outdoor Air 356-OA01
1,1,1-Trichloroethane	µg/m³	5,200	**68,000**	1,000	ND (0.27)	0.06 J	0.04 J	0.056 J	0.56	0.27	0.17 J	0.085 J	0.069 J	0.065 J	0.065 J
1,1,2,2-Tetrachloroethane	µg/m³	0.042	NE	NE	NE	ND (0.22)	ND (0.26)	ND (0.4)	ND (0.29)	ND (0.27)	ND (0.24)	ND (0.28)	ND (0.29)	ND (0.26)	ND (0.24)
1,1,2-Trichloroethane	µg/m³	0.15	NE	NE	NE	ND (0.17)	ND (0.2)	ND (0.32)	ND (0.23)	ND (0.21)	ND (0.2)	ND (0.22)	ND (0.23)	ND (0.2)	ND (0.19)
1,1-Dichloroethane	µg/m³	1.5	NE	NE	NE	ND (0.13)	ND (0.15)	ND (0.24)	ND (0.17)	ND (0.16)	ND (0.14)	ND (0.16)	ND (0.17)	ND (0.15)	ND (0.14)
1,1-Dichloroethene	µg/m³	210	NE	70	NE	ND (0.063)	ND (0.074)	ND (0.12)	ND (0.084)	ND (0.078)	ND (0.071)	ND (0.08)	ND (0.084)	ND (0.074)	ND (0.069)
1,2,4-Trichlorobenzene	µg/m³	2.1	NE	NE	NE	ND (5.9)	ND (6.9)	ND (11)	ND (7.9) J	ND (7.3) J	ND (6.6) J	ND (7.4) J	ND (7.9) J	ND (6.9) J	ND (6.5) J
1,2,4-Trimethylbenzene	µg/m³	7.3	NE	NE	NE	0.29 J	0.24 J	0.36 J	**29**	**27**	**26**	**35**	**26**	0.49 J	0.79 J
1,2-Dibromoethane	µg/m³	0.0041	NE	**0.8**	NE	ND (1.2)	ND (1.4)	ND (2.2)	ND (1.6)	ND (1.5)	ND (1.4)	ND (1.5)	ND (1.6)	ND (1.4)	ND (1.3)
1,2-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1.8)	ND (1.3)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.1)	ND (1)
1,2-Dichloroethane	µg/m³	0.094	NE	**400**	ND (0.40)	ND (0.13)	0.061 J	0.072 J	**1.3**	**1.3**	**1.4**	**0.32**	**0.39**	**1.3**	0.054 J
1,2-Dichloropropane	µg/m³	0.24	NE	NE	NE	ND (0.73)	ND (0.86)	ND (1.3)	ND (0.98)	ND (0.9)	ND (0.83)	ND (0.93)	ND (0.98)	ND (0.86)	ND (0.81)
1,3,5-Trimethylbenzene	µg/m³	NE	NE	NE	NE	ND (0.78)	ND (0.92)	ND (1.4)	8.4	7.7	7.3	9.8	7.5	0.15 J	0.19 J
1,3-Dichlorobenzene	µg/m³	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1.8)	ND (1.3)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.1)	ND (1)
1,4-Dichlorobenzene	µg/m³	0.22	NE	**800**	NE	ND (0.95)	ND (1.1)	ND (1.8)	ND (1.3)	ND (1.2)	0.16 J	0.2 J	ND (1.3)	0.2 J	**0.62 J**
1,4-Dioxane (p-dioxane)	µg/m³	0.32	**3,000**	**3,000**	NE	ND (0.57)	ND (0.67)	ND (1)	ND (0.76)	ND (0.71)	ND (0.64)	ND (0.72)	ND (0.76)	ND (0.67)	**0.89**
Benzene	µg/m³	0.31	**1,300**	**60**	**0.96**	0.31	0.26 J	0.72	**8.6**	**7.8**	**7.4**	**10**	**7.8**	**0.91**	**0.41**
Bromomethane	µg/m³	5.2	**3,900**	5	NE	0.39 J	1.8 J	0.58 J	ND (0.82)	ND (0.76)	ND (0.7)	ND (0.78)	ND (0.82)	ND (0.73)	0.36 J
Carbon tetrachloride	µg/m³	0.16	**1,900**	**40**	**0.69**	**0.51**	**0.47**	0.31 J	**0.52 J**	**0.55 J**	**0.53 J**	**0.53 J**	**0.51 J**	**0.45 J**	**0.5 J**
Chlorobenzene	µg/m³	52	NE	**1,000**	NE	ND (0.73)	ND (0.86)	ND (1.3)	ND (0.98)	ND (0.9)	ND (0.82)	ND (0.92)	ND (0.98)	ND (0.86)	ND (0.8)
Chloroethane	µg/m³	10,000	NE	**30,000**	NE	ND (0.42)	ND (0.49)	ND (0.77)	ND (0.56)	ND (0.52)	ND (0.47)	ND (0.53)	ND (0.56)	ND (0.49)	ND (0.46)
Chloroform	µg/m³	0.11	**150**	**300**	ND (0.10)	ND (0.77)	ND (0.91)	ND (1.4)	**3.1**	**2.5**	**1.8**	**0.9 J**	**0.92 J**	ND (0.91)	ND (0.85)
Chloromethane	µg/m³	94	NE	NE	NE	1	0.56	0.79	1.3	1.2	1.7	1.1	1.1	1	0.98
cis-1,2-Dichloroethene	µg/m³	NE	NE	NE	NE	ND (0.12)	ND (0.15)	ND (0.23)	ND (0.17)	ND (0.16)	ND (0.14)	ND (0.16)	ND (0.17)	ND (0.15)	0.031 J
cis-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (1.3)	ND (0.96)	ND (0.89)	ND (0.81)	ND (0.91)	ND (0.96)	ND (0.85)	ND (0.79)
Ethylbenzene	µg/m³	0.97	NE	**2,000**	NE	0.15	0.12 J	0.22 J	**17**	**15**	**15**	**21**	**15**	0.89	0.53
Freon 11	µg/m³	730	NE	NE	NE	1.4	1 J	1.2 J	1.6	1.5	1.5	1.2	1.3	1.2	1.2
Freon 12	µg/m³	210	NE	NE	NE	2.4 J	2	2	2.5	2.6	2.5	2.2	2.2	2.4	2.4
Freon 113	µg/m³	31,000	NE	NE	NE	0.8 J	0.46 J	0.43 J	ND (1.6)	ND (1.5)	0.62 J	ND (1.5)	ND (1.6)	0.66 J	0.68 J
Freon 114	µg/m³	31,000	NE	NE	NE	ND (1.1)	ND (1.3)	ND (2)	ND (1.5)	ND (1.4)	ND (1.2)	ND (1.4)	ND (1.5)	ND (1.3)	ND (1.2)
Hexachlorobutadiene	µg/m³	0.11	NE	NE	NE	ND (8.4)	ND (10)	ND (16)	ND (11) J	ND (10) J	ND (9.5) J	ND (11) J	ND (11) J	ND (10) J	ND (9.3) J
Methyl tert-butyl ether	µg/m³	9.4	NE	**8,000**	ND (1.8)	ND (0.57)	ND (0.67)	ND (1)	ND (0.76)	ND (0.71)	ND (0.64)	ND (0.72)	ND (0.76)	ND (0.67)	ND (0.63)
Methylene chloride	µg/m³	5.2	**14,000**	**400**	ND (1.74)	0.28 J	0.2 J	ND (2)	ND (1.5)	ND (1.4)	ND (1.2)	ND (1.4)	ND (1.5)	0.32 J	0.6 J
Naphthalene	µg/m³	0.072	NE	**9**	NE	ND (4.1) J	ND (4.9)	ND (7.6) J	**2.9 J**	**3 J**	**2.7 J**	**2.6 J**	**2.5 J**	ND (4.9) J	**1.9 J**
Styrene	µg/m³	1,000	**21,000**	900	NE	ND (0.67)	ND (0.8)	ND (1.2)	2.2	2.4	3	ND (0.86)	ND (0.9)	0.36 J	ND (0.74)
Tetrachloroethene	µg/m³	0.41	**20,000**	**35**	ND (0.47)	0.15 J	0.052 J	0.37 J	0.41	0.19 J	0.21 J	0.28	0.28 J	0.091 J	0.12 J

TABLE 4-27
356 Center Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	Neighborhood[4] Background Air Results BGA02	Soil Gas 356-SG01	One unit Indoor Air 356-IA01	One unit Indoor Air 356-IA02	One unit Indoor Air 356-IA03	One unit Indoor Air 356-IA04	One unit Indoor Air 356-IA05	One unit Indoor Air 356-IA06	Outdoor Air 356-OA01
Toluene	µg/m³	5,200	**37,000**	300	ND (3.0)	0.99	0.56	1.3	130	110	110	150	120	2.5	2.1
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.63)	ND (0.74)	ND (1.2)	ND (0.84)	ND (0.78)	ND (0.71)	ND (0.8)	ND (0.84)	ND (0.74)	ND (0.69)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (1.3)	ND (0.96)	ND (0.89)	ND (0.81)	ND (0.91)	ND (0.96)	ND (0.85)	ND (0.79)
Trichloroethene	µg/m³	1.2	NE	**600**	ND (0.43)	0.05 J	ND (0.2)	0.053 J	0.25	0.096 J	0.028 J	ND (0.22)	0.038 J	ND (0.2)	0.034 J
Vinyl chloride	µg/m³	0.16	**180,000**	NE	ND (0.77)	ND (0.04)	ND (0.048)	ND (0.075)	ND (0.054)	ND (0.05)	ND (0.046)	ND (0.051)	ND (0.054)	0.02 J	ND (0.045)
Xylenes, m & p	µg/m³	730	**22,000**	700	NE	0.5	0.36	0.64	77	70	68	98	71	2.4	1.2
Xylenes, o	µg/m³	730	**22,000**	700	NE	0.19	0.13 J	0.26	26	23	23	32	23	1.1	0.57

Notes:

Results greater than the screening level are bolded. Indoor air, and outdoor air data is compared to the residential air RSL and soil gas data is compared to the residential air RSL multiplied by an attenuation factor of 10.

[1] Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. A screening level to compare to soil gas concentrations may be 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

[2] Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

[3] West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

[4] Neighborhood background results are from samples collected at 323 Lewis Street (upwind of the AMCO site) in June 2009.

ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-28
366 Center Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	BGA02	Soil Gas 366-SG01	Soil Gas 366-SG01 (FD)	Downstairs Indoor Air 366-IA01	Downstairs Indoor Air 366-IA02	Downstairs Indoor Air 366-IA03	Downstairs Indoor Air 366-IA04	Outdoor Air 366-OA01
1,1,1-Trichloroethane	µg/m^3	5,200	**68,000**	1,000	ND (0.27)	0.06 J	0.04 J	0.081 J	0.088 J	0.13 J	0.078 J	0.34	0.1 J	0.051 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.042	NE	NE	NE	ND (0.22)	ND (0.26)	ND (0.23)	ND (0.21)	ND (0.24)	ND (0.24)	ND (0.23)	ND (0.25)	ND (0.2)
1,1,2-Trichloroethane	µg/m^3	0.15	NE	NE	NE	ND (0.17)	ND (0.2)	ND (0.19)	ND (0.17)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.2)	ND (0.16)
1,1-Dichloroethane	µg/m^3	1.5	NE	NE	NE	ND (0.13)	ND (0.15)	ND (0.14)	ND (0.12)	ND (0.14)	ND (0.14)	0.024 J	ND (0.15)	ND (0.12)
1,1-Dichloroethene	µg/m^3	210	NE	70	NE	ND (0.063)	ND (0.074)	ND (0.068)	ND (0.061)	ND (0.069)	ND (0.069)	0.083	ND (0.072)	ND (0.059)
1,2,4-Trichlorobenzene	µg/m^3	2.1	NE	NE	NE	ND (5.9)	ND (6.9)	ND (6.3)	ND (5.8)	ND (6.5)	ND (6.5)	ND (6.3)	ND (6.8)	ND (5.5)
1,2,4-Trimethylbenzene	µg/m^3	7.3	NE	NE	NE	0.29 J	0.24 J	ND (0.84)	ND (0.76)	2.1	2.3	1.2	1.9	0.32 J
1,2-Dibromoethane	µg/m^3	0.0041	NE	**0.8**	NE	ND (1.2)	ND (1.4)	ND (1.3)	ND (1.2)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.4)	ND (1.1)
1,2-Dichlorobenzene	µg/m^3	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1)	ND (0.93)	ND (1)	ND (1)	ND (1)	ND (1.1)	ND (0.9)
1,2-Dichloroethane	µg/m^3	0.094	NE	**400**	ND (0.40)	ND (0.13)	0.061 J	0.012 J	0.014 J	0.093 J	0.08 J	**0.2**	**0.11 J**	**0.11 J**
1,2-Dichloropropane	µg/m^3	0.24	NE	NE	NE	ND (0.73)	ND (0.86)	ND (0.79)	ND (0.72)	ND (0.81)	ND (0.81)	ND (0.79)	ND (0.84)	ND (0.69)
1,3,5-Trimethylbenzene	µg/m^3	NE	NE	NE	NE	ND (0.78)	ND (0.92)	ND (0.84)	ND (0.76)	0.69 J	0.76 J	0.35 J	0.53 J	0.11 J
1,3-Dichlorobenzene	µg/m^3	210	NE	NE	NE	ND (0.95)	ND (1.1)	ND (1)	ND (0.93)	ND (1)	ND (1)	ND (1)	ND (1.1)	ND (0.9)
1,4-Dichlorobenzene	µg/m^3	0.22	NE	**800**	NE	ND (0.95)	ND (1.1)	ND (1)	ND (0.93)	**0.31 J**	0.22 J	ND (1)	**0.88 J**	ND (0.9)
1,4-Dioxane (p-dioxane)	µg/m^3	0.32	**3,000**	**3,000**	NE	ND (0.57)	ND (0.67)	ND (0.62)	ND (0.56)	**0.46 J**	ND (0.63)	ND (0.62)	ND (0.66)	ND (0.54)
Benzene	µg/m^3	0.31	**1,300**	**60**	**0.96**	0.31	0.26 J	0.36	**0.32**	**1.2**	**0.86**	**0.58**	**0.79**	**0.42**
Bromomethane	µg/m^3	5.2	**3,900**	5	NE	0.39 J	1.8 J	ND (0.66)	ND (0.6)	ND (0.68)	2 J	1.6 J	2.1 J	ND (0.58)
Carbon tetrachloride	µg/m^3	0.16	**1,900**	**40**	**0.69**	**0.51**	**0.47**	0.31	**0.33**	**0.53**	**0.46**	**0.38**	**0.38**	**0.48**
Chlorobenzene	µg/m^3	52	NE	**1,000**	NE	ND (0.73)	ND (0.86)	ND (0.79)	ND (0.71)	ND (0.8)	ND (0.8)	ND (0.79)	ND (0.84)	ND (0.68)
Chloroethane	µg/m^3	10,000	NE	**30,000**	NE	ND (0.42)	ND (0.49)	0.14 J	ND (0.41)	ND (0.46)	ND (0.46)	ND (0.45)	ND (0.48)	ND (0.39)
Chloroform	µg/m^3	0.11	**150**	**300**	ND (0.10)	ND (0.77)	ND (0.91)	**4.9**	**5**	**0.46 J**	**0.54 J**	**0.52 J**	**0.71 J**	ND (0.73)
Chloromethane	µg/m^3	94	NE	NE	NE	1	0.56	0.51	0.4	1	0.93	0.64	0.98	1.2
cis-1,2-Dichloroethene	µg/m^3	NE	NE	NE	NE	ND (0.12)	ND (0.15)	ND (0.14)	ND (0.12)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.12)
cis-1,3-Dichloropropene	µg/m^3	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.78)	ND (0.7)	ND (0.79)	ND (0.79)	ND (0.78)	ND (0.83)	ND (0.68)
Ethylbenzene	µg/m^3	0.97	NE	**2,000**	NE	0.15	0.12 J	0.053 J	0.047 J	**1.7**	**1.4**	0.79	**1.8**	0.74
Freon 11	µg/m^3	730	NE	NE	NE	1.4	1 J	2.2	2.4	1.8	1.7	1.6	1.6	1.1
Freon 12	µg/m^3	210	NE	NE	NE	2.4 J	2	1.2	1	2.1	1.8	1.9	1.8	2
Freon 113	µg/m^3	31,000	NE	NE	NE	0.8 J	0.46 J	ND (1.3)	0.59 J	ND (1.3)	0.44 J	0.36 J	0.44 J	0.52 J
Freon 114	µg/m^3	31,000	NE	NE	NE	ND (1.1)	ND (1.3)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.3)	ND (1)
Hexachlorobutadiene	µg/m^3	0.11	NE	NE	NE	ND (8.4)	ND (10)	ND (9.1)	ND (8.3)	ND (9.3)	ND (9.3)	ND (9.1)	ND (9.8)	ND (7.9)
Methyl tert-butyl ether	µg/m^3	9.4	NE	**8,000**	ND (1.8)	ND (0.57)	ND (0.67)	ND (0.62)	ND (0.56)	ND (0.63)	ND (0.63)	ND (0.62)	ND (0.66)	ND (0.54)
Methylene chloride	µg/m^3	5.2	**14,000**	**400**	ND (1.74)	0.28 J	0.2 J	ND (1.2)	ND (1.1)	0.52 J	0.44 J	0.39 J	0.62 J	0.78 J
Naphthalene	µg/m^3	0.072	NE	**9**	NE	ND (4.1) J	ND (4.9)	ND (4.5)	ND (4.1)	ND (4.6)	**0.9 J**	ND (4.5)	ND (4.8)	ND (3.9)
Styrene	µg/m^3	1,000	**21,000**	900	NE	ND (0.67)	ND (0.8)	ND (0.73)	ND (0.66)	1.9	1	0.62 J	1.3	0.23 J
Tetrachloroethene	µg/m^3	0.41	**20,000**	**35**	ND (0.47)	0.15 J	0.052 J	0.38	0.39	0.2 J	0.19 J	**1.2**	0.19 J	0.26

TABLE 4-28
366 Center Street Analytical Results - Air (June 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential[1] RSL	Acute[2] REL	Chronic[2] REL	West Oakland[3] Background Air Results	Neighborhood[4] Background Air Results BGA01	Neighborhood[4] Background Air Results BGA02	Soil Gas 366-SG01	Soil Gas 366-SG01 (FD)	Downstairs Indoor Air 366-IA01	Downstairs Indoor Air 366-IA02	Downstairs Indoor Air 366-IA03	Downstairs Indoor Air 366-IA04	Outdoor Air 366-OA01
Toluene	µg/m³	5,200	**37,000**	300	ND (3.0)	0.99	0.56	0.6	0.72	14	9.1	5.3	13	2
trans-1,2-Dichloroethene	µg/m³	63	NE	NE	NE	ND (0.63)	ND (0.74)	ND (0.68)	ND (0.61)	ND (0.69)	ND (0.69)	ND (0.68)	ND (0.72)	ND (0.59)
trans-1,3-Dichloropropene	µg/m³	0.61	NE	NE	NE	ND (0.72)	ND (0.85)	ND (0.78)	ND (0.7)	ND (0.79)	ND (0.79)	ND (0.78)	ND (0.83)	ND (0.68)
Trichloroethene	µg/m³	1.2	NE	**600**	ND (0.43)	0.05 J	ND (0.2)	0.091 J	0.03 J	0.098 J	0.04 J	0.7	0.046 J	0.045 J
Vinyl chloride	µg/m³	0.16	**180,000**	NE	ND (0.77)	ND (0.04)	ND (0.048)	0.0097 J	ND (0.04)	0.022 J	ND (0.045)	ND (0.044)	ND (0.047)	ND (0.038)
Xylenes, m & p	µg/m³	730	**22,000**	700	NE	0.5	0.36	0.095 J	0.12 J	5.9	5	2.7	6.5	2.5
Xylenes, o	µg/m³	730	**22,000**	700	NE	0.19	0.13 J	0.04 J	0.041 J	2	1.8	0.98	2.1	0.85

Notes:

Results greater than the screening level are bolded. Indoor air, and outdoor air data is compared to the residential air RSL and soil gas data is compared to the residential air RSL multiplied by an attenuation factor of 10.

1 Regional screening levels (EPA, December 2009) shown are specific concentrations of chemicals that are considered health protective for human populations. These RSLs are provided for comparisons to the crawlspace air, indoor air, and outdoor air levels in this table. A screening level to compare to soil gas concentrations may be 10 times higher than the residential air RSL due to attenuation from the soil gas to the air that people breathe.

2 Reference Exposure Levels developed by Office of Environmental Health Hazard Assessment as of December 2008. Acute RELs are designed to address an average exposure time of 1 hour. Chronic RELs are designed to address continuous exposure for up to a lifetime.

3 West Oakland background results are from the Oakland-Filbert Street ambient air sampling station monitored by the Bay Area Air Quality Management District, located at 2419 Filbert Street (approximately one mile northeast, or crosswind, of the AMCO site); the result is from December 2002.

4 Neighborhood background results are from samples collected at 323 Lewis Street (upwind of the AMCO site) in June 2009.

ND not detected above the laboratory's reporting limit shown in parentheses
NE not established
J estimated value
µg/m³ micrograms per cubic meter

TABLE 4-29
Soil Screening Levels
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level	Source	Notes
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/kg	8,700,000	EPA Regional Screening Level	
1,1,2,2-Tetrachloroethane	µg/kg	560	EPA Regional Screening Level	
1,1,2-Trichloroethane	µg/kg	1,100	EPA Regional Screening Level	
1,1-Dichloroethane	µg/kg	3,300	EPA Regional Screening Level	
1,1-Dichloroethene	µg/kg	240,000	EPA Regional Screening Level	
1,1-Dichloropropene		NDRI		Not detected, SL not required
1,2,3-Trichlorobenzene	µg/kg	49,000	EPA Regional Screening Level	
1,2,3-Trichloropropane	µg/kg	5	EPA Regional Screening Level	
1,2,4-Trichlorobenzene	µg/kg	22,000	EPA Regional Screening Level	
1,2,4-Trimethylbenzene	µg/kg	62,000	EPA Regional Screening Level	
1,2-Dibromo-3-chloropropane	µg/kg	5.4	EPA Regional Screening Level	
1,2-Dibromoethane	µg/kg	34	EPA Regional Screening Level	
1,2-Dichlorobenzene	µg/kg	1,900,000	EPA Regional Screening Level	
1,2-Dichloroethane	µg/kg	430	EPA Regional Screening Level	
1,2-Dichloropropane	µg/kg	890	EPA Regional Screening Level	
1,3,5-Trimethylbenzene	µg/kg	780,000	EPA Regional Screening Level	
1,3-Dichlorobenzene	µg/kg	530,000	EPA Region 9 Residential Soil PRG	
1,3-Dichloropropane	µg/kg	1,600,000	EPA Regional Screening Level	
1,4-Dichlorobenzene	µg/kg	2,400	EPA Regional Screening Level	
1,4-Dioxane (p-dioxane)	µg/kg	44,000	EPA Regional Screening Level	
2-Hexanone	µg/kg	210,000	EPA Regional Screening Level	
Acetone	µg/kg	61,000,000	EPA Regional Screening Level	
Benzene	µg/kg	1,100	EPA Regional Screening Level	
Bromochloromethane		NDRI		Not detected, SL not required
Bromodichloromethane	µg/kg	270	EPA Regional Screening Level	
Bromoform	µg/kg	61,000	EPA Regional Screening Level	
Bromomethane	µg/kg	7,300	EPA Regional Screening Level	
Carbon disulfide	µg/kg	820,000	EPA Regional Screening Level	
Carbon tetrachloride	µg/kg	610	EPA Regional Screening Level	
Chlorobenzene	µg/kg	290,000	EPA Regional Screening Level	
Chloroethane	µg/kg	15,000,000	EPA Regional Screening Level	
Chloroform	µg/kg	290	EPA Regional Screening Level	
Chloromethane	µg/kg	120,000	EPA Regional Screening Level	
cis-1,2-Dichloroethene	µg/kg	780,000	EPA Regional Screening Level	
cis-1,3-Dichloropropene	µg/kg	1,700	Surrogate	1,3-Dichloropropene was used as the surrogate
Cyclohexane	µg/kg	7,000,000	EPA Regional Screening Level	
Dibromochloromethane	µg/kg	680	EPA Regional Screening Level	
Ethyl tert-butyl ether	µg/kg	43,000	Surrogate	Methyl tertbutyl ether (MTBE) was used as the surrogate
Ethylbenzene	µg/kg	5,400	EPA Regional Screening Level	
Freon 11	µg/kg	790,000	EPA Regional Screening Level	
Freon 12	µg/kg	180,000	EPA Regional Screening Level	
Freon 113	µg/kg	43,000,000	EPA Regional Screening Level	
Isopropyl ether	µg/kg	1,400,000	EPA Regional Screening Level	
Isopropylbenzene (cumene)	µg/kg	2,100,000	EPA Regional Screening Level	
Methyl acetate	µg/kg	78,000,000	EPA Regional Screening Level	
Methyl ethyl ketone	µg/kg	28,000,000	EPA Regional Screening Level	
Methyl isobutyl ketone	µg/kg	5,300,000	EPA Regional Screening Level	
Methyl tert-butyl ether	µg/kg	43,000	EPA Regional Screening Level	
Methylcyclohexane	µg/kg	2,600,000	EPA Region 9 Residential Soil PRG	
Methylene chloride	µg/kg	11,000	EPA Regional Screening Level	
Naphthalene	µg/kg	3,600	EPA Regional Screening Level	
Styrene	µg/kg	6,300,000	EPA Regional Screening Level	

Analyte	Units	Screening Level	Source	Notes
Volatile Organic Compounds				
tert-Amyl methyl ether	µg/kg	43,000	Surrogate	Methyl tertbutyl ether (MTBE) was used as the surrogate
tert-Butyl alcohol	µg/kg	160,000,000	Surrogate	sec-butyl alcohol was used as the surrogate
Tetrachloroethene	µg/kg	550	EPA Regional Screening Level	
Toluene	µg/kg	5,000,000	EPA Regional Screening Level	
trans-1,2-Dichloroethene	µg/kg	150,000	EPA Regional Screening Level	
trans-1,3-Dichloropropene	µg/kg	1,700	Surrogate	1,3-Dichloropropene was used as the surrogate
Trichloroethene	µg/kg	2,800	EPA Regional Screening Level	
Vinyl chloride	µg/kg	60	EPA Regional Screening Level	
Xylenes, m & p	µg/kg	3,400,000	EPA Regional Screening Level	
Xylenes, o	µg/kg	3,800,000	EPA Regional Screening Level	
Xylenes, total	µg/kg	630,000	EPA Regional Screening Level	
Semivolatile Organic Compounds				
1,1'-Biphenyl	µg/kg	3,900,000	EPA Regional Screening Level	
1,2,4,5-Tetrachlorobenzene	µg/kg	18,000	EPA Regional Screening Level	
1,4-Dioxane (p-dioxane)	µg/kg	44,000	EPA Regional Screening Level	
2,2'-Oxybis(1-Chloropropane)	µg/kg	4,600	EPA Regional Screening Level	
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	EPA Regional Screening Level	
2,4,5-Trichlorophenol	µg/kg	6,100,000	EPA Regional Screening Level	
2,4,6-Trichlorophenol	µg/kg	44,000	EPA Regional Screening Level	
2,4-Dichlorophenol	µg/kg	180,000	EPA Regional Screening Level	
2,4-Dimethylphenol	µg/kg	1,200,000	EPA Regional Screening Level	
2,4-Dinitrophenol	µg/kg	120,000	EPA Regional Screening Level	
2,4-Dinitrotoluene	µg/kg	1,600	EPA Regional Screening Level	
2,6-Dinitrotoluene	µg/kg	61,000	EPA Regional Screening Level	
2-Chloronaphthalene	µg/kg	6,300,000	EPA Regional Screening Level	
2-Chlorophenol	µg/kg	390,000	EPA Regional Screening Level	
2-Methylnaphthalene	µg/kg	310,000	EPA Regional Screening Level	
2-Methylphenol	µg/kg	3,100,000	EPA Regional Screening Level	
2-Nitroaniline	µg/kg	610,000	EPA Regional Screening Level	
2-Nitrophenol		NDRI		Not detected, SL not required
3,3'-Dichlorobenzidine	µg/kg	1,100	EPA Regional Screening Level	
3-Nitroaniline	µg/kg	24,000	Surrogate	4-Nitroaniline used as the surrogate
4,6-Dinitro-2-methylphenol	µg/kg	4,900	EPA Regional Screening Level	
4-Bromophenylphenyl ether		NDRI		Not detected, SL not required
4-Chloro-3-methylphenol	µg/kg	3,100,000	Surrogate	3-methylphenol was used as the surrogate
4-Chloroaniline	µg/kg	2,400	EPA Regional Screening Level	
4-Chlorophenylphenyl ether		NDRI		Not detected, SL not required
4-Methylphenol	µg/kg	310,000	EPA Regional Screening Level	
4-Nitroaniline	µg/kg	24,000	EPA Regional Screening Level	
4-Nitrophenol	µg/kg	120,000	Surrogate	2,4-Dinitrophenol was used as the surrogate
Acenaphthene	µg/kg	3,400,000	EPA Regional Screening Level	
Acenaphthylene	µg/kg	1,700,000	Surrogate	Pyrene was used as the surrogate
Acetophenone	µg/kg	7,800,000	EPA Regional Screening Level	
Anthracene	µg/kg	17,000,000	EPA Regional Screening Level	
Atrazine	µg/kg	2,100	EPA Regional Screening Level	
Benzaldehyde	µg/kg	7,800,000	EPA Regional Screening Level	
Benzo(a)anthracene	µg/kg	150	EPA Regional Screening Level	
Benzo(a)pyrene	µg/kg	15	EPA Regional Screening Level	
Benzo(b)fluoranthene	µg/kg	150	EPA Regional Screening Level	
Benzo(g,h,i)perylene	µg/kg	1,700,000	Surrogate	Pyrene was used as the surrogate
Benzo(k)fluoranthene	µg/kg	1,500	EPA Regional Screening Level	
Benzyl butyl phthalate	µg/kg	260,000	EPA Regional Screening Level	

TABLE 4-29
Soil Screening Levels
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level	Source	Notes
Semivolatile Organic Compounds				
bis(2-Chloroethoxy)methane	µg/kg	180,000	EPA Regional Screening Level	
bis(2-Chloroethyl)ether	µg/kg	210	EPA Regional Screening Level	
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	EPA Regional Screening Level	
Caprolactam	µg/kg	31,000,000	EPA Regional Screening Level	
Carbazole	µg/kg	24,000	EPA Region 9 Residential Soil PRG	
Chrysene	µg/kg	15,000	EPA Regional Screening Level	
Dibenz(a,h)anthracene	µg/kg	15	EPA Regional Screening Level	
Dibenzofuran	µg/kg	78,000	EPA Regional Screening Level	
Diethylphthalate	µg/kg	49,000,000	EPA Regional Screening Level	
Dimethylphthalate	µg/kg	100,000,000	EPA Region 9 Residential Soil PRG	
Di-n-butyl phthalate	µg/kg	6,100,000	EPA Regional Screening Level	
Di-n-octyl phthalate	µg/kg	2,400,000	EPA Region 9 Residential Soil PRG	
Fluoranthene	µg/kg	2,300,000	EPA Regional Screening Level	
Fluorene	µg/kg	2,300,000	EPA Regional Screening Level	
Hexachlorobenzene	µg/kg	300	EPA Regional Screening Level	
Hexachlorobutadiene	µg/kg	6,200	EPA Regional Screening Level	
Hexachlorocyclopentadiene	µg/kg	370,000	EPA Regional Screening Level	
Hexachloroethane	µg/kg	35,000	EPA Regional Screening Level	
Indeno(1,2,3-c,d)pyrene	µg/kg	150	EPA Regional Screening Level	
Isophorone	µg/kg	510,000	EPA Regional Screening Level	
Naphthalene	µg/kg	3,600	EPA Regional Screening Level	
Nitrobenzene	µg/kg	4,800	EPA Regional Screening Level	
N-Nitrosodi-n-propylamine	µg/kg	69	EPA Regional Screening Level	
N-Nitrosodiphenylamine	µg/kg	99,000	EPA Regional Screening Level	
Pentachlorophenol	µg/kg	3,000	EPA Regional Screening Level	
Phenanthrene	µg/kg	1,700,000	Surrogate	Pyrene was used as the surrogate
Phenol	µg/kg	18,000,000	EPA Regional Screening Level	
Pyrene	µg/kg	1,700,000	EPA Regional Screening Level	
Total Petroleum Hydrocarbons				
Diesel c10-c24		NA		Not available because Diesel and Gasoline are
Gasoline c6-c10		NA		considered a mixture of compounds
Metals				
Aluminum	mg/kg	77,000	EPA Regional Screening Level	
Antimony	mg/kg	31	EPA Regional Screening Level	
Arsenic	mg/kg	0.39 / 22	EPA Regional Screening Level	0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.
Barium	mg/kg	15,000	EPA Regional Screening Level	
Beryllium	mg/kg	160	EPA Regional Screening Level	
Cadmium	mg/kg	70	EPA Regional Screening Level	
Chromium	mg/kg	210	EPA Region 9 Residential Soil PRG	
Cobalt	mg/kg	23	EPA Regional Screening Level	
Copper	mg/kg	3,100	EPA Regional Screening Level	
Cyanide	mg/kg	1,600	EPA Regional Screening Level	
Lead	mg/kg	80	OEHHA CHHSL	
Manganese	mg/kg	1,800	EPA Regional Screening Level	
Mercury	mg/kg	5.6	EPA Regional Screening Level	
Nickel	mg/kg	1,500	EPA Regional Screening Level	
Selenium	mg/kg	390	EPA Regional Screening Level	
Silver	mg/kg	390	EPA Regional Screening Level	
Thallium	mg/kg	5.2	EPA Region 9 Residential Soil PRG	
Vanadium	mg/kg	390	EPA Regional Screening Level	
Zinc	mg/kg	23,000	EPA Regional Screening Level	
Calcium		NA		Essential nutrient; SL not required

TABLE 4-29
Soil Screening Levels
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level	Source	Notes
Metals				
Iron	mg/kg	55,000	EPA Regional Screening Level	
Magnesium		NA		Essential nutrient; SL not required
Potassium		NA		Essential nutrient; SL not required
Sodium		NA		Essential nutrient; SL not required
Organochlorine Pesticides/PCBs				
4,4'-DDD	µg/kg	2,000	EPA Regional Screening Level	
4,4'-DDE	µg/kg	1,400	EPA Regional Screening Level	
4,4'-DDT	µg/kg	1,700	EPA Regional Screening Level	
Aldrin	µg/kg	29	EPA Regional Screening Level	
alpha-BHC	µg/kg	77	EPA Regional Screening Level	
alpha-Chlordane	µg/kg	1,600	Surrogate	Chlordane was used as the surrogate
Aroclor-1016	µg/kg	3,900	EPA Regional Screening Level	
Aroclor-1221	µg/kg	140	EPA Regional Screening Level	
Aroclor-1232	µg/kg	140	EPA Regional Screening Level	
Aroclor-1242	µg/kg	220	EPA Regional Screening Level	
Aroclor-1248	µg/kg	220	EPA Regional Screening Level	
Aroclor-1254	µg/kg	220	EPA Regional Screening Level	
Aroclor-1260	µg/kg	220	EPA Regional Screening Level	
Aroclor-1262		NDRI		Not detected, SL not required
Aroclor-1268		NDRI		Not detected, SL not required
beta-BHC	µg/kg	270	EPA Regional Screening Level	
delta-BHC	µg/kg	77	Surrogate	alpha-BHC was used as the surrogate
Dieldrin	µg/kg	30	EPA Regional Screening Level	
Endosulfan I	µg/kg	370,000	Surrogate	Endosulfan was used as the surrogate
Endosulfan II	µg/kg	370,000	Surrogate	Endosulfan was used as the surrogate
Endosulfan sulfate	µg/kg	370,000	Surrogate	Endosulfan was used as the surrogate
Endrin	µg/kg	18,000	EPA Regional Screening Level	
Endrin aldehyde	µg/kg	18,000	Surrogate	Endrin was used as the surrogate
Endrin ketone	µg/kg	18,000	Surrogate	Endrin was used as the surrogate
gamma-BHC	µg/kg	520	EPA Regional Screening Level	
gamma-Chlordane	µg/kg	1,600	Surrogate	Chlordane was used as the surrogate
Heptachlor	µg/kg	110	EPA Regional Screening Level	
Heptachlor epoxide	µg/kg	53	EPA Regional Screening Level	
Methoxychlor	µg/kg	310,000	EPA Regional Screening Level	
Toxaphene	µg/kg	440	EPA Regional Screening Level	
Dioxins/Furans (1)				
1,2,3,4,6,7,8-HpCDD	ng/kg	450	TEF Calculation	
1,2,3,4,6,7,8-HpCDF	ng/kg	450	TEF Calculation	
1,2,3,4,7,8,9-HpCDF	ng/kg	450	TEF Calculation	
1,2,3,4,7,8-HxCDD	ng/kg	45	TEF Calculation	
1,2,3,4,7,8-HxCDF	ng/kg	45	TEF Calculation	
1,2,3,6,7,8-HxCDD	ng/kg	45	TEF Calculation	
1,2,3,6,7,8-HxCDF	ng/kg	45	TEF Calculation	
1,2,3,7,8,9-HxCDD	ng/kg	45	TEF Calculation	
1,2,3,7,8,9-HxCDF	ng/kg	45	TEF Calculation	
1,2,3,7,8-PeCDD	ng/kg	4.5	TEF Calculation	
1,2,3,7,8-PeCDF	ng/kg	90	TEF Calculation	
2,3,4,6,7,8-HxCDF	ng/kg	45	TEF Calculation	
2,3,4,7,8-PeCDF	ng/kg	9	TEF Calculation	
2,3,7,8-TCDD	ng/kg	4.5	EPA Regional Screening Level	
2,3,7,8-TCDF	ng/kg	45	TEF Calculation	
OCDD	ng/kg	45,000	TEF Calculation	
OCDF	ng/kg	45,000	TEF Calculation	

Notes:
(1) Dioxin/Furan screening levels calculated using Toxicity Equivalency Factors (EPA 2000)
EPA Region 9 PRGs were last updated in October 2004.
EPA Regional Screening Levels were last updated in May 2010.

OEHHA	Office of Environmental Health Hazard Assessment
CHHSL	California Human Health Screening Level
NA	not applicable
NDRI	not detected in soil during the Remedial Investigation phase
PRG	Preliminary Remediation Goal
TEF	Toxicity Equivalence Factor
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram

TABLE 4-30
1428 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland[2] Background Levels	1428SSa 1 ft bgs[3] 10/18/2006	1428SSa 3 ft bgs[4] 10/18/2006	1428SSb 1 ft bgs 10/18/2006	1428SSb 1 ft bgs (FD) 10/18/2006	1428SSb 3 ft bgs 10/18/2006	1428SSc 1 ft bgs 10/18/2006	1428SSc 3 ft bgs 10/18/2006	1428SSd 1 ft bgs 10/18/2006	1428SSd 3 ft bgs 10/18/2006	1428SSe 1 ft bgs 10/18/2006	1428SSe 3 ft bgs 10/18/2006
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (5.3)	ND (5)	ND (6.8)	ND (16)	ND (4.7)	ND (5.6)	ND (7.5)	ND (5.6)	ND (5.2)	ND (6)	ND (5.6)
1,2-Dibromoethane	µg/kg	34	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2-Dichloroethane	µg/kg	430	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,2-Dichloropropane	µg/kg	890	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
2-Hexanone	µg/kg	210,000	NE	ND (21)	ND (20)	ND (27)	ND (32)	ND (19)	ND (22)	ND (30)	ND (22)	ND (21)	ND (24)	ND (22)
Acetone	µg/kg	61,000,000	NE	ND (21)	ND (20)	19 J	ND (32)	ND (19)	23	17 J	ND (22)	ND (21)	54	ND (22)
Benzene	µg/kg	1,100	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Bromochloromethane	µg/kg	NDRI	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Bromodichloromethane	µg/kg	270	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Bromoform	µg/kg	61,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Bromomethane	µg/kg	7,300	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Carbon disulfide	µg/kg	820,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Carbon tetrachloride	µg/kg	610	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Chlorobenzene	µg/kg	290,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Chloroethane	µg/kg	15,000,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Chloroform	µg/kg	290	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Chloromethane	µg/kg	120,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)

TABLE 4-30
1428 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	1428SSa 1 ft bgs[3] 10/18/2006	1428SSa 3 ft bgs[4] 10/18/2006	1428SSb 1 ft bgs 10/18/2006	1428SSb 1 ft bgs (FD) 10/18/2006	1428SSb 3 ft bgs 10/18/2006	1428SSc 1 ft bgs 10/18/2006	1428SSc 3 ft bgs 10/18/2006	1428SSd 1 ft bgs 10/18/2006	1428SSd 3 ft bgs 10/18/2006	1428SSe 1 ft bgs 10/18/2006	1428SSe 3 ft bgs 10/18/2006
Volatile Organic Compounds														
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Dibromochloromethane	µg/kg	680	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (11)	ND (10)	ND (14)	ND (16)	ND (9.4)	ND (11)	ND (15)	ND (11)	ND (10)	ND (12)	ND (11)
Ethylbenzene	µg/kg	5,400	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Freon 11	µg/kg	790,000	NE	3.4	3.5	8.8	11	2 J	2.2 J	5	4.1	ND (2.6)	3.2	5.9
Freon 113	µg/kg	43,000,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Freon 12	µg/kg	180,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Isopropyl ether	µg/kg	1,400,000	NE	ND (11)	ND (10)	ND (14)	ND (16)	ND (9.4)	ND (11)	ND (15)	ND (11)	ND (10)	ND (12)	ND (11)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (21)	ND (20)	ND (27)	ND (32)	ND (19)	ND (22)	ND (30)	ND (22)	ND (21)	ND (24)	ND (22)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (21)	ND (20)	ND (27)	ND (32)	ND (19)	ND (22)	ND (30)	ND (22)	ND (21)	ND (24)	ND (22)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (11)	ND (10)	ND (14)	ND (16)	ND (9.4)	ND (11)	ND (15)	ND (11)	ND (10)	ND (12)	ND (11)
Methylene chloride	µg/kg	11,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Styrene	µg/kg	6,300,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (11)	ND (10)	ND (14)	ND (16)	ND (9.4)	ND (11)	ND (15)	ND (11)	ND (10)	ND (12)	ND (11)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (53)	ND (50)	ND (68)	ND (79)	ND (47)	ND (56)	ND (75)	ND (56)	ND (52)	ND (60)	ND (56)
Tetrachloroethene	µg/kg	550	NE	ND (2.6)	ND (2.5)	ND (3.4)	2.5 J	20	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	17	ND (2.8)
Toluene	µg/kg	5,000,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Trichloroethene	µg/kg	2,800	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	20	ND (2.8)
Vinyl chloride	µg/kg	60	NE	ND (2.6)	ND (2.5)	ND (3.4)	ND (4)	ND (2.4)	ND (2.8)	ND (3.7)	ND (2.8)	ND (2.6)	ND (3)	ND (2.8)
Xylenes, total	µg/kg	630,000	NE	ND (5.3)	ND (5)	ND (6.8)	ND (7.9)	ND (4.7)	ND (5.6)	ND (7.5)	ND (5.6)	ND (5.2)	ND (6)	ND (5.6)
Semivolatile Organic Compounds														
1,1'-Biphenyl	µg/kg	3,900,000	NE	ND (910)	ND (320)	290 J	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (360) J	ND (130) J	ND (390) J	ND (75) R	ND (80) J	ND (390) J	ND (95) R	ND (83) R	ND (410) R	ND (530) J	6.6 J
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)

TABLE 4-30
1428 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	1428SSa	1428SSa	1428SSb	1428SSb	1428SSb	1428SSc	1428SSc	1428SSd	1428SSd	1428SSe	1428SSe
				1 ft bgs[3]	3 ft bgs[4]	1 ft bgs	1 ft bgs (FD)	3 ft bgs	1 ft bgs	3 ft bgs	1 ft bgs	3 ft bgs	1 ft bgs	3 ft bgs
				10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006	10/18/2006
Semivolatile Organic Compounds														
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (1,800)	ND (620)	ND (1,900)	ND (1,900)	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2,6-Dinitrotoluene	µg/kg	61,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	1,800	ND (1,100)	ND (1,300)	ND (1,100)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2-Chlorophenol	µg/kg	390,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2-Methylnaphthalene	µg/kg	310,000	NE	ND (910)	ND (320)	180 J	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2-Methylphenol	µg/kg	3,100,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
2-Nitroaniline	µg/kg	610,000	NE	ND (1,800)	ND (620)	ND (1,900)	ND (1,900)	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
2-Nitrophenol	µg/kg	NDRI	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
3-Nitroaniline	µg/kg	24,000	NE	ND (1,800)	ND (620)	ND (1,900)	370	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (1,800)	ND (620)	ND (1,900)	ND (1,900)	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
4-Chloroaniline	µg/kg	2,400	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
4-Methylphenol	µg/kg	310,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
4-Nitroaniline	µg/kg	24,000	NE	ND (1,800)	ND (620)	ND (1,900)	ND (1,900)	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
4-Nitrophenol	µg/kg	120,000	NE	ND (1,800)	ND (620)	ND (1,900)	100	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
Acenaphthene	µg/kg	3,400,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Acenaphthylene	µg/kg	1,700,000	NE	330	72 J	2,300 J	400 J	24 J	ND (990)	ND (240)	150 J	ND (1,100)	900 J	170
Acetophenone	µg/kg	7,800,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Anthracene	µg/kg	17,000,000	NE	320	110 J	3,000 J	270 J	28 J	ND (990)	ND (240)	130 J	ND (1,100)	1,100 J	250
Atrazine	µg/kg	2,100	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Benzaldehyde	µg/kg	7,800,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Benzo(a)anthracene	µg/kg	150	NE	1,600	340	8,300 J	970 J	96 J	380	41 J	500 J	260	4,700	1,200
Benzo(a)pyrene	µg/kg	15	NE	1,800	410	9,200 J	1,500 J	150 J	690	68 J	770 J	390	6,200	1,600
Benzo(b)fluoranthene	µg/kg	150	NE	2,000	380	9,800 J	1,500 J	180 J	630	79 J	940 J	420	6,000	1,400

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Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland [2] Background Levels	1428SSa 1 ft bgs [3] 10/18/2006	1428SSa 3 ft bgs [4] 10/18/2006	1428SSb 1 ft bgs 10/18/2006	1428SSb 1 ft bgs (FD) 10/18/2006	1428SSb 3 ft bgs 10/18/2006	1428SSc 1 ft bgs 10/18/2006	1428SSc 3 ft bgs 10/18/2006	1428SSd 1 ft bgs 10/18/2006	1428SSd 3 ft bgs 10/18/2006	1428SSe 1 ft bgs 10/18/2006	1428SSe 3 ft bgs 10/18/2006
Semivolatile Organic Compounds														
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	670	160 J	4,400 J	810 J	ND (200)	360	64 J	570 J	ND (1,100)	4,000	610
Benzo(k)fluoranthene	µg/kg	1,500	NE	860	180 J	3,600 J	720 J	67 J	260	29 J	300 J	150	2,900	810
Benzyl butyl phthalate	µg/kg	260,000	NE	ND (910)	ND (320)	ND (1,000)	100	ND (200)	240	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	ND (910)	ND (320)	120 J	120	36 J	150	39 J	560 J	ND (1,100)	190 J	200
Caprolactam	µg/kg	31,000,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Carbazole	µg/kg	24,000	NE	190	ND (320)	630 J	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	240 J	ND (1,100)
Chrysene	µg/kg	15,000	NE	2,200	420	10,000 J	1,400 J	140 J	560	70 J	830 J	450	6,100	1,500
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Dibenzofuran	µg/kg	78,000	NE	ND (910)	ND (320)	130 J	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Diethylphthalate	µg/kg	49,000,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	ND (910)	ND (320)	230 J	ND (960)	ND (200)	ND (990)	180 J	190 J	ND (1,100)	440 J	ND (1,100)
Di-n-octyl phthalate	µg/kg	2,400,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Fluoranthene	µg/kg	2,300,000	NE	3,800	840	19,000 J	2,600 J	270	980	83 J	1,300	670	9,800	2,600
Fluorene	µg/kg	2,300,000	NE	120	ND (320)	1,600 J	110 J	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	490 J	ND (1,100)
Hexachlorobenzene	µg/kg	300	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Hexachloroethane	µg/kg	35,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	950	220 J	4,600 J	970 J	100 J	460	57 J	500 J	220	3,600	870
Isophorone	µg/kg	510,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Naphthalene	µg/kg	3,600	NE	210	ND (320)	1,000 J	330 J	37 J	ND (990)	ND (240)	ND (1,100)	ND (1,100)	180 J	ND (1,100)
Nitrobenzene	µg/kg	4,800	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Pentachlorophenol	µg/kg	3,000	NE	ND (1,800)	ND (620)	ND (1,900)	ND (1,900)	ND (390)	ND (1,900)	ND (470)	ND (2,000)	ND (2,000)	ND (2,600)	ND (2,200)
Phenanthrene	µg/kg	1,700,000	NE	2,500	680	20,000 J	2,200 J	220	530	51 J	1,000 J	400 J	6,800	1,600
Phenol	µg/kg	18,000,000	NE	ND (910)	ND (320)	ND (1,000)	ND (960)	ND (200)	ND (990)	ND (240)	ND (1,100)	ND (1,100)	ND (1,300)	ND (1,100)
Pyrene	µg/kg	1,700,000	NE	3,800	820	20,000 J	2,900 J	260	1,000	97 J	1,400	680	11,000	2,800

TABLE 4-30
1428 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	1428SSa 1 ft bgs[3] 10/18/2006	1428SSa 3 ft bgs[4] 10/18/2006	1428SSb 1 ft bgs 10/18/2006	1428SSb 1 ft bgs (FD) 10/18/2006	1428SSb 3 ft bgs 10/18/2006	1428SSc 1 ft bgs 10/18/2006	1428SSc 3 ft bgs 10/18/2006	1428SSd 1 ft bgs 10/18/2006	1428SSd 3 ft bgs 10/18/2006	1428SSe 1 ft bgs 10/18/2006	1428SSe 3 ft bgs 10/18/2006
Metals														
Aluminum	mg/kg	77,000	NE	2,160	4,610	7,910	6,920	3,940	2,140	11,900	5,640	1,910	7,060	5,570
Antimony	mg/kg	31	5.9	0.75 J	ND (6.8)	37.7	36.5	6 J	0.87 J	ND (8.7)	ND (7.1)	1.3 J	77.4	18.4
Arsenic[5]	mg/kg	0.062 / 22	***14***	*4.9*	*3.1*	*14.8*	*13.5*	*6.2*	*5.2*	*13.5*	*15.7*	*4.7*	35.1	*10.8*
Barium	mg/kg	15,000	NE	150	125	1,490	1,220	231	126	3,210	1,160	123	711	374
Beryllium	mg/kg	160	0.9	0.08 J	0.09 J	0.27 J	0.22 J	0.12 J	0.09 J	0.47 J	0.16 J	0.05 J	0.29 J	0.15 J
Cadmium	mg/kg	70	1.5	0.76	0.15 J	4	4.3	0.78	0.94	17.9	5.6	1.6	3.4	2.1
Calcium	mg/kg	NA	NE	2,210	2,650	18,700	21,900	3,910	2,540	31,900	12,400	2,400	9,160	4,490
Chromium	mg/kg	210	91.4	12.5	24.8	41.7	39	21.8	10.9	81.1	112	17.8	38.8	37.3
Cobalt	mg/kg	23	NE	2.3 J	5 J	9.4	8.6	4.5 J	2.6 J	14.4	11.4	3.2 J	7.1	6.6
Copper	mg/kg	3,100	59.6	64.3	23.9	427	347	55.6	72.6	267	439	76.1	440	257
Iron	mg/kg	55,000	NE	9,130	9,140	26,100	23,700	10,500	8,670	51,500	44,100	15,000	22,200	16,600
Lead[6]	mg/kg	194 / 340	14.7	443	72.1 J+	2,320	1,590 J+	*224*	429	4,170 J+	2,920	*318 J+*	2,660 J+	1,050 J+
Magnesium	mg/kg	NA	NE	686	1,440	2,410	2,230	1,190	766	2,650	3,180	695	2,310	1,730
Manganese	mg/kg	1,800	NE	102	220	493	478	193	123	492	485	239	313	260
Mercury	mg/kg	5.6	0.3	0.73	0.18	0.76	0.69	0.26	0.52	1.5	0.71	0.34	1.4	0.81
Nickel	mg/kg	1,500	120.2	10.3	17.4	38.8	38	18	10.6	44.3	59.4	18.9	33.6	27
Potassium	mg/kg	NA	NE	362 J	645	1,880	1,490	744	425 J	1,260	1,050	327 J	1,280	834
Selenium	mg/kg	390	5.6	ND (3.8)	0.55 J	ND (4.1)	ND (3.8)	ND (4)	ND (3.9)	ND (5.1)	ND (4.2)	ND (4.2)	ND (4.4)	0.66 J
Silver	mg/kg	390	1.7	0.88 J	0.58 J	6.4	4.9	0.74 J	0.95 J	4.1	6.4	0.83 J	3.2	2.6
Sodium	mg/kg	NA	NE	ND (536)	383 J	5,370	6,030	ND (567)	ND (562)	12,400	5,860	ND (602)	2,970	1,950
Thallium	mg/kg	5.2	**42.5**	0.53 J	ND (2.8)	ND (2.9)	ND (2.7)	0.71 J	0.68 J	ND (3.6)	0.61 J	1 J	ND (3.2)	ND (3.1)
Vanadium	mg/kg	390	NE	8	19.8	27.7	25.6	15.9	9	43.9	38.4	10.6	27	23.3
Zinc	mg/kg	23,000	91.5	267	77.2	2,040	2,340	277	361	4,730	2,320	495	1,130	722
Organochlorine Pesticides/PCBs														
4,4'-DDD	µg/kg	2,000	NE	160 J	4.7 J	30 J	180 J	13 J	14 J	0.53 J	13 J	4.3 J	ND (5.2)	4.7 J
4,4'-DDE	µg/kg	1,400	NE	240 J	18	6.1 J	260 J	180 J	58	3.1 J	9 J	14	7.7 J	20 J
4,4'-DDT	µg/kg	1,700	NE	360 J	38 J	270 J	1,800 J	450 J	340 J	8.4	1,000 J	110	0.34 J	200 J
Aldrin	µg/kg	29	NE	0.15 J	ND (3.2) J	ND (2) J	0.18 J	0.16 J	0.64 J	ND (2.4) J	0.68 J	0.59 J	ND (2.7) J	ND (2.3) J
alpha-BHC	µg/kg	77	NE	0.082 J	ND (3.2)	1.5 J	2.5 J	0.3 J	0.042 J	ND (2.4)	0.55 J	ND (2.1)	ND (2.7)	0.18 J
alpha-Chlordane	µg/kg	1,600	NE	0.44 J	0.18 J	1.7 J	4.3	0.64 J	3.9	ND (2.4)	10 J	0.21 J	0.54 J	2.5 J
Aroclor-1016	µg/kg	3,900	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)

TABLE 4-30
1428 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1428SSa 1 ft bgs[3] 10/18/2006	1428SSa 3 ft bgs[4] 10/18/2006	1428SSb 1 ft bgs 10/18/2006	1428SSb 1 ft bgs (FD) 10/18/2006	1428SSb 3 ft bgs 10/18/2006	1428SSc 1 ft bgs 10/18/2006	1428SSc 3 ft bgs 10/18/2006	1428SSd 1 ft bgs 10/18/2006	1428SSd 3 ft bgs 10/18/2006	1428SSe 1 ft bgs 10/18/2006	1428SSe 3 ft bgs 10/18/2006
Organochlorine Pesticides/PCBs														
Aroclor-1221	µg/kg	140	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1232	µg/kg	140	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1242	µg/kg	220	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1248	µg/kg	220	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1254	µg/kg	220	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1260	µg/kg	220	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1262	µg/kg	NDRI	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
Aroclor-1268	µg/kg	NDRI	NE	ND (36)	ND (62)	ND (39)	ND (37)	ND (39)	ND (38)	ND (47)	ND (41)	ND (41)	ND (52)	ND (44)
beta-BHC	µg/kg	270	NE	0.45 J	0.25 J	ND (2) J	2.3 J	0.36 J	1.2 J	ND (2.4)	ND (2.1) J	ND (2.1)	ND (2.7) J	0.7 J
delta-BHC	µg/kg	77	NE	0.43 J	ND (3.2)	0.92 J	0.23 J	0.14 J	0.1 J	ND (2.4)	0.25 J	ND (2.1)	0.68 J	0.26 J
Dieldrin	µg/kg	30	NE	ND (3.3) J	ND (6.2)	0.2 J	15 J	18 J	8.1 J	ND (4.7)	2 J	ND (4.1)	0.77 J	5.8 J
Endosulfan I	µg/kg	370,000	NE	0.38 J	ND (3.2)	ND (2)	0.4 J	0.069 J	0.067 J	ND (2.4)	1.9 J	ND (2.1)	ND (2.7)	0.095 J
Endosulfan II	µg/kg	370,000	NE	0.53 J	0.66 J	0.31 J	0.83 J	0.4 J	0.31 J	ND (4.7)	2.2 J	0.62 J	0.31 J	0.24 J
Endosulfan sulfate	µg/kg	370,000	NE	0.57 J	0.54 J	0.58 J	2.7 J	0.16 J	2.1 J	0.52 J	0.92 J	0.26 J	2.1 J	2.6 J
Endrin	µg/kg	18,000	NE	11 J	0.44 J	0.57 J	0.75 J	0.73 J	0.32 J	1.4 J	2 J	0.58 J	7.5 J	3.9 J
Endrin aldehyde	µg/kg	18,000	NE	ND (3.3) J	ND (3.3)	1 J	ND (3.3) J	ND (3.3) J	ND (3.3) J	ND (4.7)	5.4 J	0.42 J	3.3 J	ND (3.3) J
Endrin ketone	µg/kg	18,000	NE	0.19 J	0.68 J	4.9 J	7 J	0.16 J	0.21 J	ND (2.4)	1.4 J	ND (2.1)	0.41 J	4 J
gamma-BHC	µg/kg	520	NE	0.28 J	ND (3.2) J	0.32 J	0.48 J	ND (2) J	0.21 J	ND (2.4) J	ND (2.1) J	ND (2.1)	ND (2.7) J	ND (2.3) J
gamma-Chlordane	µg/kg	1,600	NE	ND (1.7) J	ND (1.7) J	4.4 J	1.9 J	ND (1.7) J	2 J	0.29 J	4.4 J	1.3 J	1.5 J	3.7
Heptachlor	µg/kg	110	NE	0.11 J	ND (3.2) J	0.29 J	0.69 J	0.16 J	0.25 J	ND (2.4) J	0.84 J	ND (2.1)	0.32 J	0.036 J
Heptachlor epoxide	µg/kg	53	NE	0.28 J	0.14 J	1.9 J	6.1 J	0.44 J	2.9	ND (2.4)	26	0.48 J	0.38 J	0.66 J
Methoxychlor	µg/kg	310,000	NE	18 J	ND (17) J	1.1 J	17 J	ND (17)	ND (17) J	ND (24)	0.71 J	0.5 J	12 J	ND (17) J
Toxaphene	µg/kg	440	NE	ND (180)	ND (320)	ND (200)	ND (190)	ND (200)	ND (200)	ND (240)	ND (210)	ND (210)	ND (270)	ND (230)

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

FD	field duplicate
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-31
1432 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland [2] Background Levels	1432SSa 1 ft bgs [3] 10/18/2006	1432SSa 3 ft bgs [4] 10/18/2006	1432SSb 1 ft bgs 10/18/2006	1432SSb 1 ft bgs (FD) 10/18/2006	1432SSb 3 ft bgs 10/18/2006	1432SSc 1 ft bgs 11/7/2006	1432SSc 3 ft bgs 11/7/2006
Volatile Organic Compounds										
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (6.5)	ND (6.2)	ND (7.3)	ND (6.5)	ND (7.3)	ND (15)	ND (13)
1,2-Dibromoethane	µg/kg	34	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2-Dichloroethane	µg/kg	430	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,2-Dichloropropane	µg/kg	890	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
2-Hexanone	µg/kg	210,000	NE	ND (26)	ND (25)	ND (29)	ND (26)	ND (29)	ND (29)	ND (25)
Acetone	µg/kg	61,000,000	NE	ND (13)	ND (12)	ND (29)	ND (13)	ND (29)	ND (29) J	ND (25) J
Benzene	µg/kg	1,100	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Bromochloromethane	µg/kg	NDRI	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Bromodichloromethane	µg/kg	270	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Bromoform	µg/kg	61,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6) J	ND (3.2) J
Bromomethane	µg/kg	7,300	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Carbon disulfide	µg/kg	820,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Carbon tetrachloride	µg/kg	610	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Chlorobenzene	µg/kg	290,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Chloroethane	µg/kg	15,000,000	NE	ND (1.6)	ND (1.6)	ND (3.6)	ND (1.6)	ND (3.6)	ND (3.6)	ND (3.2)
Chloroform	µg/kg	290	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Chloromethane	µg/kg	120,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)

TABLE 4-31
1432 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland[2] Background Levels	1432SSa 1 ft bgs[3] 10/18/2006	1432SSa 3 ft bgs[4] 10/18/2006	1432SSb 1 ft bgs 10/18/2006	1432SSb 1 ft bgs (FD) 10/18/2006	1432SSb 3 ft bgs 10/18/2006	1432SSc 1 ft bgs 11/7/2006	1432SSc 3 ft bgs 11/7/2006
Volatile Organic Compounds										
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Dibromochloromethane	µg/kg	680	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6) J	ND (3.2) J
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (15)	ND (13)	ND (15)	ND (15)	ND (13)
Ethylbenzene	µg/kg	5,400	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Freon 11	µg/kg	790,000	NE	4.5	5.2	9.2	5.8	12	17	3 J
Freon 113	µg/kg	43,000,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Freon 12	µg/kg	180,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Isopropyl ether	µg/kg	1,400,000	NE	ND (13)	ND (12)	ND (15)	ND (13)	ND (15)	ND (15)	ND (13)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (26)	ND (25)	ND (29)	ND (26)	ND (29)	ND (29)	ND (25)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (26)	ND (25)	ND (29)	ND (26)	ND (29)	ND (29)	ND (25)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (15)	ND (13)	ND (15)	ND (15)	ND (13)
Methylene chloride	µg/kg	11,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Styrene	µg/kg	6,300,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (15)	ND (13)	ND (15)	ND (15)	ND (13)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (65)	ND (62)	ND (73)	ND (65)	ND (73)	ND (73)	ND (63)
Tetrachloroethene	µg/kg	550	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Toluene	µg/kg	5,000,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Trichloroethene	µg/kg	2,800	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Vinyl chloride	µg/kg	60	NE	ND (3.3)	ND (3.1)	ND (3.6)	ND (3.2)	ND (3.6)	ND (3.6)	ND (3.2)
Xylenes, total	µg/kg	630,000	NE	ND (6.5)	ND (6.2)	ND (7.3)	ND (6.5)	ND (7.3)	ND (7.3)	ND (6.3)
Semivolatile Organic Compounds										
1,1'-Biphenyl	µg/kg	3,900,000	NE	220	ND (1,000)	490 J	ND (1,200)	ND (1,000)	ND (230)	ND (200)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (81) R	ND (400) J	ND (400) J	ND (490) J	ND (410) J	---	---
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)

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Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	1432SSa 1 ft bgs[3] 10/18/2006	1432SSa 3 ft bgs[4] 10/18/2006	1432SSb 1 ft bgs 10/18/2006	1432SSb 1 ft bgs (FD) 10/18/2006	1432SSb 3 ft bgs 10/18/2006	1432SSc 1 ft bgs 11/7/2006	1432SSc 3 ft bgs 11/7/2006
Semivolatile Organic Compounds										
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2,6-Dinitrotoluene	µg/kg	61,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	1,800	ND (230)	ND (200)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2-Chlorophenol	µg/kg	390,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2-Methylnaphthalene	µg/kg	310,000	NE	130	ND (1,000)	150 J	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2-Methylphenol	µg/kg	3,100,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
2-Nitroaniline	µg/kg	610,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
2-Nitrophenol	µg/kg	NDRI	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
3-Nitroaniline	µg/kg	24,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
4-Chloroaniline	µg/kg	2,400	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
4-Methylphenol	µg/kg	310,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
4-Nitroaniline	µg/kg	24,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
4-Nitrophenol	µg/kg	120,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
Acenaphthene	µg/kg	3,400,000	NE	120	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Acenaphthylene	µg/kg	1,700,000	NE	870	ND (1,000)	1,200 J	180 J	110 J	120 J	ND (200)
Acetophenone	µg/kg	7,800,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Anthracene	µg/kg	17,000,000	NE	610	ND (1,000)	570 J	160	120 J	90 J	ND (200)
Atrazine	µg/kg	2,100	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Benzaldehyde	µg/kg	7,800,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Benzo(a)anthracene	µg/kg	150	NE	1,300	290 J	1,600 J	480 J	390 J	340	66 J
Benzo(a)pyrene	µg/kg	15	NE	1,900	380 J	2,800 J	790 J	600 J	410	52 J
Benzo(b)fluoranthene	µg/kg	150	NE	2,000	400 J	3,000 J	820 J	770 J	600	110 J

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Semivolatile Organic Compounds										
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	810	190 J	1,400 J	390 J	390 J	270	37 J
Benzo(k)fluoranthene	µg/kg	1,500	NE	970	160 J	880 J	420	360 J	220 J	39 J
Benzyl butyl phthalate	µg/kg	260,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	130	110 J	ND (1,000)	ND (1,200)	160 J	60 J	ND (200)
Caprolactam	µg/kg	31,000,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Carbazole	µg/kg	24,000	NE	190	ND (1,000)	160 J	ND (1,200)	ND (1,000)	28 J	ND (200)
Chrysene	µg/kg	15,000	NE	1,800	410 J	2,300 J	750 J	780 J	460	75 J
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Dibenzofuran	µg/kg	78,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Diethylphthalate	µg/kg	49,000,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	ND (1,000)	ND (1,000)	210 J	ND (1,200)	240 J	51 J	50 J
Di-n-octyl phthalate	µg/kg	2,400,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Fluoranthene	µg/kg	2,300,000	NE	4,300	620 J	5,200 J	1,500 J	1,100	900	110 J
Fluorene	µg/kg	2,300,000	NE	320	ND (1,000)	330 J	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Hexachlorobenzene	µg/kg	300	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230) J	ND (200) J
Hexachloroethane	µg/kg	35,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	1,200	270 J	1,800 J	490 J	410 J	370	56 J
Isophorone	µg/kg	510,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Naphthalene	µg/kg	3,600	NE	1,200	ND (1,000)	2,800 J	140 J	ND (1,000)	ND (230)	ND (200)
Nitrobenzene	µg/kg	4,800	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Pentachlorophenol	µg/kg	3,000	NE	ND (2,000)	ND (2,000)	ND (2,000)	ND (2,400)	ND (2,000)	ND (440)	ND (390)
Phenanthrene	µg/kg	1,700,000	NE	5,100	500 J	6,000	1,200	920 J	590	88 J
Phenol	µg/kg	18,000,000	NE	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,200)	ND (1,000)	ND (230)	ND (200)
Pyrene	µg/kg	1,700,000	NE	4,300	720 J	5,800 J	1,500 J	1,200	940	110 J

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Metals										
Aluminum	mg/kg	77,000	NE	1,870	4,760	6,870 J	3,610 J	6,730	6,760 J	6,470
Antimony	mg/kg	31	5.9	1.1 J	1.4 J	ND (7.2)	2 J	ND (7.6)	5.7 J	2.6 J
Arsenic[5]	mg/kg	0.062 / 22	***14***	*7.8*	*8.1*	*11.7*	*9.9*	*11.1*	*13.8*	*7.6*
Barium	mg/kg	15,000	NE	396	493	1,180 J	660 J	1,290	1,170 J	502
Beryllium	mg/kg	160	0.9	0.07 J	0.24 J	0.26 J	0.13 J	0.26 J	0.25 J	0.25 J
Cadmium	mg/kg	70	1.5	1.9	1.5	5.7 J	3.4 J	3.6	5.3	3.6
Calcium	mg/kg	NA	NE	3,080	9,200	13,500 J	5,630 J	15,200	10,500 J	12,600
Chromium	mg/kg	210	91.4	13.2	19.8	47.7 J	24.1 J	47.6	62.6 J	53
Cobalt	mg/kg	23	NE	2.2 J	4.1 J	9	4.1 J	7.6	9.1	7
Copper	mg/kg	3,100	59.6	101	168	544 J	235 J	316	458 J	505
Iron	mg/kg	55,000	NE	15,700	9,680	28,200	22,600	22,900	21,700 J	15,000
Lead[6]	mg/kg	194 / 340	14.7	1,060	524 J+	1,830	1,610	1,500 J+	2,280 J	983
Magnesium	mg/kg	NA	NE	571 J	1,160	2,200 J	1,050 J	1,990	2,030 J	1,860
Manganese	mg/kg	1,800	NE	104	338	436 J	237 J	323	369 J	359
Mercury	mg/kg	5.6	0.3	1.5	1.7	1.5	1.6	2.3	1.8	2.3
Nickel	mg/kg	1,500	120.2	10.2	15.2	43.6 J	20.8 J	36.5	39 J	31.6
Potassium	mg/kg	NA	NE	514 J	759 J	1,360 J	663 J	1,270	1,490	1,240
Selenium	mg/kg	390	5.6	0.59 J	ND (5.4)	ND (4.2)	0.48 J	0.51 J	ND (4.6)	ND (4.5)
Silver	mg/kg	390	1.7	1.1 J	1.2 J	7.1 J	3 J	4.3	6.6 J+	3.6
Sodium	mg/kg	NA	NE	ND (747)	ND (770)	5,810 J	ND (704) J	3,910	4,570 J+	3,810 J+
Thallium	mg/kg	5.2	**42.5**	0.61 J	0.6 J	ND (3)	1 J	ND (3.2)	ND (3.3)	ND (3.2)
Vanadium	mg/kg	390	NE	8.4	16.4	29.6 J	15 J	30.8	28.2 J	21.3
Zinc	mg/kg	23,000	91.5	565	601	2,290 J	973 J	1,490	1,880 J	1,550
Organochlorine Pesticides/PCBs										
4,4'-DDD	µg/kg	2,000	NE	17 J	0.82 J	21 J	14 J	13 J	8.3 J	3.1 J
4,4'-DDE	µg/kg	1,400	NE	230 J	0.5 J	220 J	870 J	4.7 J	62 J	17
4,4'-DDT	µg/kg	1,700	NE	980 J	140	610 J	3,100 J	510 J	220 J	55
Aldrin	µg/kg	29	NE	0.098 J	ND (2) J	0.21 J	0.2 J	0.53 J	2.7 J	0.15 J
alpha-BHC	µg/kg	77	NE	1.5 J	ND (2)	10 J	1.5 J	0.56 J	0.67 J	0.18 J
alpha-Chlordane	µg/kg	1,600	NE	28 J	7.6 J	73 J	23 J	0.3 J	14	6.6
Aroclor-1016	µg/kg	3,900	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)

TABLE 4-31
1432 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1432SSa 1 ft bgs[3] 10/18/2006	1432SSa 3 ft bgs[4] 10/18/2006	1432SSb 1 ft bgs 10/18/2006	1432SSb 1 ft bgs (FD) 10/18/2006	1432SSb 3 ft bgs 10/18/2006	1432SSc 1 ft bgs 11/7/2006	1432SSc 3 ft bgs 11/7/2006
Organochlorine Pesticides/PCBs										
Aroclor-1221	µg/kg	140	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1232	µg/kg	140	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1242	µg/kg	220	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1248	µg/kg	220	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1254	µg/kg	220	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1260	µg/kg	220	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1262	µg/kg	NDRI	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
Aroclor-1268	µg/kg	NDRI	NE	ND (40)	ND (39)	ND (40)	ND (48)	ND (41)	ND (44)	ND (39)
beta-BHC	µg/kg	270	NE	2.9 J	ND (2) J	2.3 J	0.52 J	ND (2.1) J	0.85 J	ND (2)
delta-BHC	µg/kg	77	NE	0.037 J	0.33 J	1.4 J	0.72 J	0.27 J	0.34 J	ND (2)
Dieldrin	µg/kg	30	NE	19	4.8	17 J	10 J	3.5 J	12 J	3.5 J
Endosulfan I	µg/kg	370,000	NE	0.62 J	0.25 J	0.44 J	0.21 J	0.53 J	0.3 J	0.14 J
Endosulfan II	µg/kg	370,000	NE	0.54 J	0.62 J	0.82 J	0.28 J	0.55 J	1.1 J	0.29 J
Endosulfan sulfate	µg/kg	370,000	NE	2.7 J	0.31 J	16 J	0.83 J	2.7 J	3.5 J	1.5 J
Endrin	µg/kg	18,000	NE	19 J	6.7 J	150 J	15 J	0.22 J	9.2 J	ND (3.3) J
Endrin aldehyde	µg/kg	18,000	NE	ND (3.3) J	0.24 J	24 J	ND (3.3) J	ND (4.1)	2.5 J	1.5 J
Endrin ketone	µg/kg	18,000	NE	0.36 J	ND (2)	0.29 J	0.46 J	2.5 J	5.5 J	2.6 J
gamma-BHC	µg/kg	520	NE	0.36 J	ND (2) J	0.51 J	0.28 J	ND (2.1) J	0.16 J	0.26 J
gamma-Chlordane	µg/kg	1,600	NE	27 J	8.3 J	68 J	23	7.8 J	19 J	9.8
Heptachlor	µg/kg	110	NE	0.34 J	ND (2) J	0.36 J	0.04 J	ND (2.1) J	ND (1.7) J	ND (1.7)
Heptachlor epoxide	µg/kg	53	NE	1.6 J	ND (2)	1.1 J	1.4 J	ND (2.1)	0.73 J	0.46 J
Methoxychlor	µg/kg	310,000	NE	27 J	4.4 J	8.5 J	ND (17) J	0.22 J	0.63 J	2.7 J
Toxaphene	µg/kg	440	NE	ND (200)	ND (200)	ND (200)	ND (250)	ND (210)	ND (230)	ND (200)

TABLE 4-31
1432 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

FD	field duplicate
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1436SSa 1 ft bgs [3] 10/18/2006	1436SSa 3 ft bgs [4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (6.6)	ND (5.8)	ND (6.8)	ND (6)
1,2-Dibromoethane	µg/kg	34	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2-Dichloroethane	µg/kg	430	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,2-Dichloropropane	µg/kg	890	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
2-Hexanone	µg/kg	210,000	NE	ND (27)	ND (23)	ND (27)	ND (24)
Acetone	µg/kg	61,000,000	NE	ND (27)	ND (23)	ND (27)	ND (12)
Benzene	µg/kg	1,100	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Bromochloromethane	µg/kg	NDRI	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Bromodichloromethane	µg/kg	270	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Bromoform	µg/kg	61,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Bromomethane	µg/kg	7,300	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Carbon disulfide	µg/kg	820,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Carbon tetrachloride	µg/kg	610	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Chlorobenzene	µg/kg	290,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Chloroethane	µg/kg	15,000,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (1.5)
Chloroform	µg/kg	290	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Chloromethane	µg/kg	120,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1436SSa 1 ft bgs [3] 10/18/2006	1436SSa 3 ft bgs [4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Volatile Organic Compounds							
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Dibromochloromethane	µg/kg	680	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (14)	ND (12)
Ethylbenzene	µg/kg	5,400	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Freon 11	µg/kg	790,000	NE	ND (3.3)	4.1	15	5.8
Freon 113	µg/kg	43,000,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Freon 12	µg/kg	180,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (1.5)
Isopropyl ether	µg/kg	1,400,000	NE	ND (13)	ND (12)	ND (14)	ND (12)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (27)	ND (23)	ND (27)	ND (24)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (27)	ND (23)	ND (27)	ND (24)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (14)	ND (12)
Methylene chloride	µg/kg	11,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Styrene	µg/kg	6,300,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (13)	ND (12)	ND (14)	ND (12)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (66)	ND (58)	ND (68)	ND (60)
Tetrachloroethene	µg/kg	550	NE	4.9	5.6	ND (3.4)	ND (3)
Toluene	µg/kg	5,000,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Trichloroethene	µg/kg	2,800	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Vinyl chloride	µg/kg	60	NE	ND (3.3)	ND (2.9)	ND (3.4)	ND (3)
Xylenes, total	µg/kg	630,000	NE	ND (6.6)	ND (5.8)	ND (6.8)	ND (6)
Semivolatile Organic Compounds							
1,1'-Biphenyl	µg/kg	3,900,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (440) J	ND (81) J	ND (400) J	ND (77) J
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	1436SSa 1 ft bgs[3] 10/18/2006	1436SSa 3 ft bgs[4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Semivolatile Organic Compounds							
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2,6-Dinitrotoluene	µg/kg	61,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2-Chlorophenol	µg/kg	390,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2-Methylnaphthalene	µg/kg	310,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2-Methylphenol	µg/kg	3,100,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
2-Nitroaniline	µg/kg	610,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
2-Nitrophenol	µg/kg	NDRI	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
3-Nitroaniline	µg/kg	24,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
4-Chloroaniline	µg/kg	2,400	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
4-Methylphenol	µg/kg	310,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
4-Nitroaniline	µg/kg	24,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
4-Nitrophenol	µg/kg	120,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
Acenaphthene	µg/kg	3,400,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Acenaphthylene	µg/kg	1,700,000	NE	500	ND (210)	ND (1,000)	ND (190)
Acetophenone	µg/kg	7,800,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Anthracene	µg/kg	17,000,000	NE	820	ND (210)	130 J	ND (190)
Atrazine	µg/kg	2,100	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Benzaldehyde	µg/kg	7,800,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Benzo(a)anthracene	µg/kg	150	NE	1,800	66 J	840 J	46 J
Benzo(a)pyrene	µg/kg	15	NE	2,400	82 J	1,200	74 J
Benzo(b)fluoranthene	µg/kg	150	NE	2,300	100 J	1,800	95 J

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1436SSa 1 ft bgs[3] 10/18/2006	1436SSa 3 ft bgs[4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Semivolatile Organic Compounds							
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	960	45 J	1,300	63 J
Benzo(k)fluoranthene	µg/kg	1,500	NE	980	43 J	610 J	32 J
Benzyl butyl phthalate	µg/kg	260,000	NE	130	ND (210)	ND (1,000)	ND (190)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	570	51 J	8,900	60 J
Caprolactam	µg/kg	31,000,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Carbazole	µg/kg	24,000	NE	120	ND (210)	ND (1,000)	ND (190)
Chrysene	µg/kg	15,000	NE	2,400	86 J	1,400	69 J
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Dibenzofuran	µg/kg	78,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Diethylphthalate	µg/kg	49,000,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	ND (1,100)	28 J	380 J	140 J
Di-n-octyl phthalate	µg/kg	2,400,000	NE	ND (1,100)	ND (210)	240 J	ND (190)
Fluoranthene	µg/kg	2,300,000	NE	5,200	120 J	2,600	150 J
Fluorene	µg/kg	2,300,000	NE	390	ND (210)	ND (1,000)	ND (190)
Hexachlorobenzene	µg/kg	300	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Hexachloroethane	µg/kg	35,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	1,300	69 J	1,100	64 J
Isophorone	µg/kg	510,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Naphthalene	µg/kg	3,600	NE	110	ND (210)	ND (1,000)	ND (190)
Nitrobenzene	µg/kg	4,800	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Pentachlorophenol	µg/kg	3,000	NE	ND (2,200)	ND (400)	ND (2,000)	ND (380)
Phenanthrene	µg/kg	1,700,000	NE	5,000	70 J	1,100	76 J
Phenol	µg/kg	18,000,000	NE	ND (1,100)	ND (210)	ND (1,000)	ND (190)
Pyrene	µg/kg	1,700,000	NE	5,600 J	130 J	2,900	150 J

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	1436SSa 1 ft bgs [3] 10/18/2006	1436SSa 3 ft bgs [4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Metals							
Aluminum	mg/kg	77,000	NE	4,210 J	5,650	8,910	4,690
Antimony	mg/kg	31	5.9	1.7 J	ND (7.3)	ND (7.3)	ND (6.8)
Arsenic [5]	mg/kg	0.062 / 22	***14***	*7.6 J*	*7.7*	*15.6*	*3.3*
Barium	mg/kg	15,000	NE	333 J	217	1,450	154
Beryllium	mg/kg	160	0.9	0.12 J	0.21 J	0.23 J	0.11 J
Cadmium	mg/kg	70	1.5	3 J	1.2	13	0.59
Calcium	mg/kg	NA	NE	4,370 J	3,700	15,000	3,180
Chromium	mg/kg	210	91.4	26.1 J	144	69.7	35.3
Cobalt	mg/kg	23	NE	4.2 J	6.3	10.2	5.3 J
Copper	mg/kg	3,100	59.6	234 J	147	927	51.3
Iron	mg/kg	55,000	NE	23,500	13,900	27,700	9,290
Lead [6]	mg/kg	194 / 340	14.7	2,910	829	3,630	*216 J+*
Magnesium	mg/kg	NA	NE	1,230 J	1,630	4,060	1,580
Manganese	mg/kg	1,800	NE	304 J	120	447	183
Mercury	mg/kg	5.6	0.3	1.7	1.9	1.9	0.49
Nickel	mg/kg	1,500	120.2	14.3 J	22.7	60	18.4
Potassium	mg/kg	NA	NE	705 J	700	1,530	852
Selenium	mg/kg	390	5.6	ND (4.2) J	0.69 J	ND (4.2)	0.52 J
Silver	mg/kg	390	1.7	2.8 J	2.7	6.2	0.7 J
Sodium	mg/kg	NA	NE	ND (595)	2,460	8,190	739
Thallium	mg/kg	5.2	**42.5**	1.1 J	ND (3)	ND (3)	ND (2.8)
Vanadium	mg/kg	390	NE	12.5 J	25.3	32.9	19.5
Zinc	mg/kg	23,000	91.5	1,580 J	977	3,200	231
Organochlorine Pesticides/PCBs							
4,4'-DDD	µg/kg	2,000	NE	9.9 J	0.81 J	12 J	ND (3.8)
4,4'-DDE	µg/kg	1,400	NE	300 J	ND (4)	93	3.1 J
4,4'-DDT	µg/kg	1,700	NE	1,600	17 J	320 J	12 J
Aldrin	µg/kg	29	NE	0.17 J	ND (2.1) J	0.57 J	ND (1.9) J
alpha-BHC	µg/kg	77	NE	0.9 J	ND (2.1)	0.71 J	ND (1.9)
alpha-Chlordane	µg/kg	1,600	NE	100 J	2.8 J	120 J	0.41 J
Aroclor-1016	µg/kg	3,900	NE	ND (43)	ND (40)	ND (40)	ND (38)

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland [2] Background Levels	1436SSa 1 ft bgs [3] 10/18/2006	1436SSa 3 ft bgs [4] 10/18/2006	1436SSb 1 ft bgs 10/18/2006	1436SSb 3 ft bgs 10/18/2006
Organochlorine Pesticides/PCBs							
Aroclor-1221	µg/kg	140	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1232	µg/kg	140	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1242	µg/kg	220	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1248	µg/kg	220	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1254	µg/kg	220	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1260	µg/kg	220	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1262	µg/kg	NDRI	NE	ND (43)	ND (40)	ND (40)	ND (38)
Aroclor-1268	µg/kg	NDRI	NE	ND (43)	ND (40)	ND (40)	ND (38)
beta-BHC	µg/kg	270	NE	0.57 J	ND (2.1) J	2.7 J	ND (1.9) J
delta-BHC	µg/kg	77	NE	1.4 J	ND (2.1)	ND (2)	ND (1.9)
Dieldrin	µg/kg	30	NE	1,000	4.4 J	36	0.2 J
Endosulfan I	µg/kg	370,000	NE	0.79 J	ND (2.1)	1.5 J	ND (1.9)
Endosulfan II	µg/kg	370,000	NE	0.51 J	0.43 J	2.4 J	ND (3.8)
Endosulfan sulfate	µg/kg	370,000	NE	4.7 J	0.82 J	0.97 J	1.9 J
Endrin	µg/kg	18,000	NE	1.2 J	1.4 J	13 J	1.3 J
Endrin aldehyde	µg/kg	18,000	NE	ND (3.3) J	0.5 J	0.56 J	ND (3.8)
Endrin ketone	µg/kg	18,000	NE	8.7 J	0.65 J	1.7 J	0.59 J
gamma-BHC	µg/kg	520	NE	0.36 J	ND (2.1) J	ND (2) J	ND (1.9) J
gamma-Chlordane	µg/kg	1,600	NE	110 J	1.4 J	1.5 J	1 J
Heptachlor	µg/kg	110	NE	0.34 J	ND (2.1) J	1.3 J	ND (1.9) J
Heptachlor epoxide	µg/kg	53	NE	2.3 J	ND (2.1)	0.74 J	ND (1.9)
Methoxychlor	µg/kg	310,000	NE	45 J	2.5 J	29	0.42 J
Toxaphene	µg/kg	440	NE	ND (220)	ND (210)	ND (200)	ND (190)

TABLE 4-32
1436 3rd Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias

TABLE 4-33
326 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (5.9)	ND (4.8)	ND (5)	ND (5)	ND (5.4)	ND (8.8)	ND (15)	ND (5.5)	ND (5.6)	ND (11)	ND (15)
1,2-Dibromoethane	µg/kg	34	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,2-Dichloroethane	µg/kg	430	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
1,2-Dichloropropane	µg/kg	890	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
2-Hexanone	µg/kg	210,000	NE	ND (24)	ND (19)	ND (20)	ND (20)	ND (11)	ND (18)	ND (29)	ND (22)	ND (22)	ND (21)	ND (30)
Acetone	µg/kg	61,000,000	NE	16 J	12 J	ND (20)	ND (20)	ND (11)	64	ND (29)	20 J	ND (11)	ND (21)	ND (30)
Benzene	µg/kg	1,100	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
Bromochloromethane	µg/kg	NDRI	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Bromodichloromethane	µg/kg	270	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
Bromoform	µg/kg	61,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Bromomethane	µg/kg	7,300	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Carbon disulfide	µg/kg	820,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Carbon tetrachloride	µg/kg	610	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
Chlorobenzene	µg/kg	290,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Chloroethane	µg/kg	15,000,000	NE	ND (1.5)	ND (1.2)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (1.4)	ND (2.7)	ND (3.8)
Chloroform	µg/kg	290	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Chloromethane	µg/kg	120,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)

TABLE 4-33
326 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland[2] Background Levels	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Volatile Organic Compounds														
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
Dibromochloromethane	µg/kg	680	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (12)	ND (9.6)	ND (10)	ND (10)	ND (11)	ND (18)	ND (15)	ND (11)	ND (11)	ND (11)	ND (15)
Ethylbenzene	µg/kg	5,400	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Freon 11	µg/kg	790,000	NE	4.9	2.7	2.2 J	3.8	8.2	14	11	5.3	8.5	9.2	11
Freon 113	µg/kg	43,000,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Freon 12	µg/kg	180,000	NE	ND (1.5)	ND (1.2)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (1.4)	ND (2.7)	ND (3.8)
Isopropyl ether	µg/kg	1,400,000	NE	ND (12)	ND (9.6)	ND (10)	ND (10)	ND (11)	ND (18)	ND (15)	ND (11)	ND (11)	ND (11)	ND (15)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (24)	ND (19)	ND (20)	ND (20)	ND (11)	ND (35)	ND (29)	ND (22)	ND (22)	ND (21)	ND (30)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (24)	ND (19)	ND (20)	ND (20)	ND (11)	ND (18)	ND (29)	ND (11)	ND (11)	ND (21)	ND (30)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (12)	ND (9.6)	ND (10)	ND (10)	ND (5.4)	ND (18)	ND (15)	ND (11)	ND (11)	ND (11)	ND (15)
Methylene chloride	µg/kg	11,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Styrene	µg/kg	6,300,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (12)	ND (9.6)	ND (10)	ND (10)	ND (5.4)	ND (8.8)	ND (15)	ND (5.5)	ND (11)	ND (11)	ND (15)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (59)	ND (48)	ND (50)	ND (50)	ND (27)	ND (44)	ND (73)	ND (27)	ND (28)	ND (53)	ND (76)
Tetrachloroethene	µg/kg	550	NE	ND (3)	ND (2.4)	2.9	9.7	ND (1.3)	ND (2.2)	ND (3.6)	4.4	11	ND (2.7)	ND (3.8)
Toluene	µg/kg	5,000,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Trichloroethene	µg/kg	2,800	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (1.3)	ND (2.2)	ND (3.6)	ND (1.4)	ND (2.8)	ND (2.7)	ND (3.8)
Vinyl chloride	µg/kg	60	NE	ND (3)	ND (2.4)	ND (2.5)	ND (2.5)	ND (2.7)	ND (4.4)	ND (3.6)	ND (2.7)	ND (2.8)	ND (2.7)	ND (3.8)
Xylenes, total	µg/kg	630,000	NE	ND (5.9)	ND (4.8)	ND (5)	ND (5)	ND (2.7)	ND (4.4)	ND (7.3)	ND (5.5)	ND (5.6)	ND (5.3)	ND (7.6)
Semivolatile Organic Compounds														
1,1'-Biphenyl	µg/kg	3,900,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (75) J	ND (80) J	ND (76) J	ND (86) J	ND (77) J	ND (75) J	ND (83) J	ND (86) J	ND (86) J	ND (73) J	ND (87) J
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)

TABLE 4-33
326 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Semivolatile Organic Compounds														
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2,6-Dinitrotoluene	µg/kg	61,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2-Chlorophenol	µg/kg	390,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2-Methylnaphthalene	µg/kg	310,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	35 J	ND (210)	ND (220)	30 J	ND (190)	ND (220)
2-Methylphenol	µg/kg	3,100,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
2-Nitroaniline	µg/kg	610,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
2-Nitrophenol	µg/kg	NDRI	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
3-Nitroaniline	µg/kg	24,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
4-Chloroaniline	µg/kg	2,400	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
4-Methylphenol	µg/kg	310,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
4-Nitroaniline	µg/kg	24,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
4-Nitrophenol	µg/kg	120,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
Acenaphthene	µg/kg	3,400,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Acenaphthylene	µg/kg	1,700,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Acetophenone	µg/kg	7,800,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Anthracene	µg/kg	17,000,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	20 J	ND (190)	ND (210)	40 J	100 J	29 J	ND (220)
Atrazine	µg/kg	2,100	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Benzaldehyde	µg/kg	7,800,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Benzo(a)anthracene	µg/kg	150	NE	54 J	ND (200)	38 J	ND (220)	66 J	41 J	29 J	170 J	280	94 J	46 J
Benzo(a)pyrene	µg/kg	15	NE	75 J	ND (200)	45 J	ND (220)	100 J	56 J	39 J	220	270	140 J	62 J
Benzo(b)fluoranthene	µg/kg	150	NE	96 J	ND (200)	51 J	22 J	110 J	90 J	50 J	260	280	170 J	83 J

TABLE 4-33
326 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Semivolatile Organic Compounds														
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	47 J	ND (200)	ND (190)	ND (220)	22 J	53 J	22 J	180 J	34 J	42 J	ND (220)
Benzo(k)fluoranthene	µg/kg	1,500	NE	42 J	ND (200)	23 J	ND (220)	56 J	35 J	26 J	110 J	140 J	86 J	35 J
Benzyl butyl phthalate	µg/kg	260,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	85 J	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	200	38 J	59 J	ND (220)	ND (200)	3,600	110 J	55 J	ND (220)	ND (190)	ND (220)
Caprolactam	µg/kg	31,000,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Carbazole	µg/kg	24,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	31 J	ND (190)	ND (220)
Chrysene	µg/kg	15,000	NE	85 J	ND (200)	44 J	ND (220)	99 J	71 J	46 J	210 J	340	140 J	66 J
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Dibenzofuran	µg/kg	78,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	22 J	ND (190)	ND (220)
Diethylphthalate	µg/kg	49,000,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	42 J	90 J	37 J	ND (220)	ND (200)	170 J	ND (210)	150 J	ND (220)	ND (190)	ND (220)
Di-n-octyl phthalate	µg/kg	2,400,000	NE	24 J	ND (200)	21 J	ND (220)	ND (200)	91 J	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Fluoranthene	µg/kg	2,300,000	NE	120 J	ND (200)	68 J	26 J	160 J	89 J	67 J	360	590	240	100 J
Fluorene	µg/kg	2,300,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	40 J	ND (190)	ND (220)
Hexachlorobenzene	µg/kg	300	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Hexachloroethane	µg/kg	35,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	56 J	ND (200)	39 J	ND (220)	70 J	62 J	28 J	170 J	140 J	110 J	44 J
Isophorone	µg/kg	510,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Naphthalene	µg/kg	3,600	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	23 J	ND (210)	ND (220)	22 J	ND (190)	ND (220)
Nitrobenzene	µg/kg	4,800	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Pentachlorophenol	µg/kg	3,000	NE	ND (370)	ND (400)	ND (370)	ND (420)	ND (380)	ND (370)	ND (410)	ND (430)	ND (420)	ND (360)	ND (430)
Phenanthrene	µg/kg	1,700,000	NE	73 J	ND (200)	52 J	ND (220)	89 J	78 J	61 J	150 J	440	120 J	50 J
Phenol	µg/kg	18,000,000	NE	ND (190)	ND (200)	ND (190)	ND (220)	ND (200)	ND (190)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)
Pyrene	µg/kg	1,700,000	NE	110 J	ND (200)	72 J	23 J	150 J	110 J	67 J	320	500	220	94 J

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326 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
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Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Metals														
Aluminum	mg/kg	77,000	NE	5,030	4,540	3,000	2,210	2,460 J	4,280 J	2,200	7,250	2,890	3,120	9,120
Antimony	mg/kg	31	5.9	ND (6.4)	ND (7.1)	ND (7.3)	ND (7.6)	ND (7.7)	0.81 J	ND (7.8)	ND (6.9)	0.6 J	1.2 J	13
Arsenic[5]	mg/kg	0.062 / 22	***14***	*6*	*2.8*	*5.5*	*3.5*	*10.4*	*9.6*	*8.5*	451	125	*7.5*	*15.5*
Barium	mg/kg	15,000	NE	161	99.4	114	48.3	173 J	483 J	112	907	195	379	487
Beryllium	mg/kg	160	0.9	0.11 J	0.07 J	0.13 J	0.07 J	0.08 J	0.14 J	0.07 J	0.31 J	0.12 J	0.13 J	0.48 J
Cadmium	mg/kg	70	1.5	0.89	0.11 J	0.33 J	0.19 J	0.53 J	2.6	0.53 J	4.1	0.68	2.1	1.7
Calcium	mg/kg	NA	NE	2,650	2,600	2,250	1,730	1,660 J	4,250 J	1,960	10,900	5,470	4,360	19,400
Chromium	mg/kg	210	91.4	33.8	28.9	13.8	12.5	14.7 J	42.5 J	12.2	77.5	31.2	25.6	19.2
Cobalt	mg/kg	23	NE	5.1 J	4.4 J	2.5 J	2 J	2.2 J	5.7 J	2 J	7.2	2.2 J	3.6 J	4.7 J
Copper	mg/kg	3,100	59.6	44.6	16.9	46.7	8.7	40.5 J	120 J	48.7	173	45.5	109	110
Iron	mg/kg	55,000	NE	9,630	8,510	5,090	6,000	5,270 J	17,400 J	8,370	25,400	5,530	13,600	9,050
Lead[6]	mg/kg	194 / 340	14.7	*274*	35.9	*261 J+*	179	167 J+	389 J+	*284*	28,600	631 J+	1,270 J+	53,000 J
Magnesium	mg/kg	NA	NE	1,780	1,410	1,010	701	784 J	1,660 J	612 J	2,190	982	1,160	2,080
Manganese	mg/kg	1,800	NE	187	251	202	53	175 J	465 J	78.2	352	278	309	305
Mercury	mg/kg	5.6	0.3	0.41	0.1 J	0.22	0.36	0.55	1	4.4	0.62	0.82	0.69	0.61
Nickel	mg/kg	1,500	120.2	20.2	17.6	8.6	10.6	9.5 J	34.1 J	7.7	27.9	8.4	15.4	14.5
Potassium	mg/kg	NA	NE	905	666	561 J	356 J	409 J	671	310 J	1,360	643	762	1,320
Selenium	mg/kg	390	5.6	0.55 J	0.52 J	ND (4.3)	ND (4.4)	ND (4.5)	ND (4.1)	ND (4.6)	0.57 J	ND (4.1)	ND (3.8)	ND (4.7)
Silver	mg/kg	390	1.7	0.68 J	0.47 J	0.18 J	ND (1.3)	0.2 J	0.8 J	0.35 J	2.6	0.21 J	0.8 J	5.3
Sodium	mg/kg	NA	NE	833	303 J	ND (607)	ND (635)	ND (642)	ND (585)	ND (652)	5,940	ND (587)	ND (545)	1,540
Thallium	mg/kg	5.2	**42.5**	ND (2.7)	ND (2.9)	ND (3)	ND (3.2)	0.7 J	1.3 J	ND (3.3)	ND (2.9)	0.58 J	0.95 J	ND (3.4)
Vanadium	mg/kg	390	NE	21.9	19.4	10.2	8.1	8.5 J	16.9 J	8.2	24.5	8	13	21.3
Zinc	mg/kg	23,000	91.5	298	63.2	139	72.4	175 J	555 J	206	2,380	251	732	344
Organochlorine Pesticides/PCBs														
4,4'-DDD	µg/kg	2,000	NE	13 J	0.36 J	0.39 J	0.48 J	490 J	1,000 J	45 J	400	780	15 J	3.5 J
4,4'-DDE	µg/kg	1,400	NE	180	8.1 J	1.1 J	ND (3.3) J	2,100 J	11,000 J	590 J	740 J	810 J	150	33
4,4'-DDT	µg/kg	1,700	NE	14 J	25 J	47	2.4 J	9 J	3,100 J	4,400 J	2,200	3,000	400 J	73
Aldrin	µg/kg	29	NE	ND (1.9) J	ND (2) R	ND (3.8) J	ND (2.2) J	1.7 J	ND (190) J	ND (2.1) J	1.6 J	ND (2.2)	ND (1.9)	ND (2.2)
alpha-BHC	µg/kg	77	NE	ND (1.9)	ND (2) R	ND (3.8)	0.24 J	ND (2)	ND (190)	ND (2.1)	ND (2.2)	ND (2.2)	ND (1.9)	0.24 J
alpha-Chlordane	µg/kg	1,600	NE	2.3 J	ND (2) R	ND (3.8)	0.29 J	7.9 J	ND (190)	0.59 J	0.55 J	0.5 J	3.3 J	0.65 J
Aroclor-1016	µg/kg	3,900	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)

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Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	326SSa 1 ft bgs[3] 10/18/2006	326SSa 3 ft bgs[4] 10/18/2006	326SSb 1 ft bgs 10/18/2006	326SSb 3 ft bgs 10/18/2006	326SSc 1 ft bgs 10/18/2006	326SSc 1 ft bgs (FD) 10/18/2006	326SSc 3 ft bgs 10/18/2006	326SSd 1 ft bgs 10/18/2006	326SSd 2.5 ft bgs 10/18/2006	326SSe 1 ft bgs 10/18/2006	326SSe 3 ft bgs 10/18/2006
Organochlorine Pesticides/PCBs														
Aroclor-1221	µg/kg	140	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1232	µg/kg	140	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1242	µg/kg	220	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1248	µg/kg	220	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1254	µg/kg	220	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1260	µg/kg	220	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1262	µg/kg	NDRI	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
Aroclor-1268	µg/kg	NDRI	NE	ND (37)	ND (40)	ND (37)	ND (42)	ND (38)	ND (37)	ND (41)	ND (43)	ND (42)	ND (36)	ND (43)
beta-BHC	µg/kg	270	NE	ND (1.9) J	ND (2) J	ND (3.8) J	0.054 J	1.4 J	ND (190)	0.2 J	ND (2.2)	0.57 J	0.86 J	2.4
delta-BHC	µg/kg	77	NE	0.28 J	ND (2) R	ND (3.8)	ND (2.2)	ND (2)	ND (190)	0.24 J	0.25 J	0.62 J	ND (1.9)	ND (2.2)
Dieldrin	µg/kg	30	NE	0.34 J	ND (4) R	ND (7.4)	ND (3.3) J	160 J	23 J	13	1.4 J	9.8 J	ND (3.6)	0.47 J
Endosulfan I	µg/kg	370,000	NE	1.6 J	ND (2) R	ND (3.8)	ND (2.2)	5.7 J	ND (190)	0.67 J	0.6 J	0.34 J	ND (1.9)	ND (2.2)
Endosulfan II	µg/kg	370,000	NE	0.35 J	ND (4) R	ND (7.4)	ND (4.2)	5.9 J	32 J	3 J	2.5 J	0.77 J	1.5 J	0.42 J
Endosulfan sulfate	µg/kg	370,000	NE	3 J	ND (4) R	ND (7.4)	0.37 J	6.8 J	ND (370)	1.6 J	0.78 J	1.2 J	0.35 J	ND (4.3)
Endrin	µg/kg	18,000	NE	0.44 J	0.21 J	ND (7.4)	3.5 J	0.78 J	ND (370)	0.26 J	340 J	0.28 J	0.82 J	0.44 J
Endrin aldehyde	µg/kg	18,000	NE	ND (3.7)	0.47 J	ND (7.4)	ND (3.3) J	0.75 J	24 J	ND (3.3) J	0.33 J	ND (4.2)	1.3 J	0.28 J
Endrin ketone	µg/kg	18,000	NE	0.34 J	1.5 J	0.53 J	0.41 J	5.2 J	ND (190)	0.95 J	0.44 J	1.6 J	0.21 J	0.33 J
gamma-BHC	µg/kg	520	NE	5 J	ND (2) R	ND (3.8) J	0.2 J	3.7 J	ND (190) J	0.27 J	220 J	26 J	ND (1.9)	1 J
gamma-Chlordane	µg/kg	1,600	NE	0.23 J	0.57 J	ND (3.8)	ND (1.7) J	4	110 J	1.7 J	22	23 J	3.1 J	0.73 J
Heptachlor	µg/kg	110	NE	ND (1.9) J	ND (2) R	ND (3.8) J	ND (2.2) J	0.66 J	ND (190) J	ND (2.1) J	ND (2.2) J	ND (2.2)	ND (1.9)	ND (2.2)
Heptachlor epoxide	µg/kg	53	NE	0.47 J	ND (2) R	ND (3.8)	ND (2.2)	4.3 J	ND (190)	0.49 J	ND (2.2)	0.34 J	ND (1.9)	ND (2.2)
Methoxychlor	µg/kg	310,000	NE	31	0.79 J	1.8 J	ND (17) J	12 J	82 J	26	5.9 J	6.2 J	9.5 J	3.4 J
Toxaphene	µg/kg	440	NE	ND (190)	ND (200) R	ND (380)	ND (220)	ND (200)	ND (19,000)	ND (210)	ND (220)	ND (220)	ND (190)	ND (220)

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

FD	field duplicate
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland[2] Background Levels	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Volatile Organic Compounds										
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (12)	ND (12)	ND (12)	ND (15)	ND (10)	ND (6.7)	ND (9.4)
1,2-Dibromoethane	µg/kg	34	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,2-Dichloroethane	µg/kg	430	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
1,2-Dichloropropane	µg/kg	890	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
2-Hexanone	µg/kg	210,000	NE	ND (24)	ND (24)	ND (25)	ND (30)	ND (20)	ND (13)	ND (19)
Acetone	µg/kg	61,000,000	NE	ND (24)	ND (24)	ND (25)	ND (30)	ND (20)	ND (13)	ND (19)
Benzene	µg/kg	1,100	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Bromochloromethane	µg/kg	NDRI	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
Bromodichloromethane	µg/kg	270	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Bromoform	µg/kg	61,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Bromomethane	µg/kg	7,300	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Carbon disulfide	µg/kg	820,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
Carbon tetrachloride	µg/kg	610	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Chlorobenzene	µg/kg	290,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Chloroethane	µg/kg	15,000,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Chloroform	µg/kg	290	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Chloromethane	µg/kg	120,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Volatile Organic Compounds										
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Dibromochloromethane	µg/kg	680	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (12)	ND (12)	ND (12)	ND (15)	ND (10)	ND (13)	ND (9.4)
Ethylbenzene	µg/kg	5,400	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Freon 11	µg/kg	790,000	NE	11	7.4	5.3	7	7.8	ND (3.3)	6.1
Freon 113	µg/kg	43,000,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Freon 12	µg/kg	180,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Isopropyl ether	µg/kg	1,400,000	NE	ND (12)	ND (12)	ND (12)	ND (15)	ND (10)	ND (13)	ND (9.4)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (24)	ND (24)	ND (25)	ND (30)	ND (20)	ND (13)	ND (19)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (24)	ND (24)	ND (25)	ND (30)	ND (20)	ND (27)	ND (19)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (12)	ND (12)	ND (12)	ND (15)	ND (10)	ND (13)	ND (9.4)
Methylene chloride	µg/kg	11,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (3.3)	ND (2.4)
Styrene	µg/kg	6,300,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (12)	ND (12)	ND (12)	ND (15)	ND (10)	ND (13)	ND (9.4)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (60)	ND (61)	ND (61)	ND (75)	ND (51)	ND (67)	ND (47)
Tetrachloroethene	µg/kg	550	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Toluene	µg/kg	5,000,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Trichloroethene	µg/kg	2,800	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Vinyl chloride	µg/kg	60	NE	ND (3)	ND (3.1)	ND (3.1)	ND (3.8)	ND (2.6)	ND (1.7)	ND (2.4)
Xylenes, total	µg/kg	630,000	NE	ND (6)	ND (6.1)	ND (6.1)	ND (7.5)	ND (5.1)	ND (3.3)	ND (4.7)
Semivolatile Organic Compounds										
1,1'-Biphenyl	µg/kg	3,900,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (370) J	ND (73) J	ND (79) J	ND (89) J	ND (83) J	ND (73) J	ND (76) J
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Semivolatile Organic Compounds										
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
2,6-Dinitrotoluene	µg/kg	61,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2-Chlorophenol	µg/kg	390,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
2-Methylnaphthalene	µg/kg	310,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2-Methylphenol	µg/kg	3,100,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
2-Nitroaniline	µg/kg	610,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
2-Nitrophenol	µg/kg	NDRI	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
3-Nitroaniline	µg/kg	24,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
4-Chloroaniline	µg/kg	2,400	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
4-Methylphenol	µg/kg	310,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
4-Nitroaniline	µg/kg	24,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
4-Nitrophenol	µg/kg	120,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360)	ND (380)
Acenaphthene	µg/kg	3,400,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Acenaphthylene	µg/kg	1,700,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Acetophenone	µg/kg	7,800,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
Anthracene	µg/kg	17,000,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Atrazine	µg/kg	2,100	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Benzaldehyde	µg/kg	7,800,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) J	ND (190)	ND (190)
Benzo(a)anthracene	µg/kg	150	NE	210	130 J	20 J	93 J	38 J	37 J	ND (190)
Benzo(a)pyrene	µg/kg	15	NE	430	280 J	27 J	190 J	51 J	49 J	ND (190)
Benzo(b)fluoranthene	µg/kg	150	NE	520	310 J	36 J	240	66 J	58 J	24 J

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Semivolatile Organic Compounds										
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	210	270 J	ND (200)	140 J	27 J	41 J	ND (190)
Benzo(k)fluoranthene	µg/kg	1,500	NE	200	130 J	ND (200)	90 J	23 J	ND (190)	ND (190)
Benzyl butyl phthalate	µg/kg	260,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	440	210 J	23 J	170 J	21 J	33 J	ND (190)
Caprolactam	µg/kg	31,000,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Carbazole	µg/kg	24,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Chrysene	µg/kg	15,000	NE	350	230 J	21 J	150 J	52 J	52 J	ND (190)
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Dibenzofuran	µg/kg	78,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Diethylphthalate	µg/kg	49,000,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	ND (930)	190 J	96 J	ND (230)	ND (210)	100 J	ND (190)
Di-n-octyl phthalate	µg/kg	2,400,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Fluoranthene	µg/kg	2,300,000	NE	520	270 J	26 J	160 J	77 J	74 J	26 J
Fluorene	µg/kg	2,300,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Hexachlorobenzene	µg/kg	300	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Hexachloroethane	µg/kg	35,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	310	270 J	26 J	180 J	36 J	46 J	ND (190)
Isophorone	µg/kg	510,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
Naphthalene	µg/kg	3,600	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)
Nitrobenzene	µg/kg	4,800	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) R	ND (190)	ND (190)
Pentachlorophenol	µg/kg	3,000	NE	ND (1,800)	ND (1,800)	ND (390)	ND (440)	ND (410)	ND (360) J	ND (380)
Phenanthrene	µg/kg	1,700,000	NE	210 J	100 J	ND (200)	67 J	58 J	52 J	ND (190)
Phenol	µg/kg	18,000,000	NE	ND (930)	ND (920)	ND (200)	ND (230)	ND (210) J	ND (190)	ND (190)
Pyrene	µg/kg	1,700,000	NE	520	310 J	29 J	160 J	73 J	81 J	22 J

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland[2] Background Levels	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Metals										
Aluminum	mg/kg	77,000	NE	2,680 J	5,670 J	5,510	5,580	5,570	6,380 J	1,660
Antimony	mg/kg	31	5.9	ND (6.7)	ND (6.6)	ND (7)	ND (6.8)	ND (7.3)	ND (6.5) J	ND (6.8)
Arsenic[5]	mg/kg	0.062 / 22	***14***	*4.3 J*	*7.8 J*	*3.9*	*6.6*	*4.5*	*7.5 J*	*3.7*
Barium	mg/kg	15,000	NE	174 J	360 J	821	292	240	190 J	31
Beryllium	mg/kg	160	0.9	0.09 J	0.19 J	0.16 J	0.27 J	0.23 J	0.27 J	0.05 J
Cadmium	mg/kg	70	1.5	0.9	2	ND (0.59)	1.7	0.41 J	1.1 J	0.11 J
Calcium	mg/kg	NA	NE	3,190 J	5,490 J	5,510	5,760	8,500	8,310 J	1,490
Chromium	mg/kg	210	91.4	10.3 J	30.6 J	32.4	27.3	18.7	19.1 J	8.8
Cobalt	mg/kg	23	NE	2.3 J	5.7	5.3 J	5.4 J	4.2 J	5.7 J	1.5 J
Copper	mg/kg	3,100	59.6	28 J	80 J	27	63.7	40.4	48.3 J	5.2
Iron	mg/kg	55,000	NE	12,200	14,400	10,500	14,500	9,900	13,700 J	2,690
Lead[6]	mg/kg	194 / 340	14.7	574	822 J+	*223*	563 J+	432	354 J+	26.2 J+
Magnesium	mg/kg	NA	NE	879 J	2,100 J	1,820	2,410	2,440	3,610 J	612
Manganese	mg/kg	1,800	NE	99.7 J	271 J	181	261	200	285	124
Mercury	mg/kg	5.6	0.3	0.5	0.58	0.33	0.56	0.46	0.53	0.19
Nickel	mg/kg	1,500	120.2	11.8 J	28.4 J	18.1	25.8	13.9	21.3 J	5.8
Potassium	mg/kg	NA	NE	624 J	1,520 J	1,170	1,510	1,150	1,660 J	407 J
Selenium	mg/kg	390	5.6	ND (3.9)	0.52 J	0.47 J	0.56 J	ND (4.2)	ND (3.8) J	ND (4)
Silver	mg/kg	390	1.7	0.4 J	1.4	0.75 J	1.2	0.5 J	0.61 J-	ND (1.1)
Sodium	mg/kg	NA	NE	ND (556) J	1,920 J	554 J	1,760	ND (605)	ND (542)	ND (566)
Thallium	mg/kg	5.2	**42.5**	0.39 J	ND (2.7)	ND (2.9)	ND (2.9)	ND (3)	0.56 J	ND (2.8)
Vanadium	mg/kg	390	NE	9 J	22.4 J	23.9	23.3	21.5	18.5 J	6.3
Zinc	mg/kg	23,000	91.5	254 J	724 J	68.9	648	71.7	260 J	25
Organochlorine Pesticides/PCBs										
4,4'-DDD	µg/kg	2,000	NE	9.2 J	5.9 J	0.44 J	5.8 J	2.3 J	0.89 J	1.5 J
4,4'-DDE	µg/kg	1,400	NE	110 J	0.67 J	1.1 J	12	ND (3.3) J	1.2 J	0.37 J
4,4'-DDT	µg/kg	1,700	NE	480 J	210 J	ND (3.9)	33 J	9.9 J	4.9	7.4
Aldrin	µg/kg	29	NE	0.77 J	0.51 J	ND (2) J	0.094 J	0.11 J	ND (1.9) J	ND (1.9)
alpha-BHC	µg/kg	77	NE	0.14 J	ND (1.8)	ND (2)	0.35 J	ND (2.1)	ND (1.9)	ND (1.9)
alpha-Chlordane	µg/kg	1,600	NE	370 J	2.5 J	1.7 J	19 J	0.1 J	2.1 J	0.25 J
Aroclor-1016	µg/kg	3,900	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	356SSa 1 ft bgs[3] 10/18/2006	356SSa 1 ft bgs (FD) 10/18/2006	356SSa 3 ft bgs[4] 10/18/2006	356SSb 1 ft bgs 10/18/2006	356SSb 3 ft bgs 10/18/2006	356SSc 1 ft bgs 10/18/2006	356SSc 3 ft bgs 10/18/2006
Organochlorine Pesticides/PCBs										
Aroclor-1221	µg/kg	140	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1232	µg/kg	140	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1242	µg/kg	220	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1248	µg/kg	220	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1254	µg/kg	220	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1260	µg/kg	220	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1262	µg/kg	NDRI	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
Aroclor-1268	µg/kg	NDRI	NE	ND (36)	ND (36)	ND (39)	ND (44)	ND (41)	ND (36)	ND (38)
beta-BHC	µg/kg	270	NE	0.07 J	ND (1.8) J	ND (2) J	0.17 J	0.089 J	ND (1.9) J	ND (1.9)
delta-BHC	µg/kg	77	NE	0.41 J	ND (1.8)	ND (2)	0.56 J	ND (2.1)	ND (1.9)	ND (1.9)
Dieldrin	µg/kg	30	NE	5.1 J	2.3 J	ND (3.9)	2.3 J	ND (3.3) J	ND (3.6)	ND (3.8)
Endosulfan I	µg/kg	370,000	NE	3.5 J	3.3 J	ND (2)	0.97 J	0.15 J	ND (1.9)	ND (1.9)
Endosulfan II	µg/kg	370,000	NE	1.8 J	1.4 J	ND (3.9)	0.29 J	0.2 J	ND (3.6)	ND (3.8)
Endosulfan sulfate	µg/kg	370,000	NE	0.3 J	0.71 J	ND (3.9)	1.2 J	0.3 J	ND (3.6)	ND (3.8)
Endrin	µg/kg	18,000	NE	37 J	0.25 J	ND (3.9)	0.3 J	0.67 J	ND (3.6)	ND (3.8)
Endrin aldehyde	µg/kg	18,000	NE	ND (3.3)	0.19 J	0.55 J	ND (3.3) J	ND (3.3) J	ND (3.6)	ND (3.8)
Endrin ketone	µg/kg	18,000	NE	0.73 J	0.75 J	19 J	0.93 J	1.6 J	ND (3.6)	ND (1.9)
gamma-BHC	µg/kg	520	NE	ND (1.9) J	0.22 J	ND (2) J	ND (2.3) J	0.17 J	ND (1.9) J	ND (1.9)
gamma-Chlordane	µg/kg	1,600	NE	390	2.8 J	0.48 J	16	ND (1.7) J	1.8 J	ND (1.9)
Heptachlor	µg/kg	110	NE	3.4 J	1.4 J	ND (2) J	0.042 J	ND (2.1) J	ND (1.9) J	ND (1.9)
Heptachlor epoxide	µg/kg	53	NE	11 J	0.97 J	ND (2)	2.2 J	0.057 J	ND (1.9)	ND (1.9)
Methoxychlor	µg/kg	310,000	NE	ND (17) J	0.68 J	1.8 J	ND (17) J	ND (17) J	2.4 J	ND (0.22) R
Toxaphene	µg/kg	440	NE	ND (190)	ND (180)	ND (200)	ND (230)	ND (210)	ND (190)	ND (190)

TABLE 4-34
356 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

FD	field duplicate
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J-	estimated value, low bias
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	360SSa 1 ft bgs [3] 10/18/2006	360SSa 3 ft bgs [4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/kg	8,700,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,1,2,2-Tetrachloroethane	µg/kg	560	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,1,2-Trichloroethane	µg/kg	1,100	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,1-Dichloroethane	µg/kg	3,300	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,1-Dichloroethene	µg/kg	240,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,1-Dichloropropene	µg/kg	NDRI	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2,3-Trichlorobenzene	µg/kg	49,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2,3-Trichloropropane	µg/kg	5	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2,4-Trichlorobenzene	µg/kg	22,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2,4-Trimethylbenzene	µg/kg	62,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2-Dibromo-3-chloroprop	µg/kg	5.4	NE	ND (13)	ND (11)	ND (12)	ND (9.8)
1,2-Dibromoethane	µg/kg	34	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2-Dichlorobenzene	µg/kg	1,900,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2-Dichloroethane	µg/kg	430	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,2-Dichloropropane	µg/kg	890	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,3-Dichlorobenzene	µg/kg	530,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,3-Dichloropropane	µg/kg	1,600,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
1,4-Dichlorobenzene	µg/kg	2,400	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
2-Hexanone	µg/kg	210,000	NE	ND (26)	ND (22)	ND (25)	ND (20)
Acetone	µg/kg	61,000,000	NE	ND (26)	ND (22)	ND (25)	ND (20)
Benzene	µg/kg	1,100	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Bromochloromethane	µg/kg	NDRI	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Bromodichloromethane	µg/kg	270	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Bromoform	µg/kg	61,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Bromomethane	µg/kg	7,300	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Carbon disulfide	µg/kg	820,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Carbon tetrachloride	µg/kg	610	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Chlorobenzene	µg/kg	290,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Chloroethane	µg/kg	15,000,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Chloroform	µg/kg	290	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Chloromethane	µg/kg	120,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	360SSa 1 ft bgs [3] 10/18/2006	360SSa 3 ft bgs [4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Volatile Organic Compounds							
cis-1,2-Dichloroethene	µg/kg	780,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
cis-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Dibromochloromethane	µg/kg	680	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Ethyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (11)	ND (12)	ND (9.8)
Ethylbenzene	µg/kg	5,400	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Freon 11	µg/kg	790,000	NE	3.2	3.6	2.2 J	1.8 J
Freon 113	µg/kg	43,000,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Freon 12	µg/kg	180,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Isopropyl ether	µg/kg	1,400,000	NE	ND (13)	ND (11)	ND (12)	ND (9.8)
Isopropylbenzene (cumen	µg/kg	2,100,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Methyl ethyl ketone	µg/kg	28,000,000	NE	ND (26)	ND (22)	ND (25)	ND (20)
Methyl isobutyl ketone	µg/kg	5,300,000	NE	ND (26)	ND (22)	ND (25)	ND (20)
Methyl tert-butyl ether	µg/kg	43,000	NE	ND (13)	ND (11)	ND (12)	ND (9.8)
Methylene chloride	µg/kg	11,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Styrene	µg/kg	6,300,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
tert-Amyl methyl ether	µg/kg	43,000	NE	ND (13)	ND (11)	ND (12)	ND (9.8)
tert-Butyl alcohol	µg/kg	160,000,000	NE	ND (65)	ND (56)	ND (61)	ND (49)
Tetrachloroethene	µg/kg	550	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Toluene	µg/kg	5,000,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
trans-1,2-Dichloroethene	µg/kg	150,000	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
trans-1,3-Dichloropropene	µg/kg	1,700	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Trichloroethene	µg/kg	2,800	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Vinyl chloride	µg/kg	60	NE	ND (3.2)	ND (2.8)	ND (3.1)	ND (2.5)
Xylenes, total	µg/kg	630,000	NE	ND (6.5)	ND (5.6)	ND (6.1)	ND (4.9)
Semivolatile Organic Compounds							
1,1'-Biphenyl	µg/kg	3,900,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
1,2,4,5-Tetrachlorobenzen	µg/kg	18,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
1,4-Dioxane (p-dioxane)	µg/kg	44,000	NE	ND (73) J	ND (76) J	ND (410) J	ND (76) J
2,2'-Oxybis(1-Chloropropa	µg/kg	4,600	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,3,4,6-Tetrachlorophenol	µg/kg	1,800,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,4,5-Trichlorophenol	µg/kg	6,100,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	360SSa 1 ft bgs[3] 10/18/2006	360SSa 3 ft bgs[4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Semivolatile Organic Compounds							
2,4,6-Trichlorophenol	µg/kg	44,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,4-Dichlorophenol	µg/kg	180,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,4-Dimethylphenol	µg/kg	1,200,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,4-Dinitrophenol	µg/kg	120,000	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
2,4-Dinitrotoluene	µg/kg	1,600	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2,6-Dinitrotoluene	µg/kg	61,000	NE	62 J	ND (190)	ND (1,000)	ND (190)
2-Chloronaphthalene	µg/kg	6,300,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2-Chlorophenol	µg/kg	390,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2-Methylnaphthalene	µg/kg	310,000	NE	ND (180)	28 J	ND (1,000)	46 J
2-Methylphenol	µg/kg	3,100,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
2-Nitroaniline	µg/kg	610,000	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
2-Nitrophenol	µg/kg	NDRI	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
3,3'-Dichlorobenzidine	µg/kg	1,100	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
3-Nitroaniline	µg/kg	24,000	NE	24 J	ND (370)	ND (2,000)	ND (370)
4,6-Dinitro-2-methylphenol	µg/kg	4,900	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
4-Bromophenylphenyl eth	µg/kg	NDRI	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
4-Chloro-3-methylphenol	µg/kg	3,100,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
4-Chloroaniline	µg/kg	2,400	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
4-Chlorophenylphenyl eth	µg/kg	NDRI	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
4-Methylphenol	µg/kg	310,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
4-Nitroaniline	µg/kg	24,000	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
4-Nitrophenol	µg/kg	120,000	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
Acenaphthene	µg/kg	3,400,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Acenaphthylene	µg/kg	1,700,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Acetophenone	µg/kg	7,800,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Anthracene	µg/kg	17,000,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Atrazine	µg/kg	2,100	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Benzaldehyde	µg/kg	7,800,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Benzo(a)anthracene	µg/kg	150	NE	47 J	44 J	160	44 J
Benzo(a)pyrene	µg/kg	15	NE	90 J	67 J	320	59 J
Benzo(b)fluoranthene	µg/kg	150	NE	120 J	91 J	400	84 J

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level [1]	Oakland Background Levels [2]	360SSa 1 ft bgs[3] 10/18/2006	360SSa 3 ft bgs[4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Semivolatile Organic Compounds							
Benzo(g,h,i)perylene	µg/kg	1,700,000	NE	91 J	37 J	150	29 J
Benzo(k)fluoranthene	µg/kg	1,500	NE	60 J	33 J	200	32 J
Benzyl butyl phthalate	µg/kg	260,000	NE	24 J	ND (190)	ND (1,000)	ND (190)
bis(2-Chloroethoxy)metha	µg/kg	180,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
bis(2-Chloroethyl)ether	µg/kg	210	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
bis(2-Ethylhexyl)phthalate	µg/kg	35,000	NE	55 J	59 J	150 J	33 J
Caprolactam	µg/kg	31,000,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Carbazole	µg/kg	24,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Chrysene	µg/kg	15,000	NE	110 J	74 J	420	76 J
Dibenz(a,h)anthracene	µg/kg	15	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Dibenzofuran	µg/kg	78,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Diethylphthalate	µg/kg	49,000,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Dimethylphthalate	µg/kg	100,000,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Di-n-butyl phthalate	µg/kg	6,100,000	NE	140 J	ND (190)	ND (1,000)	46 J
Di-n-octyl phthalate	µg/kg	2,400,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Fluoranthene	µg/kg	2,300,000	NE	160 J	110 J	830	110 J
Fluorene	µg/kg	2,300,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Hexachlorobenzene	µg/kg	300	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Hexachlorobutadiene	µg/kg	6,200	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Hexachlorocyclopentadien	µg/kg	370,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Hexachloroethane	µg/kg	35,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Indeno(1,2,3-c,d)pyrene	µg/kg	150	NE	75 J	45 J	240	42 J
Isophorone	µg/kg	510,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Naphthalene	µg/kg	3,600	NE	23 J	21 J	ND (1,000)	31 J
Nitrobenzene	µg/kg	4,800	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
N-Nitrosodi-n-propylamine	µg/kg	69	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
N-Nitrosodiphenylamine	µg/kg	99,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Pentachlorophenol	µg/kg	3,000	NE	ND (360)	ND (370)	ND (2,000)	ND (370)
Phenanthrene	µg/kg	1,700,000	NE	90 J	85 J	770 J	100 J
Phenol	µg/kg	18,000,000	NE	ND (180)	ND (190)	ND (1,000)	ND (190)
Pyrene	µg/kg	1,700,000	NE	130 J	98 J	710	98 J

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	360SSa 1 ft bgs[3] 10/18/2006	360SSa 3 ft bgs[4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Metals							
Aluminum	mg/kg	77,000	NE	7,190	2,420	3,570	6,640 J
Antimony	mg/kg	31	5.9	ND (9.2)	ND (6.8)	ND (6.9)	ND (6.8) J
Arsenic[5]	mg/kg	0.062 / 22	***14***	*11.1*	*4*	*6.4*	*5.3*
Barium	mg/kg	15,000	NE	610	75.3	188	168 J
Beryllium	mg/kg	160	0.9	0.23 J	0.1 J	0.15 J	0.21 J
Cadmium	mg/kg	70	1.5	1.8	0.41 J	1.5	0.21 J
Calcium	mg/kg	NA	NE	7,850	3,640	3,780	8,450 J
Chromium	mg/kg	210	91.4	31.2	9.5	14	22.9 J
Cobalt	mg/kg	23	NE	6.9 J	2.3 J	3.7 J	5.9
Copper	mg/kg	3,100	59.6	152	19.6	75.6	105 J
Iron	mg/kg	55,000	NE	19,900	8,680	17,500	14,800 J
Lead[6]	mg/kg	194 / 340	14.7	2,230 J+	193	600	478 J
Magnesium	mg/kg	NA	NE	2,800	1,060	1,320	3,090 J
Manganese	mg/kg	1,800	NE	322	108	161	245 J
Mercury	mg/kg	5.6	0.3	0.21	0.61	2.8	1.7 J
Nickel	mg/kg	1,500	120.2	32.2	8.2	14.9	20.9 J
Potassium	mg/kg	NA	NE	1,920	748	743	1,510 J
Selenium	mg/kg	390	5.6	ND (5.4)	ND (4)	ND (4)	ND (4)
Silver	mg/kg	390	1.7	1.6	0.28 J	0.68 J	1.3
Sodium	mg/kg	NA	NE	2,410	ND (569)	ND (571)	674
Thallium	mg/kg	5.2	**42.5**	ND (3.9)	0.45 J	0.91 J	ND (2.8)
Vanadium	mg/kg	390	NE	25.8	8.4	13.2	22.3 J
Zinc	mg/kg	23,000	91.5	897	81.6	356	178 J
Organochlorine Pesticides/PCBs							
4,4'-DDD	µg/kg	2,000	NE	1.6 J	1.8 J	7.5 J	0.39 J
4,4'-DDE	µg/kg	1,400	NE	130 J	50 J	54 J	5.2 J
4,4'-DDT	µg/kg	1,700	NE	9 J	380 J	800 J	38 J
Aldrin	µg/kg	29	NE	0.48 J	1.2 J	0.11 J	ND (1.9) J
alpha-BHC	µg/kg	77	NE	0.34 J	0.28 J	0.26 J	ND (1.9)
alpha-Chlordane	µg/kg	1,600	NE	7.3 J	1.3 J	3 J	ND (1.9)
Aroclor-1016	µg/kg	3,900	NE	ND (180)	ND (37)	ND (40)	ND (37)

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Screening Level[1]	Oakland Background Levels[2]	360SSa 1 ft bgs[3] 10/18/2006	360SSa 3 ft bgs[4] 10/18/2006	360SSb 1 ft bgs 10/18/2006	360SSb 3 ft bgs 10/18/2006
Organochlorine Pesticides/PCBs							
Aroclor-1221	µg/kg	140	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1232	µg/kg	140	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1242	µg/kg	220	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1248	µg/kg	220	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1254	µg/kg	220	NE	11,000	2,400 J	ND (40)	ND (37)
Aroclor-1260	µg/kg	220	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1262	µg/kg	NDRI	NE	ND (180)	ND (37)	ND (40)	ND (37)
Aroclor-1268	µg/kg	NDRI	NE	ND (180)	ND (37)	ND (40)	ND (37)
beta-BHC	µg/kg	270	NE	ND (1.8) J	1.2 J	0.057 J	ND (1.9) J
delta-BHC	µg/kg	77	NE	0.23 J	0.18 J	0.032 J	ND (1.9)
Dieldrin	µg/kg	30	NE	14 J	12 J	3.9 J	ND (3.7)
Endosulfan I	µg/kg	370,000	NE	20 J	4 J	0.35 J	ND (1.9)
Endosulfan II	µg/kg	370,000	NE	53 J	8.6 J	0.87 J	ND (3.7)
Endosulfan sulfate	µg/kg	370,000	NE	0.42 J	0.32 J	0.16 J	0.4 J
Endrin	µg/kg	18,000	NE	530	5.3 J	0.64 J	0.57 J
Endrin aldehyde	µg/kg	18,000	NE	8.2 J	6.8	ND (3.3) J	ND (3.7)
Endrin ketone	µg/kg	18,000	NE	1.5 J	0.15 J	0.27 J	ND (1.9)
gamma-BHC	µg/kg	520	NE	ND (1.8) J	ND (1.9) J	0.2 J	ND (1.9) J
gamma-Chlordane	µg/kg	1,600	NE	3.9 J	29 J	2.9 J	0.51 J
Heptachlor	µg/kg	110	NE	ND (1.8) J	0.47 J	0.33 J	ND (1.9) J
Heptachlor epoxide	µg/kg	53	NE	310 J	9.9 J	2.5 J	ND (1.9)
Methoxychlor	µg/kg	310,000	NE	9.6 J	ND (17) J	220 J	2 J
Toxaphene	µg/kg	440	NE	ND (180)	ND (190)	ND (210)	ND (190)

TABLE 4-35
360 Center Street Analytical Results - Soil (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Notes:

Results greater than the screening level are bolded.

[1] Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Table 16b (Soil Screening Levels) for source of screening levels.

[2] Oakland background results are from background metal concentration studies conducted by the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. Samples were taken from locations representing the Colluvian and Fill geologic unit.

[3] 1ft bgs samples were collected between 0.5 and 1ft bgs

[4] 3ft bgs samples were collected between 2.5 and 3 ft bgs

[5] For Arsenic, 0.062 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias

TABLE 4-36
Residential Soil Results Summary (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential Soil Levels	Screening Levels[1]
4,4'-DDE	mg/kg	0.00037 - 11	1.4
4,4'-DDT	mg/kg	0.00034 - 4.4	1.7
Antimony	mg/kg	0.6 - 77.4	31
Aroclor-1254	mg/kg	< 0.036 - 11	0.22
Arsenic *	mg/kg	2.8 - 451	0.39 / 22
Benzo(a)anthracene	mg/kg	0.02 - 8.3	0.15
Benzo(a)pyrene	mg/kg	0.027 - 9.2	0.015
Benzo(b)fluoranthene	mg/kg	0.022 - 9.8	0.15
Benzo(k)fluoranthene	mg/kg	0.023 - 3.6	1.5
Dieldrin	mg/kg	0.0002 - 1	0.03
Heptachlor epoxide	mg/kg	0.000057 - 0.31	0.053
Indeno(1,2,3-c,d)pyrene	mg/kg	0.026 - 4.6	0.15
Lead **	mg/kg	26.2 - 53000	80

Notes:

Only compounds detected above screening levels are shown

(1) EPA Regional Screening Levels for residential soil, May 2010.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

mg/kg milligrams per kilogram

TABLE 4-37
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-06D 2 ft bgs	RMW-06D 6 ft bgs	RMW-06D 11 ft bgs	RMW-06M 2 ft bgs	RMW-06M 6 ft bgs	RMW-06M 11 ft bgs	RMW-15D 1 ft bgs	RMW-15D 6 ft bgs	RMW-15D 11 ft bgs	RMW-15D 16 ft bgs	RMW-15M 1 ft bgs	RMW-15M 10 ft bgs	RMW-15M 15 ft bgs	RMW-15S 1 ft bgs	RMW-15S 6 ft bgs	RMW-15S 11 ft bgs
		Sample Date	10/12/2009	10/16/2009	10/16/2009	10/12/2009	10/15/2009	10/15/2009	10/12/2009	10/21/2009	10/21/2009	10/21/2009	10/12/2009	11/2/2009	11/2/2009	10/12/2009	10/20/2009	10/20/2009
Analyte	ISL	Units	Analytical Results															
Volatile Organic Compounds																		
1,1,1-Trichloroethane	38,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,1,2,2-Tetrachloroethane	2,800	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,1,2-Trichloroethane	5,300	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	9.9	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,1-Dichloroethane	17,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	13	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,1-Dichloroethene	1,100,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	0.84 J	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,1-Dichloropropene	NE	µg/kg	ND (2.2)	---	---	ND (2.2)	---	---	ND (3.1)	---	---	---	ND (2.2)	---	---	ND (2.8)	---	---
1,2,3-Trichlorobenzene	490,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1) J	ND (5.1)	---	ND (5.6) J	ND (5.6)
1,2,3-Trichloropropane	95	µg/kg	ND (2.2)	---	---	ND (2.2)	---	---	ND (3.1)	---	---	---	ND (2.2)	---	---	ND (2.8)	---	---
1,2,4-Trichlorobenzene	99,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1) J	ND (5.1)	---	ND (5.6) J	ND (5.6)
1,2,4-Trimethylbenzene	260,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
1,2-Dibromo-3-chloropropane	69	µg/kg	ND (8.9)	ND (4.8)	ND (5)	ND (8.8)	ND (4.9)	ND (4.9)	ND (13)	ND (5.1)	ND (4.6)	ND (4.8)	ND (8.7)	ND (5.1)	ND (5.1)	ND (11)	ND (5.6)	ND (5.6)
1,2-Dibromoethane	170	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,2-Dichlorobenzene	9,800,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6) J	ND (5.6)
1,2-Dichloroethane	2,200	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,2-Dichloropropane	4,500	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
1,3,5-Trimethylbenzene	10,000,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
1,3-Dichlorobenzene	NE	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6) J	ND (5.6)
1,3-Dichloropropane	20,000,000	µg/kg	ND (2.2)	---	---	ND (2.2)	---	---	ND (3.1)	---	---	---	ND (2.2)	---	---	ND (2.8)	---	---
1,4-Dichlorobenzene	12,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1) J	ND (2.8)	ND (5.6) J	ND (5.6)
1,4-Dioxane (p-dioxane)	160,000	µg/kg	---	ND (95) R	ND (100) R	---	ND (99) R	ND (97) R	---	ND (100) R	ND (92) R	ND (96) R	---	ND (100) R	ND (100) R	---	ND (110) R	ND (110) R
2-Hexanone	1,400,000	µg/kg	ND (18)	ND (9.5)	ND (10)	ND (18)	ND (9.9)	ND (9.7)	ND (25)	ND (10)	ND (9.2)	ND (9.6)	ND (17)	ND (10)	ND (10)	ND (23)	ND (11)	ND (11)
Acetone	630,000,000	µg/kg	ND (18)	ND (9.5)	ND (10)	ND (18)	ND (9.9)	ND (9.7)	81	ND (10)	ND (9.2)	ND (9.6)	ND (17)	26	ND (10)	ND (23)	2 J	2.9 J
Benzene	5,400	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Bromochloromethane	NE	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
Bromodichloromethane	1,400	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Bromoform	220,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Bromomethane	32,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Carbon disulfide	3,700,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Carbon tetrachloride	3,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Chlorobenzene	1,400,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	7.2	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6) J	ND (5.6)
Chloroethane	61,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Chloroform	1,500	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Chloromethane	500,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
cis-1,2-Dichloroethene	10,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
[1] cis-1,3-Dichloropropene	8,100	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Cyclohexane	29,000,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
Dibromochloromethane	3,300	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
[2] Ethyl tert-butyl ether	220,000	µg/kg	ND (8.9)	ND (9.5)	ND (10)	ND (8.8)	ND (9.9)	ND (9.7)	ND (13)	ND (10)	ND (9.2)	ND (9.6)	ND (8.7)	ND (10)	ND (10)	ND (11)	ND (11)	ND (11)
Ethylbenzene	27,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	7.1	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Freon 11	3,400,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Freon 12	780,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Freon 113	180,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	9.9	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Isopropylbenzene (cumene)	11,000,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1) J	ND (5.1)	---	ND (5.6)	ND (5.6)
Methyl acetate	1,000,000,000	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
Methyl ethyl ketone	200,000,000	µg/kg	ND (18)	ND (9.5)	ND (10)	ND (18)	ND (9.9)	ND (9.7)	23 J	3.1 J	3.4 J	ND (9.6)	ND (17)	ND (10)	ND (10)	ND (23)	ND (11)	ND (11)
Methyl isobutyl ketone	53,000,000	µg/kg	ND (18)	ND (9.5)	ND (10)	ND (18)	ND (9.9)	ND (9.7)	ND (25)	ND (10)	ND (9.2)	ND (9.6)	ND (17)	ND (10)	ND (10)	ND (23)	ND (11)	ND (11)
Methyl tert-butyl ether	220,000	µg/kg	ND (8.9)	ND (4.8)	ND (5)	ND (8.8)	ND (4.9)	ND (4.9)	ND (13)	ND (5.1)	ND (4.6)	ND (4.8)	ND (8.7)	ND (5.1)	ND (5.1)	ND (11)	ND (5.6)	ND (5.6)
Methylcyclohexane	NE	µg/kg	---	ND (4.8)	ND (5)	---	ND (4.9)	ND (4.9)	---	ND (5.1)	ND (4.6)	ND (4.8)	---	ND (5.1)	ND (5.1)	---	ND (5.6)	ND (5.6)
Methylene chloride	53,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Naphthalene	18,000	µg/kg	ND (2.2)	---	---	ND (2.2)	---	---	74	---	---	---	ND (2.2)	---	---	ND (2.8)	---	---

TABLE 4-37
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-06D 2 ft bgs	RMW-06D 6 ft bgs	RMW-06D 11 ft bgs	RMW-06M 2 ft bgs	RMW-06M 6 ft bgs	RMW-06M 11 ft bgs	RMW-15D 1 ft bgs	RMW-15D 6 ft bgs	RMW-15D 11 ft bgs	RMW-15D 16 ft bgs	RMW-15M 1 ft bgs	RMW-15M 10 ft bgs	RMW-15M 15 ft bgs	RMW-15S 1 ft bgs	RMW-15S 6 ft bgs	RMW-15S 11 ft bgs
Sample Date			10/12/2009	10/16/2009	10/16/2009	10/12/2009	10/15/2009	10/15/2009	10/12/2009	10/21/2009	10/21/2009	10/21/2009	10/12/2009	11/2/2009	11/2/2009	10/12/2009	10/20/2009	10/20/2009
Analyte	ISL	Units	Analytical Results															
Volatile Organic Compounds																		
Styrene	36,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
3 tert-Amyl methyl ether	220,000	µg/kg	---	ND (9.5)	ND (10)	---	ND (9.9)	ND (9.7)	---	ND (10)	ND (9.2)	ND (9.6)	---	ND (10)	ND (10)	---	ND (11)	ND (11)
4 tert-Butyl alcohol	2,000,000,000	µg/kg	---	ND (48)	ND (50)	---	ND (49)	ND (49)	---	ND (51)	ND (46)	ND (48)	---	ND (51)	ND (51)	---	ND (56)	ND (56)
Tetrachloroethene	2,600	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	13	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Toluene	45,000,000	µg/kg	ND (2.2)	5.4	ND (5)	ND (2.2)	5	ND (4.9)	10	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
trans-1,2-Dichloroethene	690,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
5 trans-1,3-Dichloropropene	8,100	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1)	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Trichloroethene	14,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Vinyl chloride	1,700	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	ND (3.1)	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1) J	ND (2.8)	ND (5.6)	ND (5.6)
Xylenes, m & p	17,000,000	µg/kg	ND (4.5)	ND (4.8)	ND (5)	ND (4.4)	ND (4.9)	ND (4.9)	12	ND (5.1)	ND (4.6)	ND (4.8)	ND (4.3)	ND (5.1) J	ND (5.1)	ND (5.6)	ND (5.6)	ND (5.6)
Xylenes, o	19,000,000	µg/kg	ND (2.2)	ND (4.8)	ND (5)	ND (2.2)	ND (4.9)	ND (4.9)	17	ND (5.1)	ND (4.6)	ND (4.8)	ND (2.2)	ND (5.1) J	ND (5.1)	ND (2.8)	ND (5.6)	ND (5.6)
Semivolatile Organic Compounds																		
1,1'-Biphenyl	51,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	74 J	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
1,2,4,5-Tetrachlorobenzene	180,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,2'-Oxybis(1-Chloropropane)	22,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,3,4,6-Tetrachlorophenol	18,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,4,5-Trichlorophenol	62,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,4,6-Trichlorophenol	160,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,4-Dichlorophenol	1,800,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,4-Dimethylphenol	12,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,4-Dinitrophenol	1,200,000	µg/kg	ND (360) R	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350) R	ND (400)	ND (380)	ND (370)	ND (330) R	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
2,4-Dinitrotoluene	5,500	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2,6-Dinitrotoluene	620,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2-Chloronaphthalene	82,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2-Chlorophenol	5,100,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2-Methylnaphthalene	4,100,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	4,400	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2-Methylphenol	31,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
2-Nitroaniline	6,000,000	µg/kg	ND (360)	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350)	ND (400)	ND (380)	ND (370)	ND (330)	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
2-Nitrophenol	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
3,3'-Dichlorobenzidine	3,800	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
6 3-Nitroaniline	86,000	µg/kg	ND (360)	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350)	ND (400)	ND (380)	ND (370)	ND (330)	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
4,6-Dinitro-2-methylphenol	49,000	µg/kg	ND (360) R	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350) R	ND (400)	ND (380)	ND (370)	ND (330) R	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
4-Bromophenylphenyl ether	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
7 4-Chloro-3-methylphenol	31,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
4-Chloroaniline	8,600	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
4-Methylphenol	3,100,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
4-Nitroaniline	86,000	µg/kg	ND (360)	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350)	ND (400)	ND (380)	ND (370)	ND (330)	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
8 4-Nitrophenol	1,200,000	µg/kg	ND (360)	ND (380)	ND (390)	ND (360)	ND (380)	ND (390)	ND (350)	ND (400)	ND (380)	ND (370)	ND (330)	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
Acenaphthene	33,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	26 J	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
9 Acenaphthylene	17,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Acetophenone	100,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Anthracene	170,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Atrazine	7,500	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Benzaldehyde	100,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Benzo(a)anthracene	2,100	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Benzo(a)pyrene	210	µg/kg	23 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Benzo(b)fluoranthene	2,100	µg/kg	33 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
10 Benzo(g,h,i)perylene	17,000,000	µg/kg	ND (180) J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210) J	ND (200) J	ND (190) J	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Benzo(k)fluoranthene	21,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)

TABLE 4-37
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-06D 2 ft bgs	RMW-06D 6 ft bgs	RMW-06D 11 ft bgs	RMW-06M 2 ft bgs	RMW-06M 6 ft bgs	RMW-06M 11 ft bgs	RMW-15D 1 ft bgs	RMW-15D 6 ft bgs	RMW-15D 11 ft bgs	RMW-15D 16 ft bgs	RMW-15M 1 ft bgs	RMW-15M 10 ft bgs	RMW-15M 15 ft bgs	RMW-15S 1 ft bgs	RMW-15S 6 ft bgs	RMW-15S 11 ft bgs
		Sample Date	10/12/2009	10/16/2009	10/16/2009	10/12/2009	10/15/2009	10/15/2009	10/12/2009	10/21/2009	10/21/2009	10/21/2009	10/12/2009	11/2/2009	11/2/2009	10/12/2009	10/20/2009	10/20/2009
Analyte	ISL	Units	Analytical Results															
Semivolatile Organic Compounds																		
Benzyl butyl phthalate	910,000	µg/kg	41 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) J	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
bis(2-Chloroethoxy)methane	1,800,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
bis(2-Chloroethyl)ether	1,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
bis(2-Ethylhexyl)phthalate	120,000	µg/kg	120 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	170 J	ND (210)	ND (200)	ND (190)	29 J	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Caprolactam	310,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	61 J	260
Carbazole	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Chrysene	210,000	µg/kg	26 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Dibenz(a,h)anthracene	210	µg/kg	ND (180) J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Dibenzofuran	1,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Diethylphthalate	490,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	1,800	25 J	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Dimethylphthalate	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Di-n-butyl phthalate	62,000,000	µg/kg	230	ND (200)	ND (200)	34 J	ND (190)	21 J	200	ND (210)	ND (200)	ND (190)	56 J	ND (210)	ND (200)	97 J	ND (190)	ND (200)
Di-n-octyl phthalate	NE	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Fluoranthene	22,000,000	µg/kg	34 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	56 J	ND (210)	ND (200)	ND (190)	ND (170) J	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Fluorene	22,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Hexachlorobenzene	1,100	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Hexachlorobutadiene	22,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Hexachlorocyclopentadiene	3,700,000	µg/kg	ND (180) J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) J	ND (210)	ND (200)	ND (190)	ND (170) J	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Hexachloroethane	120,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Indeno(1,2,3-c,d)pyrene	2,100	µg/kg	34 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180) R	ND (210)	ND (200)	ND (190)	ND (170) R	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Isophorone	1,800,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Naphthalene	18,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	190	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Nitrobenzene	24,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
N-Nitrosodi-n-propylamine	250	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
N-Nitrosodiphenylamine	350,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Pentachlorophenol	9,000	µg/kg	ND (360)	ND (380)	ND (390)	ND (360) J	ND (380)	ND (390)	ND (350)	ND (400) J	ND (380) J	ND (370) J	ND (330)	ND (400)	ND (400)	ND (320)	ND (380)	ND (400)
11 Phenanthrene	17,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	44 J	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Phenol	180,000,000	µg/kg	ND (180)	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	ND (180)	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Pyrene	17,000,000	µg/kg	44 J	ND (200)	ND (200)	ND (190)	ND (190)	ND (200)	120 J	ND (210)	ND (200)	ND (190)	ND (170)	ND (210)	ND (200)	ND (170)	ND (190)	ND (200)
Total Petroleum Hydrocarbons																		
Diesel c10-c24	NE	mg/kg	68 J	0.31 J	ND (0.25)	2.5 J	1.3 J	ND (0.32)	2,300 J	5 J	ND (0.31)	0.51 J	1,200 J	ND (0.54) J	ND (0.32) J	13 J	1.7 J	ND (0.31)
Gasoline c6-c10	NE	mg/kg	ND (0.018) J	ND (0.014) J	ND (0.02) J	ND (0.013) J	ND (0.015) J	ND (0.013) J	0.19 J	ND (0.016) J	ND (0.022) J	ND (0.016) J	ND (0.018) J	ND (0.013) J	ND (0.016) J	ND (0.014) J	ND (0.013) J	ND (0.015) J
Metals																		
Aluminum	990,000	mg/kg	9,270	4,500	6,760	8,210	4,080	15,300	6,060	4,900	11,600	7,780	7,600	11,300	7,410	5,510	5,230	11,700
Antimony	410	mg/kg	3 J	ND (6.9) J	ND (7) J	1.8 J	ND (7) J	ND (6.4) J	1.8 J	ND (7.1) J	ND (6.6) J	ND (6.1) J	1.6 J	ND (5.4) J	ND (7) J	1.5 J	ND (6.6) J	ND (7) J
Arsenic	1.6	mg/kg	46.9	1.5	2.6	31.4	1.6	3.3	56.3	2	3.1	2.2	31.9	2.9	3	39.9	1.9	2.6
Barium	190,000	mg/kg	206	53.6	57.1	130	71.5	115	77.6	59.4	56.3	54.8	119	66.7	52.8	50.6	65.4	69.1
Beryllium	2,000	mg/kg	0.85	0.23 J	0.31 J	0.53 J	0.24 J	0.51 J	0.45 J	0.26 J	0.41 J	0.26 J	0.47 J	0.36 J	0.3 J	0.35 J	0.25 J	0.36 J
Cadmium	800	mg/kg	ND (0.58)	ND (0.58)	ND (0.59)	ND (0.55)	ND (0.59)	ND (0.53)	ND (0.55)	ND (0.6)	ND (0.55)	ND (0.51)	11.9	ND (0.45)	ND (0.58)	ND (0.51)	ND (0.55)	ND (0.59)
Chromium	NE	mg/kg	168	29.5	40	27.3	28.1	83.3	15.6	29.2	47.1	40.7	7.2	42.6	38.6	4.3	29.1	49
Cobalt	300	mg/kg	17.7	3.8 J	6.7	13.6	4.1 J	9	12.3	6.4	7.4	6.2	11.2	8	7.1	8	5.1 J	7.9
Copper	41,000	mg/kg	81.5 J	7.6 J	8.7 J	24.3 J	7.5 J	10.8 J	31.9 J	19.2 J	16.9 J	23.2 J	39.2 J	8.5	7.6	12.5 J	13.5 J	8.5 J
Cyanide	20,000	mg/kg	ND (2.9)	ND (2.8)	ND (2.9)	ND (2.6)	ND (3)	ND (2.9)	ND (2.8)	ND (2.9)	ND (3)	ND (3)	ND (2.7)	ND (2.8)	ND (2.9)	ND (2.8)	ND (2.9)	ND (2.9)
Lead	800	mg/kg	312 J	2.1 J	3 J	44.8 J	9.3 J	4.4 J	810 J	2.6 J	3.4 J	2.7 J	59.9 J	3.3 J	3.2 J	215 J	2.9 J	3.3 J
Manganese	23,000	mg/kg	518	111	147	916	124	221	594	154	191	128	1,140	220	134	506	136	200
Mercury	34	mg/kg	1.7	ND (0.12)	0.034 J	0.42	0.067 J	0.066 J	0.87	0.025 J	0.033 J	0.025 J	0.63	0.057 J	ND (0.11)	0.81	ND (0.12)	ND (0.12)
Nickel	20,000	mg/kg	46.7	17.2	34.7	17.4	15.6	54.1	7.1	18.8	40.6	33.6	7.5	39.2	33.1	4.3	18.7	41.7
Selenium	5,100	mg/kg	6.8	0.73 J	1 J	4	0.94 J	2.5 J	3.9	1.3 J	1.7 J	1.6 J	4.2	1.6 J	1.3 J	3.6	1.3 J	2 J
Silver	5,100	mg/kg	0.22 J+	ND (1.2)	ND (1.2)	0.16 J+	ND (1.2)	ND (1.1)	0.17 J+	ND (1.2)	ND (1.1)	ND (1)	0.21 J+	ND (0.9) R	ND (1.2) R	0.23 J+	ND (1.1)	ND (1.2)
Thallium	NE	mg/kg	ND (2.9)	ND (2.9)	ND (2.9)	0.92 J	ND (2.9)	ND (2.7)	1.2 J	ND (3)	ND (2.7)	ND (2.6)	0.39 J	ND (2.3)	ND (2.9)	0.48 J	ND (2.7)	ND (2.9)

TABLE 4-37
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-06D 2 ft bgs	RMW-06D 6 ft bgs	RMW-06D 11 ft bgs	RMW-06M 2 ft bgs	RMW-06M 6 ft bgs	RMW-06M 11 ft bgs	RMW-15D 1 ft bgs	RMW-15D 6 ft bgs	RMW-15D 11 ft bgs	RMW-15D 16 ft bgs	RMW-15M 1 ft bgs	RMW-15M 10 ft bgs	RMW-15M 15 ft bgs	RMW-15S 1 ft bgs	RMW-15S 6 ft bgs	RMW-15S 11 ft bgs
		Sample Date	10/12/2009	10/16/2009	10/16/2009	10/12/2009	10/15/2009	10/15/2009	10/12/2009	10/21/2009	10/21/2009	10/21/2009	10/12/2009	11/2/2009	11/2/2009	10/12/2009	10/20/2009	10/20/2009
Analyte	**ISL**	**Units**	**Analytical Results**															
Metals																		
Vanadium	5,200	mg/kg	45.2 J	21.6 J	30.3 J	41.4 J	21.9 J	50.2 J	28.1 J	21.1 J	34.5 J	29.3 J	27 J	35.6	34.5	21.1 J	22.6 J	33.1 J
Zinc	310,000	mg/kg	220 J	15.2 J	23.3 J	214 J	21.9 J	30.4 J	256 J	26.3 J	28.3 J	28.8 J	195 J	24.1	21.6	190 J	22.7 J	24.8 J
Calcium	NE	mg/kg	4,750	1,570	1,560	3,930	2,340	2,100	2,340	2,060	1,610	1,620	4,400	1,880	1,700	2,380	2,440	1,560
Iron	720,000	mg/kg	66,100	8,310	13,200	34,600	8,070	20,400	30,900	8,990	15,900	12,900	31,700	15,900	14,200	28,000	9,140	15,300
Magnesium	NE	mg/kg	3,510	1,540	2,860	4,200	1,390	3,750	1,600	1,410	3,070	2,550	2,110	2,770	2,690	1,450	1,500	3,110
Potassium	NE	mg/kg	747	ND (374) J	ND (456) J	530 J+	ND (529) J	463 J+	420 J+	637 J+	536 J+	468 J+	424 J+	860	ND (453) J	314 J+	695 J+	481 J+
Sodium	NE	mg/kg	289 J	166 J	198 J	ND (444) J	180 J	ND (352) J	ND (209) J	ND (173) J	ND (170) J	ND (147) J	ND (274) J	ND (140) J	ND (155) J	ND (247) J	ND (122) J	ND (180) J
Organochlorine Pesticides/PCBs																		
4,4'-DDD	7,200	µg/kg	39	0.066 J	ND (3.9)	41	0.055 J	0.13 J	8,600	32	ND (3.9) J	ND (3.9)	55	0.35 J	0.15 J	2.8 J	0.48 J	ND (4.5)
4,4'-DDE	5,100	µg/kg	140	0.2 J	ND (3.9)	23	0.07 J	0.18 J	1,800	7.3	ND (3.9) J	ND (3.9)	110	ND (4)	0.045 J	84	0.38 J	ND (4.5)
4,4'-DDT	7,000	µg/kg	130	0.14 J	ND (3.9)	23	ND (3.8)	0.071 J	27 J	3.7 J	ND (3.9) J	ND (3.9)	400	0.34 J	0.12 J	55	0.64 J	ND (4.5)
Aldrin	100	µg/kg	0.087 J	0.037 J	ND (2)	0.018 J	0.04 J	0.037 J	ND (370)	ND (2.1)	ND (2) J	ND (2)	0.041 J	ND (2.1)	ND (2.1)	ND (1.8)	ND (2)	ND (2.3)
alpha-BHC	270	µg/kg	ND (1.9)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	ND (2.1)	ND (2) J	ND (2)	ND (1.8)	ND (2.1)	ND (2.1)	ND (3.7)	ND (2)	ND (2.3)
12 alpha-Chlordane	6,500	µg/kg	1.1 J	ND (2)	ND (2)	0.1 J	ND (2)	ND (2.1)	3.6 J	0.27 J	ND (2) J	ND (2)	3.9 J	ND (2.1)	ND (2.1)	4	ND (2)	ND (2.3)
Aroclor-1016	21,000	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1221	540	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1232	540	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1242	740	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1248	740	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1254	740	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1260	740	µg/kg	100	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1262	NE	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
Aroclor-1268	NE	µg/kg	ND (37)	ND (38)	ND (39)	ND (36)	ND (38)	ND (39)	ND (36)	ND (41)	ND (39)	ND (39)	ND (35)	ND (40)	ND (39)	ND (35)	ND (38)	ND (39)
beta-BHC	960	µg/kg	ND (1.9)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	ND (2.1)	ND (2) J	ND (2)	ND (18)	ND (2.1)	0.037 J	ND (3.7)	ND (2)	ND (2.3)
13 delta-BHC	270	µg/kg	ND (9.6)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	ND (2.1)	ND (2) J	ND (2)	ND (1.8)	ND (2.1)	0.017 J	ND (3.7)	ND (2)	ND (2.3)
Dieldrin	110	µg/kg	3.1 J	ND (3.8)	ND (3.9)	0.15 J	ND (3.8)	0.028 J	13 J	ND (4.2)	ND (3.9) J	ND (3.9)	9.6 J	ND (4)	ND (4)	18	ND (3.9)	ND (4.5)
14 Endosulfan I	3,700,000	µg/kg	0.14 J	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	12 J	ND (2.1)	ND (2) J	ND (2)	0.027 J	ND (2.1)	ND (2.1)	0.18 J	ND (2)	ND (2.3)
15 Endosulfan II	3,700,000	µg/kg	1.6 J	ND (3.8)	ND (3.9)	0.13 J	ND (3.8)	ND (4)	ND (710)	ND (4.2)	ND (3.9) J	ND (3.9)	1.6 J	ND (4)	ND (4)	0.16 J	ND (3.9)	ND (4.5)
16 Endosulfan sulfate	3,700,000	µg/kg	1.2 J	ND (3.8)	ND (3.9)	0.11 J	ND (3.8)	ND (4)	1.1 J	ND (4.2)	ND (3.9) J	ND (3.9)	0.49 J	ND (4)	ND (4)	0.11 J	ND (3.9)	ND (4.5)
Endrin	180,000	µg/kg	0.15 J	ND (3.8)	ND (3.9)	0.057 J	ND (3.8)	ND (4)	6.9 J	0.29 J	ND (3.9) J	ND (3.9)	0.36 J	ND (4)	ND (4)	0.69 J	ND (3.9)	ND (4.5)
17 Endrin aldehyde	180,000	µg/kg	0.29 J	0.069 J	0.052 J	ND (3.6)	0.11 J	0.14 J	6.1 J	ND (4.2)	ND (3.9) J	ND (3.9)	0.3 J	ND (4)	ND (4)	0.1 J	ND (3.9)	ND (4.5)
18 Endrin ketone	180,000	µg/kg	0.96 J	ND (3.8)	ND (3.9)	0.065 J	ND (3.8)	ND (4)	1.5 J	ND (4.2)	ND (3.9) J	ND (3.9)	0.94 J	ND (4)	ND (4)	0.24 J	ND (3.9)	ND (4.5)
gamma-BHC	2,100	µg/kg	ND (1.9)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	ND (2.1)	ND (2) J	ND (2)	ND (18)	ND (2.1)	0.046 J	ND (1.8)	ND (2)	ND (2.3)
19 gamma-Chlordane	6,500	µg/kg	ND (9.6)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	0.24 J	ND (2) J	ND (2)	ND (18)	ND (2.1)	ND (2.1)	4.3	ND (2)	ND (2.3)
Heptachlor	380	µg/kg	ND (1.9)	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (2.1)	ND (370)	ND (2.1)	ND (2) J	ND (2)	ND (1.8)	ND (2.1)	0.046 J	ND (3.7)	ND (2)	ND (2.3)
Heptachlor epoxide	190	µg/kg	ND (9.6)	ND (2)	ND (2)	0.043 J	ND (2)	ND (2.1)	4 J	ND (2.1)	ND (2) J	ND (2)	ND (18)	ND (2.1)	ND (2.1)	0.087 J	ND (2)	ND (2.3)
Methoxychlor	3,100,000	µg/kg	ND (96)	ND (20)	ND (20)	ND (19)	ND (20)	ND (21)	ND (370)	ND (21)	ND (20) J	ND (20)	ND (18)	ND (21)	ND (21)	ND (18)	ND (20)	ND (23)
Toxaphene	1,600	µg/kg	ND (960)	ND (200)	ND (200)	ND (190)	ND (200)	ND (210)	ND (37,000)	ND (210)	ND (200) J	ND (200)	ND (180)	ND (210)	ND (210)	ND (370)	ND (200)	ND (230)

[1] 1,3-Dichloropropene was used as the surrogate
[2] Methyl tertbutyl ether (MTBE) was used as the surrogate
[3] Methyl tertbutyl ether (MTBE) was used as the surrogate
[4] sec-butyl alcohol was used as the surrogate
[5] 1,3-Dichloropropene was used as the surrogate
[6] 4-Nitroaniline used as the surrogate
[7] 3-methylphenol was used as the surrogate
[8] 2,4-Dinitrophenol was used as the surrogate
[9] Pyrene was used as the surrogate
[10] Pyrene was used as the surrogate
[11] Pyrene was used as the surrogate
[12] Chlordane was used as the surrogate
[13] alpha-BHC was used as the surrogate
[14] Endosulfan was used as the surrogate
[15] Endosulfan was used as the surrogate
[16] Endosulfan was used as the surrogate
[17] Endrin was used as the surrogate
[18] Endrin was used as the surrogate
[19] Chlordane was used as the surrogate

Results greater than the screening level are bolded.
Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
Units are presented as reported by the laboratory.

ISL	Industrial Screening Level
ft bgs	feet below ground surface
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
--	not analyzed
NE	not established
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-38
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15D	RMW-15M	RMW-15M	RMW-15M	RMW-15M	RMW-15M	RMW-15S
			22 ft bgs	22 ft bgs (FD)	26 ft bgs	30 ft bgs	35 ft bgs	35 ft bgs (FD)	40 ft bgs	45 ft bgs	50 ft bgs	55 ft bgs	61 ft bgs	20 ft bgs	25 ft bgs	30 ft bgs	35 ft bgs	35 ft bgs (FD)	16 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	10/20/2009
Analyte	**ISL**	**Units**	**Analytical Results**																
Volatile Organic Compounds																			
1,1,1-Trichloroethane	38,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,1,2,2-Tetrachloroethane	2,800	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,1,2-Trichloroethane	5,300	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,1-Dichloroethane	17,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,1-Dichloroethene	1,100,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2,3-Trichlorobenzene	490,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2,4-Trichlorobenzene	99,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2,4-Trimethylbenzene	260,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2-Dibromo-3-chloropropane	69	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2-Dibromoethane	170	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2-Dichlorobenzene	9,800,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2-Dichloroethane	2,200	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,2-Dichloropropane	4,500	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,3,5-Trimethylbenzene	10,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,3-Dichlorobenzene	NE	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
1,4-Dichlorobenzene	12,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6) J	ND (5.2) J	ND (5.2) J	ND (5.5) J	ND (5.8) J	ND (4.9)
1,4-Dioxane (p-dioxane)	160,000	µg/kg	ND (97) R	ND (96) R	ND (110) R	ND (98) R	ND (100) R	ND (100) R	ND (96) R	---	ND (97) R	ND (97) R	ND (100) R	ND (92) R	ND (100) R	ND (100) R	ND (110) R	ND (120) R	ND (97) R
2-Hexanone	1,400,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	ND (9.7)	ND (10)	ND (9.2)	ND (10)	ND (10)	ND (11)	ND (12)	ND (9.7)
Acetone	630,000,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	ND (9.7)	ND (10)	ND (9.2)	ND (10)	ND (10)	ND (11)	ND (12)	2.8 J
Benzene	5,400	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Bromochloromethane	NE	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Bromodichloromethane	1,400	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Bromoform	220,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7) J	ND (4.9) J	ND (5) J	ND (5.1) J	ND (4.8) J	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Bromomethane	32,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Carbon disulfide	3,700,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	0.66 J	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Carbon tetrachloride	3,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Chlorobenzene	1,400,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Chloroethane	61,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Chloroform	1,500	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Chloromethane	500,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
cis-1,2-Dichloroethene	10,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	3.4 J	ND (5.8)	ND (4.9)
[1] cis-1,3-Dichloropropene	8,100	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Cyclohexane	29,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Dibromochloromethane	3,300	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
[2] Ethyl tert-butyl ether	220,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	ND (9.7)	ND (10)	ND (9.2)	ND (10)	ND (10)	ND (11)	ND (12)	ND (9.7)
Ethylbenzene	27,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Freon 11	3,400,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Freon 12	780,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Freon 113	180,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Isopropylbenzene (cumene)	11,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Methyl acetate	1,000,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	5.6	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Methyl ethyl ketone	200,000,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	3.3 J	2.7 J	ND (9.2)	ND (10)	ND (10)	ND (11)	ND (12)	ND (9.7)
Methyl isobutyl ketone	53,000,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	ND (9.7)	ND (10)	ND (9.2)	ND (10)	ND (10)	1.1 J	ND (12)	ND (9.7)
Methyl tert-butyl ether	220,000	µg/kg	18	9.6	18	16	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	3.5 J	ND (5)	9.6	34	21	12	ND (5.8)	ND (4.9)
Methylcyclohexane	NE	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Methylene chloride	53,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Styrene	36,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
[3] tert-Amyl methyl ether	220,000	µg/kg	ND (9.7)	ND (9.6)	ND (11)	ND (9.8)	ND (10)	ND (10)	ND (9.6)	---	ND (9.7)	ND (9.7)	ND (10)	ND (9.2)	ND (10)	ND (10)	ND (11)	ND (12)	ND (9.7)
[4] tert-Butyl alcohol	2,000,000,000	µg/kg	ND (48)	ND (48)	ND (57)	ND (49)	ND (50)	ND (51)	ND (48)	---	ND (49)	ND (49)	ND (50)	ND (46)	ND (52)	ND (52)	ND (55)	ND (58)	ND (49)
Tetrachloroethene	2,600	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)

TABLE 4-38
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-15D 22 ft bgs	RMW-15D 22 ft bgs (FD)	RMW-15D 26 ft bgs	RMW-15D 30 ft bgs	RMW-15D 35 ft bgs	RMW-15D 35 ft bgs (FD)	RMW-15D 40 ft bgs	RMW-15D 45 ft bgs	RMW-15D 50 ft bgs	RMW-15D 55 ft bgs	RMW-15D 61 ft bgs	RMW-15M 20 ft bgs	RMW-15M 25 ft bgs	RMW-15M 30 ft bgs	RMW-15M 35 ft bgs	RMW-15M 35 ft bgs (FD)	RMW-15S 16 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	10/20/2009
Analyte	ISL	Units	Analytical Results																
Volatile Organic Compounds																			
Toluene	45,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
trans-1,2-Dichloroethene	690,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
5 trans-1,3-Dichloropropene	8,100	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Trichloroethene	14,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	1.2 J	0.77 J	ND (4.9)
Vinyl chloride	1,700	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6) J	ND (5.2) J	ND (5.2) J	ND (5.5) J	ND (5.8) J	ND (4.9)
Xylenes, m & p	17,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Xylenes, o	19,000,000	µg/kg	ND (4.8)	ND (4.8)	ND (5.7)	ND (4.9)	ND (5)	ND (5.1)	ND (4.8)	---	ND (4.9)	ND (4.9)	ND (5)	ND (4.6)	ND (5.2)	ND (5.2)	ND (5.5)	ND (5.8)	ND (4.9)
Semivolatile Organic Compounds																			
1,1'-Biphenyl	51,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
1,2,4,5-Tetrachlorobenzene	180,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,2'-Oxybis(1-Chloropropane)	22,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,3,4,6-Tetrachlorophenol	18,000,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,4,5-Trichlorophenol	62,000,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,4,6-Trichlorophenol	160,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,4-Dichlorophenol	1,800,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,4-Dimethylphenol	12,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,4-Dinitrophenol	1,200,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
2,4-Dinitrotoluene	5,500	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2,6-Dinitrotoluene	620,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2-Chloronaphthalene	82,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2-Chlorophenol	5,100,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2-Methylnaphthalene	4,100,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2-Methylphenol	31,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
2-Nitroaniline	6,000,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
2-Nitrophenol	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
3,3'-Dichlorobenzidine	3,800	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
6 3-Nitroaniline	86,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
4,6-Dinitro-2-methylphenol	49,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
4-Bromophenylphenyl ether	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
7 4-Chloro-3-methylphenol	31,000,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
4-Chloroaniline	8,600	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
4-Methylphenol	3,100,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
4-Nitroaniline	86,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
8 4-Nitrophenol	1,200,000	µg/kg	ND (420)	ND (390)	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
Acenaphthene	33,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
9 Acenaphthylene	17,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Acetophenone	100,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Anthracene	170,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Atrazine	7,500	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Benzaldehyde	100,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Benzo(a)anthracene	2,100	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Benzo(a)pyrene	210	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Benzo(b)fluoranthene	2,100	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
10 Benzo(g,h,i)perylene	17,000,000	µg/kg	ND (210) J	ND (200) J	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Benzo(k)fluoranthene	21,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Benzyl butyl phthalate	910,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
bis(2-Chloroethoxy)methane	1,800,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
bis(2-Chloroethyl)ether	1,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
bis(2-Ethylhexyl)phthalate	120,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	55 J	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	25 J	24 J

TABLE 4-38
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-15D 22 ft bgs	RMW-15D 22 ft bgs (FD)	RMW-15D 26 ft bgs	RMW-15D 30 ft bgs	RMW-15D 35 ft bgs	RMW-15D 35 ft bgs (FD)	RMW-15D 40 ft bgs	RMW-15D 45 ft bgs	RMW-15D 50 ft bgs	RMW-15D 55 ft bgs	RMW-15D 61 ft bgs	RMW-15M 20 ft bgs	RMW-15M 25 ft bgs	RMW-15M 30 ft bgs	RMW-15M 35 ft bgs	RMW-15M 35 ft bgs (FD)	RMW-15S 16 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	10/20/2009
Analyte	**ISL**	**Units**	**Analytical Results**																
Semivolatile Organic Compounds																			
Caprolactam	310,000,000	µg/kg	55 J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	280
Carbazole	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Chrysene	210,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Dibenz(a,h)anthracene	210	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Dibenzofuran	1,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Diethylphthalate	490,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Dimethylphthalate	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Di-n-butyl phthalate	62,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Di-n-octyl phthalate	NE	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Fluoranthene	22,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Fluorene	22,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Hexachlorobenzene	1,100	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Hexachlorobutadiene	22,000	µg/kg	ND (210) J	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Hexachlorocyclopentadiene	3,700,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Hexachloroethane	120,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Indeno(1,2,3-c,d)pyrene	2,100	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Isophorone	1,800,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Naphthalene	18,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Nitrobenzene	24,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
N-Nitrosodi-n-propylamine	250	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
N-Nitrosodiphenylamine	350,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Pentachlorophenol	9,000	µg/kg	ND (420) J	ND (390) J	ND (460)	ND (370)	ND (400)	ND (400)	ND (360)	ND (390)	ND (380)	ND (390)	ND (380)	ND (380)	ND (410)	ND (410)	ND (390)	ND (390)	ND (370)
11 Phenanthrene	17,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Phenol	180,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	310	850	690	860	1,300	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200)	ND (200)	ND (190)
Pyrene	17,000,000	µg/kg	ND (210)	ND (200)	ND (240)	ND (190)	ND (210)	ND (200)	ND (180)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (210)	ND (210)	ND (200) J	ND (200)	ND (190)
Total Petroleum Hydrocarbons																			
Diesel c10-c24	NE	mg/kg	0.36 J	ND (1.2) J	0.53 J	0.63 J	0.63 J	0.66 J	ND (0.32)	0.31 J	0.53 J	0.96 J	0.49 J	ND (1.8) J	ND (0.62) J	ND (0.77) J	ND (0.19) J	ND (0.34) J	ND (0.3)
Gasoline c6-c10	NE	mg/kg	ND (0.013) J	ND (0.015) J	ND (0.019) J	ND (0.015) J	ND (0.015) J	ND (0.015) J	ND (0.016) J	ND (0.014) J	ND (0.013) J	ND (0.015) J	ND (0.016) J	ND (0.012) J	ND (0.015) J	ND (0.016) J	ND (0.011)	ND (0.019) J	ND (0.014) J
Organochlorine Pesticides/PCBs																			
4,4'-DDD	7,200	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
4,4'-DDE	5,100	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
4,4'-DDT	7,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
Aldrin	100	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
alpha-BHC	270	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
12 alpha-Chlordane	6,500	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
Aroclor-1016	21,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1221	540	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1232	540	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1242	740	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1248	740	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1254	740	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1260	740	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1262	NE	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
Aroclor-1268	NE	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (41)
beta-BHC	960	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
13 delta-BHC	270	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
Dieldrin	110	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
14 Endosulfan I	3,700,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
15 Endosulfan II	3,700,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
16 Endosulfan sulfate	3,700,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)

TABLE 4-38
Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-15D 22 ft bgs	RMW-15D 22 ft bgs (FD)	RMW-15D 26 ft bgs	RMW-15D 30 ft bgs	RMW-15D 35 ft bgs	RMW-15D 35 ft bgs (FD)	RMW-15D 40 ft bgs	RMW-15D 45 ft bgs	RMW-15D 50 ft bgs	RMW-15D 55 ft bgs	RMW-15D 61 ft bgs	RMW-15M 20 ft bgs	RMW-15M 25 ft bgs	RMW-15M 30 ft bgs	RMW-15M 35 ft bgs	RMW-15M 35 ft bgs (FD)	RMW-15S 16 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	11/2/2009	10/20/2009
Analyte	ISL	Units	Analytical Results																
Organochlorine Pesticides/PCBs																			
Endrin	180,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
[17] Endrin aldehyde	180,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
[18] Endrin ketone	180,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (4.1)
gamma-BHC	2,100	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
[19] gamma-Chlordane	6,500	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
Heptachlor	380	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
Heptachlor epoxide	190	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (2.1)
Methoxychlor	3,100,000	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (21)
Toxaphene	1,600	µg/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (210)

[1] 1,3-Dichloropropene was used as the surrogate
[2] Methyl tertbutyl ether (MTBE) was used as the surrogate
[3] Methyl tertbutyl ether (MTBE) was used as the surrogate
[4] sec-butyl alcohol was used as the surrogate
[5] 1,3-Dichloropropene was used as the surrogate
[6] 4-Nitroaniline used as the surrogate
[7] 3-methylphenol was used as the surrogate
[8] 2,4-Dinitrophenol was used as the surrogate
[9] Pyrene was used as the surrogate
[10] Pyrene was used as the surrogate
[11] Pyrene was used as the surrogate
[12] Chlordane was used as the surrogate
[13] alpha-BHC was used as the surrogate
[14] Endosulfan was used as the surrogate
[15] Endosulfan was used as the surrogate
[16] Endosulfan was used as the surrogate
[17] Endrin was used as the surrogate
[18] Endrin was used as the surrogate
[19] Chlordane was used as the surrogate

Results greater than the screening level are bolded.
Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
Units are presented as reported by the laboratory.

ISL	Industrial Screening Level
ft bgs	feet below ground surface
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
--	not analyzed
NE	not established
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
R	rejected for failure to meet quality control requirements

TABLE 4-39

Well Installation Soil Analytical Results (September - October 2009) Compared to Industrial Regional Screening Levels (Total Petroleum Hydrocarbons Only)

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-06D 16 ft bgs	RMW-06D 21 ft bgs	RMW-06D 26 ft bgs	RMW-06D 31 ft bgs	RMW-06D 36 ft bgs	RMW-06D 41 ft bgs	RMW-06D 46 ft bgs	RMW-06D 51 ft bgs	RMW-06D 56 ft bgs	RMW-06D 61 ft bgs	RMW-06M 16 ft bgs	RMW-06M 21 ft bgs	RMW-06M 26 ft bgs	RMW-06M 31 ft bgs	RMW-06M 36 ft bgs
		Sample Date	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/16/2009	10/19/2009	10/15/2009	10/15/2009	10/15/2009	10/15/2009	10/15/2009
Analyte	**ISL**	**Units**	**Analytical Results**														
Total Petroleum Hydrocarbons																	
Diesel c10-c24	NE	mg/kg	ND (0.25)	ND (0.25)	ND (0.28)	ND (0.26)	0.28 J	0.27 J	0.29 J	ND (0.26)	0.5 J	0.5 J	2.5 J	0.36 J	ND (0.31)	ND (0.33)	0.62 J
Gasoline c6-c10	NE	mg/kg	ND (0.013) J	ND (0.011) J	ND (0.012) J	ND (0.017) J	ND (0.016) J	ND (0.013) J	ND (0.032) J	ND (0.013) J	ND (0.016) J	0.016 J	ND (0.013) J	ND (0.011) J	ND (0.014) J	ND (0.013) J	ND (0.015) J

Results greater than the screening level are bolded.

Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).

Units are presented as reported by the laboratory.

ISL Industrial Screening Level

ft bgs feet below ground surface

mg/kg milligrams per kilogram

NE not established

ND not detected above the laboratory's reporting limit shown in parentheses

J estimated value

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-16D 5 ft bgs	RMW-16D 10 ft bgs	RMW-16D 10 ft bgs (FD)	RMW-16D 15 ft bgs	RMW-16D 15 ft bgs (FD)	RMW-16ES 0.5 ft bgs	RMW-16ES 6 ft bgs	RMW-16ES 11 ft bgs	RMW-16ES 16 ft bgs	RMW-16M 0.5 ft bgs	RMW-16M 5 ft bgs	RMW-16M 10 ft bgs	RMW-16M 15 ft bgs	RMW-16WS 0.5 ft bgs	RMW-16WS 5 ft bgs	RMW-16WS 10 ft bgs	RMW-16WS 15 ft bgs
Sample Date			10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/20/2009	10/30/2009	10/30/2009	10/30/2009	10/20/2009	10/22/2009	10/22/2009	10/22/2009	10/20/2009	10/29/2009	10/29/2009	10/29/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
1,1,1-Trichloroethane	8,700,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,1,2,2-Tetrachloroethane	560	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,1,2-Trichloroethane	1,100	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,1-Dichloroethane	3,300	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,1-Dichloroethene	240,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	0.7 J	ND (4.6)	ND (6)	0.57 J	ND (4.7)	ND (5.2)
1,2,3-Trichlorobenzene	49,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,2,4-Trichlorobenzene	22,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,2,4-Trimethylbenzene	62,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	1.1 J	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,2-Dibromo-3-chloropropane	5.4	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,2-Dibromoethane	34	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,2-Dichlorobenzene	1,900,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,2-Dichloroethane	430	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,2-Dichloropropane	890	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,3,5-Trimethylbenzene	780,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
1,3-Dichlorobenzene	NE	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,4-Dichlorobenzene	2,400	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
1,4-Dioxane (p-dioxane)	44,000	µg/kg	ND (97) R	ND (93) R	ND (97) R	ND (96) R	ND (98) R	ND (170) R	ND (91) R	ND (88) R	ND (89) R	ND (110) R	ND (94) R	ND (96) R	ND (92) R	ND (120) R	ND (99) R	ND (93) R	ND (100) R
2-Hexanone	210,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	ND (17)	ND (9.1)	ND (8.8)	ND (8.9)	ND (11)	ND (9.4)	ND (9.6)	ND (9.2)	ND (12)	ND (9.9)	ND (9.3)	ND (10)
Acetone	61,000,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	19	ND (9.1)	ND (8.8)	ND (8.9)	21	ND (9.4)	ND (9.6)	ND (9.2)	12	ND (9.9)	ND (9.3)	ND (10)
Benzene	1,100	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	1.6 J	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Bromochloromethane	NE	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Bromodichloromethane	270	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Bromoform	61,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7) R	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6) R	ND (4.9)	ND (4.7)	ND (5.2)
Bromomethane	7,300	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Carbon disulfide	820,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	0.84 J	ND (4.9)	ND (4.7)	ND (5.2)
Carbon tetrachloride	610	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Chlorobenzene	290,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Chloroethane	15,000,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Chloroform	290	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Chloromethane	120,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
cis-1,2-Dichloroethene	780,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
[1] cis-1,3-Dichloropropene	1,700	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Cyclohexane	7,000,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Dibromochloromethane	680	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
[2] Ethyl tert-butyl ether	43,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	ND (17)	ND (9.1)	ND (8.8)	ND (8.9)	ND (11)	ND (9.4)	ND (9.6)	ND (9.2)	ND (12)	ND (9.9)	ND (9.3)	ND (10)
Ethylbenzene	5,400	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	4 J	ND (4.6)	ND (4.4)	ND (4.4)	0.73 J	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Freon 11	790,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Freon 12	180,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Freon 113	43,000,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Isopropylbenzene (cumene)	2,100,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Methyl acetate	78,000,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	3.9 J	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Methyl ethyl ketone	28,000,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	ND (17)	ND (9.1)	ND (8.8)	ND (8.9)	8 J	3.1 J	ND (9.6)	ND (9.2)	ND (12)	ND (9.9)	ND (9.3)	ND (10)
Methyl isobutyl ketone	5,300,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	ND (17)	ND (9.1)	ND (8.8)	ND (8.9)	ND (11)	ND (9.4)	ND (9.6)	ND (9.2)	ND (12)	ND (9.9)	ND (9.3)	ND (10)
Methyl tert-butyl ether	43,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Methylcyclohexane	NE	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Methylene chloride	11,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	10	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Styrene	6,300,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
[3] tert-Amyl methyl ether	43,000	µg/kg	ND (9.7)	ND (9.3)	ND (9.7)	ND (9.6)	ND (9.8)	ND (17)	ND (9.1)	ND (8.8)	ND (8.9)	ND (11)	ND (9.4)	ND (9.6)	ND (9.2)	ND (12)	ND (9.9)	ND (9.3)	ND (10)
[4] tert-Butyl alcohol	160,000,000	µg/kg	ND (48)	ND (46)	ND (49)	ND (48)	ND (49)	ND (87)	ND (46)	ND (44)	ND (44)	ND (53)	ND (47)	ND (48)	ND (46)	ND (60)	ND (49)	ND (47)	ND (52)
Tetrachloroethene	550	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-16D 5 ft bgs	RMW-16D 10 ft bgs	RMW-16D 10 ft bgs (FD)	RMW-16D 15 ft bgs	RMW-16D 15 ft bgs (FD)	RMW-16ES 0.5 ft bgs	RMW-16ES 6 ft bgs	RMW-16ES 11 ft bgs	RMW-16ES 16 ft bgs	RMW-16M 0.5 ft bgs	RMW-16M 5 ft bgs	RMW-16M 10 ft bgs	RMW-16M 15 ft bgs	RMW-16WS 0.5 ft bgs	RMW-16WS 5 ft bgs	RMW-16WS 10 ft bgs	RMW-16WS 15 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/20/2009	10/30/2009	10/30/2009	10/30/2009	10/20/2009	10/22/2009	10/22/2009	10/22/2009	10/20/2009	10/29/2009	10/29/2009	10/29/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
Toluene	5,000,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	18	ND (4.6)	ND (4.4)	ND (4.4)	18	ND (4.7)	ND (4.8)	ND (4.6)	13	ND (4.9)	ND (4.7)	ND (5.2)
trans-1,2-Dichloroethene	150,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
5 trans-1,3-Dichloropropene	1,700	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Trichloroethene	2,800	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Vinyl chloride	60	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	ND (8.7)	ND (4.6)	ND (4.4)	ND (4.4)	ND (5.3)	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Xylenes, m & p	3,400,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	12 J	ND (4.6)	ND (4.4)	ND (4.4)	2.2 J	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Xylenes, o	3,800,000	µg/kg	ND (4.8)	ND (4.6)	ND (4.9)	ND (4.8)	ND (4.9)	2 J	ND (4.6)	ND (4.4)	ND (4.4)	0.64 J	ND (4.7)	ND (4.8)	ND (4.6)	ND (6)	ND (4.9)	ND (4.7)	ND (5.2)
Semivolatile Organic Compounds																			
1,1'-Biphenyl	3,900,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
1,2,4,5-Tetrachlorobenzene	18,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,2'-Oxybis(1-Chloropropane)	4,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,3,4,6-Tetrachlorophenol	1,800,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,4,5-Trichlorophenol	6,100,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,4,6-Trichlorophenol	44,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,4-Dichlorophenol	180,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,4-Dimethylphenol	1,200,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	23 J	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,4-Dinitrophenol	120,000	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
2,4-Dinitrotoluene	1,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2,6-Dinitrotoluene	61,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2-Chloronaphthalene	6,300,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2-Chlorophenol	390,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2-Methylnaphthalene	310,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	26 J	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2-Methylphenol	3,100,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
2-Nitroaniline	610,000	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
2-Nitrophenol	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
3,3'-Dichlorobenzidine	1,100	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
6 3-Nitroaniline	24,000	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
4,6-Dinitro-2-methylphenol	4,900	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
4-Bromophenylphenyl ether	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
7 4-Chloro-3-methylphenol	3,100,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
4-Chloroaniline	2,400	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
4-Methylphenol	310,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
4-Nitroaniline	24,000	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
8 4-Nitrophenol	120,000	µg/kg	ND (390)	ND (380)	ND (400)	ND (370)	ND (360)	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
Acenaphthene	3,400,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
9 Acenaphthylene	1,700,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Acetophenone	7,800,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Anthracene	17,000,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	38 J	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Atrazine	2,100	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzaldehyde	7,800,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzo(a)anthracene	150	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	110 J	ND (200)	ND (200)	ND (200)	50 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzo(a)pyrene	15	µg/kg	22 J	ND (200)	ND (210)	ND (190)	ND (190)	150 J	ND (200)	ND (200)	ND (200)	77 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzo(b)fluoranthene	150	µg/kg	30 J	ND (200)	ND (210)	ND (190)	ND (190)	180 J	ND (200)	ND (200)	ND (200)	100 J	ND (200)	ND (200)	ND (200)	19 J	ND (190)	ND (200)	ND (220)
10 Benzo(g,h,i)perylene	1,700,000	µg/kg	ND (200) J	ND (200) J	ND (210)	ND (190) J	ND (190) J	120 J	ND (200)	ND (200)	ND (200)	63 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzo(k)fluoranthene	1,500	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	66 J	ND (200)	ND (200)	ND (200)	30 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Benzyl butyl phthalate	260,000	µg/kg	34 J	ND (200)	ND (210)	ND (190)	ND (190)	360	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
bis(2-Chloroethoxy)methane	180,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
bis(2-Chloroethyl)ether	210	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
bis(2-Ethylhexyl)phthalate	35,000	µg/kg	240	ND (200)	29 J	ND (190)	ND (190)	870	480	38 J	ND (200)	34 J	37 J	ND (200)	ND (200)	35 J	28 J	ND (200)	ND (220)

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-16D 5 ft bgs	RMW-16D 10 ft bgs	RMW-16D 10 ft bgs (FD)	RMW-16D 15 ft bgs	RMW-16D 15 ft bgs (FD)	RMW-16ES 0.5 ft bgs	RMW-16ES 6 ft bgs	RMW-16ES 11 ft bgs	RMW-16ES 16 ft bgs	RMW-16M 0.5 ft bgs	RMW-16M 5 ft bgs	RMW-16M 10 ft bgs	RMW-16M 15 ft bgs	RMW-16WS 0.5 ft bgs	RMW-16WS 5 ft bgs	RMW-16WS 10 ft bgs	RMW-16WS 15 ft bgs
Sample Date			10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/20/2009	10/30/2009	10/30/2009	10/30/2009	10/20/2009	10/22/2009	10/22/2009	10/22/2009	10/20/2009	10/29/2009	10/29/2009	10/29/2009
Analyte	RSL	Units	Analytical Results																
Semivolatile Organic Compounds																			
Caprolactam	31,000,000	µg/kg	60 J	ND (200)	ND (210)	53 J	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	87 J	ND (200)	ND (200)	ND (200)	63 J	ND (190)	ND (200)	ND (220)
Carbazole	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	29 J	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Chrysene	15,000	µg/kg	25 J	ND (200)	ND (210)	ND (190)	ND (190)	140 J	ND (200)	ND (200)	ND (200)	68 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Dibenz(a,h)anthracene	15	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Dibenzofuran	78,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Diethylphthalate	49,000,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Dimethylphthalate	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Di-n-butyl phthalate	6,100,000	µg/kg	62 J	ND (200)	ND (210)	ND (190)	ND (190)	350	ND (200)	ND (200)	ND (200)	25 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Di-n-octyl phthalate	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	27 J	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Fluoranthene	2,300,000	µg/kg	32 J	ND (200)	ND (210)	ND (190)	ND (190)	190	ND (200)	ND (200)	ND (200)	94 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Fluorene	2,300,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Hexachlorobenzene	300	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Hexachlorobutadiene	6,200	µg/kg	ND (200)	ND (200) J	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Hexachloroethane	35,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	110 J	ND (200)	ND (200)	ND (200)	61 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Isophorone	510,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Naphthalene	3,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Nitrobenzene	4,800	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	ND (200)	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Pentachlorophenol	3,000	µg/kg	ND (390) J	ND (380) J	ND (400)	ND (370) J	ND (360) J	ND (360)	ND (390)	ND (390)	ND (400)	ND (380)	ND (400)	ND (400)	ND (380)	ND (350)	ND (380)	ND (390)	ND (430)
11 Phenanthrene	1,700,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	98 J	ND (200)	ND (200)	ND (200)	46 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Phenol	18,000,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (190)	ND (190)	ND (190)	ND (200)	61 J	ND (200)	ND (190)	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	64 J
Pyrene	1,700,000	µg/kg	37 J	ND (200)	ND (210)	ND (190)	ND (190)	220	ND (200)	ND (200)	ND (200)	100 J	ND (200)	ND (200)	ND (200)	ND (180)	ND (190)	ND (200)	ND (220)
Total Petroleum Hydrocarbons																			
Diesel c10-c24	NE	mg/kg	3.7 J	1.8 J	ND (0.31) J	ND (0.4) J	ND (0.24) J	390 J	0.25 J	ND (0.18)	ND (0.18)	19 J	ND (0.31)	ND (0.31)	0.42 J	20 J	0.23 J	ND (0.19)	ND (0.18)
Gasoline c6-c10	NE	mg/kg	ND (0.014) J	ND (0.015) J	ND (0.014) J	ND (0.012) J	ND (0.016) J	ND (0.039) J	ND (0.02) J	ND (0.016) J	ND (0.016) J	ND (0.019) J	ND (0.013) J	ND (0.016) J	ND (0.014) J	ND (0.014) J	ND (0.014) J	ND (0.016) J	ND (0.016) J
Metals																			
Aluminum	77,000	mg/kg	5,310	10,700	9,090	10,700	6,830	7,970	13,900	9,640	6,570	8,190	5,760	8,270	5,850	7,590	15,300	11,200	8,300
Antimony	31	mg/kg	ND (6.7) J	ND (6.5) J	ND (6.7) J	ND (6.8) J	ND (6.8) J	1.9 J	ND (5.7) J	ND (6.1) J	ND (6.2) J	3.3 J	ND (5.8)	ND (5.1)	ND (6.1)	6.7 J	ND (7.1) J	ND (6.7) J	ND (6.8) J
Arsenic	0.39	mg/kg	2.6	3.3	2.7	3.9	2.2	9.2	4.3	2.2	1.5	5.6	2.1	1	2.1	6.5	4.5	2.8	2.8
Barium	15,000	mg/kg	71.8	87.6	72.2	69.7	54.6	201	80.6	61.4	61	256	77.5	51.3	60.7	158	82.2	70.4	61.6
Beryllium	160	mg/kg	0.24 J	0.46 J	0.34 J	0.43 J	0.27 J	0.36 J	0.47 J	0.36 J	0.21 J	0.49 J	0.27 J	0.22 J	0.25 J	0.37 J	0.62	0.35 J	0.3 J
Cadmium	70	mg/kg	ND (0.56)	ND (0.54)	ND (0.56)	ND (0.56)	ND (0.57)	0.54 J	ND (0.48)	ND (0.51)	ND (0.51)	ND (0.58)	ND (0.48)	ND (0.43)	ND (0.51)	0.5 J	ND (0.59)	ND (0.56)	ND (0.57)
Chromium	NE	mg/kg	32.7	44.9	39.9	45.4	40	52.4	39.4	43.2	38.9	36.4	30.8	44.8	35.2	42.9	43.6	42.4	47.7
Cobalt	23	mg/kg	5.8	9.5	7.8	8.3	6.4	8.1	12.7	6.6	5.9	25.8	7.2	5	5.7	6.4	14.2	8.6	6.9
Copper	3,100	mg/kg	13.5 J	12.3 J	8.8 J	10 J	7.9 J	97.6 J	11.4	9.2	6.5	90.4 J	7.3	6.3	7	126 J	12.9	9.8	9.2
Cyanide	1,600	mg/kg	ND (2.8)	ND (2.8)	ND (2.8)	ND (3)	ND (2.7)	0.19 J	ND (2.9)	ND (2.9)	ND (2.8)	ND (2.9)	ND (2.7)	ND (2.5)	ND (2.6)	0.26 J	ND (3)	ND (2.8)	ND (2.8)
Lead	400	mg/kg	23.6 J	12.6 J	2.8 J	4.1 J	2.4 J	335 J	4.9 J	2.9 J	2.3 J	229 J	2.5 J	2.7 J	2.3 J	347 J	4.6 J	3.6 J	3.1 J
Manganese	1,800	mg/kg	131	245	175	247	144	318	268	164	128	241	118	106	131	283	261	218	151
Mercury	5.6	mg/kg	0.16	0.081 J	0.029 J	ND (0.11)	ND (0.12)	0.2	0.074 J	ND (0.12)	0.045 J	0.63	0.035 J	0.027 J	0.029 J	0.55	0.048 J	ND (0.12)	0.049 J
Nickel	1,500	mg/kg	21.2	38.9	36.6	41.2	34.1	38.2	42.8	34.5	27.2	30.2	21.8	28.8	29.9	29.8	47.5	39.4	36.9
Selenium	390	mg/kg	1.5 J	2 J	1.6 J	2 J	1.5 J	2.7 J	2.1 J	2 J	0.93 J	2.1 J	1.5 J	1.4 J	1.7 J	1.9 J	2.6 J	2 J	1.5 J
Silver	390	mg/kg	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	0.34 J+	ND (0.95) R	ND (1) R	ND (1) R	0.42 J+	ND (0.97) J	ND (0.86) J	ND (1)	0.28 J+	ND (1.2) R	ND (1.1) R	ND (1.1) R
Thallium	NE	mg/kg	ND (2.8)	ND (2.7)	ND (2.8)	ND (2.8)	ND (2.8)	ND (2.9)	ND (2.4)	ND (2.5)	ND (2.6)	ND (2.9)	ND (2.4)	ND (2.1)	ND (2.6)	ND (2.7)	ND (2.9)	ND (2.8)	ND (2.8)
Vanadium	390	mg/kg	22.7 J	36.5 J	31.2 J	36.7 J	28.6 J	33.2 J	39.2	32.3	22.8	32.4 J	23.9	19	26.9	31.8 J	42.1	35.1	33.8
Zinc	23,000	mg/kg	40.2 J	36.2 J	25.2 J	26.2 J	21.6 J	337 J	26.6	23.5	19.5	195 J	17.7	23.3	21.1	341 J	31.8	25.8	23.2
Calcium	NE	mg/kg	1,930	1,810	1,720	1,680	1,560	5,240	1,980	1,840	1,630	10,600	1,310	1,450	1,410	3,070	2,210	1,980	1,810
Iron	55,000	mg/kg	9,290	16,500	14,200	17,300	12,100	18,100	19,800	14,500	9,650	15,100	9,760	9,420	11,600	14,400	22,700	15,900	14,100

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-16D 5 ft bgs	RMW-16D 10 ft bgs	RMW-16D 10 ft bgs (FD)	RMW-16D 15 ft bgs	RMW-16D 15 ft bgs (FD)	RMW-16ES 0.5 ft bgs	RMW-16ES 6 ft bgs	RMW-16ES 11 ft bgs	RMW-16ES 16 ft bgs	RMW-16M 0.5 ft bgs	RMW-16M 5 ft bgs	RMW-16M 10 ft bgs	RMW-16M 15 ft bgs	RMW-16WS 0.5 ft bgs	RMW-16WS 5 ft bgs	RMW-16WS 10 ft bgs	RMW-16WS 15 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/20/2009	10/30/2009	10/30/2009	10/30/2009	10/20/2009	10/22/2009	10/22/2009	10/22/2009	10/20/2009	10/29/2009	10/29/2009	10/29/2009
Analyte	**RSL**	**Units**	**Analytical Results**																
Metals																			
Magnesium	NE	mg/kg	1,480	2,990	3,120	3,050	2,470	3,310	3,540	2,950	2,330	2,410	1,740	2,500	2,210	2,250	4,100	3,420	2,720
Potassium	NE	mg/kg	554 J+	902 J+	532 J+	819 J+	444 J+	831 J+	967	574	ND (421) J	915 J+	527 J+	419 J+	414 J	770 J+	1,030	587	ND (546) J
Sodium	NE	mg/kg	ND (160) J	ND (178) J	ND (227) J	ND (163) J	618	ND (234) J	ND (315) J	ND (407) J	ND (473) J	ND (371) J	149 J	127 J	537 J	ND (242) J	ND (387) J	ND (300) J	917
Organochlorine Pesticides/PCBs																			
4,4'-DDD	2,000	µg/kg	5	ND (3.9)	ND (3.7)	0.91 J	ND (3.6)	310	ND (3.9)	0.1 J	0.24 J	2.6 J	3.1 J	ND (3.9)	0.65 J	1.5 J	ND (3.8)	ND (3.9)	ND (4.3)
4,4'-DDE	1,400	µg/kg	110	ND (3.9)	0.37 J	3.4 J	ND (3.6)	490	ND (3.9)	0.055 J	0.15 J	46	4.3	ND (3.9)	0.44 J	20	ND (3.8)	ND (3.9)	ND (4.3)
4,4'-DDT	1,700	µg/kg	250	0.29 J	0.94 J	8.4	0.33 J	1,100	ND (3.9)	0.08 J	0.25 J	26	10	0.28 J	0.9 J	38	ND (3.8)	ND (3.9)	ND (4.3)
Aldrin	29	µg/kg	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (1.9)	0.96 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
alpha-BHC	77	µg/kg	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (1.9)	ND (96)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
12 alpha-Chlordane	1,600	µg/kg	4.9	ND (2)	ND (1.9)	0.19 J	ND (1.9)	16	ND (2)	ND (2)	ND (2)	0.77 J	0.33 J	ND (2)	ND (2)	2.1	ND (2)	ND (2)	ND (2.2)
Aroclor-1016	3,900	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1221	140	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1232	140	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1242	220	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1248	220	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1254	220	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	2,100	ND (39)	ND (39)	ND (39)	92	ND (39)	ND (39)	ND (38)	130	ND (38)	ND (39)	ND (42)
Aroclor-1260	220	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1262	NE	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
Aroclor-1268	NE	µg/kg	ND (39)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (39)	ND (39)	ND (39)	ND (35)	ND (39)	ND (39)	ND (38)	ND (33)	ND (38)	ND (39)	ND (42)
beta-BHC	270	µg/kg	ND (2)	ND (2)	ND (1.9)	ND (2)	ND (1.9)	ND (96)	ND (2)	0.088 J	0.074 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
13 delta-BHC	77	µg/kg	ND (20)	ND (2)	ND (1.9)	ND (2)	ND (1.9)	ND (96)	ND (2)	0.013 J	0.017 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
Dieldrin	30	µg/kg	6.7	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	30 J	ND (3.9)	ND (3.9)	0.052 J	ND (3.8)	0.41 J	ND (3.9)	ND (3.9)	ND (3.5)	ND (3.8)	ND (3.9)	ND (4.3)
14 Endosulfan I	370,000	µg/kg	1.2 J	ND (2)	ND (1.9)	ND (2)	ND (1.9)	3.3 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
15 Endosulfan II	370,000	µg/kg	1.2 J	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	5.4 J	ND (3.9)	ND (3.9)	ND (3.9)	ND (3.8)	0.85 J	ND (3.9)	ND (3.9)	ND (3.5)	ND (3.8)	ND (3.9)	ND (4.3)
16 Endosulfan sulfate	370,000	µg/kg	ND (3.9)	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	23	ND (3.9)	ND (3.9)	ND (3.9)	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.9)	ND (3.5)	ND (3.8)	ND (3.9)	ND (4.3)
Endrin	18,000	µg/kg	0.81 J	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	1.1 J	ND (3.9)	ND (3.9)	ND (3.9)	0.21 J	ND (3.9)	ND (3.9)	ND (3.9)	0.28 J	ND (3.8)	ND (3.9)	ND (4.3)
17 Endrin aldehyde	18,000	µg/kg	1.5 J	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	2.3 J	ND (3.9)	ND (3.9)	ND (3.9)	0.26 J	ND (3.9)	ND (3.9)	ND (3.9)	ND (3.5)	ND (3.8)	ND (3.9)	ND (4.3)
18 Endrin ketone	18,000	µg/kg	0.9 J	ND (3.9)	ND (3.7)	ND (3.8)	ND (3.6)	4.8 J	ND (3.9)	ND (3.9)	ND (3.9)	0.37 J	ND (3.9)	ND (3.9)	ND (3.9)	0.24 J	ND (3.8)	ND (3.9)	ND (4.3)
gamma-BHC	520	µg/kg	0.34 J	ND (2)	ND (1.9)	ND (2)	ND (1.9)	0.94 J	ND (2)	0.031 J	0.079 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
19 gamma-Chlordane	1,600	µg/kg	2.7	ND (2)	ND (1.9)	ND (2)	ND (1.9)	40 J	ND (2)	ND (2)	ND (2)	1.5 J	0.36 J	ND (2)	ND (2)	1.7 J	ND (2)	ND (2)	ND (2.2)
Heptachlor	110	µg/kg	0.36 J	ND (2)	ND (1.9)	ND (2)	ND (1.9)	3.6 J	ND (2)	0.058 J	0.02 J	ND (2)	ND (2)	ND (2)	ND (2)	ND (1.8)	ND (2)	ND (2)	ND (2.2)
Heptachlor epoxide	53	µg/kg	2 J	ND (2)	ND (1.9)	ND (2)	ND (1.9)	22 J	ND (2)	ND (2)	0.034 J	ND (2)	ND (2)	ND (2)	ND (2)	0.52 J	ND (2)	ND (2)	ND (2.2)
Methoxychlor	310,000	µg/kg	ND (200)	ND (20)	ND (19)	ND (20)	ND (19)	10 J	ND (20)	0.081 J	0.076 J	ND (20)	ND (20)	ND (20)	ND (20)	ND (18)	ND (20)	ND (20)	ND (22)
Toxaphene	440	µg/kg	ND (200)	ND (200)	ND (190)	ND (200)	ND (190)	ND (960)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (220)

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 6 ft bgs	RMW-17D 11 ft bgs	RMW-17M 6 ft bgs	RMW-17M 11 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009
Analyte	RSL	Units	Analytical Results			
Volatile Organic Compounds						
1,1,1-Trichloroethane	8,700,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,1,2,2-Tetrachloroethane	560	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,1,2-Trichloroethane	1,100	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,1-Dichloroethane	3,300	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,1-Dichloroethene	240,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2,3-Trichlorobenzene	49,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2,4-Trichlorobenzene	22,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2,4-Trimethylbenzene	62,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2-Dibromo-3-chloropropane	5.4	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2-Dibromoethane	34	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2-Dichlorobenzene	1,900,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2-Dichloroethane	430	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,2-Dichloropropane	890	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,3,5-Trimethylbenzene	780,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,3-Dichlorobenzene	NE	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,4-Dichlorobenzene	2,400	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1,4-Dioxane (p-dioxane)	44,000	µg/kg	ND (94) R	ND (94) R	ND (100) R	ND (90) R
2-Hexanone	210,000	µg/kg	ND (9.4)	ND (9.4)	ND (10)	ND (9)
Acetone	61,000,000	µg/kg	21	ND (9.4)	23	ND (9)
Benzene	1,100	µg/kg	ND (4.7)	ND (4.7)	0.73 J	ND (4.5)
Bromochloromethane	NE	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Bromodichloromethane	270	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Bromoform	61,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Bromomethane	7,300	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Carbon disulfide	820,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Carbon tetrachloride	610	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Chlorobenzene	290,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Chloroethane	15,000,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Chloroform	290	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Chloromethane	120,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
cis-1,2-Dichloroethene	780,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
1 cis-1,3-Dichloropropene	1,700	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Cyclohexane	7,000,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Dibromochloromethane	680	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
2 Ethyl tert-butyl ether	43,000	µg/kg	ND (9.4)	ND (9.4)	ND (10)	ND (9)
Ethylbenzene	5,400	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Freon 11	790,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Freon 12	180,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Freon 113	43,000,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Isopropylbenzene (cumene)	2,100,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Methyl acetate	78,000,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Methyl ethyl ketone	28,000,000	µg/kg	ND (9.4)	ND (9.4)	ND (10)	ND (9)
Methyl isobutyl ketone	5,300,000	µg/kg	ND (9.4)	ND (9.4)	ND (10)	ND (9)
Methyl tert-butyl ether	43,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Methylcyclohexane	NE	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Methylene chloride	11,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Styrene	6,300,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
3 tert-Amyl methyl ether	43,000	µg/kg	ND (9.4)	ND (9.4)	ND (10)	ND (9)
4 tert-Butyl alcohol	160,000,000	µg/kg	ND (47)	ND (47)	ND (50)	ND (45)
Tetrachloroethene	550	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)

TABLE 4-40

Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 6 ft bgs	RMW-17D 11 ft bgs	RMW-17M 6 ft bgs	RMW-17M 11 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009
Analyte	RSL	Units	Analytical Results			
Volatile Organic Compounds						
Toluene	5,000,000	µg/kg	ND (4.7)	ND (4.6)	ND (5)	ND (4.5)
trans-1,2-Dichloroethene	150,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
5 trans-1,3-Dichloropropene	1,700	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Trichloroethene	2,800	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Vinyl chloride	60	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Xylenes, m & p	3,400,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Xylenes, o	3,800,000	µg/kg	ND (4.7)	ND (4.7)	ND (5)	ND (4.5)
Semivolatile Organic Compounds						
1,1'-Biphenyl	3,900,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
1,2,4,5-Tetrachlorobenzene	18,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,2'-Oxybis(1-Chloropropane)	4,600	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,3,4,6-Tetrachlorophenol	1,800,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,4,5-Trichlorophenol	6,100,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,4,6-Trichlorophenol	44,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,4-Dichlorophenol	180,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,4-Dimethylphenol	1,200,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,4-Dinitrophenol	120,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
2,4-Dinitrotoluene	1,600	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2,6-Dinitrotoluene	61,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2-Chloronaphthalene	6,300,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2-Chlorophenol	390,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2-Methylnaphthalene	310,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2-Methylphenol	3,100,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
2-Nitroaniline	610,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
2-Nitrophenol	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
3,3'-Dichlorobenzidine	1,100	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
6 3-Nitroaniline	24,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
4,6-Dinitro-2-methylphenol	4,900	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
4-Bromophenylphenyl ether	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
7 4-Chloro-3-methylphenol	3,100,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
4-Chloroaniline	2,400	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
4-Methylphenol	310,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
4-Nitroaniline	24,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
8 4-Nitrophenol	120,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
Acenaphthene	3,400,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
9 Acenaphthylene	1,700,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Acetophenone	7,800,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Anthracene	17,000,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Atrazine	2,100	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzaldehyde	7,800,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzo(a)anthracene	150	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzo(a)pyrene	15	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzo(b)fluoranthene	150	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
10 Benzo(g,h,i)perylene	1,700,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzo(k)fluoranthene	1,500	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Benzyl butyl phthalate	260,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
bis(2-Chloroethoxy)methane	180,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
bis(2-Chloroethyl)ether	210	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
bis(2-Ethylhexyl)phthalate	35,000	µg/kg	40 J	48 J	ND (200)	ND (200)

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 6 ft bgs	RMW-17D 11 ft bgs	RMW-17M 6 ft bgs	RMW-17M 11 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009
Analyte	RSL	Units	Analytical Results			
Semivolatile Organic Compounds						
Caprolactam	31,000,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Carbazole	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Chrysene	15,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Dibenz(a,h)anthracene	15	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Dibenzofuran	78,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Diethylphthalate	49,000,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Dimethylphthalate	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Di-n-butyl phthalate	6,100,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Di-n-octyl phthalate	NE	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Fluoranthene	2,300,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Fluorene	2,300,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Hexachlorobenzene	300	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Hexachlorobutadiene	6,200	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Hexachloroethane	35,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Isophorone	510,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Naphthalene	3,600	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Nitrobenzene	4,800	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Pentachlorophenol	3,000	µg/kg	ND (370)	ND (390)	ND (380)	ND (390)
11 Phenanthrene	1,700,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Phenol	18,000,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Pyrene	1,700,000	µg/kg	ND (190)	ND (200)	ND (200)	ND (200)
Total Petroleum Hydrocarbons						
Diesel c10-c24	NE	mg/kg	17 J	0.26 J	3.4 J	ND (0.34) J
Gasoline c6-c10	NE	mg/kg	ND (0.012) J	ND (0.012) J	ND (0.011) J	ND (0.013) J
Metals						
Aluminum	77,000	mg/kg	5,050	11,100	5,700	14,800
Antimony	31	mg/kg	ND (5.7) J	ND (6.2) J	ND (7.4)	ND (7) J
Arsenic	0.39	mg/kg	1.7	3.2	2.1	3.3
Barium	15,000	mg/kg	69.9	63	83.1	45.9
Beryllium	160	mg/kg	0.23 J	0.42 J	0.22 J	0.44 J
Cadmium	70	mg/kg	ND (0.48)	ND (0.52)	ND (0.61)	ND (0.58)
Chromium	NE	mg/kg	28.2	43.1	30.6	40.4
Cobalt	23	mg/kg	4.3 J	6.8	5.5 J	13.4
Copper	3,100	mg/kg	6.7	9.7	8.8	11.4
Cyanide	1,600	mg/kg	ND (2.8)	ND (2.9)	ND (3.1)	ND (2.9)
Lead	400	mg/kg	2.4 J	3.5 J	3.7	4.7 J
Manganese	1,800	mg/kg	146	123	154	1,370
Mercury	5.6	mg/kg	0.042 J	0.058 J	0.065 J	0.044 J
Nickel	1,500	mg/kg	16	39.3	18.7	46.4
Selenium	390	mg/kg	1.2 J	1.6 J	1.4 J	2.1 J
Silver	390	mg/kg	ND (0.96) R	ND (1) R	ND (1.2)	ND (1.2) R
Thallium	NE	mg/kg	ND (2.4)	ND (2.6)	ND (3.1)	ND (2.9)
Vanadium	390	mg/kg	21.6	35.6	23.2	36.5
Zinc	23,000	mg/kg	14.5	25.2	21.5	29.3
Calcium	NE	mg/kg	1,800	1,620	3,260	1,700
Iron	55,000	mg/kg	8,680	16,500	8,650	18,100

TABLE 4-40
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (All Analyses)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 6 ft bgs	RMW-17D 11 ft bgs	RMW-17M 6 ft bgs	RMW-17M 11 ft bgs
		Sample Date	**10/27/2009**	**10/27/2009**	**10/26/2009**	**10/26/2009**
Analyte	**RSL**	**Units**	**Analytical Results**			
Metals						
Magnesium	NE	mg/kg	1,570	3,090	1,660	3,920
Potassium	NE	mg/kg	753	ND (512) J	944	1,190
Sodium	NE	mg/kg	ND (270) J	675	393 J	ND (428) J
Organochlorine Pesticides/PCBs						
4,4'-DDD	2,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
4,4'-DDE	1,400	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
4,4'-DDT	1,700	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
Aldrin	29	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
alpha-BHC	77	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
12 alpha-Chlordane	1,600	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
Aroclor-1016	3,900	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1221	140	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1232	140	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1242	220	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1248	220	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1254	220	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1260	220	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1262	NE	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
Aroclor-1268	NE	µg/kg	ND (38)	ND (39)	ND (39)	ND (38)
beta-BHC	270	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
13 delta-BHC	77	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
Dieldrin	30	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
14 Endosulfan I	370,000	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
15 Endosulfan II	370,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
16 Endosulfan sulfate	370,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
Endrin	18,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
17 Endrin aldehyde	18,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
18 Endrin ketone	18,000	µg/kg	ND (3.8)	ND (3.9)	ND (3.9)	ND (3.8)
gamma-BHC	520	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
19 gamma-Chlordane	1,600	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
Heptachlor	110	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
Heptachlor epoxide	53	µg/kg	ND (2)	ND (2)	ND (2)	ND (2)
Methoxychlor	310,000	µg/kg	ND (20)	ND (20)	ND (20)	ND (20)
Toxaphene	440	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)

[1] 1,3-Dichloropropene was used as the surrogate
[2] Methyl tertbutyl ether (MTBE) was used as the surrogate
[3] Methyl tertbutyl ether (MTBE) was used as the surrogate
[4] sec-butyl alcohol was used as the surrogate
[5] 1,3-Dichloropropene was used as the surrogate
[6] 4-Nitroaniline used as the surrogate
[7] 3-methylphenol was used as the surrogate
[8] 2,4-Dinitrophenol was used as the surrogate
[9] Pyrene was used as the surrogate
[10] Pyrene was used as the surrogate
[11] Pyrene was used as the surrogate
[12] Chlordane was used as the surrogate
[13] alpha-BHC was used as the surrogate
[14] Endosulfan was used as the surrogate
[15] Endosulfan was used as the surrogate
[16] Endosulfan was used as the surrogate
[17] Endrin was used as the surrogate
[18] Endrin was used as the surrogate
[19] Chlordane was used as the surrogate

Results greater than the screening level are bolded.
Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).
Units are presented as reported by the laboratory.

RSL	Residential Screening Level
ft bgs	feet below ground surface
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NE	not established
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-09D 0.5 ft bgs	RMW-09D 0.5 ft bgs (FD)	RMW-09D 5 ft bgs	RMW-09D 10 ft bgs	RMW-09D 15 ft bgs	RMW-09D 20 ft bgs	RMW-09D 20 ft bgs (FD)	RMW-09D 30 ft bgs	RMW-09D 40 ft bgs	RMW-09D 50 ft bgs	RMW-09D 60 ft bgs	RMW-09D 70 ft bgs	RMW-09D 77 ft bgs	RMW-16D 20 ft bgs	RMW-16D 20 ft bgs (FD)	RMW-16D 25 ft bgs	RMW-16D 30 ft bgs
Sample Date			11/2/2009	11/2/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
1,1,1-Trichloroethane	8,700,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,1,2,2-Tetrachloroethane	560	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,1,2-Trichloroethane	1,100	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,1-Dichloroethane	3,300	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	2.4 J	ND (4.9)	---
1,1-Dichloroethene	240,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2,3-Trichlorobenzene	49,000	µg/kg	ND (5.3) R	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2,4-Trichlorobenzene	22,000	µg/kg	ND (5.3) R	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2,4-Trimethylbenzene	62,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2-Dibromo-3-chloropropane	5.4	µg/kg	ND (5.3) R	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2-Dibromoethane	34	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2-Dichlorobenzene	1,900,000	µg/kg	ND (5.3) R	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	7.2	12	6.9	---
1,2-Dichloroethane	430	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,2-Dichloropropane	890	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,3,5-Trimethylbenzene	780,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,3-Dichlorobenzene	NE	µg/kg	ND (5.3) R	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,4-Dichlorobenzene	2,400	µg/kg	ND (5.3) R	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
1,4-Dioxane (p-dioxane)	44,000	µg/kg	ND (110) R	ND (110) R	ND (120) R	ND (110) R	ND (98) R	ND (91) R	ND (97) R	ND (99) R	ND (110) R	ND (110) R	ND (100) R	ND (100) R	ND (110) R	ND (110) R	ND (110) R	ND (98) R	---
2-Hexanone	210,000	µg/kg	ND (11)	ND (11)	ND (12)	ND (11)	ND (9.8)	ND (9.1)	ND (9.7)	ND (9.9)	ND (11)	ND (11)	ND (10)	ND (10)	ND (11)	ND (11)	ND (11)	ND (9.8)	---
Acetone	61,000,000	µg/kg	ND (11)	ND (11)	45	130	35	ND (9.1)	ND (9.7)	ND (9.9)	ND (11)	ND (11)	ND (10)	ND (10)	ND (11)	ND (11)	ND (11)	ND (9.8)	---
Benzene	1,100	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Bromochloromethane	NE	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Bromodichloromethane	270	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Bromoform	61,000	µg/kg	ND (5.3) R	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6) J	ND (4.9)	---
Bromomethane	7,300	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
Carbon disulfide	820,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	0.82 J	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
Carbon tetrachloride	610	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Chlorobenzene	290,000	µg/kg	ND (5.3) J	ND (5.3) J	ND (5.9) J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Chloroethane	15,000,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
Chloroform	290	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Chloromethane	120,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
cis-1,2-Dichloroethene	780,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	1.7 J	2.3 J	1.8 J	---
[1] cis-1,3-Dichloropropene	1,700	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Cyclohexane	7,000,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Dibromochloromethane	680	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
[2] Ethyl tert-butyl ether	43,000	µg/kg	ND (11)	ND (11) J	ND (12) J	ND (11)	ND (9.8) J	ND (9.1) J	ND (9.7) J	ND (9.9) J	ND (11) J	ND (11) J	ND (10) J	ND (10) J	ND (11) J	ND (11)	ND (11)	ND (9.8)	---
Ethylbenzene	5,400	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Freon 11	790,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Freon 12	180,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
Freon 113	43,000,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Isopropylbenzene (cumene)	2,100,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Methyl acetate	78,000,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Methyl ethyl ketone	28,000,000	µg/kg	ND (11)	ND (11)	ND (12)	13	ND (9.8)	ND (9.1)	ND (9.7)	ND (9.9)	ND (11)	ND (11)	ND (10)	ND (10)	ND (11)	ND (11)	ND (11)	ND (9.8)	---
Methyl isobutyl ketone	5,300,000	µg/kg	ND (11)	ND (11)	ND (12)	ND (11)	ND (9.8)	ND (9.1)	ND (9.7)	ND (9.9)	ND (11)	ND (11)	ND (10)	ND (10)	ND (11)	ND (11)	ND (11)	ND (9.8)	---
Methyl tert-butyl ether	43,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Methylcyclohexane	NE	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Methylene chloride	11,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Styrene	6,300,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
[3] tert-Amyl methyl ether	43,000	µg/kg	ND (11)	ND (11) J	ND (12) J	ND (11)	ND (9.8) J	ND (9.1) J	ND (9.7) J	ND (9.9) J	ND (11) J	ND (11) J	ND (10) J	ND (10) J	ND (11) J	ND (11)	ND (11)	ND (9.8)	---
[4] tert-Butyl alcohol	160,000,000	µg/kg	ND (53)	ND (53)	ND (59)	ND (53)	ND (49)	ND (46)	ND (49)	ND (50)	ND (53)	ND (56)	ND (52)	ND (51)	ND (54)	ND (53)	ND (56)	ND (49)	---
Tetrachloroethene	550	µg/kg	ND (5.3)	ND (5.3)	0.61 J	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-09D	RMW-16D	RMW-16D	RMW-16D	RMW-16D
			0.5 ft bgs	0.5 ft bgs (FD)	5 ft bgs	10 ft bgs	15 ft bgs	20 ft bgs	20 ft bgs (FD)	30 ft bgs	40 ft bgs	50 ft bgs	60 ft bgs	70 ft bgs	77 ft bgs	20 ft bgs	20 ft bgs (FD)	25 ft bgs	30 ft bgs
		Sample Date	11/2/2009	11/2/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
Toluene	5,000,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
trans-1,2-Dichloroethene	150,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
5 trans-1,3-Dichloropropene	1,700	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Trichloroethene	2,800	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Vinyl chloride	60	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1)	ND (5.4)	ND (5.3)	ND (5.6)	ND (4.9)	---
Xylenes, m & p	3,400,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Xylenes, o	3,800,000	µg/kg	ND (5.3)	ND (5.3)	ND (5.9)	ND (5.3)	ND (4.9)	ND (4.6)	ND (4.9)	ND (5)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.1) J	ND (5.4) J	ND (5.3)	ND (5.6)	ND (4.9)	---
Semivolatile Organic Compounds																			
1,1'-Biphenyl	3,900,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
1,2,4,5-Tetrachlorobenzene	18,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,2'-Oxybis(1-Chloropropane)	4,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,3,4,6-Tetrachlorophenol	1,800,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,4,5-Trichlorophenol	6,100,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,4,6-Trichlorophenol	44,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,4-Dichlorophenol	180,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,4-Dimethylphenol	1,200,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,4-Dinitrophenol	120,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
2,4-Dinitrotoluene	1,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2,6-Dinitrotoluene	61,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2-Chloronaphthalene	6,300,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2-Chlorophenol	390,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2-Methylnaphthalene	310,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2-Methylphenol	3,100,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
2-Nitroaniline	610,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
2-Nitrophenol	NE	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
3,3'-Dichlorobenzidine	1,100	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
6 3-Nitroaniline	24,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
4,6-Dinitro-2-methylphenol	4,900	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
4-Bromophenylphenyl ether	NE	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
7 4-Chloro-3-methylphenol	3,100,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
4-Chloroaniline	2,400	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
4-Methylphenol	310,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
4-Nitroaniline	24,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
8 4-Nitrophenol	120,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)	ND (380)	ND (400)	ND (390)	ND (390)	ND (350)	ND (390)	ND (380)	ND (390)
Acenaphthene	3,400,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
9 Acenaphthylene	1,700,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Acetophenone	7,800,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Anthracene	17,000,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Atrazine	2,100	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Benzaldehyde	7,800,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Benzo(a)anthracene	150	µg/kg	ND (200)	ND (200) J	41 J	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Benzo(a)pyrene	15	µg/kg	ND (200)	ND (200)	59 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Benzo(b)fluoranthene	150	µg/kg	ND (200)	ND (200)	73 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
10 Benzo(g,h,i)perylene	1,700,000	µg/kg	ND (200)	ND (200)	60 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180) J	ND (200)	ND (200) J	ND (200)
Benzo(k)fluoranthene	1,500	µg/kg	ND (200)	ND (200)	30 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Benzyl butyl phthalate	260,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
bis(2-Chloroethoxy)methane	180,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
bis(2-Chloroethyl)ether	210	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
bis(2-Ethylhexyl)phthalate	35,000	µg/kg	21 J	37 J	130 J	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	27 J	22 J

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-09D 0.5 ft bgs	RMW-09D 0.5 ft bgs (FD)	RMW-09D 5 ft bgs	RMW-09D 10 ft bgs	RMW-09D 15 ft bgs	RMW-09D 20 ft bgs	RMW-09D 20 ft bgs (FD)	RMW-09D 30 ft bgs	RMW-09D 40 ft bgs
Sample Date			11/2/2009	11/2/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009	11/3/2009
Analyte	RSL	Units	Analytical Results								
Semivolatile Organic Compounds											
Caprolactam	31,000,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Carbazole	NE	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Chrysene	15,000	µg/kg	ND (200)	ND (200) J	53 J	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Dibenz(a,h)anthracene	15	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Dibenzofuran	78,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Diethylphthalate	49,000,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Dimethylphthalate	NE	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Di-n-butyl phthalate	6,100,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Di-n-octyl phthalate	NE	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Fluoranthene	2,300,000	µg/kg	ND (200)	ND (200) J	70 J	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Fluorene	2,300,000	µg/kg	ND (200)	ND (200) J	ND (210)	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Hexachlorobenzene	300	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Hexachlorobutadiene	6,200	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Hexachloroethane	35,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (200)	ND (200)	44 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Isophorone	510,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Naphthalene	3,600	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Nitrobenzene	4,800	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Pentachlorophenol	3,000	µg/kg	ND (380)	ND (390)	ND (410)	ND (390)	ND (390)	ND (380)	ND (400)	ND (390)	ND (400)
11 Phenanthrene	1,700,000	µg/kg	ND (200)	ND (200)	35 J	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Phenol	18,000,000	µg/kg	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	200 J
Pyrene	1,700,000	µg/kg	ND (200)	ND (200) J	91 J	ND (200) J	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)
Total Petroleum Hydrocarbons											
Diesel c10-c24	NE	mg/kg	13 J	12 J	56 J	ND (0.8) J	2.3 J	ND (0.3) J	ND (0.4) J	ND (0.39) J	ND (0.38) J
Gasoline c6-c10	NE	mg/kg	ND (0.016) J	ND (0.011)	0.021 J	0.022 J	0.039 J	0.01 J	0.012 J	0.013 J	0.0088 J

Sample Location			RMW-09D 50 ft bgs	RMW-09D 60 ft bgs	RMW-09D 70 ft bgs	RMW-09D 77 ft bgs	RMW-16D 20 ft bgs	RMW-16D 20 ft bgs (FD)	RMW-16D 25 ft bgs	RMW-16D 30 ft bgs
Sample Date			11/3/2009	11/3/2009	11/3/2009	11/3/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009
Analyte	RSL	Units	Analytical Results							
Semivolatile Organic Compounds										
Caprolactam	31,000,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Carbazole	NE	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Chrysene	15,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Dibenz(a,h)anthracene	15	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Dibenzofuran	78,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Diethylphthalate	49,000,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Dimethylphthalate	NE	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Di-n-butyl phthalate	6,100,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Di-n-octyl phthalate	NE	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Fluoranthene	2,300,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Fluorene	2,300,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Hexachlorobenzene	300	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Hexachlorobutadiene	6,200	µg/kg	ND (200)	ND (200) J	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Hexachloroethane	35,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Isophorone	510,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Naphthalene	3,600	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Nitrobenzene	4,800	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Pentachlorophenol	3,000	µg/kg	ND (380)	ND (400) J	ND (390)	ND (390)	ND (350) J	ND (390)	ND (380) J	ND (390)
11 Phenanthrene	1,700,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Phenol	18,000,000	µg/kg	ND (200)	ND (200)	210	300	ND (180)	ND (200)	ND (200)	ND (200)
Pyrene	1,700,000	µg/kg	ND (200)	ND (200)	ND (200)	ND (200)	ND (180)	ND (200)	ND (200)	ND (200)
Total Petroleum Hydrocarbons										
Diesel c10-c24	NE	mg/kg	ND (0.46) J	ND (0.15)	ND (0.44) J	ND (0.38) J	ND (0.43) J	ND (0.31) J	ND (0.42) J	ND (0.43) J
Gasoline c6-c10	NE	mg/kg	0.017 J	0.0076 J	0.0093 J	0.011 J	ND (0.015) J	ND (0.016) J	ND (0.017) J	ND (0.022) J

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-16D 35 ft bgs	RMW-16D 40 ft bgs	RMW-16D 45 ft bgs	RMW-16D 50 ft bgs	RMW-16D 55 ft bgs	RMW-16D 60 ft bgs	RMW-16M 20 ft bgs	RMW-16M 20 ft bgs (FD)	RMW-16M 25 ft bgs	RMW-16M 30 ft bgs	RMW-16M 35 ft bgs	RMW-17D 21 ft bgs	RMW-17D 21 ft bgs (FD)	RMW-17D 31 ft bgs	RMW-17D 41 ft bgs	RMW-17D 51 ft bgs	RMW-17D 61 ft bgs
Sample Date			10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
1,1,1-Trichloroethane	8,700,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,1,2,2-Tetrachloroethane	560	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,1,2-Trichloroethane	1,100	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,1-Dichloroethane	3,300	µg/kg	4.8 J	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	0.73 J	1 J	1.6 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,1-Dichloroethene	240,000	µg/kg	ND (5)	0.87 J	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2,3-Trichlorobenzene	49,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2,4-Trichlorobenzene	22,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2,4-Trimethylbenzene	62,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2-Dibromo-3-chloropropane	5.4	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2-Dibromoethane	34	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2-Dichlorobenzene	1,900,000	µg/kg	3.4 J	3 J	1.2 J	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	1.3 J	0.81 J	1.1 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2-Dichloroethane	430	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,2-Dichloropropane	890	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,3,5-Trimethylbenzene	780,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,3-Dichlorobenzene	NE	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,4-Dichlorobenzene	2,400	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	0.9 J	0.64 J	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
1,4-Dioxane (p-dioxane)	44,000	µg/kg	ND (100) R	ND (100) R	ND (100) R	ND (110) R	ND (100) R	ND (130) R	ND (95) R	ND (97) R	ND (110) R	ND (110) R	ND (100) J	ND (100) R	ND (99) R	ND (100) R	ND (110) R	ND (90) R	ND (100) R
2-Hexanone	210,000	µg/kg	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
Acetone	61,000,000	µg/kg	ND (10)	ND (10)	23	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
Benzene	1,100	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Bromochloromethane	NE	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Bromodichloromethane	270	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Bromoform	61,000	µg/kg	ND (5) J	ND (5.1) J	ND (5) J	ND (5.4) J	ND (5.1) J	ND (6.4) J	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Bromomethane	7,300	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Carbon disulfide	820,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Carbon tetrachloride	610	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Chlorobenzene	290,000	µg/kg	4.8 J	3.8 J	1.6 J	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	0.73 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Chloroethane	15,000,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Chloroform	290	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4) J	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Chloromethane	120,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
cis-1,2-Dichloroethene	780,000	µg/kg	3.2 J	1.2 J	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	2.1 J	1.2 J	2 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
[1] cis-1,3-Dichloropropene	1,700	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Cyclohexane	7,000,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Dibromochloromethane	680	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
[2] Ethyl tert-butyl ether	43,000	µg/kg	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
Ethylbenzene	5,400	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Freon 11	790,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Freon 12	180,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Freon 113	43,000,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Isopropylbenzene (cumene)	2,100,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Methyl acetate	78,000,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Methyl ethyl ketone	28,000,000	µg/kg	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
Methyl isobutyl ketone	5,300,000	µg/kg	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
Methyl tert-butyl ether	43,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Methylcyclohexane	NE	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Methylene chloride	11,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Styrene	6,300,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
[3] tert-Amyl methyl ether	43,000	µg/kg	ND (10)	ND (10)	ND (10)	ND (11)	ND (10)	ND (13)	ND (9.5)	ND (9.7)	ND (11)	ND (11)	ND (10)	ND (10)	ND (9.9)	ND (10)	ND (11)	ND (9)	ND (10)
[4] tert-Butyl alcohol	160,000,000	µg/kg	ND (50)	ND (51)	ND (50)	ND (54)	ND (51)	ND (64)	ND (47)	ND (49)	ND (53)	ND (54)	ND (52)	ND (50)	ND (50)	ND (51)	ND (53)	ND (45)	ND (52)
Tetrachloroethene	550	µg/kg	0.61 J	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	0.77 J	ND (5.4)	0.69 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Sample Location			RMW-16D 35 ft bgs	RMW-16D 40 ft bgs	RMW-16D 45 ft bgs	RMW-16D 50 ft bgs	RMW-16D 55 ft bgs	RMW-16D 60 ft bgs	RMW-16M 20 ft bgs	RMW-16M 20 ft bgs (FD)	RMW-16M 25 ft bgs	RMW-16M 30 ft bgs	RMW-16M 35 ft bgs	RMW-17D 21 ft bgs	RMW-17D 21 ft bgs (FD)	RMW-17D 31 ft bgs	RMW-17D 41 ft bgs	RMW-17D 51 ft bgs	RMW-17D 61 ft bgs
Sample Date			10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009
Analyte	RSL	Units	Analytical Results																
Volatile Organic Compounds																			
Toluene	5,000,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4) J	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5) J	ND (5)	6.7	5.9	ND (4.5)	5.9 J
trans-1,2-Dichloroethene	150,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
5 trans-1,3-Dichloropropene	1,700	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Trichloroethene	2,800	µg/kg	0.6 J	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	0.86 J	0.56 J	0.6 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Vinyl chloride	60	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	0.84 J	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Xylenes, m & p	3,400,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Xylenes, o	3,800,000	µg/kg	ND (5)	ND (5.1)	ND (5)	ND (5.4)	ND (5.1)	ND (6.4)	ND (4.7)	ND (4.9)	ND (5.3)	ND (5.4)	ND (5.2)	ND (5)	ND (5)	ND (5.1)	ND (5.3)	ND (4.5)	ND (5.2)
Semivolatile Organic Compounds																			
1,1'-Biphenyl	3,900,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
1,2,4,5-Tetrachlorobenzene	18,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,2'-Oxybis(1-Chloropropane)	4,600	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,3,4,6-Tetrachlorophenol	1,800,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,4,5-Trichlorophenol	6,100,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,4,6-Trichlorophenol	44,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,4-Dichlorophenol	180,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,4-Dimethylphenol	1,200,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,4-Dinitrophenol	120,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
2,4-Dinitrotoluene	1,600	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2,6-Dinitrotoluene	61,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2-Chloronaphthalene	6,300,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2-Chlorophenol	390,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2-Methylnaphthalene	310,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2-Methylphenol	3,100,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
2-Nitroaniline	610,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
2-Nitrophenol	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
3,3'-Dichlorobenzidine	1,100	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
6 3-Nitroaniline	24,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
4,6-Dinitro-2-methylphenol	4,900	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
4-Bromophenylphenyl ether	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
7 4-Chloro-3-methylphenol	3,100,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
4-Chloroaniline	2,400	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
4-Methylphenol	310,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
4-Nitroaniline	24,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
8 4-Nitrophenol	120,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410)	ND (380)	ND (380)	ND (350)
Acenaphthene	3,400,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
9 Acenaphthylene	1,700,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Acetophenone	7,800,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Anthracene	17,000,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Atrazine	2,100	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzaldehyde	7,800,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzo(a)anthracene	150	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzo(a)pyrene	15	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzo(b)fluoranthene	150	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
10 Benzo(g,h,i)perylene	1,700,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzo(k)fluoranthene	1,500	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Benzyl butyl phthalate	260,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
bis(2-Chloroethoxy)methane	180,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
bis(2-Chloroethyl)ether	210	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
bis(2-Ethylhexyl)phthalate	35,000	µg/kg	25 J	30 J	93 J	37 J	30 J	61 J	ND (190)	28 J	ND (200)	ND (210)	29 J	53 J	ND (200)	47 J	36 J	55 J	58 J

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-16D	RMW-16D	RMW-16D	RMW-16D	RMW-16D	RMW-16D	RMW-16M	RMW-16M	RMW-16M	RMW-16M	RMW-16M	RMW-17D	RMW-17D	RMW-17D	RMW-17D	RMW-17D	RMW-17D
			35 ft bgs	40 ft bgs	45 ft bgs	50 ft bgs	55 ft bgs	60 ft bgs	20 ft bgs	20 ft bgs (FD)	25 ft bgs	30 ft bgs	35 ft bgs	21 ft bgs	21 ft bgs (FD)	31 ft bgs	41 ft bgs	51 ft bgs	61 ft bgs
		Sample Date	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/21/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/22/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009	10/27/2009
Analyte	**RSL**	**Units**	**Analytical Results**																
Semivolatile Organic Compounds																			
Caprolactam	31,000,000	µg/kg	ND (180)	ND (190)	62 J	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Carbazole	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Chrysene	15,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Dibenz(a,h)anthracene	15	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Dibenzofuran	78,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Diethylphthalate	49,000,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Dimethylphthalate	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Di-n-butyl phthalate	6,100,000	µg/kg	ND (180)	ND (190)	ND (180)	19 J	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	41 J	ND (180)
Di-n-octyl phthalate	NE	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Fluoranthene	2,300,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Fluorene	2,300,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Hexachlorobenzene	300	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Hexachlorobutadiene	6,200	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Hexachloroethane	35,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Isophorone	510,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Naphthalene	3,600	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Nitrobenzene	4,800	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Pentachlorophenol	3,000	µg/kg	ND (360)	ND (360)	ND (340)	ND (330)	ND (370)	ND (390)	ND (380)	ND (400)	ND (380)	ND (400)	ND (390)	ND (400)	ND (390)	ND (410) J	ND (380) J	ND (380) J	ND (350) J
11 Phenanthrene	1,700,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Phenol	18,000,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Pyrene	1,700,000	µg/kg	ND (180)	ND (190)	ND (180)	ND (170)	ND (190)	ND (200)	ND (190)	ND (200)	ND (200)	ND (210)	ND (200)	ND (200)	ND (200)	ND (210)	ND (200)	ND (190)	ND (180)
Total Petroleum Hydrocarbons																			
Diesel c10-c24	NE	mg/kg	ND (0.45) J	ND (0.28) J	ND (0.5) J	ND (0.47) J	ND (0.48) J	ND (0.43) J	ND (0.3)	ND (0.33)	ND (0.31)	ND (0.32)	ND (0.32)	0.24 J	ND (0.23)	7.2 J	1.2 J	0.46 J	0.35 J
Gasoline c6-c10	NE	mg/kg	ND (0.021) J	ND (0.028) J	ND (0.02) J	ND (0.018) J	ND (0.013) J	ND (0.019) J	ND (0.011) J	ND (0.015) J	ND (0.017) J	ND (0.011) J	ND (0.015) J	ND (0.017) J	ND (0.017) J	ND (0.015) J	ND (0.018) J	ND (0.017) J	ND (0.019) J

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 71 ft bgs	RMW-17D 81 ft bgs	RMW-17M 21 ft bgs	RMW-17M 31 ft bgs	RMW-17M 36 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009	10/26/2009
Analyte	RSL	Units	Analytical Results				
Volatile Organic Compounds							
1,1,1-Trichloroethane	8,700,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,1,2,2-Tetrachloroethane	560	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,1,2-Trichloroethane	1,100	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,1-Dichloroethane	3,300	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,1-Dichloroethene	240,000	µg/kg	ND (5.1)	ND (4.6)	0.74 J	ND (5.7)	0.81 J
1,2,3-Trichlorobenzene	49,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2,4-Trichlorobenzene	22,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2,4-Trimethylbenzene	62,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2-Dibromo-3-chloropropane	5.4	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2-Dibromoethane	34	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2-Dichlorobenzene	1,900,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2-Dichloroethane	430	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,2-Dichloropropane	890	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,3,5-Trimethylbenzene	780,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,3-Dichlorobenzene	NE	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,4-Dichlorobenzene	2,400	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1,4-Dioxane (p-dioxane)	44,000	µg/kg	ND (100) R	ND (92) R	ND (98) R	ND (110) R	ND (110) R
2-Hexanone	210,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
Acetone	61,000,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
Benzene	1,100	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Bromochloromethane	NE	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Bromodichloromethane	270	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Bromoform	61,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Bromomethane	7,300	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Carbon disulfide	820,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Carbon tetrachloride	610	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Chlorobenzene	290,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Chloroethane	15,000,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Chloroform	290	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Chloromethane	120,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
cis-1,2-Dichloroethene	780,000	µg/kg	0.53 J	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
1 cis-1,3-Dichloropropene	1,700	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Cyclohexane	7,000,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Dibromochloromethane	680	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
2 Ethyl tert-butyl ether	43,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
Ethylbenzene	5,400	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Freon 11	790,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Freon 12	180,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Freon 113	43,000,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Isopropylbenzene (cumene)	2,100,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Methyl acetate	78,000,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Methyl ethyl ketone	28,000,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
Methyl isobutyl ketone	5,300,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
Methyl tert-butyl ether	43,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Methylcyclohexane	NE	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Methylene chloride	11,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Styrene	6,300,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
3 tert-Amyl methyl ether	43,000	µg/kg	ND (10)	ND (9.2)	ND (9.8)	ND (11)	ND (11)
4 tert-Butyl alcohol	160,000,000	µg/kg	ND (51)	ND (46)	ND (49)	ND (57)	ND (53)
Tetrachloroethene	550	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 71 ft bgs	RMW-17D 81 ft bgs	RMW-17M 21 ft bgs	RMW-17M 31 ft bgs	RMW-17M 36 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009	10/26/2009
Analyte	**RSL**	**Units**	**Analytical Results**				
Volatile Organic Compounds							
Toluene	5,000,000	µg/kg	ND (5.1)	4.9	ND (4.6)	ND (5.7)	ND (5.3)
trans-1,2-Dichloroethene	150,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
5 trans-1,3-Dichloropropene	1,700	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Trichloroethene	2,800	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Vinyl chloride	60	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Xylenes, m & p	3,400,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Xylenes, o	3,800,000	µg/kg	ND (5.1)	ND (4.6)	ND (4.9)	ND (5.7)	ND (5.3)
Semivolatile Organic Compounds							
1,1'-Biphenyl	3,900,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
1,2,4,5-Tetrachlorobenzene	18,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,2'-Oxybis(1-Chloropropane)	4,600	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,3,4,6-Tetrachlorophenol	1,800,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,4,5-Trichlorophenol	6,100,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,4,6-Trichlorophenol	44,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,4-Dichlorophenol	180,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,4-Dimethylphenol	1,200,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,4-Dinitrophenol	120,000	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
2,4-Dinitrotoluene	1,600	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2,6-Dinitrotoluene	61,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2-Chloronaphthalene	6,300,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2-Chlorophenol	390,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2-Methylnaphthalene	310,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2-Methylphenol	3,100,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
2-Nitroaniline	610,000	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
2-Nitrophenol	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
3,3'-Dichlorobenzidine	1,100	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
6 3-Nitroaniline	24,000	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
4,6-Dinitro-2-methylphenol	4,900	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
4-Bromophenylphenyl ether	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
7 4-Chloro-3-methylphenol	3,100,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
4-Chloroaniline	2,400	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
4-Chlorophenylphenyl ether	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
4-Methylphenol	310,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
4-Nitroaniline	24,000	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
8 4-Nitrophenol	120,000	µg/kg	ND (350)	---	ND (390)	ND (420)	ND (400)
Acenaphthene	3,400,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
9 Acenaphthylene	1,700,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Acetophenone	7,800,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Anthracene	17,000,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Atrazine	2,100	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzaldehyde	7,800,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzo(a)anthracene	150	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzo(a)pyrene	15	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzo(b)fluoranthene	150	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
10 Benzo(g,h,i)perylene	1,700,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzo(k)fluoranthene	1,500	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Benzyl butyl phthalate	260,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
bis(2-Chloroethoxy)methane	180,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
bis(2-Chloroethyl)ether	210	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
bis(2-Ethylhexyl)phthalate	35,000	µg/kg	26 J	---	ND (200)	ND (210)	ND (210)

TABLE 4-41
Well Installation Soil Analytical Results (September - October 2009) Compared to Residential Regional Screening Levels (Organics Only)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

		Sample Location	RMW-17D 71 ft bgs	RMW-17D 81 ft bgs	RMW-17M 21 ft bgs	RMW-17M 31 ft bgs	RMW-17M 36 ft bgs
		Sample Date	10/27/2009	10/27/2009	10/26/2009	10/26/2009	10/26/2009
Analyte	RSL	Units	Analytical Results				
Semivolatile Organic Compounds							
Caprolactam	31,000,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Carbazole	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Chrysene	15,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Dibenz(a,h)anthracene	15	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Dibenzofuran	78,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Diethylphthalate	49,000,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Dimethylphthalate	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Di-n-butyl phthalate	6,100,000	µg/kg	34 J	---	ND (200)	ND (210)	ND (210)
Di-n-octyl phthalate	NE	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Fluoranthene	2,300,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Fluorene	2,300,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Hexachlorobenzene	300	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Hexachlorobutadiene	6,200	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Hexachlorocyclopentadiene	370,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Hexachloroethane	35,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Indeno(1,2,3-c,d)pyrene	150	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Isophorone	510,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Naphthalene	3,600	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Nitrobenzene	4,800	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
N-Nitrosodi-n-propylamine	69	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
N-Nitrosodiphenylamine	99,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Pentachlorophenol	3,000	µg/kg	ND (350) J	---	ND (390)	ND (420)	ND (400)
11 Phenanthrene	1,700,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Phenol	18,000,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Pyrene	1,700,000	µg/kg	ND (180)	---	ND (200)	ND (210)	ND (210)
Total Petroleum Hydrocarbons							
Diesel c10-c24	NE	mg/kg	0.39 J	0.28 J	ND (0.25)	4.9 J	ND (1.6) J
Gasoline c6-c10	NE	mg/kg	ND (0.022) J	ND (0.023) J	ND (0.011) J	ND (0.014) J	ND (0.014) J

[1] 1,3-Dichloropropene was used as the surrogate
[2] Methyl tertbutyl ether (MTBE) was used as the surrogate
[3] Methyl tertbutyl ether (MTBE) was used as the surrogate
[4] sec-butyl alcohol was used as the surrogate
[5] 1,3-Dichloropropene was used as the surrogate
[6] 4-Nitroaniline used as the surrogate
[7] 3-methylphenol was used as the surrogate
[8] 2,4-Dinitrophenol was used as the surrogate
[9] Pyrene was used as the surrogate
[10] Pyrene was used as the surrogate
[11] Pyrene was used as the surrogate
[12] Chlordane was used as the surrogate
[13] alpha-BHC was used as the surrogate
[14] Endosulfan was used as the surrogate
[15] Endosulfan was used as the surrogate
[16] Endosulfan was used as the surrogate
[17] Endrin was used as the surrogate
[18] Endrin was used as the surrogate
[19] Chlordane was used as the surrogate

Results greater than the screening level are bolded.
Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations).

RSL	Residential Screening Level
ft bgs	feet below ground surface
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
--	not analyzed
NE	not established
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
R	rejected for failure to meet quality control requirements

TABLE 4-42
Residential Soil Results Summary (October 2009)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential Soil Levels	Screening Levels[1]
4,4'-DDD	mg/kg	0.000055 - 8.6	2
4,4'-DDE	mg/kg	0.000045 - 1.8	1.4
Aroclor-1254	mg/kg	< 0.035 - 2.1	0.22
Arsenic *	mg/kg	1 - 56.3	0.39 / 22
Benzo(a)pyrene	mg/kg	0.022 - < 0.24	0.015
Benzo(b)fluoranthene	mg/kg	0.019 - < 0.24	0.15
Cobalt	mg/kg	3.8 - 25.8	23
Iron	mg/kg	8070 - 66100	55000
Lead **	mg/kg	2.1 - 810	80

Notes:

Only compounds detected above screening levels are shown

(1) EPA Regional Screening Levels for residential soil, May 2010.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

mg/kg milligrams per kilogram

TABLE 4-43
1432 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Fig	none			
Metals					
Arsenic *	ND (0.06)	NC	NC	0.062 / 22	mg/kg
Chromium	0.79	NC	NC	210	mg/kg
Lead **	0.28	NC	NC	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.02)	NC	NC	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.025)	NC	NC	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.018)	NC	NC	1.1	mg/kg
1,1-Dichloroethane	ND (0.017)	NC	NC	3.3	mg/kg
1,1-Dichloroethene	ND (0.022)	NC	NC	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.039)	NC	NC	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.026)	NC	NC	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.18)	NC	NC	0.0054	mg/kg
1,2-Dibromoethane	ND (0.013)	NC	NC	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.016)	NC	NC	1,900	mg/kg
1,2-Dichloroethane	ND (0.021)	NC	NC	0.43	mg/kg
1,2-Dichloropropane	ND (0.034)	NC	NC	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.019)	NC	NC	530	mg/kg
1,4-Dichlorobenzene	ND (0.016)	NC	NC	2.4	mg/kg
2-Hexanone	ND (0.71)	NC	NC	210	mg/kg
Acetone	ND (0.41)	NC	NC	61,000	mg/kg
Benzene	ND (0.019)	NC	NC	1.1	mg/kg
Bromochloromethane	ND (0.023)	NC	NC	NE	mg/kg
Bromodichloromethane	ND (0.016)	NC	NC	0.27	mg/kg
Bromoform	ND (0.05)	NC	NC	61	mg/kg
Bromomethane	ND (0.039)	NC	NC	7.3	mg/kg
Carbon disulfide	ND (0.029)	NC	NC	820	mg/kg
Carbon tetrachloride	ND (0.022)	NC	NC	0.61	mg/kg
Chlorobenzene	ND (0.017)	NC	NC	290	mg/kg
Chloroethane	ND (0.031)	NC	NC	15,000	mg/kg
Chloroform	ND (0.018)	NC	NC	0.29	mg/kg
Chloromethane	ND (0.025)	NC	NC	120	mg/kg
cis-1,2-Dichloroethene	ND (0.021)	NC	NC	780	mg/kg
cis-1,3-Dichloropropene	ND (0.015)	NC	NC	1.7	mg/kg
Cyclohexane	ND (0.018)	NC	NC	7,000	mg/kg
Dibromochloromethane	ND (0.015)	NC	NC	0.68	mg/kg
Ethylbenzene	ND (0.018)	NC	NC	5.4	mg/kg
Freon 11	ND (0.024)	NC	NC	790	mg/kg
Freon 113	ND (0.022)	NC	NC	43,000	mg/kg
Freon 12	ND (0.03)	NC	NC	180	mg/kg
Isopropylbenzene (cumene)	ND (0.013)	NC	NC	2,100	mg/kg
Methyl acetate	0.053 J	NC	NC	78,000	mg/kg
Methyl ethyl ketone	ND (0.58)	NC	NC	28,000	mg/kg
Methyl isobutyl ketone	ND (0.5)	NC	NC	5,300	mg/kg
Methyl tert-butyl ether	ND (0.014)	NC	NC	43	mg/kg
Methylcyclohexane	ND (0.011)	NC	NC	2,600	mg/kg
Methylene chloride	ND (0.035)	NC	NC	11	mg/kg
Styrene	ND (0.017)	NC	NC	6,300	mg/kg
tert-Butyl alcohol	ND (0.19) R	NC	NC	160,000	mg/kg
Tetrachloroethene	ND (0.02)	NC	NC	0.55	mg/kg
Toluene	ND (0.018)	NC	NC	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.025)	NC	NC	150	mg/kg
trans-1,3-Dichloropropene	ND (0.016)	NC	NC	1.7	mg/kg
Trichloroethene	ND (0.034)	NC	NC	2.8	mg/kg
Vinyl chloride	ND (0.038)	NC	NC	0.06	mg/kg
Xylenes, total	ND (0.034)	NC	NC	630	mg/kg

TABLE 4-43
1432 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Grape	1432SSc			
Metals					
Arsenic *	ND (0.06)	**13.8**	**7.6**	0.062 / 22	mg/kg
Chromium	0.44	62.6 J	53	210	mg/kg
Lead **	0.86	**2,280 J**	**983**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.02)	ND (0.0036)	ND (0.0032)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.025)	ND (0.0036)	ND (0.0032)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.018)	ND (0.0036)	ND (0.0032)	1.1	mg/kg
1,1-Dichloroethane	ND (0.017)	ND (0.0036)	ND (0.0032)	3.3	mg/kg
1,1-Dichloroethene	ND (0.022)	ND (0.0036)	ND (0.0032)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.04)	ND (0.0036)	ND (0.0032)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.026)	ND (0.0036)	ND (0.0032)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.18)	ND (0.015)	ND (0.013)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.014)	ND (0.0036)	ND (0.0032)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.016)	ND (0.0036)	ND (0.0032)	1,900	mg/kg
1,2-Dichloroethane	ND (0.021)	ND (0.0036)	ND (0.0032)	0.43	mg/kg
1,2-Dichloropropane	ND (0.035)	ND (0.0036)	ND (0.0032)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.019)	ND (0.0036)	ND (0.0032)	530	mg/kg
1,4-Dichlorobenzene	ND (0.016)	ND (0.0036)	ND (0.0032)	2.4	mg/kg
2-Hexanone	ND (0.72)	ND (0.029)	ND (0.025)	210	mg/kg
Acetone	ND (0.42)	ND (0.029) J	ND (0.025) J	61,000	mg/kg
Benzene	ND (0.019)	ND (0.0036)	ND (0.0032)	1.1	mg/kg
Bromochloromethane	ND (0.023)	ND (0.0036)	ND (0.0032)	NE	mg/kg
Bromodichloromethane	ND (0.016)	ND (0.0036)	ND (0.0032)	0.27	mg/kg
Bromoform	ND (0.051)	ND (0.0036) J	ND (0.0032) J	61	mg/kg
Bromomethane	ND (0.04)	ND (0.0036)	ND (0.0032)	7.3	mg/kg
Carbon disulfide	ND (0.029)	ND (0.0036)	ND (0.0032)	820	mg/kg
Carbon tetrachloride	ND (0.023)	ND (0.0036)	ND (0.0032)	0.61	mg/kg
Chlorobenzene	ND (0.017)	ND (0.0036)	ND (0.0032)	290	mg/kg
Chloroethane	ND (0.032)	ND (0.0036)	ND (0.0032)	15,000	mg/kg
Chloroform	ND (0.018)	ND (0.0036)	ND (0.0032)	0.29	mg/kg
Chloromethane	ND (0.025)	ND (0.0036)	ND (0.0032)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.021)	ND (0.0036)	ND (0.0032)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.015)	ND (0.0036)	ND (0.0032)	1.7	mg/kg
Cyclohexane	ND (0.018)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.015)	ND (0.0036) J	ND (0.0032) J	0.68	mg/kg
Ethylbenzene	ND (0.018)	ND (0.0036)	ND (0.0032)	5.4	mg/kg
Freon 11	ND (0.024)	0.017	0.003 J	790	mg/kg
Freon 113	ND (0.022)	ND (0.0036)	ND (0.0032)	43,000	mg/kg
Freon 12	ND (0.03)	ND (0.0036)	ND (0.0032)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.013)	ND (0.0036)	ND (0.0032)	2,100	mg/kg
Methyl acetate	ND (0.017)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.58)	ND (0.029)	ND (0.025)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.51)	ND (0.029)	ND (0.025)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.014)	ND (0.015)	ND (0.013)	43	mg/kg
Methylcyclohexane	ND (0.011)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.035)	ND (0.0036)	ND (0.0032)	11	mg/kg
Styrene	ND (0.017)	ND (0.0036)	ND (0.0032)	6,300	mg/kg
tert-Butyl alcohol	ND (0.19) R	ND (0.073)	ND (0.063)	160,000	mg/kg
Tetrachloroethene	ND (0.02)	ND (0.0036)	ND (0.0032)	0.55	mg/kg
Toluene	ND (0.018)	ND (0.0036)	ND (0.0032)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.025)	ND (0.0036)	ND (0.0032)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.016)	ND (0.0036)	ND (0.0032)	1.7	mg/kg
Trichloroethene	ND (0.034)	ND (0.0036)	ND (0.0032)	2.8	mg/kg
Vinyl chloride	ND (0.038)	ND (0.0036)	ND (0.0032)	0.06	mg/kg
Xylenes, total	ND (0.034)	ND (0.0073)	ND (0.0063)	630	mg/kg

TABLE 4-43
1432 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Pomegranate	1432SSa			
Metals						
	Arsenic *	**0.08**	**7.8**	**8.1**	0.062 / 22	mg/kg
	Chromium	0.49	13.2	19.8	210	mg/kg
	Lead **	0.16	**1,060**	**524 J+**	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.02)	ND (0.0033)	ND (0.0031)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.025)	ND (0.0033)	ND (0.0031)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.018)	ND (0.0033)	ND (0.0031)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.016)	ND (0.0033)	ND (0.0031)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.021)	ND (0.0033)	ND (0.0031)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.039)	ND (0.0033)	ND (0.0031)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.025)	ND (0.0033)	ND (0.0031)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.18)	ND (0.0065)	ND (0.0062)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.013)	ND (0.0033)	ND (0.0031)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0031)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.021)	ND (0.0033)	ND (0.0031)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.034)	ND (0.0033)	ND (0.0031)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.018)	ND (0.0033)	ND (0.0031)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.016)	ND (0.0033)	ND (0.0031)	2.4	mg/kg
	2-Hexanone	ND (0.7)	ND (0.026)	ND (0.025)	210	mg/kg
	Acetone	ND (0.41)	ND (0.013)	ND (0.012)	61,000	mg/kg
	Benzene	ND (0.019)	ND (0.0033)	ND (0.0031)	1.1	mg/kg
	Bromochloromethane	ND (0.023)	ND (0.0033)	ND (0.0031)	NE	mg/kg
	Bromodichloromethane	ND (0.015)	ND (0.0033)	ND (0.0031)	0.27	mg/kg
	Bromoform	ND (0.05)	ND (0.0033)	ND (0.0031)	61	mg/kg
	Bromomethane	ND (0.039)	ND (0.0033)	ND (0.0031)	7.3	mg/kg
	Carbon disulfide	ND (0.029)	ND (0.0033)	ND (0.0031)	820	mg/kg
	Carbon tetrachloride	ND (0.022)	ND (0.0033)	ND (0.0031)	0.61	mg/kg
	Chlorobenzene	ND (0.017)	ND (0.0033)	ND (0.0031)	290	mg/kg
	Chloroethane	ND (0.031)	ND (0.0016)	ND (0.0016)	15,000	mg/kg
	Chloroform	ND (0.017)	ND (0.0033)	ND (0.0031)	0.29	mg/kg
	Chloromethane	ND (0.024)	ND (0.0033)	ND (0.0031)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.021)	ND (0.0033)	ND (0.0031)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.015)	ND (0.0033)	ND (0.0031)	1.7	mg/kg
	Cyclohexane	ND (0.018)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.015)	ND (0.0033)	ND (0.0031)	0.68	mg/kg
	Ethylbenzene	ND (0.018)	ND (0.0033)	ND (0.0031)	5.4	mg/kg
	Freon 11	ND (0.024)	0.0045	0.0052	790	mg/kg
	Freon 113	ND (0.022)	ND (0.0033)	ND (0.0031)	43,000	mg/kg
	Freon 12	ND (0.03)	ND (0.0033)	ND (0.0031)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.012)	ND (0.0033)	ND (0.0031)	2,100	mg/kg
	Methyl acetate	ND (0.017)	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.57)	ND (0.026)	ND (0.025)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.5)	ND (0.026)	ND (0.025)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.013)	ND (0.013)	ND (0.012)	43	mg/kg
	Methylcyclohexane	ND (0.011)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.035)	ND (0.0033)	ND (0.0031)	11	mg/kg
	Styrene	ND (0.017)	ND (0.0033)	ND (0.0031)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.19) R	ND (0.065)	ND (0.062)	160,000	mg/kg
	Tetrachloroethene	ND (0.02)	ND (0.0033)	ND (0.0031)	0.55	mg/kg
	Toluene	ND (0.018)	ND (0.0033)	ND (0.0031)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.025)	ND (0.0033)	ND (0.0031)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.016)	ND (0.0033)	ND (0.0031)	1.7	mg/kg
	Trichloroethene	ND (0.034)	ND (0.0033)	ND (0.0031)	2.8	mg/kg
	Vinyl chloride	ND (0.038)	ND (0.0033)	ND (0.0031)	0.06	mg/kg
	Xylenes, total	ND (0.033)	ND (0.0065)	ND (0.0062)	630	mg/kg

TABLE 4-43
1432 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Tomato	1432SSc			
Metals					
Arsenic *	ND (0.06)	**13.8**	**7.6**	0.062 / 22	mg/kg
Chromium	0.88	62.6 J	53	210	mg/kg
Lead **	0.75	**2,280 J**	**983**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.022)	ND (0.0036)	ND (0.0032)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.028)	ND (0.0036)	ND (0.0032)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.02)	ND (0.0036)	ND (0.0032)	1.1	mg/kg
1,1-Dichloroethane	ND (0.018)	ND (0.0036)	ND (0.0032)	3.3	mg/kg
1,1-Dichloroethene	ND (0.024)	ND (0.0036)	ND (0.0032)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.043)	ND (0.0036)	ND (0.0032)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.028)	ND (0.0036)	ND (0.0032)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.2)	ND (0.015)	ND (0.013)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.015)	ND (0.0036)	ND (0.0032)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.017)	ND (0.0036)	ND (0.0032)	1,900	mg/kg
1,2-Dichloroethane	ND (0.023)	ND (0.0036)	ND (0.0032)	0.43	mg/kg
1,2-Dichloropropane	ND (0.038)	ND (0.0036)	ND (0.0032)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.02)	ND (0.0036)	ND (0.0032)	530	mg/kg
1,4-Dichlorobenzene	ND (0.018)	ND (0.0036)	ND (0.0032)	2.4	mg/kg
2-Hexanone	ND (0.78)	ND (0.029)	ND (0.025)	210	mg/kg
Acetone	ND (0.45)	ND (0.029) J	ND (0.025) J	61,000	mg/kg
Benzene	ND (0.021)	ND (0.0036)	ND (0.0032)	1.1	mg/kg
Bromochloromethane	ND (0.025)	ND (0.0036)	ND (0.0032)	NE	mg/kg
Bromodichloromethane	ND (0.017)	ND (0.0036)	ND (0.0032)	0.27	mg/kg
Bromoform	ND (0.055)	ND (0.0036) J	ND (0.0032) J	61	mg/kg
Bromomethane	ND (0.043)	ND (0.0036)	ND (0.0032)	7.3	mg/kg
Carbon disulfide	ND (0.032)	ND (0.0036)	ND (0.0032)	820	mg/kg
Carbon tetrachloride	ND (0.025)	ND (0.0036)	ND (0.0032)	0.61	mg/kg
Chlorobenzene	ND (0.019)	ND (0.0036)	ND (0.0032)	290	mg/kg
Chloroethane	ND (0.034)	ND (0.0036)	ND (0.0032)	15,000	mg/kg
Chloroform	ND (0.019)	ND (0.0036)	ND (0.0032)	0.29	mg/kg
Chloromethane	ND (0.027)	ND (0.0036)	ND (0.0032)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.023)	ND (0.0036)	ND (0.0032)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.016)	ND (0.0036)	ND (0.0032)	1.7	mg/kg
Cyclohexane	ND (0.02)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.017)	ND (0.0036) J	ND (0.0032) J	0.68	mg/kg
Ethylbenzene	ND (0.02)	ND (0.0036)	ND (0.0032)	5.4	mg/kg
Freon 11	ND (0.026)	0.017	0.003 J	790	mg/kg
Freon 113	ND (0.024)	ND (0.0036)	ND (0.0032)	43,000	mg/kg
Freon 12	ND (0.033)	ND (0.0036)	ND (0.0032)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.014)	ND (0.0036)	ND (0.0032)	2,100	mg/kg
Methyl acetate	ND (0.019)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.64)	ND (0.029)	ND (0.025)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.55)	ND (0.029)	ND (0.025)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.015)	ND (0.015)	ND (0.013)	43	mg/kg
Methylcyclohexane	ND (0.012)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.038)	ND (0.0036)	ND (0.0032)	11	mg/kg
Styrene	ND (0.019)	ND (0.0036)	ND (0.0032)	6,300	mg/kg
tert-Butyl alcohol	ND (0.21) R	ND (0.073)	ND (0.063)	160,000	mg/kg
Tetrachloroethene	ND (0.022)	ND (0.0036)	ND (0.0032)	0.55	mg/kg
Toluene	ND (0.02)	ND (0.0036)	ND (0.0032)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.028)	ND (0.0036)	ND (0.0032)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.017)	ND (0.0036)	ND (0.0032)	1.7	mg/kg
Trichloroethene	ND (0.037)	ND (0.0036)	ND (0.0032)	2.8	mg/kg
Vinyl chloride	ND (0.042)	ND (0.0036)	ND (0.0032)	0.06	mg/kg
Xylenes, total	ND (0.037)	ND (0.0073)	ND (0.0063)	630	mg/kg

Notes:

Deep samples were collected between 2.5 and 3 ft below ground surface.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

**For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

Produce results were compared to Soil Screening Levels.

Results greater than the screening level are bolded.

Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Soil Screening Level table for source of screening levels.

Shallow samples 1ft bgs samples were collected between 0.5 and 1ft below ground surface.

mg/kg	milligrams per kilogram
NA	not analyzed
NC	not collected
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
J+	estimated value, possible high bias
R	rejected for failure to meet quality control requirements

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Bell Pepper	none			
Metals					
Arsenic *	ND (0.06)	NC	NC	0.062 / 22	mg/kg
Chromium	0.58	NC	NC	210	mg/kg
Lead **	0.13	NC	NC	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.019)	NC	NC	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.024)	NC	NC	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.017)	NC	NC	1.1	mg/kg
1,1-Dichloroethane	ND (0.016)	NC	NC	3.3	mg/kg
1,1-Dichloroethene	ND (0.021)	NC	NC	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.037)	NC	NC	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.024)	NC	NC	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.17)	NC	NC	0.0054	mg/kg
1,2-Dibromoethane	ND (0.013)	NC	NC	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.015)	NC	NC	1,900	mg/kg
1,2-Dichloroethane	ND (0.02)	NC	NC	0.43	mg/kg
1,2-Dichloropropane	ND (0.032)	NC	NC	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.018)	NC	NC	530	mg/kg
1,4-Dichlorobenzene	ND (0.015)	NC	NC	2.4	mg/kg
2-Hexanone	ND (0.67)	NC	NC	210	mg/kg
Acetone	ND (0.39)	NC	NC	61,000	mg/kg
Benzene	ND (0.018)	NC	NC	1.1	mg/kg
Bromochloromethane	ND (0.022)	NC	NC	NE	mg/kg
Bromodichloromethane	ND (0.015)	NC	NC	0.27	mg/kg
Bromoform	ND (0.047)	NC	NC	61	mg/kg
Bromomethane	ND (0.037)	NC	NC	7.3	mg/kg
Carbon disulfide	ND (0.027)	NC	NC	820	mg/kg
Carbon tetrachloride	ND (0.021)	NC	NC	0.61	mg/kg
Chlorobenzene	ND (0.016)	NC	NC	290	mg/kg
Chloroethane	ND (0.03)	NC	NC	15,000	mg/kg
Chloroform	ND (0.017)	NC	NC	0.29	mg/kg
Chloromethane	ND (0.023)	NC	NC	120	mg/kg
cis-1,2-Dichloroethene	ND (0.02)	NC	NC	780	mg/kg
cis-1,3-Dichloropropene	ND (0.014)	NC	NC	1.7	mg/kg
Cyclohexane	ND (0.017)	NC	NC	7,000	mg/kg
Dibromochloromethane	ND (0.014)	NC	NC	0.68	mg/kg
Ethylbenzene	ND (0.017)	NC	NC	5.4	mg/kg
Freon 11	ND (0.023)	NC	NC	790	mg/kg
Freon 113	ND (0.021)	NC	NC	43,000	mg/kg
Freon 12	ND (0.028)	NC	NC	180	mg/kg
Isopropylbenzene (cumene)	ND (0.012)	NC	NC	2,100	mg/kg
Methyl acetate	ND (0.016)	NC	NC	78,000	mg/kg
Methyl ethyl ketone	ND (0.55)	NC	NC	28,000	mg/kg
Methyl isobutyl ketone	ND (0.48)	NC	NC	5,300	mg/kg
Methyl tert-butyl ether	ND (0.013)	NC	NC	43	mg/kg
Methylcyclohexane	ND (0.01)	NC	NC	2,600	mg/kg
Methylene chloride	ND (0.033)	NC	NC	11	mg/kg
Styrene	ND (0.016)	NC	NC	6,300	mg/kg
tert-Butyl alcohol	ND (0.18) R	NC	NC	160,000	mg/kg
Tetrachloroethene	ND (0.019)	NC	NC	0.55	mg/kg
Toluene	ND (0.017)	NC	NC	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.024)	NC	NC	150	mg/kg
trans-1,3-Dichloropropene	ND (0.015)	NC	NC	1.7	mg/kg
Trichloroethene	ND (0.032)	NC	NC	2.8	mg/kg
Vinyl chloride	ND (0.036)	NC	NC	0.06	mg/kg
Xylenes, total	ND (0.032)	NC	NC	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Green Chili	1436SSa			
Metals						
	Arsenic *	ND (0.06)	**7.6 J**	**7.7**	0.062 / 22	mg/kg
	Chromium	0.68	26.1 J	144	210	mg/kg
	Lead **	0.15	**2,910**	**829**	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.016)	ND (0.0033)	ND (0.0029)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.02)	ND (0.0033)	ND (0.0029)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.015)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.013)	ND (0.0033)	ND (0.0029)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.017)	ND (0.0033)	ND (0.0029)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.031)	ND (0.0033)	ND (0.0029)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.02)	ND (0.0033)	ND (0.0029)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.14)	ND (0.0066)	ND (0.0058)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.011)	ND (0.0033)	ND (0.0029)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.012)	ND (0.0033)	ND (0.0029)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.017)	ND (0.0033)	ND (0.0029)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.027)	ND (0.0033)	ND (0.0029)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.013)	ND (0.0033)	ND (0.0029)	2.4	mg/kg
	2-Hexanone	ND (0.56)	ND (0.027)	ND (0.023)	210	mg/kg
	Acetone	ND (0.33)	ND (0.027)	ND (0.023)	61,000	mg/kg
	Benzene	ND (0.015)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
	Bromochloromethane	ND (0.018)	ND (0.0033)	ND (0.0029)	NE	mg/kg
	Bromodichloromethane	ND (0.012)	ND (0.0033)	ND (0.0029)	0.27	mg/kg
	Bromoform	ND (0.04)	ND (0.0033)	ND (0.0029)	61	mg/kg
	Bromomethane	ND (0.031)	ND (0.0033)	ND (0.0029)	7.3	mg/kg
	Carbon disulfide	ND (0.023)	ND (0.0033)	ND (0.0029)	820	mg/kg
	Carbon tetrachloride	ND (0.018)	ND (0.0033)	ND (0.0029)	0.61	mg/kg
	Chlorobenzene	ND (0.014)	ND (0.0033)	ND (0.0029)	290	mg/kg
	Chloroethane	ND (0.025)	ND (0.0033)	ND (0.0029)	15,000	mg/kg
	Chloroform	ND (0.014)	ND (0.0033)	ND (0.0029)	0.29	mg/kg
	Chloromethane	ND (0.02)	ND (0.0033)	ND (0.0029)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.017)	ND (0.0033)	ND (0.0029)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.012)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
	Cyclohexane	ND (0.015)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.012)	ND (0.0033)	ND (0.0029)	0.68	mg/kg
	Ethylbenzene	ND (0.014)	ND (0.0033)	ND (0.0029)	5.4	mg/kg
	Freon 11	ND (0.019)	ND (0.0033)	0.0041	790	mg/kg
	Freon 113	ND (0.018)	ND (0.0033)	ND (0.0029)	43,000	mg/kg
	Freon 12	ND (0.024)	ND (0.0033)	ND (0.0029)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.0096)	ND (0.0033)	ND (0.0029)	2,100	mg/kg
	Methyl acetate	ND (0.014)	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.46)	ND (0.027)	ND (0.023)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.4)	ND (0.027)	ND (0.023)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.011)	ND (0.013)	ND (0.012)	43	mg/kg
	Methylcyclohexane	ND (0.0084)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.028)	ND (0.0033)	ND (0.0029)	11	mg/kg
	Styrene	ND (0.014)	ND (0.0033)	ND (0.0029)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.15) R	ND (0.066)	ND (0.058)	160,000	mg/kg
	Tetrachloroethene	ND (0.016)	0.0049	0.0056	0.55	mg/kg
	Toluene	ND (0.014)	ND (0.0033)	ND (0.0029)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.02)	ND (0.0033)	ND (0.0029)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.013)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
	Trichloroethene	ND (0.027)	ND (0.0033)	ND (0.0029)	2.8	mg/kg
	Vinyl chloride	ND (0.03)	ND (0.0033)	ND (0.0029)	0.06	mg/kg
	Xylenes, total	ND (0.027)	ND (0.0066)	ND (0.0058)	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Lemon	1436SSb			
Metals					
Arsenic *	ND (0.06)	**15.6**	**3.3**	0.062 / 22	mg/kg
Chromium	0.7	69.7	35.3	210	mg/kg
Lead **	0.19	**3,630**	**216 J+**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.017)	ND (0.0034)	ND (0.003)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.021)	ND (0.0034)	ND (0.003)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.015)	ND (0.0034)	ND (0.003)	1.1	mg/kg
1,1-Dichloroethane	ND (0.014)	ND (0.0034)	ND (0.003)	3.3	mg/kg
1,1-Dichloroethene	ND (0.018)	ND (0.0034)	ND (0.003)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.033)	ND (0.0034)	ND (0.003)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.021)	ND (0.0034)	ND (0.003)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.15)	ND (0.0068)	ND (0.006)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.011)	ND (0.0034)	ND (0.003)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.013)	ND (0.0034)	ND (0.003)	1,900	mg/kg
1,2-Dichloroethane	ND (0.017)	ND (0.0034)	ND (0.003)	0.43	mg/kg
1,2-Dichloropropane	ND (0.029)	ND (0.0034)	ND (0.003)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.016)	ND (0.0034)	ND (0.003)	530	mg/kg
1,4-Dichlorobenzene	ND (0.013)	ND (0.0034)	ND (0.003)	2.4	mg/kg
2-Hexanone	ND (0.59)	ND (0.027)	ND (0.024)	210	mg/kg
Acetone	ND (0.34)	ND (0.027)	ND (0.012)	61,000	mg/kg
Benzene	ND (0.016)	ND (0.0034)	ND (0.003)	1.1	mg/kg
Bromochloromethane	ND (0.019)	ND (0.0034)	ND (0.003)	NE	mg/kg
Bromodichloromethane	ND (0.013)	ND (0.0034)	ND (0.003)	0.27	mg/kg
Bromoform	ND (0.042)	ND (0.0034)	ND (0.003)	61	mg/kg
Bromomethane	ND (0.033)	ND (0.0034)	ND (0.003)	7.3	mg/kg
Carbon disulfide	ND (0.024)	ND (0.0034)	ND (0.003)	820	mg/kg
Carbon tetrachloride	ND (0.019)	ND (0.0034)	ND (0.003)	0.61	mg/kg
Chlorobenzene	ND (0.014)	ND (0.0034)	ND (0.003)	290	mg/kg
Chloroethane	ND (0.026)	ND (0.0034)	ND (0.0015)	15,000	mg/kg
Chloroform	ND (0.015)	ND (0.0034)	ND (0.003)	0.29	mg/kg
Chloromethane	ND (0.021)	ND (0.0034)	ND (0.003)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.018)	ND (0.0034)	ND (0.003)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.012)	ND (0.0034)	ND (0.003)	1.7	mg/kg
Cyclohexane	ND (0.015)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.013)	ND (0.0034)	ND (0.003)	0.68	mg/kg
Ethylbenzene	ND (0.015)	ND (0.0034)	ND (0.003)	5.4	mg/kg
Freon 11	ND (0.02)	0.015	0.0058	790	mg/kg
Freon 113	ND (0.018)	ND (0.0034)	ND (0.003)	43,000	mg/kg
Freon 12	ND (0.025)	ND (0.0034)	ND (0.0015)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.011)	ND (0.0034)	ND (0.003)	2,100	mg/kg
Methyl acetate	ND (0.014)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.48)	ND (0.027)	ND (0.024)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.42)	ND (0.027)	ND (0.024)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.011)	ND (0.014)	ND (0.012)	43	mg/kg
Methylcyclohexane	ND (0.0088)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.029)	ND (0.0034)	ND (0.003)	11	mg/kg
Styrene	ND (0.014)	ND (0.0034)	ND (0.003)	6,300	mg/kg
tert-Butyl alcohol	ND (0.16) R	ND (0.068)	ND (0.06)	160,000	mg/kg
Tetrachloroethene	ND (0.017)	ND (0.0034)	ND (0.003)	0.55	mg/kg
Toluene	ND (0.015)	ND (0.0034)	ND (0.003)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.021)	ND (0.0034)	ND (0.003)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.013)	ND (0.0034)	ND (0.003)	1.7	mg/kg
Trichloroethene	ND (0.028)	ND (0.0034)	ND (0.003)	2.8	mg/kg
Vinyl chloride	ND (0.032)	ND (0.0034)	ND (0.003)	0.06	mg/kg
Xylenes, total	ND (0.028)	ND (0.0068)	ND (0.006)	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Lemon (FD)	1436SSb			
Metals						
	Arsenic *	ND (0.06)	**15.6**	**3.3**	0.062 / 22	mg/kg
	Chromium	0.59	69.7	35.3	210	mg/kg
	Lead **	0.16	**3,630**	**216 J+**	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.022)	ND (0.0034)	ND (0.003)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.028)	ND (0.0034)	ND (0.003)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.02)	ND (0.0034)	ND (0.003)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.018)	ND (0.0034)	ND (0.003)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.024)	ND (0.0034)	ND (0.003)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.043)	ND (0.0034)	ND (0.003)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.028)	ND (0.0034)	ND (0.003)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.2)	ND (0.0068)	ND (0.006)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.015)	ND (0.0034)	ND (0.003)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.017)	ND (0.0034)	ND (0.003)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.023)	ND (0.0034)	ND (0.003)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.038)	ND (0.0034)	ND (0.003)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.02)	ND (0.0034)	ND (0.003)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.018)	ND (0.0034)	ND (0.003)	2.4	mg/kg
	2-Hexanone	ND (0.78)	ND (0.027)	ND (0.024)	210	mg/kg
	Acetone	ND (0.45)	ND (0.027)	ND (0.012)	61,000	mg/kg
	Benzene	ND (0.021)	ND (0.0034)	ND (0.003)	1.1	mg/kg
	Bromochloromethane	ND (0.025)	ND (0.0034)	ND (0.003)	NE	mg/kg
	Bromodichloromethane	ND (0.017)	ND (0.0034)	ND (0.003)	0.27	mg/kg
	Bromoform	ND (0.055)	ND (0.0034)	ND (0.003)	61	mg/kg
	Bromomethane	ND (0.043)	ND (0.0034)	ND (0.003)	7.3	mg/kg
	Carbon disulfide	ND (0.032)	ND (0.0034)	ND (0.003)	820	mg/kg
	Carbon tetrachloride	ND (0.025)	ND (0.0034)	ND (0.003)	0.61	mg/kg
	Chlorobenzene	ND (0.019)	ND (0.0034)	ND (0.003)	290	mg/kg
	Chloroethane	ND (0.034)	ND (0.0034)	ND (0.0015)	15,000	mg/kg
	Chloroform	ND (0.019)	ND (0.0034)	ND (0.003)	0.29	mg/kg
	Chloromethane	ND (0.027)	ND (0.0034)	ND (0.003)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.023)	ND (0.0034)	ND (0.003)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.016)	ND (0.0034)	ND (0.003)	1.7	mg/kg
	Cyclohexane	ND (0.02)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.017)	ND (0.0034)	ND (0.003)	0.68	mg/kg
	Ethylbenzene	ND (0.02)	ND (0.0034)	ND (0.003)	5.4	mg/kg
	Freon 11	ND (0.026)	0.015	0.0058	790	mg/kg
	Freon 113	ND (0.024)	ND (0.0034)	ND (0.003)	43,000	mg/kg
	Freon 12	ND (0.033)	ND (0.0034)	ND (0.0015)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.014)	ND (0.0034)	ND (0.003)	2,100	mg/kg
	Methyl acetate	ND (0.019)	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.64)	ND (0.027)	ND (0.024)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.55)	ND (0.027)	ND (0.024)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.015)	ND (0.014)	ND (0.012)	43	mg/kg
	Methylcyclohexane	ND (0.012)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.038)	ND (0.0034)	ND (0.003)	11	mg/kg
	Styrene	ND (0.019)	ND (0.0034)	ND (0.003)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.21) R	ND (0.068)	ND (0.06)	160,000	mg/kg
	Tetrachloroethene	ND (0.022)	ND (0.0034)	ND (0.003)	0.55	mg/kg
	Toluene	ND (0.02)	ND (0.0034)	ND (0.003)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.028)	ND (0.0034)	ND (0.003)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.017)	ND (0.0034)	ND (0.003)	1.7	mg/kg
	Trichloroethene	ND (0.037)	ND (0.0034)	ND (0.003)	2.8	mg/kg
	Vinyl chloride	ND (0.042)	ND (0.0034)	ND (0.003)	0.06	mg/kg
	Xylenes, total	ND (0.037)	ND (0.0068)	ND (0.006)	630	mg/kg

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Mint	1436SSa			
Metals						
	Arsenic *	ND (0.06)	**7.6 J**	**7.7**	0.062 / 22	mg/kg
	Chromium	1.07	26.1 J	144	210	mg/kg
	Lead **	8.47	**2,910**	**829**	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.019)	ND (0.0033)	ND (0.0029)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.024)	ND (0.0033)	ND (0.0029)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.017)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.016)	ND (0.0033)	ND (0.0029)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.021)	ND (0.0033)	ND (0.0029)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.037)	ND (0.0033)	ND (0.0029)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.024)	ND (0.0033)	ND (0.0029)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.17)	ND (0.0066)	ND (0.0058)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.013)	ND (0.0033)	ND (0.0029)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.02)	ND (0.0033)	ND (0.0029)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.033)	ND (0.0033)	ND (0.0029)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.018)	ND (0.0033)	ND (0.0029)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	2.4	mg/kg
	2-Hexanone	ND (0.67)	ND (0.027)	ND (0.023)	210	mg/kg
	Acetone	ND (0.39)	ND (0.027)	ND (0.023)	61,000	mg/kg
	Benzene	ND (0.018)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
	Bromochloromethane	ND (0.022)	ND (0.0033)	ND (0.0029)	NE	mg/kg
	Bromodichloromethane	ND (0.015)	ND (0.0033)	ND (0.0029)	0.27	mg/kg
	Bromoform	ND (0.048)	ND (0.0033)	ND (0.0029)	61	mg/kg
	Bromomethane	ND (0.037)	ND (0.0033)	ND (0.0029)	7.3	mg/kg
	Carbon disulfide	ND (0.027)	ND (0.0033)	ND (0.0029)	820	mg/kg
	Carbon tetrachloride	ND (0.021)	ND (0.0033)	ND (0.0029)	0.61	mg/kg
	Chlorobenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	290	mg/kg
	Chloroethane	ND (0.03)	ND (0.0033)	ND (0.0029)	15,000	mg/kg
	Chloroform	ND (0.017)	ND (0.0033)	ND (0.0029)	0.29	mg/kg
	Chloromethane	ND (0.023)	ND (0.0033)	ND (0.0029)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.02)	ND (0.0033)	ND (0.0029)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.014)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
	Cyclohexane	ND (0.017)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.014)	ND (0.0033)	ND (0.0029)	0.68	mg/kg
	Ethylbenzene	ND (0.017)	ND (0.0033)	ND (0.0029)	5.4	mg/kg
	Freon 11	ND (0.023)	ND (0.0033)	0.0041	790	mg/kg
	Freon 113	ND (0.021)	ND (0.0033)	ND (0.0029)	43,000	mg/kg
	Freon 12	ND (0.028)	ND (0.0033)	ND (0.0029)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.012)	ND (0.0033)	ND (0.0029)	2,100	mg/kg
	Methyl acetate	0.19	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.55)	ND (0.027)	ND (0.023)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.48)	ND (0.027)	ND (0.023)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.013)	ND (0.013)	ND (0.012)	43	mg/kg
	Methylcyclohexane	ND (0.01)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.033)	ND (0.0033)	ND (0.0029)	11	mg/kg
	Styrene	ND (0.016)	ND (0.0033)	ND (0.0029)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.18) R	ND (0.066)	ND (0.058)	160,000	mg/kg
	Tetrachloroethene	ND (0.019)	0.0049	0.0056	0.55	mg/kg
	Toluene	ND (0.017)	ND (0.0033)	ND (0.0029)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.024)	ND (0.0033)	ND (0.0029)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.015)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
	Trichloroethene	ND (0.032)	ND (0.0033)	ND (0.0029)	2.8	mg/kg
	Vinyl chloride	ND (0.036)	ND (0.0033)	ND (0.0029)	0.06	mg/kg
	Xylenes, total	ND (0.032)	ND (0.0066)	ND (0.0058)	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Red Chili	1436SSa			
Metals					
Arsenic *	**0.07**	**7.6 J**	**7.7**	0.062 / 22	mg/kg
Chromium	0.39	26.1 J	144	210	mg/kg
Lead **	0.77	**2,910**	**829**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.019)	ND (0.0033)	ND (0.0029)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.023)	ND (0.0033)	ND (0.0029)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.017)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
1,1-Dichloroethane	ND (0.015)	ND (0.0033)	ND (0.0029)	3.3	mg/kg
1,1-Dichloroethene	ND (0.02)	ND (0.0033)	ND (0.0029)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.036)	ND (0.0033)	ND (0.0029)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.023)	ND (0.0033)	ND (0.0029)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.17)	ND (0.0066)	ND (0.0058)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.012)	ND (0.0033)	ND (0.0029)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.014)	ND (0.0033)	ND (0.0029)	1,900	mg/kg
1,2-Dichloroethane	ND (0.019)	ND (0.0033)	ND (0.0029)	0.43	mg/kg
1,2-Dichloropropane	ND (0.031)	ND (0.0033)	ND (0.0029)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.017)	ND (0.0033)	ND (0.0029)	530	mg/kg
1,4-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	2.4	mg/kg
2-Hexanone	ND (0.65)	ND (0.027)	ND (0.023)	210	mg/kg
Acetone	ND (0.38)	ND (0.027)	ND (0.023)	61,000	mg/kg
Benzene	ND (0.018)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
Bromochloromethane	ND (0.021)	ND (0.0033)	ND (0.0029)	NE	mg/kg
Bromodichloromethane	ND (0.014)	ND (0.0033)	ND (0.0029)	0.27	mg/kg
Bromoform	ND (0.046)	ND (0.0033)	ND (0.0029)	61	mg/kg
Bromomethane	ND (0.036)	ND (0.0033)	ND (0.0029)	7.3	mg/kg
Carbon disulfide	ND (0.026)	ND (0.0033)	ND (0.0029)	820	mg/kg
Carbon tetrachloride	ND (0.02)	ND (0.0033)	ND (0.0029)	0.61	mg/kg
Chlorobenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	290	mg/kg
Chloroethane	ND (0.029)	ND (0.0033)	ND (0.0029)	15,000	mg/kg
Chloroform	ND (0.016)	ND (0.0033)	ND (0.0029)	0.29	mg/kg
Chloromethane	ND (0.023)	ND (0.0033)	ND (0.0029)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.019)	ND (0.0033)	ND (0.0029)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.014)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Cyclohexane	ND (0.017)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.014)	ND (0.0033)	ND (0.0029)	0.68	mg/kg
Ethylbenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	5.4	mg/kg
Freon 11	ND (0.022)	ND (0.0033)	0.0041	790	mg/kg
Freon 113	ND (0.02)	ND (0.0033)	ND (0.0029)	43,000	mg/kg
Freon 12	ND (0.027)	ND (0.0033)	ND (0.0029)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.012)	ND (0.0033)	ND (0.0029)	2,100	mg/kg
Methyl acetate	0.13 J	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.53)	ND (0.027)	ND (0.023)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.46)	ND (0.027)	ND (0.023)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.012)	ND (0.013)	ND (0.012)	43	mg/kg
Methylcyclohexane	ND (0.0096)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.032)	ND (0.0033)	ND (0.0029)	11	mg/kg
Styrene	ND (0.016)	ND (0.0033)	ND (0.0029)	6,300	mg/kg
tert-Butyl alcohol	ND (0.17) R	ND (0.066)	ND (0.058)	160,000	mg/kg
Tetrachloroethene	ND (0.018)	0.0049	0.0056	0.55	mg/kg
Toluene	ND (0.016)	ND (0.0033)	ND (0.0029)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.023)	ND (0.0033)	ND (0.0029)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.015)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Trichloroethene	ND (0.031)	ND (0.0033)	ND (0.0029)	2.8	mg/kg
Vinyl chloride	ND (0.035)	ND (0.0033)	ND (0.0029)	0.06	mg/kg
Xylenes, total	ND (0.031)	ND (0.0066)	ND (0.0058)	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Tomatillo	1436SSa			
Metals					
Arsenic *	ND (0.06)	**7.6 J**	**7.7**	0.062 / 22	mg/kg
Chromium	0.68	26.1 J	144	210	mg/kg
Lead **	0.65	**2,910**	**829**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.02)	ND (0.0033)	ND (0.0029)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.024)	ND (0.0033)	ND (0.0029)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.018)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
1,1-Dichloroethane	ND (0.016)	ND (0.0033)	ND (0.0029)	3.3	mg/kg
1,1-Dichloroethene	ND (0.021)	ND (0.0033)	ND (0.0029)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.038)	ND (0.0033)	ND (0.0029)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.025)	ND (0.0033)	ND (0.0029)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.18)	ND (0.0066)	ND (0.0058)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.013)	ND (0.0033)	ND (0.0029)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	1,900	mg/kg
1,2-Dichloroethane	ND (0.02)	ND (0.0033)	ND (0.0029)	0.43	mg/kg
1,2-Dichloropropane	ND (0.033)	ND (0.0033)	ND (0.0029)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.018)	ND (0.0033)	ND (0.0029)	530	mg/kg
1,4-Dichlorobenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	2.4	mg/kg
2-Hexanone	ND (0.69)	ND (0.027)	ND (0.023)	210	mg/kg
Acetone	ND (0.4)	ND (0.027)	ND (0.023)	61,000	mg/kg
Benzene	ND (0.019)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
Bromochloromethane	ND (0.022)	ND (0.0033)	ND (0.0029)	NE	mg/kg
Bromodichloromethane	ND (0.015)	ND (0.0033)	ND (0.0029)	0.27	mg/kg
Bromoform	ND (0.049)	ND (0.0033)	ND (0.0029)	61	mg/kg
Bromomethane	ND (0.038)	ND (0.0033)	ND (0.0029)	7.3	mg/kg
Carbon disulfide	ND (0.028)	ND (0.0033)	ND (0.0029)	820	mg/kg
Carbon tetrachloride	ND (0.022)	ND (0.0033)	ND (0.0029)	0.61	mg/kg
Chlorobenzene	ND (0.017)	ND (0.0033)	ND (0.0029)	290	mg/kg
Chloroethane	ND (0.031)	ND (0.0033)	ND (0.0029)	15,000	mg/kg
Chloroform	ND (0.017)	ND (0.0033)	ND (0.0029)	0.29	mg/kg
Chloromethane	ND (0.024)	ND (0.0033)	ND (0.0029)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.021)	ND (0.0033)	ND (0.0029)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.015)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Cyclohexane	ND (0.018)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.015)	ND (0.0033)	ND (0.0029)	0.68	mg/kg
Ethylbenzene	ND (0.017)	ND (0.0033)	ND (0.0029)	5.4	mg/kg
Freon 11	ND (0.023)	ND (0.0033)	0.0041	790	mg/kg
Freon 113	ND (0.021)	ND (0.0033)	ND (0.0029)	43,000	mg/kg
Freon 12	ND (0.029)	ND (0.0033)	ND (0.0029)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.012)	ND (0.0033)	ND (0.0029)	2,100	mg/kg
Methyl acetate	ND (0.017)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.56)	ND (0.027)	ND (0.023)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.49)	ND (0.027)	ND (0.023)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.013)	ND (0.013)	ND (0.012)	43	mg/kg
Methylcyclohexane	ND (0.011)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.034)	ND (0.0033)	ND (0.0029)	11	mg/kg
Styrene	ND (0.017)	ND (0.0033)	ND (0.0029)	6,300	mg/kg
tert-Butyl alcohol	ND (0.18) R	ND (0.066)	ND (0.058)	160,000	mg/kg
Tetrachloroethene	ND (0.019)	0.0049	0.0056	0.55	mg/kg
Toluene	ND (0.017)	ND (0.0033)	ND (0.0029)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.025)	ND (0.0033)	ND (0.0029)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.015)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Trichloroethene	ND (0.033)	ND (0.0033)	ND (0.0029)	2.8	mg/kg
Vinyl chloride	ND (0.037)	ND (0.0033)	ND (0.0029)	0.06	mg/kg
Xylenes, total	ND (0.033)	ND (0.0066)	ND (0.0058)	630	mg/kg

TABLE 4-44
1436 3rd Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Tomato	1436SSa			
Metals					
Arsenic *	0.06	**7.6 J**	**7.7**	0.062 / 22	mg/kg
Chromium	0.73	26.1 J	144	210	mg/kg
Lead **	1	**2,910**	**829**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.018)	ND (0.0033)	ND (0.0029)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.023)	ND (0.0033)	ND (0.0029)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.016)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
1,1-Dichloroethane	ND (0.015)	ND (0.0033)	ND (0.0029)	3.3	mg/kg
1,1-Dichloroethene	ND (0.02)	ND (0.0033)	ND (0.0029)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.036)	ND (0.0033)	ND (0.0029)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.023)	ND (0.0033)	ND (0.0029)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.16)	ND (0.0066)	ND (0.0058)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.012)	ND (0.0033)	ND (0.0029)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.014)	ND (0.0033)	ND (0.0029)	1,900	mg/kg
1,2-Dichloroethane	ND (0.019)	ND (0.0033)	ND (0.0029)	0.43	mg/kg
1,2-Dichloropropane	ND (0.031)	ND (0.0033)	ND (0.0029)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.017)	ND (0.0033)	ND (0.0029)	530	mg/kg
1,4-Dichlorobenzene	ND (0.015)	ND (0.0033)	ND (0.0029)	2.4	mg/kg
2-Hexanone	ND (0.64)	ND (0.027)	ND (0.023)	210	mg/kg
Acetone	ND (0.37)	ND (0.027)	ND (0.023)	61,000	mg/kg
Benzene	ND (0.017)	ND (0.0033)	ND (0.0029)	1.1	mg/kg
Bromochloromethane	ND (0.021)	ND (0.0033)	ND (0.0029)	NE	mg/kg
Bromodichloromethane	ND (0.014)	ND (0.0033)	ND (0.0029)	0.27	mg/kg
Bromoform	ND (0.045)	ND (0.0033)	ND (0.0029)	61	mg/kg
Bromomethane	ND (0.035)	ND (0.0033)	ND (0.0029)	7.3	mg/kg
Carbon disulfide	ND (0.026)	ND (0.0033)	ND (0.0029)	820	mg/kg
Carbon tetrachloride	ND (0.02)	ND (0.0033)	ND (0.0029)	0.61	mg/kg
Chlorobenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	290	mg/kg
Chloroethane	ND (0.028)	ND (0.0033)	ND (0.0029)	15,000	mg/kg
Chloroform	ND (0.016)	ND (0.0033)	ND (0.0029)	0.29	mg/kg
Chloromethane	ND (0.022)	ND (0.0033)	ND (0.0029)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.019)	ND (0.0033)	ND (0.0029)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.014)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Cyclohexane	ND (0.017)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.014)	ND (0.0033)	ND (0.0029)	0.68	mg/kg
Ethylbenzene	ND (0.016)	ND (0.0033)	ND (0.0029)	5.4	mg/kg
Freon 11	ND (0.022)	ND (0.0033)	0.0041	790	mg/kg
Freon 113	ND (0.02)	ND (0.0033)	ND (0.0029)	43,000	mg/kg
Freon 12	ND (0.027)	ND (0.0033)	ND (0.0029)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.011)	ND (0.0033)	ND (0.0029)	2,100	mg/kg
Methyl acetate	ND (0.016)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.52)	ND (0.027)	ND (0.023)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.46)	ND (0.027)	ND (0.023)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.012)	ND (0.013)	ND (0.012)	43	mg/kg
Methylcyclohexane	ND (0.0096)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.032)	ND (0.0033)	ND (0.0029)	11	mg/kg
Styrene	ND (0.016)	ND (0.0033)	ND (0.0029)	6,300	mg/kg
tert-Butyl alcohol	ND (0.17) R	ND (0.066)	ND (0.058)	160,000	mg/kg
Tetrachloroethene	ND (0.018)	0.0049	0.0056	0.55	mg/kg
Toluene	ND (0.016)	ND (0.0033)	ND (0.0029)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.023)	ND (0.0033)	ND (0.0029)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.014)	ND (0.0033)	ND (0.0029)	1.7	mg/kg
Trichloroethene	ND (0.031)	ND (0.0033)	ND (0.0029)	2.8	mg/kg
Vinyl chloride	ND (0.035)	ND (0.0033)	ND (0.0029)	0.06	mg/kg
Xylenes, total	ND (0.03)	ND (0.0066)	ND (0.0058)	630	mg/kg

Notes:

Deep samples were collected between 2.5 and 3 ft below ground surface.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

Produce results were compared to Soil Screening Levels.

Results greater than the screening level are bolded.

Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Soil Screening Level table for source of screening levels.

Shallow samples 1ft bgs samples were collected between 0.5 and 1ft below ground surface.

FD	field duplicate
mg/kg	milligrams per kilogram
NA	not analyzed
NC	not collected
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
R	rejected for failure to meet quality control requirements
J+	estimated value, possible high bias

TABLE 4-45
356 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Apple	**none**			
Metals					
Arsenic *	ND (0.06)	NC	NC	0.062 / 22	mg/kg
Chromium	0.3	NC	NC	210	mg/kg
Lead **	0.3	NC	NC	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.017) J	NC	NC	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.021) J	NC	NC	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.015) J	NC	NC	1.1	mg/kg
1,1-Dichloroethane	ND (0.014) J	NC	NC	3.3	mg/kg
1,1-Dichloroethene	ND (0.018) J	NC	NC	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.033) J	NC	NC	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.021) J	NC	NC	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.15) J	NC	NC	0.0054	mg/kg
1,2-Dibromoethane	ND (0.011) J	NC	NC	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.013) J	NC	NC	1,900	mg/kg
1,2-Dichloroethane	ND (0.017) J	NC	NC	0.43	mg/kg
1,2-Dichloropropane	ND (0.028) J	NC	NC	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.016) J	NC	NC	530	mg/kg
1,4-Dichlorobenzene	ND (0.013) J	NC	NC	2.4	mg/kg
2-Hexanone	ND (0.59) J	NC	NC	210	mg/kg
Acetone	ND (0.34) J	NC	NC	61,000	mg/kg
Benzene	ND (0.016) J	NC	NC	1.1	mg/kg
Bromochloromethane	ND (0.019) J	NC	NC	NE	mg/kg
Bromodichloromethane	ND (0.013) J	NC	NC	0.27	mg/kg
Bromoform	ND (0.042) J	NC	NC	61	mg/kg
Bromomethane	ND (0.032) J	NC	NC	7.3	mg/kg
Carbon disulfide	ND (0.024) J	NC	NC	820	mg/kg
Carbon tetrachloride	ND (0.019) J	NC	NC	0.61	mg/kg
Chlorobenzene	ND (0.014) J	NC	NC	290	mg/kg
Chloroethane	ND (0.026) J	NC	NC	15,000	mg/kg
Chloroform	ND (0.015) J	NC	NC	0.29	mg/kg
Chloromethane	ND (0.021) J	NC	NC	120	mg/kg
cis-1,2-Dichloroethene	ND (0.018) J	NC	NC	780	mg/kg
cis-1,3-Dichloropropene	ND (0.012) J	NC	NC	1.7	mg/kg
Cyclohexane	ND (0.015) J	NC	NC	7,000	mg/kg
Dibromochloromethane	ND (0.013) J	NC	NC	0.68	mg/kg
Ethylbenzene	ND (0.015) J	NC	NC	5.4	mg/kg
Freon 11	ND (0.02) J	NC	NC	790	mg/kg
Freon 113	ND (0.018) J	NC	NC	43,000	mg/kg
Freon 12	ND (0.025) J	NC	NC	180	mg/kg
Isopropylbenzene (cumene)	ND (0.011) J	NC	NC	2,100	mg/kg
Methyl acetate	ND (0.014) J	NC	NC	78,000	mg/kg
Methyl ethyl ketone	ND (0.48) J	NC	NC	28,000	mg/kg
Methyl isobutyl ketone	ND (0.42) J	NC	NC	5,300	mg/kg
Methyl tert-butyl ether	ND (0.011) J	NC	NC	43	mg/kg
Methylcyclohexane	ND (0.0087) J	NC	NC	2,600	mg/kg
Methylene chloride	ND (0.029) J	NC	NC	11	mg/kg
Styrene	ND (0.014) J	NC	NC	6,300	mg/kg
tert-Butyl alcohol	ND (0.16) R	NC	NC	160,000	mg/kg
Tetrachloroethene	ND (0.017) J	NC	NC	0.55	mg/kg
Toluene	ND (0.015) J	NC	NC	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.021) J	NC	NC	150	mg/kg
trans-1,3-Dichloropropene	ND (0.013) J	NC	NC	1.7	mg/kg
Trichloroethene	ND (0.028) J	NC	NC	2.8	mg/kg
Vinyl chloride	ND (0.032) J	NC	NC	0.06	mg/kg
Xylenes, total	ND (0.028) J	NC	NC	630	mg/kg

TABLE 4-45

356 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)

Human Health Risk Assessment

AMCO Chemical Superfund Site, Oakland, California

Notes:

Deep samples were collected between 2.5 and 3 ft below ground surface.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

Produce results were compared to Soil Screening Levels.

Results greater than the screening level are bolded.

Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Soil Screening Level table for source of screening levels.

Shallow samples 1ft bgs samples were collected between 0.5 and 1ft below ground surface.

mg/kg	milligrams per kilogram
NA	not analyzed
NC	not collected
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
R	rejected for failure to meet quality control requirements

TABLE 4-46
360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Apple	**none**			
Metals						
	Arsenic *	**0.07**	NC	NC	0.062 / 22	mg/kg
	Chromium	0.46	NC	NC	210	mg/kg
	Lead **	0.23	NC	NC	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.017)	NC	NC	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.021)	NC	NC	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.015)	NC	NC	1.1	mg/kg
	1,1-Dichloroethane	ND (0.014)	NC	NC	3.3	mg/kg
	1,1-Dichloroethene	ND (0.018)	NC	NC	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.032)	NC	NC	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.021)	NC	NC	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.15)	NC	NC	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.011)	NC	NC	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.013)	NC	NC	1,900	mg/kg
	1,2-Dichloroethane	ND (0.017)	NC	NC	0.43	mg/kg
	1,2-Dichloropropane	ND (0.028)	NC	NC	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.015)	NC	NC	530	mg/kg
	1,4-Dichlorobenzene	ND (0.013)	NC	NC	2.4	mg/kg
	2-Hexanone	ND (0.58)	NC	NC	210	mg/kg
	Acetone	ND (0.34)	NC	NC	61,000	mg/kg
	Benzene	ND (0.016)	NC	NC	1.1	mg/kg
	Bromochloromethane	ND (0.019)	NC	NC	NE	mg/kg
	Bromodichloromethane	ND (0.013)	NC	NC	0.27	mg/kg
	Bromoform	ND (0.041)	NC	NC	61	mg/kg
	Bromomethane	ND (0.032)	NC	NC	7.3	mg/kg
	Carbon disulfide	ND (0.024)	NC	NC	820	mg/kg
	Carbon tetrachloride	ND (0.018)	NC	NC	0.61	mg/kg
	Chlorobenzene	ND (0.014)	NC	NC	290	mg/kg
	Chloroethane	ND (0.026)	NC	NC	15,000	mg/kg
	Chloroform	ND (0.014)	NC	NC	0.29	mg/kg
	Chloromethane	ND (0.02)	NC	NC	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.017)	NC	NC	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.012)	NC	NC	1.7	mg/kg
	Cyclohexane	ND (0.015)	NC	NC	7,000	mg/kg
	Dibromochloromethane	ND (0.012)	NC	NC	0.68	mg/kg
	Ethylbenzene	ND (0.015)	NC	NC	5.4	mg/kg
	Freon 11	ND (0.02)	NC	NC	790	mg/kg
	Freon 113	ND (0.018)	NC	NC	43,000	mg/kg
	Freon 12	ND (0.025)	NC	NC	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.01)	NC	NC	2,100	mg/kg
	Methyl acetate	ND (0.014)	NC	NC	78,000	mg/kg
	Methyl ethyl ketone	ND (0.47)	NC	NC	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.41)	NC	NC	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.011)	NC	NC	43	mg/kg
	Methylcyclohexane	ND (0.0086)	NC	NC	2,600	mg/kg
	Methylene chloride	ND (0.029)	NC	NC	11	mg/kg
	Styrene	ND (0.014)	NC	NC	6,300	mg/kg
	tert-Butyl alcohol	ND (0.16) R	NC	NC	160,000	mg/kg
	Tetrachloroethene	ND (0.016)	NC	NC	0.55	mg/kg
	Toluene	ND (0.015)	NC	NC	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.021)	NC	NC	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.013)	NC	NC	1.7	mg/kg
	Trichloroethene	ND (0.028)	NC	NC	2.8	mg/kg
	Vinyl chloride	ND (0.031)	NC	NC	0.06	mg/kg
	Xylenes, total	ND (0.028)	NC	NC	630	mg/kg

TABLE 4-46
360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

	Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Blackberry (CS)	360SSa			
Metals						
	Arsenic *	ND (0.06)	**11.1**	**4**	0.062 / 22	mg/kg
	Chromium	0.66	31.2	9.5	210	mg/kg
	Lead **	3.27	**2,230 J+**	193	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.018)	ND (0.0032)	ND (0.0028)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.022)	ND (0.0032)	ND (0.0028)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.016)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.015)	ND (0.0032)	ND (0.0028)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.019)	ND (0.0032)	ND (0.0028)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.034)	ND (0.0032)	ND (0.0028)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.022)	ND (0.0032)	ND (0.0028)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.16)	ND (0.013)	ND (0.011)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.012)	ND (0.0032)	ND (0.0028)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.014)	ND (0.0032)	ND (0.0028)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.018)	ND (0.0032)	ND (0.0028)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.03)	ND (0.0032)	ND (0.0028)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.016)	ND (0.0032)	ND (0.0028)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.014)	ND (0.0032)	ND (0.0028)	2.4	mg/kg
	2-Hexanone	ND (0.62)	ND (0.026)	ND (0.022)	210	mg/kg
	Acetone	ND (0.36)	ND (0.026)	ND (0.022)	61,000	mg/kg
	Benzene	ND (0.017)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
	Bromochloromethane	ND (0.02)	ND (0.0032)	ND (0.0028)	NE	mg/kg
	Bromodichloromethane	ND (0.014)	ND (0.0032)	ND (0.0028)	0.27	mg/kg
	Bromoform	ND (0.044)	ND (0.0032)	ND (0.0028)	61	mg/kg
	Bromomethane	ND (0.034)	ND (0.0032)	ND (0.0028)	7.3	mg/kg
	Carbon disulfide	ND (0.025)	ND (0.0032)	ND (0.0028)	820	mg/kg
	Carbon tetrachloride	ND (0.02)	ND (0.0032)	ND (0.0028)	0.61	mg/kg
	Chlorobenzene	ND (0.015)	ND (0.0032)	ND (0.0028)	290	mg/kg
	Chloroethane	ND (0.027)	ND (0.0032)	ND (0.0028)	15,000	mg/kg
	Chloroform	ND (0.015)	ND (0.0032)	ND (0.0028)	0.29	mg/kg
	Chloromethane	ND (0.022)	ND (0.0032)	ND (0.0028)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.018)	ND (0.0032)	ND (0.0028)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.013)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
	Cyclohexane	ND (0.016)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.013)	ND (0.0032)	ND (0.0028)	0.68	mg/kg
	Ethylbenzene	ND (0.016)	ND (0.0032)	ND (0.0028)	5.4	mg/kg
	Freon 11	ND (0.021)	0.0032	0.0036	790	mg/kg
	Freon 113	ND (0.019)	ND (0.0032)	ND (0.0028)	43,000	mg/kg
	Freon 12	ND (0.026)	ND (0.0032)	ND (0.0028)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.011)	ND (0.0032)	ND (0.0028)	2,100	mg/kg
	Methyl acetate	ND (0.015)	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.5)	ND (0.026)	ND (0.022)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.44)	ND (0.026)	ND (0.022)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.012)	ND (0.013)	ND (0.011)	43	mg/kg
	Methylcyclohexane	ND (0.0092)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.03)	ND (0.0032)	ND (0.0028)	11	mg/kg
	Styrene	ND (0.015)	ND (0.0032)	ND (0.0028)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.16) R	ND (0.065)	ND (0.056)	160,000	mg/kg
	Tetrachloroethene	ND (0.017)	ND (0.0032)	ND (0.0028)	0.55	mg/kg
	Toluene	ND (0.016)	ND (0.0032)	ND (0.0028)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.022)	ND (0.0032)	ND (0.0028)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.014)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
	Trichloroethene	ND (0.03)	ND (0.0032)	ND (0.0028)	2.8	mg/kg
	Vinyl chloride	ND (0.033)	ND (0.0032)	ND (0.0028)	0.06	mg/kg
	Xylenes, total	ND (0.029)	ND (0.0065)	ND (0.0056)	630	mg/kg

TABLE 4-46
360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Blackberry (CS)	**360SSb**			
Metals					
Arsenic *	ND (0.06)	**6.4**	**5.3**	0.062 / 22	mg/kg
Chromium	0.66	14	22.9 J	210	mg/kg
Lead **	3.27	**600**	**478 J**	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.018)	ND (0.0031)	ND (0.0025)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.022)	ND (0.0031)	ND (0.0025)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.016)	ND (0.0031)	ND (0.0025)	1.1	mg/kg
1,1-Dichloroethane	ND (0.015)	ND (0.0031)	ND (0.0025)	3.3	mg/kg
1,1-Dichloroethene	ND (0.019)	ND (0.0031)	ND (0.0025)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.034)	ND (0.0031)	ND (0.0025)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.022)	ND (0.0031)	ND (0.0025)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.16)	ND (0.012)	ND (0.0098)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.012)	ND (0.0031)	ND (0.0025)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.014)	ND (0.0031)	ND (0.0025)	1,900	mg/kg
1,2-Dichloroethane	ND (0.018)	ND (0.0031)	ND (0.0025)	0.43	mg/kg
1,2-Dichloropropane	ND (0.03)	ND (0.0031)	ND (0.0025)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.016)	ND (0.0031)	ND (0.0025)	530	mg/kg
1,4-Dichlorobenzene	ND (0.014)	ND (0.0031)	ND (0.0025)	2.4	mg/kg
2-Hexanone	ND (0.62)	ND (0.025)	ND (0.02)	210	mg/kg
Acetone	ND (0.36)	ND (0.025)	ND (0.02)	61,000	mg/kg
Benzene	ND (0.017)	ND (0.0031)	ND (0.0025)	1.1	mg/kg
Bromochloromethane	ND (0.02)	ND (0.0031)	ND (0.0025)	NE	mg/kg
Bromodichloromethane	ND (0.014)	ND (0.0031)	ND (0.0025)	0.27	mg/kg
Bromoform	ND (0.044)	ND (0.0031)	ND (0.0025)	61	mg/kg
Bromomethane	ND (0.034)	ND (0.0031)	ND (0.0025)	7.3	mg/kg
Carbon disulfide	ND (0.025)	ND (0.0031)	ND (0.0025)	820	mg/kg
Carbon tetrachloride	ND (0.02)	ND (0.0031)	ND (0.0025)	0.61	mg/kg
Chlorobenzene	ND (0.015)	ND (0.0031)	ND (0.0025)	290	mg/kg
Chloroethane	ND (0.027)	ND (0.0031)	ND (0.0025)	15,000	mg/kg
Chloroform	ND (0.015)	ND (0.0031)	ND (0.0025)	0.29	mg/kg
Chloromethane	ND (0.022)	ND (0.0031)	ND (0.0025)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.018)	ND (0.0031)	ND (0.0025)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.013)	ND (0.0031)	ND (0.0025)	1.7	mg/kg
Cyclohexane	ND (0.016)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.013)	ND (0.0031)	ND (0.0025)	0.68	mg/kg
Ethylbenzene	ND (0.016)	ND (0.0031)	ND (0.0025)	5.4	mg/kg
Freon 11	ND (0.021)	0.0022 J	0.0018 J	790	mg/kg
Freon 113	ND (0.019)	ND (0.0031)	ND (0.0025)	43,000	mg/kg
Freon 12	ND (0.026)	ND (0.0031)	ND (0.0025)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.011)	ND (0.0031)	ND (0.0025)	2,100	mg/kg
Methyl acetate	ND (0.015)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.5)	ND (0.025)	ND (0.02)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.44)	ND (0.025)	ND (0.02)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.012)	ND (0.012)	ND (0.0098)	43	mg/kg
Methylcyclohexane	ND (0.0092)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.03)	ND (0.0031)	ND (0.0025)	11	mg/kg
Styrene	ND (0.015)	ND (0.0031)	ND (0.0025)	6,300	mg/kg
tert-Butyl alcohol	ND (0.16) R	ND (0.061)	ND (0.049)	160,000	mg/kg
Tetrachloroethene	ND (0.017)	ND (0.0031)	ND (0.0025)	0.55	mg/kg
Toluene	ND (0.016)	ND (0.0031)	ND (0.0025)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.022)	ND (0.0031)	ND (0.0025)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.014)	ND (0.0031)	ND (0.0025)	1.7	mg/kg
Trichloroethene	ND (0.03)	ND (0.0031)	ND (0.0025)	2.8	mg/kg
Vinyl chloride	ND (0.033)	ND (0.0031)	ND (0.0025)	0.06	mg/kg
Xylenes, total	ND (0.029)	ND (0.0061)	ND (0.0049)	630	mg/kg

TABLE 4-46
360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
	Cactus	360SSa			
Metals					
Arsenic *	ND (0.06)	**11.1**	**4**	0.062 / 22	mg/kg
Chromium	0.75	31.2	9.5	210	mg/kg
Lead **	2.7 J	**2,230 J+**	193	194 / 340	mg/kg
VOCs					
1,1,1-Trichloroethane	ND (0.016)	ND (0.0032)	ND (0.0028)	8,700	mg/kg
1,1,2,2-Tetrachloroethane	ND (0.019)	ND (0.0032)	ND (0.0028)	0.56	mg/kg
1,1,2-Trichloroethane	ND (0.014)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
1,1-Dichloroethane	ND (0.013)	ND (0.0032)	ND (0.0028)	3.3	mg/kg
1,1-Dichloroethene	ND (0.017)	ND (0.0032)	ND (0.0028)	240	mg/kg
1,2,4-Trichlorobenzene	ND (0.03)	ND (0.0032)	ND (0.0028)	22	mg/kg
1,2,4-Trimethylbenzene	ND (0.02)	ND (0.0032)	ND (0.0028)	62	mg/kg
1,2-Dibromo-3-chloropropane	ND (0.14)	ND (0.013)	ND (0.011)	0.0054	mg/kg
1,2-Dibromoethane	ND (0.01)	ND (0.0032)	ND (0.0028)	0.034	mg/kg
1,2-Dichlorobenzene	ND (0.012)	ND (0.0032)	ND (0.0028)	1,900	mg/kg
1,2-Dichloroethane	ND (0.016)	ND (0.0032)	ND (0.0028)	0.43	mg/kg
1,2-Dichloropropane	ND (0.026)	ND (0.0032)	ND (0.0028)	0.89	mg/kg
1,3-Dichlorobenzene	ND (0.014)	ND (0.0032)	ND (0.0028)	530	mg/kg
1,4-Dichlorobenzene	ND (0.012)	ND (0.0032)	ND (0.0028)	2.4	mg/kg
2-Hexanone	ND (0.55)	ND (0.026)	ND (0.022)	210	mg/kg
Acetone	ND (0.32)	ND (0.026)	ND (0.022)	61,000	mg/kg
Benzene	ND (0.015)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
Bromochloromethane	ND (0.018)	ND (0.0032)	ND (0.0028)	NE	mg/kg
Bromodichloromethane	ND (0.012)	ND (0.0032)	ND (0.0028)	0.27	mg/kg
Bromoform	ND (0.039)	ND (0.0032)	ND (0.0028)	61	mg/kg
Bromomethane	ND (0.03)	ND (0.0032)	ND (0.0028)	7.3	mg/kg
Carbon disulfide	ND (0.022)	ND (0.0032)	ND (0.0028)	820	mg/kg
Carbon tetrachloride	ND (0.017)	ND (0.0032)	ND (0.0028)	0.61	mg/kg
Chlorobenzene	ND (0.013)	ND (0.0032)	ND (0.0028)	290	mg/kg
Chloroethane	ND (0.024)	ND (0.0032)	ND (0.0028)	15,000	mg/kg
Chloroform	ND (0.014)	ND (0.0032)	ND (0.0028)	0.29	mg/kg
Chloromethane	ND (0.019)	ND (0.0032)	ND (0.0028)	120	mg/kg
cis-1,2-Dichloroethene	ND (0.016)	ND (0.0032)	ND (0.0028)	780	mg/kg
cis-1,3-Dichloropropene	ND (0.012)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
Cyclohexane	ND (0.014)	NA	NA	7,000	mg/kg
Dibromochloromethane	ND (0.012)	ND (0.0032)	ND (0.0028)	0.68	mg/kg
Ethylbenzene	ND (0.014)	ND (0.0032)	ND (0.0028)	5.4	mg/kg
Freon 11	ND (0.018)	0.0032	0.0036	790	mg/kg
Freon 113	ND (0.017)	ND (0.0032)	ND (0.0028)	43,000	mg/kg
Freon 12	ND (0.023)	ND (0.0032)	ND (0.0028)	180	mg/kg
Isopropylbenzene (cumene)	ND (0.0093)	ND (0.0032)	ND (0.0028)	2,100	mg/kg
Methyl acetate	ND (0.013)	NA	NA	78,000	mg/kg
Methyl ethyl ketone	ND (0.44)	ND (0.026)	ND (0.022)	28,000	mg/kg
Methyl isobutyl ketone	ND (0.39)	ND (0.026)	ND (0.022)	5,300	mg/kg
Methyl tert-butyl ether	ND (0.011)	ND (0.013)	ND (0.011)	43	mg/kg
Methylcyclohexane	ND (0.0081)	NA	NA	2,600	mg/kg
Methylene chloride	ND (0.027)	ND (0.0032)	ND (0.0028)	11	mg/kg
Styrene	0.022 J	ND (0.0032)	ND (0.0028)	6,300	mg/kg
tert-Butyl alcohol	ND (0.15) R	ND (0.065)	ND (0.056)	160,000	mg/kg
Tetrachloroethene	ND (0.015)	ND (0.0032)	ND (0.0028)	0.55	mg/kg
Toluene	ND (0.014)	ND (0.0032)	ND (0.0028)	5,000	mg/kg
trans-1,2-Dichloroethene	ND (0.019)	ND (0.0032)	ND (0.0028)	150	mg/kg
trans-1,3-Dichloropropene	ND (0.012)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
Trichloroethene	ND (0.026)	ND (0.0032)	ND (0.0028)	2.8	mg/kg
Vinyl chloride	ND (0.029)	ND (0.0032)	ND (0.0028)	0.06	mg/kg
Xylenes, total	ND (0.026)	ND (0.0065)	ND (0.0056)	630	mg/kg

TABLE 4-46
360 Center Street Analytical Results - Produce and Adjacent Soil Samples (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte		Produce Result	Soil Result (Shallow)	Soil Result (Deep)	Soil Screening Level	Units
		Cactus (FD)	360SSa			
Metals						
	Arsenic *	ND (0.06)	**11.1**	**4**	0.062 / 22	mg/kg
	Chromium	0.66	31.2	9.5	210	mg/kg
	Lead **	1.21 J	**2,230 J+**	193	194 / 340	mg/kg
VOCs						
	1,1,1-Trichloroethane	ND (0.023)	ND (0.0032)	ND (0.0028)	8,700	mg/kg
	1,1,2,2-Tetrachloroethane	ND (0.029)	ND (0.0032)	ND (0.0028)	0.56	mg/kg
	1,1,2-Trichloroethane	ND (0.021)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
	1,1-Dichloroethane	ND (0.019)	ND (0.0032)	ND (0.0028)	3.3	mg/kg
	1,1-Dichloroethene	ND (0.025)	ND (0.0032)	ND (0.0028)	240	mg/kg
	1,2,4-Trichlorobenzene	ND (0.045)	ND (0.0032)	ND (0.0028)	22	mg/kg
	1,2,4-Trimethylbenzene	ND (0.029)	ND (0.0032)	ND (0.0028)	62	mg/kg
	1,2-Dibromo-3-chloropropane	ND (0.21)	ND (0.013)	ND (0.011)	0.0054	mg/kg
	1,2-Dibromoethane	ND (0.015)	ND (0.0032)	ND (0.0028)	0.034	mg/kg
	1,2-Dichlorobenzene	ND (0.018)	ND (0.0032)	ND (0.0028)	1,900	mg/kg
	1,2-Dichloroethane	ND (0.024)	ND (0.0032)	ND (0.0028)	0.43	mg/kg
	1,2-Dichloropropane	ND (0.039)	ND (0.0032)	ND (0.0028)	0.89	mg/kg
	1,3-Dichlorobenzene	ND (0.021)	ND (0.0032)	ND (0.0028)	530	mg/kg
	1,4-Dichlorobenzene	ND (0.018)	ND (0.0032)	ND (0.0028)	2.4	mg/kg
	2-Hexanone	ND (0.81)	ND (0.026)	ND (0.022)	210	mg/kg
	Acetone	ND (0.47)	ND (0.026)	ND (0.022)	61,000	mg/kg
	Benzene	ND (0.022)	ND (0.0032)	ND (0.0028)	1.1	mg/kg
	Bromochloromethane	ND (0.026)	ND (0.0032)	ND (0.0028)	NE	mg/kg
	Bromodichloromethane	ND (0.018)	ND (0.0032)	ND (0.0028)	0.27	mg/kg
	Bromoform	ND (0.057)	ND (0.0032)	ND (0.0028)	61	mg/kg
	Bromomethane	ND (0.045)	ND (0.0032)	ND (0.0028)	7.3	mg/kg
	Carbon disulfide	ND (0.033)	ND (0.0032)	ND (0.0028)	820	mg/kg
	Carbon tetrachloride	ND (0.025)	ND (0.0032)	ND (0.0028)	0.61	mg/kg
	Chlorobenzene	ND (0.019)	ND (0.0032)	ND (0.0028)	290	mg/kg
	Chloroethane	ND (0.036)	ND (0.0032)	ND (0.0028)	15,000	mg/kg
	Chloroform	ND (0.02)	ND (0.0032)	ND (0.0028)	0.29	mg/kg
	Chloromethane	ND (0.028)	ND (0.0032)	ND (0.0028)	120	mg/kg
	cis-1,2-Dichloroethene	ND (0.024)	ND (0.0032)	ND (0.0028)	780	mg/kg
	cis-1,3-Dichloropropene	ND (0.017)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
	Cyclohexane	ND (0.021)	NA	NA	7,000	mg/kg
	Dibromochloromethane	ND (0.017)	ND (0.0032)	ND (0.0028)	0.68	mg/kg
	Ethylbenzene	ND (0.02)	ND (0.0032)	ND (0.0028)	5.4	mg/kg
	Freon 11	ND (0.027)	0.0032	0.0036	790	mg/kg
	Freon 113	ND (0.025)	ND (0.0032)	ND (0.0028)	43,000	mg/kg
	Freon 12	ND (0.034)	ND (0.0032)	ND (0.0028)	180	mg/kg
	Isopropylbenzene (cumene)	ND (0.014)	ND (0.0032)	ND (0.0028)	2,100	mg/kg
	Methyl acetate	ND (0.02)	NA	NA	78,000	mg/kg
	Methyl ethyl ketone	ND (0.66)	ND (0.026)	ND (0.022)	28,000	mg/kg
	Methyl isobutyl ketone	ND (0.57)	ND (0.026)	ND (0.022)	5,300	mg/kg
	Methyl tert-butyl ether	ND (0.015)	ND (0.013)	ND (0.011)	43	mg/kg
	Methylcyclohexane	ND (0.012)	NA	NA	2,600	mg/kg
	Methylene chloride	ND (0.04)	ND (0.0032)	ND (0.0028)	11	mg/kg
	Styrene	ND (0.02)	ND (0.0032)	ND (0.0028)	6,300	mg/kg
	tert-Butyl alcohol	ND (0.21) R	ND (0.065)	ND (0.056)	160,000	mg/kg
	Tetrachloroethene	ND (0.023)	ND (0.0032)	ND (0.0028)	0.55	mg/kg
	Toluene	ND (0.02)	ND (0.0032)	ND (0.0028)	5,000	mg/kg
	trans-1,2-Dichloroethene	ND (0.029)	ND (0.0032)	ND (0.0028)	150	mg/kg
	trans-1,3-Dichloropropene	ND (0.018)	ND (0.0032)	ND (0.0028)	1.7	mg/kg
	Trichloroethene	ND (0.039)	ND (0.0032)	ND (0.0028)	2.8	mg/kg
	Vinyl chloride	ND (0.043)	ND (0.0032)	ND (0.0028)	0.06	mg/kg
	Xylenes, total	ND (0.038)	ND (0.0065)	ND (0.0056)	630	mg/kg

Notes:

Deep samples were collected between 2.5 and 3 ft below ground surface.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

Produce results were compared to Soil Screening Levels.

Results greater than the screening level are bolded.

Screening levels are specific concentrations of chemicals that are considered health protective for human populations (including sensitive populations). See Soil Screening Level table for source of screening levels.

Shallow samples 1ft bgs samples were collected between 0.5 and 1ft below ground surface.

CS	composite
FD	field duplicate
mg/kg	milligrams per kilogram
NA	not analyzed
NC	not collected
ND	not detected above the laboratory's reporting limit shown in parentheses
J	estimated value
R	rejected for failure to meet quality control requirements
J+	estimated value, possible high bias

TABLE 4-47
Residential Produce and Adjacent Soil Results Summary (October 2006)
Human Health Risk Assessment
AMCO Chemical Superfund Site, Oakland, California

Analyte	Units	Residential Produce Levels	Screening Levels[1]
Arsenic *	mg/kg	0.06 - 0.08	0.39 / 22
Chromium	mg/kg	0.39 - 1.07	210
Lead **	mg/kg	0.15 - 8.47	80

Notes:

(1) EPA Region 9 Preliminary Remediation Goals for soil, October 2004.

* For Arsenic, 0.39 mg/kg is the cancer endpoint; 22 mg/kg is the noncancer endpoint.

** For Lead: Lead screening level in soil was evaluated using the California Human Health Screening Level developed by the Office of Environmental Health Hazard Assessment.

mg/kg milligrams per kilogram

Attachment 5
ATSDR ToxFaqs (on CD)

Attachment 6
proUCL Outputs (on CD)

Attachment 7
Responses to DTSC Comments on HHRA

Draft Responses to DTSC Comments on the AMCO HHRA

General Comment A

A. There are highly elevated levels of VOCs that have been measured in the environmental media at this site, and this report does not include a quantitative assessment of the risks from exposure of workers and hypothetical residents to indoor air contaminated with VOCs intruding from sub-surface soil, non-aqueous phase liquids (NAPLs) or groundwater. Although an explanation is given for why the indoor air pathway is not quantitatively evaluated in this risk assessment, the HERD considers this exclusion from risk calculation a major deficiency.

The HERD used the concentrations of VOCs detected in groundwater, soil gas, and on-facility crawl space air to carry out a screening level risk evaluation of the indoor air exposure pathway of selected VOCs in selected circumstances. Using the DTSC screening groundwater vapor intrusion model (2004), the future residential cancer risk from potential inhalation of vinyl chloride intruding indoors from on-site groundwater is 8 x 10^{-3}, based on a 95% upper confidence limit (UCL) of the mean concentration 1,627 μg/L. The HERD divided the maximum on-facility soil gas concentrations of benzene, tetrachloroethylene (PCE), and vinyl chloride by their California Environmental Protection Agency (Cal.EPA) California Human Health Screening Levels (CHHSL) and multiplied the ratio by 10^{-6} to get the risk posed by each VOC. These risks were then added to get cumulative residential and industrial worker risks of 9 x 10^{-4} and 6 x 10^{-4}, respectively. An industrial worker risk of 2 x 10^{-4} was calculated in the same manner by comparing the maximum vinyl chloride concentration of 7.6 $\mu g/m^3$ detected in crawl space air of the on-facility office to its Cal/EPA CHHSL for indoor air. The HERD's evaluation clearly shows the significant risk posed by VOCs intruding indoors from groundwater, soil gas, and crawl space air and demonstrates the need for remediation of VOCs.

Response A

Due to the elevated levels of VOCs in the crawlspace and ambient air, as a precautionary measure, mitigation systems have been installed in selected homes located nearest the site. At the time that the RI and HHRA reports were submitted, the crawlspace and ambient air data sets were inadequate for a quantitative vapor intrusion evaluation so a screening level assessment was conducted. Since that time, we have collected sufficient crawlspace and ambient air data to assess potential human health risks and hazards associated with VOCs migrating from the groundwater into the office at the former AMCO facility and into nearby residences using quantitative methods. Nine sampling events from September 2004 through June 2009 have been conducted. The results of the vapor intrusion evaluation are summarized below:

Industrial Exposure Evaluation

Potential cancer risks and noncancer hazards were calculated using industrial worker exposure assumptions for the 1414 3rd Street office. Crawlspace air is used to represent the air that could potentially be inhaled by the workers in their offices. Potential cancer risk from exposure to VOCs in crawlspace air at the office building is 6×10^{-5}, which is within the risk management range of 10^{-6} to 10^{-4}. The main contributors to the cancer risk are carbon tetrachloride (35%) and vinyl chloride (18%). The noncancer HI is below 1 for exposure by an indoor worker.

Residential Exposure Evaluation

All non-facility locations (residential parcels, South Prescott Park, background) were evaluated using residential exposure assumptions. Crawlspace and ambient air is used to represent the air that could potentially be inhaled by the residents inside and outside the living spaces of their homes. Potential cancer risks are within the risk management range at all residences for crawlspace and ambient air with the exception of two of the residential properties for crawlspace (1428 3rd Street and 1432 3rd Street) and one for ambient air (1428 3rd Street). These are also the only locations having noncancer HIs greater than 1.

Potential cancer risks from inhalation of crawlspace air ranged from 5×10^{-5} to 3×10^{-4}. The primary chemical contributors to risk from inhalation of crawlspace air are vinyl chloride, benzene, 1,2-dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene at the four residences where crawlspace air and ambient air were collected. Crawlspace air HIs range from 0.5 to 8. The primary contributors to the HI in crawlspace air at the two locations that have HIs that exceed 1 are 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene.

Potential cancer risks from inhalation of ambient air ranged from 2×10^{-5} to 2×10^{-4}. The primary contributors to risk from inhalation of ambient air are naphthalene, benzene, carbon tetrachloride, and vinyl chloride. Vinyl chloride is only a primary contributor at one property - 1436 3rd Street. The HI from exposure to ambient air exceeds 1 at 1428 3rd Street (HI=4). Naphthalene (47%), 1,2,4-trimethylbenzene (18%), and 1,3,5-trimethyl-benzene (18%) are the primary contributors to the ambient air HI.

An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home ranges from $1x10^{-4}$ to $7x10^{-2}$, which is significantly above the risk management range and clearly unacceptable. Hazard indices for a child is 628 and for an adult is 262 which are also significantly above the noncancer threshold of 1.

To confirm that the risks for vapor intrusion are similar as the risks from drinking the groundwater, selected VOCs that contribute the most to the risk and hazard estimates were modeled using the DTSC screening groundwater vapor intrusion model. Defaults were used as inputs into the model except the depth to groundwater was adjusted to 5 feet below ground surface and sand was used as the SCS soil type. Below is the table of results:

VOC	Exposure Point Concentration (µg/L)	Incremental Risk from Vapor Intrusion to Indoor Air	Hazard Quotient from Vapor Intrusion to Indoor Air
Vinyl chloride	1,627	2.2×10^{-1}	80
TCE	57	6.0×10^{-6}	0.014
PCE	12	6.2×10^{-6}	0.083
Cis-1,2-DCE	13,700	NA	22
Trans-1,2-DCE	400	NA	0.83
Totals		2×10^{-1}	103

These results show that the risks and hazards related to vapor intrusion are significantly above the risk management range and clearly unacceptable.

General Comment B

B. Arsenic is present on the facility at background concentrations but is a primary risk-driver in this risk assessment, despite the fact that arsenic does not appear to have been released to the site by former facility operations. Therefore, the cumulative risk should be calculated without the inclusion of arsenic and included in this report as representative of the risk from exposure to contaminants released to the environment during manufacturing activities.

Response B

The risk calculations included risk from all inorganic compounds including those present at background concentrations in accordance with EPA's Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites (EPA 2002a). This document states, "COPCs that have both release-related and background-related sources should be included in the risk assessment. When concentrations of naturally occurring elements at a site exceed risk-based screening levels, that information should be discussed qualitatively in the risk characterization." In the risk characterization section of the HHRA, whenever arsenic is discussed as a risk driver, a statement will be added comparing concentrations of arsenic found in the exposure area to arsenic concentrations in background. The following table summarizes the arsenic exposure point concentrations at each exposure area and in the background data set.

Exposure Area	**Arsenic Exposure Point Concentration**	**Residential Risk without Arsenic**
Former AMCO Facility – shallow soil	7.71 mg/kg	$2x10^{-4}$
Former AMCO Facility – subsurface soil	8.1 mg/kg	$2x10^{-4}$
Parking Lot – shallow soil	20 mg/kg	$1x10^{-4}$
Parking Lot – subsurface soil	12.8 mg/kg	$3x10^{-4}$
Large Vacant Lot – shallow soil	26.9 mg/kg	$1x10^{-4}$
Large Vacant Lot – subsurface soil	18.1 mg/kg	$8x10^{-5}$
Small Vacant Lot – shallow soil	14.2 mg/kg	$1x10^{-4}$
Background	14 mg/kg	$1x10^{-8}$

General Comment C

C. Elevated lead levels are found throughout the facility and, thus, is a primary chemical of concern. The lead concentrations in surface soil represent a real hazard to current and future receptors and this should be highlighted throughout the risk assessment report.

Response C

We agree that lead is a concern at the former AMCO facility and off-facility locations. To address the elevated lead levels, an emergency response was conducted and surface soil (0 to 3 feet) was removed from the exposed areas of the yards of several nearby homes.

These properties include 1428, 1432, and 1436 3rd Street, and 320, 326, 356, 360, and 366/368 Center Street.

Specific Comment 1

Page 4-5 Section 4.2.2.3 Groundwater Monitoring Wells – Sampling Locations; and Page 4-8 Section 4.3 Soil Sampling. A) Section 4.2.2.3 describes the sampling of the groundwater monitoring well network of 29 wells. However, nowhere is the method of collecting groundwater described. Please describe the collection method and verify that the method used is designed to reduce the possibility of VOC loss from the groundwater samples during collection. B) Section 4.3 describes the soil sampling performed on-facility, off-facility, and at adjacent residential properties. However, the method used to collect soils for VOC analysis is equivalent to US EPA Method 5035, designed to reduce VOC loss from soil matrix during collection.

Response 1

Field procedures are presented in Appendix C. References to Appendix C will be added to these sections.

Specific Comment 2

Page 4-25 Section 4.7.1.4 Lithologic Logging/Laboratory Analyses; and, Table 6 Soil Physical Parameter Testing Results. Soil physical properties were measured using methods that have not necessarily been recommended in Appendices H and I of the DTSC *Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Ai*r (2005). A) Confirmatory measurement of soil properties using the methods recommended by the DTSC should be performed. Alternatively, justification should be provided to support the methods used for the measurement of all properties except soil air permeability. B) Soil air permeability measurements were made in the laboratory on soil samples, whereas, the DTSC recommends that soil air permeability measurements be made in-situ using the method described in Appendix I of the vapor intrusion guidance. The reason for this recommendation is that the laboratory method involves the use of confining pressure which could collapse soil pore space resulting in an underestimate of air permeability. Future soil gas sampling events should include the in-situ measurement of soil air permeability. The effects of an underestimated soil air permeability measurement on soil vapor modeling should be discussed in the uncertainty section of the human health risk assessment.

Response 2

If soil vapor modeling is conducted in the future, confirmatory sampling using the methods recommended by DTSC will be performed. To evaluate the vapor intrusion pathway, we have elected to use direct measurement to evaluate current risk as opposed to theoretical risks calculated using vapor intrusion modeling. EPA's 2002 OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) Tier 3 recommends the collection of samples from within individual buildings because they are the closest to the exposure point of interest and are likely to be more reflective of VI than samples collected further from indoor air. DTSC's Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air states "*Crawl space air is less affected by the lifestyle choices, such as household product use and smoking, of the building's occupants than indoor air. The evaluation of the* *results of crawl space air sampling is easier to interpret than indoor air sampling results"* (DTSC 2005).

Specific Comment 3

Page 5-3 Section 5.3 Non-aqueous Phase Liquids (NAPLs). Light NAPL (LNAPL) is present on the shallow groundwater at this site and contains many of the chemicals of potential concern (COPCs) for this site. The depth below ground surface where LNAPL is located should be given in this section. A figure should be included showing the approximate boundaries of the LNAPL.

Response 3

LNAPL is present along the surface of the groundwater, and within the zone of groundwater fluctuation, which in several locations extends to the bottom of concrete. The location of the LNAPL has not been delineated well enough to provide a figure; however, LNAPL can generally be considered to be present in the immediate vicinity of monitoring wells MW-13 and MW-14. LNAPL has not been observed in any other wells. Figure 14 shows the locations of all of the wells sampled for the RI report.

Specific Comment 4

Page 5-29 Section 5.5.2.4.4 Lead, and Figure 49A and 49B Lead in Surface Soil and Mid/Deep Soil. This section summarizes the lead concentrations measured in off-facility residential soils. The text should be revised to summarize the soil excavation activities that have already taken place to remove soils with highly elevated lead concentrations. The figures should be revised to include the approximate boundaries of those excavation areas. A note should be added to the figures confirming that the lead concentrations depicted in those figures represent current conditions.

Response 4

The text on page 5-29 is referring only to "off-facility" locations, which include the large vacant lot, small vacant lot, and the parking lot. No soil was excavated from these locations. Lead in residential soil is discussed in Section 5.5.3 starting on page 5-30. Section 5.5.3 notes that a soil removal action has been performed and that the results discussed are no longer representative of current soil conditions.

The figures are intended to present the results of the Remedial Investigation. The figures ***do not*** represent current conditions. The figures summarize the results of the soil sampling that was performed as part of the RI. In general soil removal occurred in all areas not covered with concrete or a structure. Removal was generally limited to 3 feet bgs. Removal actions were completed at 1428, 1432, and 1436 3rd Street, and 320, 326, 356, 360, and 366/368 Center Street.

Specific Comment 5

Page 5-35 Section 5.5.4 Summary of Nature and Extent of Contamination in Soil. Under the seventh bullet, the text states that arsenic was detected across the area at background concentrations. This text should be revised to include the background range of arsenic concentrations for this area. The text should also be revised to state that elevated arsenic was measured in a soil sample from 326 Center Street (451 mg/kg at one foot below ground surface in Sample 326SSd).

Response 5

The information regarding Sample 326SSd is presented on page 5-33, but will be added to this section. The bullet in Section 5.5.4 now reads:

- Key metals arsenic, lead, and iron were widely detected in soil samples collected from on-facility, off-facility, and residential locations.
    - Arsenic was detected above the screening level in every soil sample collected; however, concentrations detected across the RI Study Area are generally less than or equal to background concentrations typical of the San Francisco Bay Area with the exception of the sample collected location 326SSd. Arsenic was detected at concentrations greater than background in shallow (451 mg/kg) and deeper (125 mg/kg) soil at this location.

Specific Comment 6

Page 7-4 Section 7.2.2 Exposure Assessment; and Tables 33 and 34 Exposure Point Concentrations for Soil Exposure Areas and Groundwater, respectively. Exposure to dioxins/furans is evaluated in a congener-specific manner in this risk assessment. Add dioxins/furans concentrations in dioxin toxicity equivalents (TEQs) to the tables in order to compare dioxin concentrations at other sites.

Response 6

Tables 33 and 34 Exposure Point Concentrations for Soil Exposure Areas and Groundwater have been modified to include the dioxin toxicity equivalents so the reader may compare dioxin concentrations with those at other sites.

Specific Comment 7

Page 7-8 Section 7.2.4 Risk Characterization. Risks were estimated from exposure intakes calculated from concentration of chemicals in soil matrix and groundwater. A) Soil gas, crawl-space air and ambient air data were evaluated by comparing these data to generic screening levels. Screening levels for soil gas were calculated by multiplying US EPA Region 9 ambient air Preliminary Remediation Goals (PRGs) by a default attenuation factor of 10. This comparison does not include any quantitative risk estimation from the potential exposure to VOCs intruding indoors from soil gas. B) In addition, VOCs in groundwater are not evaluated for volatilization into overlying soil and subsequent migration into indoor air. Therefore, the estimates of risks to current and potential on-facility and off-facility residents and workers are greatly underestimated. The subject report should include a screening level risk assessment for VOCs intruding indoors using the soil gas data obtained to date and the most recent groundwater data. The resulting risk from this pathway should be added to the risks calculated from the other complete exposure pathways. C) The potential effect of the LNAPL on shallow groundwater on indoor air risk estimation and as a long-term source of VOCs must be discussed in detail in the uncertainty section. D) The lack of any risk evaluation of the indoor air pathway at a site with such high VOC concentrations in soil matrix, soil gas, and groundwater represents a major deficiency in this health risk assessment. There are further specific comments on this issue below.

Response 7

Part A) At the time that the RI and HHRA reports were submitted, the crawlspace and ambient air data sets were inadequate for a quantitative vapor intrusion evaluation so a screening level assessment was conducted. Since that time, we have collected sufficient crawlspace and ambient air data to assess potential human health risks and hazards associated with VOCs migrating from the groundwater into the office at the former AMCO facility and into nearby residences using quantitative methods. Due to the elevated levels of VOCs in the crawlspace and ambient air, as a precautionary measure, mitigation systems have been installed in selected homes located nearest the site. See response to comment A for a summary of the vapor intrusion evaluation using the crawlspace and ambient air data.

Part B) An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home ranges from $1x10^{-4}$ to $7x10^{-2}$, which is significantly above the risk management range and clearly unacceptable. Hazard indices for a child is 628 and for an adult is 262 which are also significantly above the noncancer threshold of 1.

Part C) The LNAPL on the groundwater will be remediated so the source of the VOCs will be removed and there will be no long-term effects on residents and workers.

Part D) Please refer to the response to Part A of this comment.

Specific Comment 8

Tables 20 and 21 Results Summary – Groundwater and Soil, respectively. For several chemicals of particular toxicological interest, the highest reporting limits are much greater than their respective screening levels. For example, the reporting limit for benzene in groundwater ranged up to 500 μg/L, whereas the screening level for this chemical is 1 μg/L. Similarly, the reporting limit for carcinogenic polycyclic aromatic hydrocarbons (PAHs) in soil ranged up to 23 mg/kg, whereas the screening level for benzo(a)pyrene is 0.062 mg/kg. It is important to acknowledge that the data sets have been examined to verify that elevated reporting limits have not significantly biased the calculation of exposure point concentrations and that the data sets are useable for health risk assessment purposes. These issues are discussed in Appendix H – Human Health Risk Assessment, Section 6.1.2 Reporting Limits; and, therefore, Section 6.1.2 should be cited in a footnote on these tables.

Response 8

The data sets have been examined to verify that the reporting limits have not significantly biased the calculation of exposure point concentrations and that the data sets are useable for health risk assessment purposes. A footnote will be added to Tables 20 and 21 citing Section 6.1.2. A detailed discussion of the reporting limits for the compounds noted above is presented below.

- Benzene was detected in 55 out of 122 groundwater samples. The exposure point concentration (99% Chebyshev UCL) for benzene is 400 μg/L. The reporting limits for benzene in the groundwater data set that was used in the risk calculation included only one sample result for a nondetect at 500 μg/L out of 122 samples. Two other nondetect samples had reporting limits greater than the screening level of 1 μg/L for benzene.

These were reporting limits of 5 and 10 μg/L. These few samples have not significantly biased the calculation of the exposure point concentration for benzene in groundwater.

- For the PAHs in soil, at the former AMCO facility and Parking Lot, the maximum detected concentration was used as the exposure point concentration for the majority of PAHs so the elevated reporting limits have not significantly biased the EPC calculation. For the Large Vacant Lot shallow soil, benzo(a)pyrene was detected in 5 out of 14 samples, and the maximum detected concentration is 1,400 mg/kg. The shallow soil EPC is 651 mg/kg. In deep soil, benzo(a)pyrene was detected in 7 out of 23 samples, with a maximum concentration of 1,400 mg/kg. The deep soil EPC is 617 mg/kg.

Specific Comment 9

Table 30 Soil Exposure Assumptions. The particulate emission factor (PEF) for the construction worker should not be the same as the PEF used for residential and worker scenarios, since it would be expected that a construction site could potentially generate significant amounts of dust. A default PEF of 1.0 x 10^6 m^3/kg as listed in the DTSC Human Health Risk Assessment (HHRA) Note Number 1 (October 2005), should be used for the construction worker. This PEF corresponds to a respirable dust concentration of one mg/m^3.

Response 9

We agree that the PEF for the construction and trench worker scenarios should be higher than for residential and industrial worker scenarios. The inhalation of particulate pathway contributes less than one percent of total risk/hazard contribution for the construction worker at three of the four exposure areas (including the parking lot and large and small vacant lots) so an increase in the particulate emission factor (PEF) would not be detectable in the final risk/hazard estimates for those areas. However, at the Former AMCO Chemical Facility exposure area, the inhalation pathway contributes 16 percent of the total cancer risk and 30 percent of the total noncancer HI. The construction worker PEF of 1.0 x 10^{-6} m^3/kg was applied to the risk/hazard calculations to assess the impacts on inhalation risk results. The revised cancer risk estimate is 7 x 10^{-5} increased from 2 x 10^{-5} which is still within EPA's target risk range. The revised noncancer HI is 20 increased from 5, which still exceeds the noncancer threshold of 1. The risk assessment has been updated using the suggested PEF for construction and trench workers.

Specific Comment 10

Table 33 Exposure Point Concentrations for Soil Exposure Areas, and Table 34 Exposure Point Concentrations for Groundwater. The exposure point concentrations for dioxins/furans in dioxin TEQ should be included in these tables.

Response 10

As noted in Response 6, TEQs have been added to the tables.

Specific Comment 11

Table 37 Summary of Cancer Risks and Noncancer Hazards – Soil. This table summarizes the risks and hazards for each facility exposure area. This table should be expanded or an additional summary table should be included that identifies the risk-driving chemicals and exposure pathways, as shown in the detailed summary tables of risk drivers presented in Appendix H – Human Health Risk Assessment. Alternatively, footnotes should be added to this table that identify the five to ten chemicals responsible for the majority of the risks/hazards and the primary exposure pathways.

Response 11

The primary risk drivers have been added to Table 37.

Specific Comment 12

Appendix H – Human Health Risk Assessment. Page 2-1 Section 2.2.1 Soil. Shallow soil samples are defined as samples taken between zero and two feet below concrete. Deep soil samples are defined as samples taken between two and seven feet below concrete. Please provide the rationale for these depth ranges and any supporting citations.

Response 12

As discussed with DTSC and the City of Oakland prior to collection of data, shallow oil samples were collected between zero and two feet below concrete because of site-specific conditions described in Section 4.3.1.

Due to the water table at the site ranging from 3 to 8 feet bgs, the deepest soil sample that could be collected was at 7 feet bgs.

This text has been added to Section 2.2.1 to explain the sample depths: A non-engineered concrete cap exists over the majority of the former AMCO facility and varies from 6 to more than 40 inches thick. In accordance with the SAP, shallow soil samples were generally collected from between 1 and 2 feet below the concrete or below ground surface in unpaved areas.

Specific Comment 13

Appendix H – Human Health Risk Assessment. Page 3-4 Section 3.2 Exposure Point Concentrations. A separate, supplemental health risk assessment should be carried out for the “hot spot” west and adjacent to the existing warehouse and office building. This hot spot area should be the approximate size of the existing residential lots near the facility.

Response 13

The cancer risks for a potential future resident on the Main Property exceed the risk management range, as shown on Table 37 and the noncancer hazard index exceed the threshold of 1 which are unacceptable conditions for residential lots without remediation. The “hot spot” west and adjacent to the existing warehouse and office building will be remediated so a supplemental health risk assessment was not conducted.

As discussed in EPA’s Re-use Assessment for the AMCO Chemical Superfund Site (EPA 2010), re-use considerations may help selection of a remedial alternative:

- Targeted use restrictions may be required on the Site to ensure protection of human health and the environment
- Long-term remedial features may create some constraints on future use at the Site.

Specific Comment 14

Appendix H – Human Health Risk Assessment. Page 3-7 Section 3.3.4 Exposure Parameters and Equations for Inhalation of Particulates and Volatiles form Soil –

Particulate-emission and Volatilization Factors. The exposure to outdoor air contaminated by vapors diffusing from soil is calculated using soil matrix concentrations and the standard methodology described in the U.S. EPA *Soil Screening Guidance: User's Guide* (April 1996). Since soil vapor concentration values are available, the exposure concentration of outdoor air should also be determined using these data. This may be done for each VOC by calculating the emission flux from the soil vapor concentration, multiplying the flux by the exposure area to get the emission rate, and then applying a box model or dispersion factor to get an exposure point concentration. The exposure point concentration and resulting risks calculated from soil matrix and soil vapor concentrations, respectively, should be compared. If the differences are significant, the reasons for the differences should be discussed in the uncertainty section. The most conservative exposure point concentrations should be evaluated in this health risk assessment.

Response 14

Risks and hazards were estimated using ambient air data (direct measurement) so we did not estimate ambient air concentrations from soil gas data (theoretical modeling).

Specific Comment 15

Appendix H – Human Health Risk Assessment. Page 4-5 Section 4.2.3 Toxicity Values for Lead. For workers exposed to lead in soil, the US EPA Region 9 industrial lead PRG of 800 mg/kg is utilized. This PRG is based on the US EPA Adult Lead Model (ALM). Please confirm that this PRG is protective of all ethnic groups.

Response 15

The evaluation of lead in soil has been updated to compare site lead concentrations to the CalEPA's residential and industrial CHHSLs of 80 mg/kg and 320 mg/kg, respectively. The Revised California Human Health Screening Levels for Lead (CalEPA 2009) states that the Geometric Standard Deviation for Blood Lead Levels (GSD) used in the Adult Lead Model for calculation of the industrial CHHSL is 1.8 based on an EPA recommended value for relatively homogeneous populations.

Specific Comment 16

Appendix H – Human Health Risk Assessment. Page 5-6 Section 5.4.5 Background Soil Risk Evaluation, and Table 1-06 Soil Exposure Point Concentrations for City of Oakland Background. For all on-facility exposure areas, arsenic is a predominant risk-driving chemical, despite the fact that the arsenic exposure point concentrations, ranging from 7.7 mg/kg to 26.9 mg/kg, could be considered present at background levels at some exposure areas. No local background soil samples were collected. Instead, background soil concentrations as reported by the City of Oakland (*Survey of Background Metal Concentration Studies*, 1996) were used to determine background risk. The background risk to industrial workers is reported in the text to be 6×10^{-5}, with arsenic as the primary risk-driver. The background soil arsenic concentration that results in that risk is not, but should be, presented in the text of this section. The range of background soil arsenic concentrations in Oakland should be presented in this section. Table 1-96 should be cited in this section. Comparison of background arsenic soil concentrations with facility-related arsenic soil concentrations should be done so that arsenic may be included or excluded as a COPC.

Response 16

A citation for Table 1-96 will be added in Section 5.4.5. The arsenic value used to calculate risk is 14.0 mg/kg. We used the most relevant arsenic background concentration from the City of Oakland Survey of Background Metal Concentration Studies (colluvium and fill). The arsenic background concentration has been added to the text. See Response B regarding exclusion of arsenic from facility-related arsenic soil concentrations.

Specific Comment 17

Appendix H – Human Health Risk Assessment. Page 5-7 Section 5.6 Residential Soil Gas, Ambient Air, and Crawl Space Air; and, Attachment 3 Table 3-8 Residential Air Results Summary. A quantitative risk evaluation of the indoor air exposure pathway has not been included in this risk assessment for either on-facility or off-facility receptors. Instead, a screening evaluation was done to determine if there is an immediate health threat to residents. The HERD recommends that the risk and hazards posed by VOCs intruding from the subsurface into indoor air be quantitatively evaluated in a supplement to this risk assessment, because VOCs at the site are present at highly elevated levels in soil gas and groundwater. There are sufficient soil gas, groundwater, ambient air, and crawlspace air data to perform such an evaluation for on-facility exposure areas and adjacent residences. The HERD expects that indoor air exposure would be the dominant, risk-driving pathway; thus, this human health risk assessment is incomplete and misleading without including the risks form this pathway. A) In order to perform a quantitative risk evaluation of soil vapor concentrations, the maximum soil gas concentrations for each exposure area, including each residence, should be utilized. The DTSC Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (January 2005) describes several acceptable evaluation methods. B) The ten VOCs responsible for the majority of the risk should be carried through this supplemental risk assessment. C) Maximum soil gas concentrations should similarly be used to quantify on-facility risks from vapor intrusion, although soil gas concentrations above the known LNAPL locations should be avoided, since the vapor intrusion models acceptable to the DTSC do not include NAPL as a continuing source. D) For groundwater VOC concentrations, the 95% upper confidence limits (UCLs) of mean values may be used in the latest DTSC screening level groundwater model. E) Target groundwater concentrations that would be protective of vapor intrusion into indoor air should be calculated for the primary risk-driving VOCs and compared to their respective maximum contaminant levels (MCLs) to make sure that the MCLs are sufficiently protective. F) At residences, backyard air levels may be compared to neighborhood background air levels, as shown in Table 3-8, to identify VOCs that may not be related to contamination coming from the facility.

Response 17

Part A) To evaluate the vapor intrusion pathway, we have elected to use direct measurement (crawlspace and ambient air data) to evaluate current risk as opposed to theoretical risk calculated using vapor intrusion modeling. EPA's 2002 OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) Tier 3 recommends the collection of samples from within individual buildings because they are the closest to the exposure point of interest and are likely to be more reflective of VI than samples collected further from indoor air. DTSC's Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air states "Crawl space air is less affected by the lifestyle choices, such as household product use and smoking, of the building's occupants than indoor air. The evaluation of the results of crawl space air sampling is easier to interpret than indoor air sampling results" (DTSC 2005).

Part B) All detected VOCs have been carried through in the quantitative risk evaluation. As shown on Table 3, the majority of VOCs detected in groundwater and soil gas were also detected in crawlspace air and ambient air.

Part C) Risks and hazards were not quantitatively evaluated using soil gas data. We used the crawlspace and ambient air data for evaluating the vapor intrusion pathway.

Part D) An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home ranges from $1x10^{-4}$ to $7x10^{-2}$, which is significantly above the risk management range and clearly unacceptable. Hazard indices for a child is 628 and for an adult is 262 which are also significantly above the noncancer threshold of 1.

Part E) Target groundwater concentrations that would be protective of vapor intrusion into indoor air were calculated using the Regional Screening Levels for Resident Air, Henry's Law Constant, and an Attenuation Factor of 0.001 from groundwater to indoor air (EPA 2010) as cited in EPA's Vapor Intrusion Database for the VOCs that contribute the most to the risk/hazard. The results compared with the California drinking water standards (MCLs) are presented below:

VOC	Target Groundwater Concentrations Protective of Vapor Intrusion into Indoor Air (µg/L)	California MCL (µg/L)
Vinyl chloride	1.4	0.5
Cis-1,2-DCE	231	6
Trans-1,2-DCE	171	10

For the VOCs that contribute the most to the total cancer risk and noncancer hazard index, the California MCLs are more protective than the vapor intrusion target groundwater concentrations.

Part F) The air concentrations found at residences near the site in comparison with the air concentrations found at the background location are presented in Tables 27a through 27f of the RI Report.

Specific Comment 18

Appendix H – Human Health Risk Assessment. Page 5-9 Section 5.6 Residential Soil Gas, Ambient Air, and Crawlspace Air. As previously, stated, target soil gas concentrations were calculated by multiplying US EPA Region 9 ambient air PRGs by a default attenuation factor of 10. The HERD does not agree that these calculated screening levels should be used, because empirical evidence has not supported the use of an attenuation factor of 10 for

California sites. Instead, the HERD recommends that the Cal/EPA California Human Health Screening Levels (CHHSLs) be used as preliminary target soil gas concentrations.

Response 18

The screening level evaluation has been replaced with a quantitative risk evaluation of the vapor intrusion pathway. Using an attenuation factor of 10 for soil gas is recommended in the OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA 2002b) and supported in the materials from the EPA/AEHS Workshop, March 16, 2010 – Update on Vapor Intrusion at U.S. EPA. For all compounds detected in the soil gas, these screening values are ***more conservative*** than the shallow soil gas CHHSLs.

Specific Comment 19

Appendix H – Human Health Risk Assessment. Page 5-7 through 5-14 Section 5.6 Residential Soil Gas, Ambient Air, and Crawlspace Air. A) Crawlspace air concentrations should be considered equivalent to indoor air concentrations. Therefore, crawlspace air concentrations could be compared to ambient air US EPA PRGs to obtain a screening level risk estimate using the methodology described in the Users' Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals (PRG) Table (October 2004). This risk estimate may be identified as a measure of current risk, as opposed to the theoretical risks calculated using vapor intrusion models. B) The comparison of crawlspace to ambient air concentrations, as is carried out in this risk assessment, is an appropriate method for excluding those concentrations in air that are likely not related to environmental media contamination.

Response 19

Part A) We agree that crawlspace air concentrations should be considered equivalent to indoor air concentrations.

Part B) Comment noted.

Specific Comment 20

Appendix H – Human Health Risk Assessment. Page 5-10 through 5-13 Section 5.6 Residential Soil Gas, Ambient Air, and Crawlspace Air. A qualitative discussion of air data obtained from adjacent residences is provided in the text. As discussed elsewhere in this memorandum, the HERD recommends a quantitative evaluation of these data. In addition, a summary table of the risks and hazards posed by the COPCs found in the air at these residences should be presented in order to establish the risk contours surrounding the facility.

Response 20

We agree that a quantitative evaluation of the crawlspace and ambient air data is appropriate. As discussed in previous responses, a quantitative evaluation has been performed. A summary table of the risks and hazards for the residences as well as the office workers is provided in Table 2.

Specific Comment 21

Appendix H – Human Health Risk Assessment. Page 7-1 Section 7.0 Summary and Discussion of Human Health Risk Assessment Results. This section discusses on-site soil and groundwater risk estimates, irrigation well results, and qualitative screening level evaluation of results obtained on environmental media on residential properties. This summary is deficient because it does not include a discussion on: the presence of VOCs in shallow groundwater as a continuing source of VOCs to ambient and indoor air, the limited identification of COPCs because of the lack of a critical evaluation of VOCs in soil gas, and presence of COPCs in the LNAPL as a continuing source at this site.

Response 21

A summary discussion of the results of the vapor intrusion evaluation has been added to this section. We disagree that there is a "limited identification" of COPCs. As shown on Table 3, the majority of VOCs detected in groundwater and soil gas were also detected in the crawlspace air and ambient air samples. All detected VOCs were quantitatively evaluated in the risk assessment.

Conclusions

The human health risk assessment contained in this remedial investigation report is deficient in several major aspects, as discussed in the comments above. The assessment should be revised to include a quantitative evaluation of the risks and hazards posed by the presence of VOCs in soil vapor and groundwater. The risk assessment should also include an in depth discussion of the health effects that may be associated with the presence of LNAPL.

Response 22

The assessment has been revised to include a quantitative evaluation of the risks and hazards posed by the presence of VOCs in crawl space air and ambient air. Soil vapor and groundwater data have been used as lines of evidence that vapor intrusion is occurring but not quantitatively evaluated. An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home ranges from 1×10^{-4} to 7×10^{-2}, which is significantly above the risk management range and clearly unacceptable. Hazard indices for a child is 628 and for an adult is 262 which are also significantly above the noncancer threshold of 1.

Responses to DTSC Comments from September 2010

September 16, 2010

Rose Marie Caraway
Remedial Project Manager/Environmental Scientist
U.S. Environmental Protection Agency
75 Hawthorne Street, SFD 7-2
San Francisco, CA 94105

Dear Ms. Caraway:
Thank you for the opportunity to review the Draft Final Human Health Risk Assessment and response to comments dated August 2010 for the AMCO Chemical Site located in Oakland, California. DTSC previously provided comments on the risk assessment to US EPA in April 2008. DTSC's Human and Ecological Risk Office (HERO) reviewed both the revised risk assessment and response to comments that were provided via email on August 24, 2010. Based upon that review, please find attached HERO's comments to both the responses provided as well as comments to the revised report. Please note that DTSC did not conduct an editorial review of the accompanying tables, but assumes that US EPA or its contractor has done this review.

If you have any questions, please contact Lynn Nakashima of my staff at (510) 540-3839 or Lnakashi@dtsc.ca.gov.

Sincerely,
Barbara J. Cook, PE
Acting Assistant Deputy Director
Brownfields & Environmental Restoration Program
Department of Toxic Substances Control

Enclosure

cc: Ms. Lynn Suer
U.S. Environmental Protection Agency
75 Hawthorne Street, SFD 7-2
San Francisco, CA 94105

Dr. Kimiko Klein
Human and Ecological Risk Office
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710

TO: Lynn Nakashima
Brownfields and Environmental Restoration Program
700 Heinz Avenue
Berkeley, CA 94710-2721

FROM: Kimiko Klein, Ph.D.
Staff Toxicologist Emeritus
Human and Ecological Risk Office (HERO)

DATE: September 15, 2010

SUBJECT: Draft Final Human Health Risk Assessment
AMCO CHEMICAL SUPERFUND SITE, OAKLAND
PCA 14125 Site Code: 200687-62

Background

This one-acre property was formerly the site of a chemical repackaging business and scrap metal yard. The facility property is separated into four exposure areas: the facility, parking lot, large vacant lot, and small vacant lot. The property is surrounded by residential and industrial properties. The community is interested in a wide range of reuse options for the facility and nearby properties, including single and multi-family residential, commercial, office, a park and playground.

A dual-phase groundwater and soil vapor extraction and treatment system operated on-site from 1997 to 1998 during which time 7,000 pounds of volatile organic compounds (VOCs) were removed, including 40 pounds of vinyl chloride. The site was listed as a Superfund site by the U. S. Environmental Protection Agency (US EPA) in 2003. The Human and Ecological Risk Office (HERO) has been requested to provided technical support and has reviewed a previous draft health risk assessment in a memorandum, dated April 8, 2008. The HERO has participated in several meetings with US EPA staff to discuss human health risk issues specific to this property and the surrounding area.

Document Reviewed

The HERO reviewed a red-line version of a document entitled "Draft Final Report, Human Health Risk Assessment, AMCO Chemical Superfund Site", dated August, 2010, and prepared for the US EPA, Region 9, by CH2M HILL. The document was transmitted to the HERO via e-mail on August 24, 2010.

General Comments

This updated, complex baseline risk assessment evaluates the exposure, risks, and hazards posed by a very large array of chemicals detected in multiple environmental and exposure media including, air, soil, groundwater and home-grown produce both on the facility properties and nearby residences. Multiple land-use scenarios are considered.

In the review by the HERO of the previous human health risk assessment report for this site contained in the memorandum, dated April 8, 2008, major deficiencies were identified. These deficiencies included: the lack of a quantitative assessment of the risks from exposure of workers and hypothetical residents to indoor air contaminated with VOCs intruding from sub-surface soil, non-aqueous phase liquids (NAPLs) and/or shallow groundwater; and, the inclusion of arsenic as a primary risk-driver even though it may be present on the facility property at background concentrations. In addition, elevated lead levels in soils were found throughout the facility, representing a hazard to current and future receptors.

The HERO read the entire revised report but focused on the revisions made to address the previous comments of the Department of Toxic Substances Control (DTSC) and the responses to those comments that appear as Attachment 7 to this report. The HERO did not review any other attachments and only cursorily reviewed the tables because of time constraints. The HERO assumes that other DTSC staff has reviewed the data sets used to support this health risk assessment for adherence to data quality objectives and assurance.

A. With respect to the assessment of risks from vapors intruding from the sub-surface, extensive crawlspace and ambient air sampling data have been incorporated in this subject report as an adjunct to the original health risk assessment. The risk assessment has been revised to include a quantitative evaluation of the indoor air inhalation pathway using crawlspace and ambient air data. Risks and hazards from exposure to indoor air were calculated using crawlspace rather than indoor air data, as indoor air data were considered to more likely be affected by lifestyle. Risks and hazards from exposure to ambient air were also calculated, as ambient air data indicated the presence of many air pollutants in this neighborhood. The risks calculated from crawlspace air range from 5×10^{-5} to 3×10^{-4} at the residences near the property.

The industrial risk calculated from crawlspace air of the on-facility office is 6×10^{-5}. Ambient air risks near the facility property range from 2×10^{-5} to 2×10^{-4}.

Groundwater and soil vapor data are included in a qualitative weight-of-evidence evaluation of VOCs in ambient air, crawlspace air, groundwater and soil vapor. The evaluation of these data indicates a complex relationship between crawlspace air, indoor air, the sub-surface, and ambient air. The HERO has three comments on the vapor intrusion risk discussion in this revised report. First, the air data indicate that vinyl chloride is a primary chemical of concern in crawlspace and ambient air on the property and at nearby residences but was never detected in the up-wind background location, indicating that vinyl chloride is likely a site-related chemical of concern, and this should be acknowledged in the text.

> The following text has been added to Section 5.6.2: The air data indicate that vinyl chloride is a primary chemical of concern in crawlspace and ambient air on the facility property and at one nearby residence. Because it was never detected in the up-wind background locations, vinyl chloride is likely a site-related chemical of concern.

Second, quantitative and qualitative evaluation of air data in this report addresses only exposure and risks in existing buildings. Vapor intrusion into future buildings that may be located in the parking lot, small vacant lot, and large vacant lot sections of the property have not been evaluated, because groundwater and soil vapor data are not quantitatively evaluated for vapor intrusion. This represents a risk evaluation gap for future development of those exposure areas, and this should be either addressed or acknowledged.

> Potential risks and hazards from vapor intrusion into future buildings from VOCs in groundwater may be as high as when residential use of the groundwater is considered, in a worst case scenario. The cancer risks estimated for future residents using the groundwater as tap water in the home is approximately 7×10^{-2}, which is significantly above the risk management range. Hazard indices for an adult (262) and child (628) resident are also significantly above the non-cancer threshold of 1.
>
> Evaluation of future vapor intrusion risk from the soil gas data into future buildings at the parking lot, small vacant lot, and large vacant lot was not conducted because of the following uncertainties:
>
> a) Subslab soil gas samples were not collected – only exterior soil gas was collected in residential yards.
> b) Exterior soil gas samples may underestimate the concentrations found beneath a building because there is no floor covering the ground surface.
> c) Soil gas samples could not be collected at the DTSC recommended depth because the groundwater is less than 5 feet from the ground surface.
> d) Use of a generic attenuation factor may over/underestimate the VOC concentrations in indoor air.

The uncertainty of potential vapor intrusion risk in the future is acknowledged in the uncertainties section (6.2) as follows:

"Potential risks and hazards from vapor intrusion into future buildings that may be located in the parking lot, small vacant lot, and large vacant lot exposure areas have been evaluated and are exceedingly high. This represents an uncertainty for future development. If future buildings are constructed in these areas, vapor mitigation systems are recommended."

Third, groundwater is present at between 2.5 to 6.5 feet below ground surface (bgs) and is highly contaminated with VOCs. The main body of the report in Section 5.5.1 Shallow Groundwater has been revised to state that risks from VOCs in groundwater intruding indoors may be as high as the risks calculated from the residential use of groundwater as tap water. A vapor intrusion screening evaluation of VOCs in groundwater is presented in Attachment 7 Response to DTSC Comments on the HHRA which clearly shows the overwhelming risk posed by the vinyl chloride in that medium. This screening evaluation should be referenced in Section 5.5.1.

The results of the screening evaluation summarized in Attachment 7 (Response to Comments from DTSC) has been added to Section 5.5.1 as follows:

"To confirm that the risks for vapor intrusion are similar as the risks from drinking the groundwater, selected VOCs that contribute the most to the risk and hazard estimates were modeled using the DTSC screening groundwater vapor intrusion model. Default values were used in the model except the depth to groundwater was adjusted to 5 feet below ground surface and sand was used as the SCS soil type. Below is the table of results:

VOC	Exposure Point Concentration (μg/L)	Incremental Risk from Vapor Intrusion to Indoor Air	Hazard Quotient from Vapor Intrusion to Indoor Air
Vinyl chloride	1,627	2.2×10^{-1}	80
TCE	57	6.0×10^{-6}	0.014
PCE	12	6.2×10^{-6}	0.083
Cis-1,2-DCE	13,700	NA	22
Trans-1,2-DCE	400	NA	0.83
Totals		2×10^{-1}	103

These results show that the risks and hazards related to vapor intrusion are significantly above the risk management range and clearly unacceptable."

B. In its memorandum of April 8, 2008, the HERO questioned why arsenic was included as a chemical of concern in the previous health risk assessment even though this element appeared to be present at the facility at background concentrations. The risk assessment report was revised to include statements that arsenic detected in the facility exposure areas are similar to background concentrations and, thus, may not be site related. A further evaluation of arsenic is presented in the response to DTSC General Comment B in Attachment 7 in which arsenic exposure point concentrations and residential risks without arsenic are given. This evaluation suggests that arsenic concentrations may be elevated over background in shallow soil of the parking lot and in the large vacant lot exposure areas perhaps due to the past use of those areas as a scrap metal yard. This should be stated in the main body of the risk assessment in Sections 5.4.2 Parking Lot and 5.4.3 Large Vacant Lot.

At this point in time, the source of the elevated arsenic levels in the shallow soil of the parking lot and the large vacant lot is unknown and cannot be attributed to the scrap metal yard.

C. Highly elevated soil lead levels have been detected throughout the facility and on nearby properties. Surface soil was removed from exposed areas of yards of eight residences as an emergency response. In Section 5.7 Residential Screening Level Soil Evaluation, the report states that residual lead concentrations are below the screening level at those residences. However, the lead screening level used in that emergency response is not given in this section, nor are the areas of excavation shown on any figure in the revised report. A site-specific lead action level of 390 mg/kg is given in the Executive Summary 4 Results for Screening Level Risk Evaluation, and, if this was used as the screening level in the emergency response, it should be identified and so stated in Section 5.7. The basis for that action level should also be briefly described in Section 5.7. No soil excavation has taken place on the facility, thus the HERO assumes that the reported soil lead concentrations, ranging from 605 to 2170 mg/kg, still remain on-site and will be the subject of future remedial activities.

The following text has been added to Section 5.7 to clearly state the action level for the lead cleanup:

"The soil was excavated until the confirmation sampling indicated that the remaining soil was below the EPA residential screening level of 400 mg/kg, or to a 3-foot maximum depth. The excavation depth was generally between one and three feet. Small areas were excavated to a depth of less than 1 foot in locations where valuable trees or plants might have been damaged by deeper excavation."

The HERO has the following comments on the subject report. The first comments address the response to DTSC comments: Following this set of comments are comments on the revised report.

Specific Comments

1. Response to DTSC Specific Comment 1. The HERO requested that the method for sampling groundwater and soil be briefly described in order to verify that appropriate sampling methods were used to reduce the possibility of VOC loss. The response states that field procedures are presented in Appendix C and that this reference will be included in the text of Section 4.2.2.3. Adding a citation without including a description in the text is not useful to the reader. In addition, these appendix and section designations do not correspond to what is contained in the risk assessment report. The HERO requests that this description be included in the risk assessment report in Sections 2.1.1 Soil and 2.1.2 Groundwater.

Sampling procedures have been extracted from Appendix C of the RI Report and inserted into the Sections 2.1.1 Soil and 2.1.2 Groundwater to describe the appropriate method for sampling soil and groundwater to reduce the possibility of VOC loss.

2. Response to DTSC Specific Comment 2. The HERO recommended specific methods to measure soil physical properties. The response states that these methods will be used if soil vapor modeling

is conducted in the future. As stated above, soil vapor modeling using soil vapor and/or groundwater data should be performed in those exposure areas where no current buildings exist.

> As discussed in the response to general comment A, it has been acknowledged that risks and hazards from exposure to VOCs via the vapor intrusion pathway in future buildings at the parking lot and small and large vacant lots could be as high as the risks and hazards when residential use of the groundwater is considered, which is significantly above levels as which action will be taken.

3. Response to DTSC Specific Comment 3. The HERO requested that a figure be included in the risk assessment showing the approximate boundaries of the light non-aqueous phase liquids (LNAPL). The response states that the LNAPL is not yet delineated but is likely present in the vicinity of monitoring wells MW-13 and MW-14. Figure 14 is cited as having the locations of all the wells sampled. This figure designation does not correspond to the figure showing the monitoring well locations in the risk assessment report. Figure 3 Grab and Monitoring Well Sample Locations for Shallow Wells used in the Risk Assessment should be cited in the response. In addition, Figure 3 appears to be incomplete, since MW-14 is not shown, and the facility office address is not given. The figure should be reviewed for other omissions and corrected to include all grab and monitoring well locations.

> Figure 3 of the HHRA only shows those wells that were included in the HHRA data set. As described in Section 2.1.2, groundwater samples were not collected from monitoring wells with floating NAPL (MW-13 and MW-14). It was not an omission that these wells are not shown on the figure. It's important to note that Figure 14 of the RI report was cited in the original response to DTSC Specific Comment 3.

4. Response to DTSC Specific Comment 4. This comment requested a summary and clarification of the soil excavation activities to remove surface soil with elevated lead concentrations. As stated in the general comments above, the HERO requests that the action level for lead used in that soil removal activity be given in Section 5.7 along with the rationale for that level.

> Section 5.7 has been revised to identify the EPA residential screening level of 400 mg/kg.

5. Response to DTSC Specific Comment 5. This comment requested clarification on specific arsenic sampling data, and the response refers to Section 5.5.4 which does not correspond to the appropriate section in the risk assessment report. The information contained in the revised bullet should be included in Section 5.7.4 326 Center Street.

> The original DTSC comment was on Section 5.5.4 of the RI report, not the HHRA. Section 5.7.4 of the HHRA has been revised to include the revision. The following text has been added to Section 5.7.4:
>
> "Arsenic was detected above the screening level in every soil sample collected; however, concentrations detected across the RI Study Area are generally less than or equal to background concentrations typical of the San Francisco Bay Area with the exception of the

sample collected location 326SSd. Arsenic was detected at concentrations greater than background in shallow (451 mg/kg) and deeper (125 mg/kg) soil at this location."

6. Response to DTSC Specific Comment 6. The HERO requested that dioxins/furan concentrations be presented as dioxin toxicity equivalents (TEQs) in the exposure point concentration tables. The response states that the tables have been so modified. Tables 8 Exposure Point Concentrations for Soil Exposure Areas and 9 Exposure Point Concentrations for Groundwater contain congener-specific data but do not include TEQ concentrations. The tables should be revised.

The DTSC's April 2008 comment 6 referred to Tables 33 and 34 of the RI report. Tables 8 and 9 of the HHRA have been modified to include the TEQ concentrations for dioxins.

7. Response to DTSC Specific Comment 7. This comment further discusses the deficiencies related to the lack of risk evaluation of the vapor intrusion pathway in the original risk assessment. General Comment A above presents the major concerns of the HERO on this issue. The HERO further notes that the potential effect of LNAPL in shallow groundwater on vapor intrusion and as a long-term source of VOCs is not addressed in this revised risk assessment. The response to this concern is that the LNAPL will be remediated to remove it as a source of VOCs. The HERO requests clarification on how it will be determined that LNAPL has been adequately remediated without a risk evaluation. In addition, it may be necessary to evaluate the risks and hazards from the continued presence of LNAPL, if the remediation of LNAPL does not take place in the near future.

The uncertainty of the potential effect of the LNAPL on the shallow groundwater on indoor air risk estimation and as a long-term source of VOCs is discussed in the uncertainties section as follows:

The potential effect of the LNAPL on the shallow groundwater on indoor air risk estimation and as a long-term source of VOCs has not been addressed. However, it is acknowledged that risks and hazards would be unacceptable if buildings were to be located over the LNAPL before remediation takes place.

8. Response to DTSC Specific Comment 8. The HERO requested examination of the groundwater and soil data sets to verify that elevated reporting limits have not significantly biased the exposure point concentration calculations. The response is clarifying, but the table designations no longer correspond to the tables in the revised report. Please correct the table designations given in the response.

Tables 20 and 21 (as cited in the April 2008 DTSC comments) are part of the RI report. Tables 1-1 in Attachment 1 and 2-1 in Attachment 2 have been footnoted to refer to Section 6.1.2 for a discussion of the reporting limits.

9. Response to DTSC Specific Comment 9. In this comment, the HERO recommended that the particulate emission factor (PEF) for the construction worker should be that listed in the DTSC Human Health Risk Assessment (HHRA) Note Number 1 (October 2005). The response states that the PEF recommended by DTSC is used in this updated assessment. However, Table 4 Soil Exposure Assumptions lists identical PEFs for all exposure scenarios evaluated. Please explain or correct.

Table 4 has been revised to show the corrected PEF for the construction worker. The risk and hazard results for the construction worker shown in the subsequent tables and discussed use the corrected PEF.

10. Response to DTSC Specific Comment 10. This comment recommends again that dioxin/furan congener concentrations be converted to a single dioxin TEQ concentration and included as an exposure point concentration. As stated above, the relevant tables have not yet been modified in this revised assessment report.

Tables 8 and 9 have the dioxin/furan congener concentrations converted into TEQ concentrations and a row to show the total dioxin TEQ concentration has been added.

11. Response to DTSC Specific Comment 11. The HERO recommended that the risk drivers be listed in the summary tables of risks and hazards. The tables have been satisfactorily revised, but, as with the other responses, the table and section designations do not, but should, correspond with the sections and tables of this revised report.

Table 37 Summary of Cancer Risks and Noncancer Hazards for Soil is part of the RI Report. Primary risk drivers have been identified for each media in Tables 12 and 13 of the HHRA.

12. Response to DTSC Specific Comment 12. A rationale was requested for the depth of soil samples taken. The rationale and revision of the risk assessment to address this comment is adequate.
No response required.

13. Response to DTSC Specific Comment 13. The HERO requested that a supplemental risk evaluation be performed for the hot spot adjacent to the existing warehouse and office building. No supplemental evaluation is included in this revised report, because the response states that the entire "main property" will be remediated. This response is adequate as long as it is explicitly stated in all future cleanup work plans that all hot spots will be included in remedial activities; and risk-based cleanup goals are developed for any interim hot spot removal actions.
Comment acknowledged.

14. Response to DTSC Specific Comment 14. The HERO recommended that ambient outdoor air exposure concentrations be calculated from site soil vapor concentrations for use in the facility property risk evaluation. The response states that such calculations are not necessary, since ambient air sampling was performed and the data obtained input directly as exposure point concentrations. However, there are no ambient air concentrations for the facility itself (1414 3rd Street) listed in Table 10 Exposure Point Concentrations for Crawlspace and Ambient Air, and no risk or hazard for the facility is given in Table 14 Risk and Hazards Summary for Vapor Intrusion Evaluation. This represents a data evaluation gap and should be so stated. Ambient air risks on the facility property may be greater than the ambient air risks on nearby properties.

Ambient air samples were not collected at the facility (1414 3rd Street) because at the time the samples were being collected, solvents were in use.

15. Response to DTSC Specific Comment 15. The HERO questioned the use of the US EPA industrial lead Preliminary Remedial Goal (PRG) of 800 mg/kg as adequately protective. The assessment

report has been satisfactorily revised to compare the site soil lead data to the residential and industrial California Environmental Protection Agency (Cal/EPA) California Human Health Screening Level (CHHSLs) for lead of 80 mg/kg and 320 mg/kg, respectively.
Comment noted. No response required.

16. Response to DTSC Specific Comment 16. The HERO requested additional discussion and evaluation of arsenic in soil at the facility, and the report has been revised to include such a discussion. In the revised report, Table 1-96 is cited, as requested. However, this table is not part of the risk assessment, so the citation should be further clarified by identifying the remedial investigation report as the location of the table.

Table 1-96 is in Attachment 1 of the risk assessment appendix. This clarification has been added to the text of Section 5.4.5.

17. Response to DTSC Specific Comment 17. This comment identifies additional deficiencies in the original risk assessment with respect to the indoor air exposure pathway. All of these issues are addressed in the comments and responses above, except for HERO's recommendation that target groundwater concentrations that would be protective of vapor intrusion into indoor air should be calculated for the risk-driving VOCs and compared to their respective maximum contaminant levels (MCLs) to make sure that the MCLs are sufficiently protective as goals in any remedial activity. The response includes the requested calculation and comparison, and the comparison indicates that remediation of groundwater to MCLs would be protective of the indoor air exposure pathway. This response should be included as part of any future report that details groundwater cleanup goals to be applied at this site.
Comment noted. No response required.

18. Responses to DTSC Specific Comments 18 through 21. These DTSC specific comments have all been satisfactorily addressed.
Comment noted. No response required.

19. Page xxi, Abbreviations and Acronyms. For your information, the Human and Ecological Risk Division (HERD) at DTSC has been renamed the Human and Ecological Risk Office (HERO).

Renamed acronym for HERD has been incorporated in the document.

20. Page 2-2, Section 2.1.2 Groundwater. It would be informative to add the range of depths to groundwater, the presumed extent of the contaminant plume, and general direction of groundwater flow to this section.

The following text has been added to Section 2.1.2:

"During the RI, the shallow water table fluctuated from approximately 2.5 to 6.5 feet below ground surface (bgs). In the dry season (May through October), flow generally appears to be toward the southwest; in the wet season (November through April), flow is generally to the south. The highest concentration of contaminants is observed in shallow groundwater (less than 25 feet bgs) in the central and south-central areas of the former AMCO facility, west of the warehouse and office. Contaminant concentrations beneath the central and south-central portions of the former facility decrease rapidly with increasing depth."

21. Page 2-3, Section 2.1.4 Residential Soil and Homegrown Produce; and Figure 4 Residential Ambient Air, Crawlspace Air, Produce and Soil Gas Sample Locations. Soil and produce samples were collected at several nearby residences and the results evaluated in this assessment. Figure 4 should be cited in this section. The title of Figure 4 should be revised to include "soil samples". Also a footnote should be added to the figure stating that not all soil vapor sample locations are shown on this figure. The HERO recommends that a new figure be included that shows the locations of all soil gas samples on the facility and at nearby properties, including 337/339 Center Street.

> The title of Figure 4 has been revised to include soil samples and a footnote added. The figure has been renumbered as Figure 4b. Figure 4a has been added that includes locations of all soil gas samples and nearby properties, including 337/339 Center Street.

22. Page 3-10, Section 3.3.7 Exposure Parameters and Equations for Inhalation of Vapors from Groundwater; and, Attachment 8 Response to TAG Advisor Comments on the HHRA. This section includes a description of the approach and equations used to evaluate the trench worker scenario, assuming the presence of standing water in the trench. The response to the TAG Advisor states that the trench model recommended by the Virginia Department of Environmental Quality is used. However, all the citations in this section given for the trench model are from the US EPA. Please clarify.

> The Virginia Trench model was used to provide the response to the TAG Advisor comment to evaluate the exposure to VOCs in groundwater by a construction worker without a wind factor. We calculated risk using the Virginia Department of Environmental Quality's trench worker model which assumes no wind velocity in the trench and the results show a risk greater than 10^{-4} (6×10^{-4}) and an HI that exceeds 1 (34). This discussion has been added to Section 6.2 Exposure Pathway and Assumption Uncertainties.

23. Page 5-8 Section 5.6.1 Comparison of VOC Data Between Crawlspace and Ambient Air. This section provides an overview of the VOCs detected in crawlspace and ambient air at residential properties near the facility. The VOCs detected in crawlspace air at levels greater than five times the levels measured in ambient air are identified. It is stated that chemicals were detected in crawlspace air with no obvious correlations with ambient air concentrations. These chemicals should be identified in this section, and a comparison made between these chemicals and chemicals detected in soil gas and/or groundwater.

> Attached tables RTC-1a through RTC-1g contain comparisons between detected concentrations of VOCs in soil gas, crawlspace air, ambient air, and background air. Ratios have been calculated between the different media. In addition, a discussion of the comparison of VOC data between groundwater, soil gas and crawlspace air data is presented in Section 5.6.3.

Conclusions

This complex risk assessment has been extensively revised to include an evaluation of VOCs detected in crawlspace air, indoor air, subsurface samples and ambient air. Some of the deficiencies previously identified by the HERO have been addressed by revisions made in the body of the report.

Other deficiencies have been addressed within the context of the response to DTSC comments in Attachment 7. The remaining major concerns of the HERO are: the risk evaluation gap for future buildings that may be sited in the parking lot, small vacant lot, and large vacant lot sections of the facility property; the lack of a risk evaluation basis for any future remediation of the LNAPL; and the lack of a risk evaluation of on-facility ambient air that could be used to inform the facility's role in ambient air risks at nearby properties. A number of the deficiencies described in the comments above may be easily addressed by updating the table, section and figure designations cited in the responses.

Any recommendations provided in this memorandum are intended for use only at this site. If you have any further questions, please contact me at (510) 540-3762 or via electronic mail at kklein @dtsc.ca.gov.

Reviewed by:

I I, c/n-

Claudio Sorrentino, Ph.D.
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Human and Ecological Risk Office

TABLE RTC-1a

Comparison of Maximum Soil Gas Concentrations to Crawl Space and Ambient Air EPCs for 1428 3rd Street

AMCO Chemical Superfund Site, Oakland, California

Address	1428 3rd Street									
Analyte	Maximum Soil Gas Concentration (µg/m^3)	Crawl Space Air EPC (µg/m^3)	Ambient Air EPC (µg/m^3)	Neighborhood Background EPC (µg/m^3)	Ratio of Soil Gas/Crawl Space Air	Ratio of Soil Gas/Ambient Air	Ratio of Crawl Space/Ambient Air	Ratio Ambient/ Background	Ratio Crawl space/ Background	Ratio Soil gas/Background
1,1,1-Trichloroethane	58	0.116	0.0913	0.0824	500.00	635.27	1.27	1.11	1.41	703.88
1,1,2,2-Tetrachloroethane	0.032	0.074	0.162	ND	0.43	0.20	0.46	NA	NA	NA
1,1,2-Trichloroethane	0.36	0.065	ND	ND	5.54	NA	NA	NA	NA	NA
1,1-Dichloroethane	47	0.026	ND	0.011	1807.69	NA	NA	NA	2.36	4272.73
1,1-Dichloroethene	ND	ND	ND	0.0397	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	0.13	11.9	14.8	0.862	0.01	0.01	0.80	17.17	13.81	0.15
1,2-Dibromoethane	ND	0.034	ND	ND	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.029	2.2	0.123	0.0525	0.01	0.24	17.89	2.34	41.90	0.55
1,2-Dichloropropane	ND	0.0908	0.0514	0.0449	NA	NA	1.77	1.14	2.02	NA
1,3,5-Trimethylbenzene	0.18	4.82	4.92	0.283	0.04	0.04	0.98	17.39	17.03	0.64
1,3-Dichlorobenzene	ND	ND	51	ND	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ND	0.578	1.37	0.0949	NA	NA	0.42	14.44	6.09	NA
1,4-Dioxane (p-dioxane)	ND	ND	ND	0.391	NA	NA	NA	NA	NA	NA
Acetone	8.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.94	0.615	2.71	0.832	1.53	0.35	0.23	3.26	0.74	1.13
Bromomethane	ND	0.143	0.195	0.209	NA	NA	0.73	0.93	0.68	NA
Carbon tetrachloride	ND	0.507	0.569	0.531	NA	NA	0.89	1.07	0.95	NA
Chlorobenzene	ND	0.0373	0.3	0.0269	NA	NA	0.12	11.15	1.39	NA
Chloroethane	0.22	0.166	0.0897	0.0485	1.33	2.45	1.85	1.85	3.42	4.54
Chloroform	22	1.71	0.214	0.155	12.87	102.80	7.99	1.38	11.03	141.94
Chloromethane	0.79	14.1	1.34	1.19	0.06	0.59	10.52	1.13	11.85	0.66
cis-1,2-Dichloroethene	160	ND	ND	0.025	NA	NA	NA	NA	NA	6400.00
cis-1,3-Dichloropropene	ND	ND	0.052	0.0594	NA	NA	NA	0.88	NA	NA
Ethylbenzene	0.34	0.93	5.42	0.645	0.37	0.06	0.17	8.40	1.44	0.53
Freon 11	14	2.44	2.26	1.97	5.74	6.19	1.08	1.15	1.24	7.11
Freon 113	1	0.661	0.7	0.671	1.51	1.43	0.94	1.04	0.99	1.49
Freon 114	ND	ND	0.13	0.12	NA	NA	NA	1.08	NA	NA
Freon 12	2.2	2.57	2.83	2.59	0.86	0.78	0.91	1.09	0.99	0.85
Freon 134a	29	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	ND	0.023	0.231	NA	NA	NA	0.10	NA	NA
Methylene chloride	0.95	3.05	21	ND	0.31	0.05	0.15	NA	NA	NA
Naphthalene	ND	0.619	6.58	0.378	NA	NA	0.09	17.41	1.64	NA
n-Heptane	17	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	ND	0.514	6.8	0.187	NA	NA	0.08	36.36	2.75	NA
Tetrachloroethene	210	1.73	1.39	0.308	121.39	151.08	1.24	4.51	5.62	681.82
Toluene	16	11	15.7	4.91	1.45	1.02	0.70	3.20	2.24	3.26
Total hexanes	46	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	47	ND	0.042	ND	NA	1119.05	NA	NA	NA	NA
trans-1,3-Dichloropropene	ND	0.018	0.041	0.056	NA	NA	0.44	0.73	0.32	NA
Trichloroethene	480	3.29	0.197	0.0947	145.90	2436.55	16.70	2.08	34.74	5068.64
Vinyl chloride	0.0094	1.75	0.0424	ND	0.01	0.22	41.27	NA	NA	NA
Xylenes, m & p	0.62	3.9	21	2.72	0.16	0.03	0.19	7.72	1.43	0.23
Xylenes, o	ND	1.94	11.2	0.718	NA	NA	0.17	15.60	2.70	NA

Notes:

Red font indicates that first media shown are greater than 5 times second media concentrations.

Blue font indicates that the first media shown are less than 5 times second media concentrations.

Yellow highlighted cells indicate chemical contributed greater than 1E-05 to cancer risk or HQ greater than 1 to cumulative risk or hazard index, respectively

Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1b
Comparison of Maximum Soil Gas Concentrations to Crawl Space and Ambient Air EPCs for 1432 3rd Street
AMCO Chemical Superfund Site, Oakland, California

Address	1432 3rd Street										
Analyte	Maximum Soil Gas Concentration ($\mu g/m^3$)	Crawl Space Air EPC ($\mu g/m^3$)	Ambient Air EPC ($\mu g/m^3$)	Neighborhood Background EPC ($\mu g/m^3$)	Ratio of Soil Gas/Crawl Space Air	Ratio of Soil Gas/Ambient Air	Ratio of Crawl Space/Ambient Air	Ratio of Background/ Ambient Air	Ratio Ambient/ Background	Ratio Crawl space/ Background	Ratio Soil gas/Background
1,1,1-Trichloroethane	4	0.103	0.0878	0.0824	**38.83**	**45.56**	1.17	0.94	1.07	1.25	**48.54**
1,1-Dichloroethane	0.23	ND	ND	0.011	NA	NA	NA	NA	NA	NA	**20.91**
1,1-Dichloroethene	ND	ND	ND	0.0397	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	6.5	13.8	0.84	0.862	0.47	**7.74**	**16.43**	1.03	0.97	**16.01**	**7.54**
1,2-Dichlorobenzene	ND	0.148	0.13	ND	NA	NA	1.14	NA	NA	NA	NA
1,2-Dichloroethane	0.16	0.757	0.0558	0.0525	0.21	2.87	**13.57**	0.94	1.06	**14.42**	3.05
1,2-Dichloropropane	ND	0.062	0.0441	0.0449	NA	NA	1.41	1.02	0.98	1.38	NA
1,3,5-Trimethylbenzene	6	11	0.405	0.283	0.55	**14.81**	**27.16**	0.70	1.43	**38.87**	**21.20**
1,3-Dichlorobenzene	15	63	0.092	ND	0.24	**163.04**	**684.78**	NA	NA	NA	NA
1,4-Dichlorobenzene	ND	2.01	0.191	0.0949	NA	NA	**10.52**	0.50	2.01	**21.18**	NA
1,4-Dioxane (p-dioxane)	ND	0.26	ND	0.391	NA	NA	NA	NA	NA	0.66	NA
4-Ethyltoluene	4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.99	7.28	0.913	0.832	0.14	1.08	**7.97**	0.91	1.10	**8.75**	1.19
Bromomethane	1	0.375	0.199	0.209	2.67	**5.03**	1.88	1.05	0.95	1.79	4.78
Carbon tetrachloride	0.43	0.545	0.543	0.531	0.79	0.79	1.00	0.98	1.02	1.03	0.81
Chlorobenzene	ND	0.16	0.022	0.0269	NA	NA	**7.27**	1.22	0.82	**5.95**	NA
Chloroethane	ND	0.156	0.0998	0.0485	NA	NA	1.56	0.49	2.06	3.22	NA
Chloroform	12	0.412	0.236	0.155	**29.13**	**50.85**	1.75	0.66	1.52	2.66	**77.42**
Chloromethane	0.92	3.05	1.3	1.19	0.30	0.71	2.35	0.92	1.09	2.56	0.77
cis-1,2-Dichloroethene	0.11	ND	ND	0.025	NA	NA	NA	NA	NA	NA	4.40
cis-1,3-Dichloropropene	ND	0.036	0.051	0.0594	NA	NA	0.71	1.16	0.86	0.61	NA
Ethanol	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.38	13.2	0.78	0.645	0.03	0.49	**16.92**	0.83	1.21	**20.47**	0.59
Freon 11	12	2.3	2.25	1.97	**5.22**	**5.33**	1.02	0.88	1.14	1.17	**6.09**
Freon 113	0.88	0.685	0.668	0.671	1.28	1.32	1.03	1.00	1.00	1.02	1.31
Freon 114	ND	0.23	0.13	0.12	NA	NA	1.77	0.92	1.08	1.92	NA
Freon 12	2.2	2.63	2.62	2.59	0.84	0.84	1.00	0.99	1.01	1.02	0.85
Freon 134a	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropanol	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	5.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	0.019	0.019	0.231	NA	NA	1.00	**12.16**	0.08	0.08	NA
Methylene chloride	0.37	2.63	3.7	ND	0.14	0.10	0.71	NA	NA	NA	NA
Naphthalene	1.6	0.887	0.74	0.378	1.80	2.16	1.20	0.51	1.96	2.35	4.23
Styrene	ND	6.7	0.175	0.187	NA	NA	**38.29**	1.07	0.94	**35.83**	NA
Tetrachloroethene	11	2.03	0.274	0.308	**5.42**	**40.15**	**7.41**	1.12	0.89	**6.59**	**35.71**
Toluene	4.7	56.9	4.87	4.91	0.08	0.97	**11.68**	1.01	0.99	**11.59**	0.96
trans-1,3-Dichloropropene	ND	0.04	0.046	0.056	NA	NA	0.87	1.22	0.82	0.71	NA
Trichloroethene	0.55	0.977	0.103	0.0947	0.56	**5.34**	**9.49**	0.92	1.09	**10.32**	**5.81**
Vinyl chloride	1.1	0.973	ND	ND	1.13	NA	NA	NA	NA	NA	NA
Xylenes, m & p	8.2	55	2.6	2.72	0.15	3.15	**21.15**	1.05	0.96	**20.22**	3.01
Xylenes, o	3.4	14.5	0.874	0.718	0.23	3.89	**16.59**	0.82	1.22	**20.19**	4.74

Notes:
Red font indicates that first media shown are greater than 5 times second media concentrations.
Blue font indicates that the first media shown are less than 5 times second media concentrations.
Yellow highlighted cells indicate chemical contributed greater than 1E-05 to cancer risk or HQ greater than 1 to cumulative risk or hazard index, respectively
Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1c
Comparison of Maximum Soil Gas Concentrations to Ambient Air EPCs for 1436 3rd Street
AMCO Chemical Superfund Site, Oakland, California

Address	**1436 3rd Street**					
Analyte	**Maximum Soil Gas Concentration ($\mu g/m^3$)**	**Ambient Air EPC ($\mu g/m^3$)**	**Neighborhood Background EPC ($\mu g/m^3$)**	**Ratio of Soil Gas/Ambient Air**	**Ratio Ambient/ Background**	**Ratio Soil gas/Background**
1,1,1-Trichloroethane	0.46	0.103	0.0824	4.47	1.25	**5.58**
1,1-Dichloroethane	0.045	ND	0.011	NA	NA	4.09
1,1-Dichloroethene	ND	ND	0.0397	NA	NA	NA
1,2,4-Trimethylbenzene	1	1.87	0.862	0.53	2.17	1.16
1,2-Dichlorobenzene	ND	0.1	ND	NA	NA	NA
1,2-Dichloroethane	0.098	0.061	0.0525	1.61	1.16	1.87
1,2-Dichloropropane	ND	ND	0.0449	NA	NA	NA
1,3,5-Trimethylbenzene	0.36	0.634	0.283	0.57	2.24	1.27
1,3-Dichlorobenzene	ND	0.074	ND	NA	NA	NA
1,4-Dichlorobenzene	ND	0.207	0.0949	NA	2.18	NA
1,4-Dioxane (p-dioxane)	0.67	0.22	0.391	3.05	0.56	1.71
Acetone	6.6	NA	NA	NA	NA	NA
Benzene	1.2	1.49	0.832	0.81	1.79	1.44
Bromomethane	1.4	0.33	0.209	4.24	1.58	**6.70**
Carbon tetrachloride	0.54	0.588	0.531	0.92	1.11	1.02
Chlorobenzene	0.12	0.048	0.0269	2.50	1.78	4.46
Chloroethane	ND	0.0698	0.0485	NA	1.44	NA
Chloroform	2.9	0.36	0.155	**8.06**	2.32	**18.71**
Chloromethane	2.6	8	1.19	0.33	**6.72**	2.18
cis-1,2-Dichloroethene	ND	ND	0.025	NA	NA	NA
cis-1,3-Dichloropropene	ND	ND	0.0594	NA	NA	NA
Ethylbenzene	0.73	1.85	0.645	0.39	2.87	1.13
Freon 11	16	2.11	1.97	**7.58**	1.07	**8.12**
Freon 113	0.87	0.693	0.671	1.26	1.03	1.30
Freon 114	ND	0.14	0.12	NA	1.17	NA
Freon 12	3.2	2.89	2.59	1.11	1.12	1.24
Freon 134a	350	NA	NA	NA	NA	NA
Methyl ethyl ketone	4.1	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	ND	0.231	NA	NA	NA
Methylene chloride	0.59	8.68	ND	0.07	NA	NA
Naphthalene	1.3	0.62	0.378	2.10	1.64	3.44
Styrene	0.14	0.322	0.187	0.43	1.72	0.75
Tetrachloroethene	5.2	0.285	0.308	**18.25**	0.93	**16.88**
Toluene	4.8	14	4.91	0.34	2.85	0.98
trans-1,3-Dichloropropene	ND	ND	0.056	NA	NA	NA
Trichloroethene	0.21	0.217	0.0947	0.97	2.29	2.22
Vinyl chloride	1.1	0.7	ND	1.57	NA	NA
Xylenes, m & p	2	6.53	2.72	0.31	2.40	0.74
Xylenes, o	0.74	1.96	0.718	0.38	2.73	1.03

Notes:
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Blue font indicates that the first media shown are less than 5 times second media concentrations.
Yellow highlighted cells indicate chemical contributed greater than 1E-05 to cancer risk or HQ greater than 1 to cumulative risk or hazard index, respectively
Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1d

Comparison of Maximum Soil Gas Concentrations to Crawl Space and Ambient Air EPCs for 320 Center St

AMCO Chemical Superfund Site, Oakland, California

Address	320 Center St								
Analyte	Maximum Soil Gas Concentration ($\mu g/m^3$)	Crawl Space Air EPC ($\mu g/m^3$)	Ambient Air EPC ($\mu g/m^3$)	Neighborhood Background EPC ($\mu g/m^3$)	Ratio of Soil Gas/Crawl Space Air	Ratio of Soil Gas/Ambient Air	Ratio of Crawl Space/Ambient Air	Ratio Ambient/ Background	Ratio Crawl space/ Background
1,1,1-Trichloroethane	ND	0.12	0.096	0.0824	NA	NA	1.25	1.17	1.46
1,1-Dichloroethane	0.17	ND	ND	0.011	NA	NA	NA	NA	NA
1,1-Dichloroethene	ND	ND	ND	0.0397	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	0.9	2	2.4	0.862	0.45	0.38	0.83	2.78	2.32
1,2-Dichloroethane	0.026	1.2	0.09	0.0525	0.02	0.29	**13.33**	1.71	**22.86**
1,2-Dichloropropane	ND	0.14	ND	0.0449	NA	NA	NA	NA	3.12
1,3,5-Trimethylbenzene	0.2	0.74	0.83	0.283	0.27	0.24	0.89	2.93	2.61
1,4-Dichlorobenzene	ND	1.4	0.19	0.0949	NA	NA	**7.37**	2.00	**14.75**
1,4-Dioxane (p-dioxane)	ND	ND	ND	0.391	NA	NA	NA	NA	NA
Benzene	1.1	2	1.8	0.832	0.55	0.61	1.11	2.16	2.40
Bromomethane	1.4	0.18	0.18	0.209	**7.78**	**7.78**	1.00	0.86	0.86
Carbon tetrachloride	ND	0.6	0.56	0.531	NA	NA	1.07	1.05	1.13
Chlorobenzene	ND	0.032	0.02	0.0269	NA	NA	1.60	0.74	1.19
Chloroethane	ND	0.029	ND	0.0485	NA	NA	NA	NA	0.60
Chloroform	1.1	0.56	0.35	0.155	1.96	3.14	1.60	2.26	3.61
Chloromethane	1.1	1	1.1	1.19	1.10	1.00	0.91	0.92	0.84
cis-1,2-Dichloroethene	ND	ND	ND	0.025	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	ND	0.053	0.046	0.0594	NA	NA	1.15	0.77	0.89
Ethylbenzene	0.28	1.8	1.8	0.645	0.16	0.16	1.00	2.79	2.79
Freon 11	1.3	3.5	3.5	1.97	0.37	0.37	1.00	1.78	1.78
Freon 113	0.55	0.72	0.8	0.671	0.76	0.69	0.90	1.19	1.07
Freon 12	1.5	2.7	2.8	2.59	0.56	0.54	0.96	1.08	1.04
Methyl tert-butyl ether	ND	0.022	ND	0.231	NA	NA	NA	NA	0.10
Methylene chloride	ND	4.4	4.2	ND	NA	NA	1.05	NA	NA
Naphthalene	ND	ND	ND	0.378	NA	NA	NA	NA	NA
Styrene	ND	0.51	0.35	0.187	NA	NA	1.46	1.87	2.73
Tetrachloroethene	5.5	0.71	0.27	0.308	**7.75**	**20.37**	2.63	0.88	2.31
Toluene	1.4	17	11	4.91	0.08	0.13	1.55	2.24	3.46
trans-1,3-Dichloropropene	ND	0.047	0.037	0.056	NA	NA	1.27	0.66	0.84
Trichloroethene	0.19	1.8	0.1	0.0947	0.11	1.90	**18.00**	1.06	**19.01**
Vinyl chloride	4.4	ND	ND	ND	NA	NA	NA	NA	NA
Xylenes, m & p	0.79	6.3	6.4	2.72	0.13	0.12	0.98	2.35	2.32
Xylenes, o	0.29	2.2	2.2	0.718	0.13	0.13	1.00	3.06	3.06

Notes:

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Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1e
Comparison of Maximum Soil Gas Concentrations to Crawl Space and Ambient Air EPCs for 326 Center St
AMCO Chemical Superfund Site, Oakland, California

Address	**326 Center St**									
Analyte	**Maximum Soil Gas Concentration (µg/m^3)**	**Crawl Space Air EPC (µg/m^3)**	**Ambient Air EPC (µg/m^3)**	**Neighborhood Background EPC (µg/m^3)**	**Ratio of Soil Gas/Crawl Space Air**	**Ratio of Soil Gas/Ambient Air**	**Ratio of Crawl Space/Ambient Air**	**Ratio Ambient/ Background**	**Crawl space/ Background**	**Ratio Soil gas/Background**
1,1,1-Trichloroethane	0.66	0.0894	0.0861	0.0824	7.38	7.67	1.04	1.04	1.08	8.01
1,1,2,2-Tetrachloroethane	0.032	0.424	ND	ND	0.08	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ND	0.076	ND	ND	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	11	0.015	ND	0.011	733.33	NA	NA	NA	1.36	1000.00
1,1-Dichloroethene	ND	ND	ND	0.0397	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	0.3	0.923	0.612	0.862	0.33	0.49	1.51	0.71	1.07	0.35
1,2-Dichlorobenzene	ND	0.13	0.083	ND	NA	NA	1.57	NA	NA	NA
1,2-Dichloroethane	0.054	1.33	0.0526	0.0525	0.04	1.03	25.29	1.00	25.33	1.03
1,2-Dichloropropane	ND	0.103	ND	0.0449	NA	NA	NA	NA	2.29	NA
1,3,5-Trimethylbenzene	0.97	0.221	0.511	0.283	4.39	1.90	0.43	1.81	0.78	3.43
1,3-Dichlorobenzene	ND	0.096	0.047	ND	NA	NA	2.04	NA	NA	NA
1,4-Dichlorobenzene	ND	2.71	0.85	0.0949	NA	NA	3.19	8.96	28.56	NA
1,4-Dioxane (p-dioxane)	ND	0.18	ND	0.391	NA	NA	NA	NA	0.46	NA
Acetone	14	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.58	1.05	1.01	0.832	0.55	0.57	1.04	1.21	1.26	0.70
Bromomethane	0.55	0.215	0.269	0.209	2.56	2.04	0.80	1.29	1.03	2.63
Carbon disulfide	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	0.46	0.521	0.516	0.531	0.88	0.89	1.01	0.97	0.98	0.87
Chlorobenzene	ND	0.033	0.015	0.0269	NA	NA	2.20	0.56	1.23	NA
Chloroethane	ND	0.0611	0.0629	0.0485	NA	NA	0.97	1.30	1.26	NA
Chloroform	32	0.291	0.255	0.155	109.97	125.49	1.14	1.65	1.88	206.45
Chloromethane	0.65	1.09	1.19	1.19	0.60	0.55	0.92	1.00	0.92	0.55
cis-1,2-Dichloroethene	ND	0.018	ND	0.025	NA	NA	NA	NA	0.72	NA
cis-1,3-Dichloropropene	ND	0.039	0.052	0.0594	NA	NA	0.75	0.88	0.66	NA
Ethylbenzene	0.15	1.08	1.06	0.645	0.14	0.14	1.02	1.64	1.67	0.23
Freon 11	4.7	2.27	1.58	1.97	2.07	2.97	1.44	0.80	1.15	2.39
Freon 113	0.45	0.673	0.66	0.671	0.67	0.68	1.02	0.98	1.00	0.67
Freon 114	ND	0.11	ND	0.12	NA	NA	NA	NA	0.92	NA
Freon 12	2.4	2.9	2.61	2.59	0.83	0.92	1.11	1.01	1.12	0.93
Hexachlorobutadiene	ND	0.68	ND	ND	NA	NA	NA	NA	NA	NA
Isopropanol	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	4.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	0.016	0.023	0.231	NA	NA	0.70	0.10	0.07	NA
Methylene chloride	0.43	5.4	3.14	ND	0.08	0.14	1.72	NA	NA	NA
Naphthalene	0.9	ND	0.036	0.378	NA	25.00	NA	0.10	NA	2.38
Styrene	ND	0.92	0.0831	0.187	NA	NA	11.07	0.44	4.92	NA
Tetrachloroethene	680	0.512	0.26	0.308	1328.13	2615.38	1.97	0.84	1.66	2207.79
Toluene	0.93	17.7	10	4.91	0.05	0.09	1.77	2.04	3.60	0.19
trans-1,3-Dichloropropene	ND	ND	0.048	0.056	NA	NA	NA	0.86	NA	NA
Trichloroethene	52	1.87	0.0761	0.0947	27.81	683.31	24.57	0.80	19.75	549.10
Vinyl chloride	0.26	0.0391	ND	ND	6.65	NA	NA	NA	NA	#VALUE!
Xylenes, m & p	0.47	4.13	3.99	2.72	0.11	0.12	1.04	1.47	1.52	0.17
Xylenes, o	0.25	1	1.31	0.718	0.25	0.19	0.76	1.82	1.39	0.35

Notes:
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Blue font indicates that the first media shown are less than 5 times second media concentrations.
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Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1f
Comparison of Maximum Soil Gas Concentrations to Ambient Air EPCs for 360 Center St
AMCO Chemical Superfund Site, Oakland, California

Address	360 Center St					
Analyte	Maximum Soil Gas Concentration ($\mu g/m^3$)	Ambient Air EPC ($\mu g/m^3$)	Neighborhood Background EPC ($\mu g/m^3$)	Ratio of Soil Gas/Ambient Air	Ratio Ambient/ Background	Ratio Soil gas/Backg round
1,1,1-Trichloroethane	ND	0.107	0.0824	NA	1.30	NA
1,1,2,2-Tetrachloroethane	0.34	ND	ND	NA	NA	NA
1,1-Dichloroethane	0.066	ND	0.011	NA	NA	6.00
1,1-Dichloroethene	ND	ND	0.0397	NA	NA	NA
1,2,4-Trimethylbenzene	5.7	4.05	0.862	1.41	4.70	6.61
1,2-Dichlorobenzene	0.71	ND	ND	NA	NA	NA
1,2-Dichloroethane	0.14	0.066	0.0525	2.12	1.26	2.67
1,2-Dichloropropane	ND	ND	0.0449	NA	NA	NA
1,3,5-Trimethylbenzene	0.69	1.35	0.283	0.51	4.77	2.44
1,3-Dichlorobenzene	26	ND	ND	NA	NA	NA
1,4-Dichlorobenzene	0.32	0.246	0.0949	1.30	2.59	3.37
1,4-Dioxane (p-dioxane)	ND	ND	0.391	NA	NA	NA
4-Ethyltoluene	4.9	NA	NA	NA	NA	NA
Acetone	51	NA	NA	NA	NA	NA
Benzene	3.6	1.71	0.832	2.11	2.06	4.33
Bromomethane	1.4	0.18	0.209	7.78	0.86	6.70
Carbon disulfide	14	NA	NA	NA	NA	NA
Carbon tetrachloride	0.73	0.713	0.531	1.02	1.34	1.37
Chlorobenzene	ND	0.052	0.0269	NA	1.93	NA
Chloroethane	1.4	0.075	0.0485	18.67	1.55	28.87
Chloroform	9.4	0.278	0.155	33.81	1.79	60.65
Chloromethane	10	1.2	1.19	8.33	1.01	8.40
cis-1,2-Dichloroethene	ND	ND	0.025	NA	NA	NA
cis-1,3-Dichloropropene	ND	ND	0.0594	NA	NA	NA
Ethanol	210	NA	NA	NA	NA	NA
Ethylbenzene	1.1	2.75	0.645	0.40	4.26	1.71
Freon 11	4.5	1.7	1.97	2.65	0.86	2.28
Freon 113	0.76	0.621	0.671	1.22	0.93	1.13
Freon 114	ND	0.12	0.12	NA	1.00	NA
Freon 12	3.2	2.6	2.59	1.23	1.00	1.24
Freon 134a	4400	NA	NA	NA	NA	NA
Isopropanol	83	NA	NA	NA	NA	NA
Methyl ethyl ketone	10	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	ND	0.231	NA	NA	NA
Methylene chloride	0.43	4.34	ND	0.10	NA	NA
Naphthalene	1.3	0.041	0.378	31.71	0.11	3.44
Styrene	0.77	0.46	0.187	1.67	2.46	4.12
Tetrachloroethene	1.7	0.368	0.308	4.62	1.19	5.52
Toluene	10	24.1	4.91	0.41	4.91	2.04
Total hexanes	0.98	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.09	ND	ND	NA	NA	NA
trans-1,3-Dichloropropene	ND	ND	0.056	NA	NA	NA
Trichloroethene	0.2	0.199	0.0947	1.01	2.10	2.11
Vinyl chloride	2	ND	ND	NA	NA	#VALUE!
Xylenes, m & p	8.3	9.63	2.72	0.86	3.54	3.05
Xylenes, o	3	3.4	0.718	0.88	4.74	4.18

Notes:
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Orange highlighted cells indicate chemical contributed greater than 1E-06 to cancer risk

TABLE RTC-1g
Comparison of Maximum Soil Gas Concentrations to Ambient Air EPCs for Prescott Park
AMCO Chemical Superfund Site, Oakland, California

Address	Prescott Park					
Analyte	Maximum Soil Gas Concentration (µg/m^3)	Ambient Air EPC (µg/m^3)	Neighborhood Background EPC (µg/m^3)	Ratio of Soil Gas/Ambient Air	Ratio Ambient/ Background	Ratio Soil gas/Background
1,1,1-Trichloroethane	7.8	0.11	0.0824	**70.91**	1.33	**94.66**
1,1,2,2-Tetrachloroethane	0.17	0.024	ND	**7.08**	NA	NA
1,1-Dichloroethane	1	ND	0.011	NA	NA	**90.91**
1,1-Dichloroethene	ND	ND	0.0397	NA	NA	NA
1,2,4-Trimethylbenzene	8.9	0.91	0.862	**9.78**	1.06	**10.32**
1,2-Dichloroethane	0.21	0.061	0.0525	3.44	1.16	4.00
1,2-Dichloropropane	ND	ND	0.0449	NA	NA	NA
1,3,5-Trimethylbenzene	1.9	0.27	0.283	**7.04**	0.95	**6.71**
1,3-Butadiene	1.7	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.31	ND	0.0949	NA	NA	3.27
1,4-Dioxane (p-dioxane)	ND	0.96	0.391	NA	2.46	NA
2,2,4-Trimethylpentane	4.3	NA	NA	NA	NA	NA
Acetone	53	NA	NA	NA	NA	NA
Benzene	14	1.3	0.832	**10.77**	1.56	**16.83**
Bromomethane	2.3	0.15	0.209	**15.33**	0.72	**11.00**
Carbon disulfide	32	NA	NA	NA	NA	NA
Carbon tetrachloride	0.56	0.64	0.531	0.88	1.21	1.05
Chlorobenzene	ND	0.034	0.0269	NA	1.26	NA
Chloroethane	0.35	0.1	0.0485	3.50	2.06	**7.22**
Chloroform	590	0.51	0.155	**1156.86**	3.29	**3806.45**
Chloromethane	1.4	1.2	1.19	1.17	1.01	1.18
cis-1,2-Dichloroethene	20	0.038	0.025	**526.32**	1.52	**800.00**
cis-1,3-Dichloropropene	ND	ND	0.0594	NA	NA	NA
Cyclohexane	52	NA	NA	NA	NA	NA
Ethanol	6.1	NA	NA	NA	NA	NA
Ethylbenzene	1.4	0.86	0.645	1.63	1.33	2.17
Freon 11	11	2	1.97	**5.50**	1.02	**5.58**
Freon 113	0.83	0.73	0.671	1.14	1.09	1.24
Freon 114	ND	ND	0.12	NA	NA	NA
Freon 12	2.3	3	2.59	0.77	1.16	0.89
Freon 134a	460	NA	NA	NA	NA	NA
Isopropanol	3.8	NA	NA	NA	NA	NA
Methyl ethyl ketone	14	NA	NA	NA	NA	NA
Methyl tert-butyl ether	ND	0.0097	0.231	NA	0.04	NA
Methylene chloride	5.8	ND	ND	NA	NA	NA
Naphthalene	29	ND	0.378	NA	NA	**76.72**
n-Heptane	20	NA	NA	NA	NA	NA
Styrene	0.85	0.24	0.187	3.54	1.28	4.55
Tetrachloroethene	60	0.42	0.308	**142.86**	1.36	**194.81**
Toluene	38	4.4	4.91	**8.64**	0.90	**7.74**
Total hexanes	25	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.14	ND	ND	NA	NA	NA
trans-1,3-Dichloropropene	ND	ND	0.056	NA	NA	NA
Trichloroethene	4.5	0.13	0.0947	**34.62**	1.37	**47.52**
Vinyl chloride	2.7	ND	ND	NA	NA	NA
Xylenes, m & p	11	2.7	2.72	4.07	0.99	4.04
Xylenes, o	2.4	0.92	0.718	2.61	1.28	3.34

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Attachment 8
Responses to TAG Advisor Comments on HHRA

Third Bullet Paragraph: “Several contaminants in groundwater currently exceed risk criteria for the ingestion pathway; however groundwater … (is not likely to be used) … as a source of drinking water.” Comment: *Groundwater also exceeds the risk criteria for inhalation by trench workers if there is no wind velocity in the trench assumed, and if the assumed cumulative exposure time is greater than one year.*

Response ES-11: We agree that the groundwater exposure to a trench worker exceeds risk criteria for inhalation of VOCs. For comparison to the risks and hazards estimated for the trench worker using the model that DTSC recommended, we calculated risk using the Virginia Department of Environmental Quality’s trench worker model which assumes no wind velocity in the trench. The results show a risk greater than 10^{-4} (6×10^{-4}) and an HI that exceeds 1 (34). Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study.

Fifth Bullet Paragraph: “Elevated lead concentrations were detected at several properties … occupying the same block as the former AMCO facility.” Question: *Because other residences have no-doubt been affected by the off-site “industrial, non-industrial, and non-point sources”, shouldn’t other residences in other nearby blocks also be investigated and soil removed where appropriate?*

Notes for Response ES-12: US EPA’s Emergency Response Group is evaluating lead contamination at residences located between Mandela, Peralta, 7th and 3rd Streets separate from the AMCO investigation.

Seventh Bullet Paragraph: “At … (the site, and in off-site locations) … soil, soil gas, and groundwater would pose an unacceptable risk to site workers. However, … (concrete) isolates workers from the contaminated soil, soil gas, and groundwater underneath.” Comment: *The current concrete pavement at the AMCO facility will provide no protection to future construction and trench workers as it will no doubt be removed during such operations.*

Response ES-13: This bullet is intended to address current site workers and has been revised to clarify.

Human Health Risk Assessment

Second Paragraph: “An ecological risk assessment … (was not performed because) … there are no reasonable and unambiguous pathways for contaminant transport from the Site to any wildlife or sensitive habitats, including Oakland harbor …” Comment: *The Oakland Inner Harbor lies approximately three thousand feet south of the site. Linear groundwater flow velocities in the lower portion of the upper aquifer were found up to about 50 feet per year. It is therefore possible for contaminants originating at the AMCO site to reach the Oakland Inner Harbor within about sixty years from the time they were discharged. Because AMCO began operations in the 1960s, it is conceivable that contaminants could reach the Oakland Inner Harbor within the next 10-20 years. This is a reasonable pathway for contaminants to reach sensitive ecological receptors. Because weak tidal effects were observed in the upper aquifer monitoring wells, it is an unambiguous pathway.*

Notes for Response 7-1: Ned Black, the Regional Ecologist and Microbiologist for the Superfund Support Team, reviewed the information gathered for HRS screening memo and along with his familiarity with the location of the site, suggested that it would be highly unlikely that an ecological risk assessment would be required for the Remedial Investigation.

Reference Internal Memorandum from Ned Black to Brunilda Davila: Review of Need for Ecological Risk Assessment at AMCO Site.

7.2 Risk Assessment Methodology

7.2.1 Toxicity Assessment

Last Paragraph, Second to the Last Sentence: "The model equations were developed to calculate cleanup goals such that there would be no more than a 5 percent probability that fetuses exposed to lead would exceed a blood lead (PbB) of 10 µg/deciliter." Comment: *This means that the lead cleanup goal would be set so that, on average, 5 fetuses out of 100 pregnancies would have a blood lead level that is known to cause permanent brain damage in small children. This compares unfavorably with the 1 in 10,000 to 1 in 1,000,000 that is generally considered acceptable for lifetime excess cancer risk in adults. The model equations should be developed to calculate a much lower cleanup goal so as not to deny environmental justice to the children of West Oakland.*

Notes for Response to Comment 7-2: In the updated assessment, lead concentrations at the site are screened against the 2009 residential and industrial CHHSLs developed by OEHHA for lead.

No site-specific cleanup goals have been developed for the AMCO site. Cleanup goals for the site will be developed as part of the feasibility study.

7.3 Results of Quantitative Risk Evaluation

7.3.1 Soil

7.3.1.1 Former AMCO Facility – Comment: *Soil at this location poses a human health risk generally 2 to 15 times higher than what is normally considered acceptable.*

7.3.1.2 Parking Lot – Comment: *Soil at this location poses a human health risk generally 2 to 28 times higher than what is normally considered acceptable.*

7.3.1.3 Large Vacant Lot - Comment: *Soil at this location poses a human health risk generally 2 to 11 times higher than what is normally considered acceptable.*

7.3.1.4 Small Vacant Lot - Comment: *Soil at this location poses a risk to children generally 3 to 12 times higher than what is normally considered minimally acceptable.*

Response 7-3: We agree that the noncancer hazards for soil are higher than what is considered acceptable for the future child resident. As mentioned in many sections of the report, a soil removal action to address high concentrations of lead was performed at the residential properties adjacent to and near the former AMCO facility.

7.3.2 Groundwater

Second Paragraph, First Sentence: "For the potential residential RME scenario, the ELCR is 1×10^{-1} for exposure to groundwater." Comment: *This means that for the reasonable* *maximum exposure to groundwater, the excess cancer risk for humans is one additional cancer per ten persons exposed. This is an extremely high cancer risk, 1000 to 100,000 times higher than what is normally considered acceptable. Although no one is likely to drink the groundwater where these levels of contaminants were found, and therefore such exposures are not currently likely, this high risk level points out the need for the EPA to give priority to this site for cleanup as a matter of environmental justice. It also points out the need to fully investigate the usable groundwater deeper under the site, which could be used for drinking water in the future.*

Response 7-4: We agree that the concentrations of contaminants in groundwater on the former AMCO facility are extremely high and not within the acceptable risk management range. Deep groundwater monitoring wells have been installed and results of the sampling will be evaluated. Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study.

Second Paragraph, Second Sentence: "The HI for the child is 1153; and the HI for the adult is 484." Comment: *This means that the other (non-cancer) risks from groundwater are in the range of about 500 to over 1000 times higher than is normally considered being acceptable. These data also highlight the environmental justice issues at this site, and the need for thorough and complete investigation and cleanup.*

Response 7-5: We agree. Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study. Cleanup goals for groundwater will be based on drinking water standards – MCLs.

Third Paragraph, Second Sentence: "For the trench worker RME scenario, the ELCR is 1×10^{-4} for exposure to groundwater." Comment: *This means that the excess lifetime cancer risk for trench workers under the reasonable maximum exposure scenario, as calculated in the Draft RI, is 1 cancer per ten thousand exposures. This is generally considered minimally acceptable for such workers. However, unreasonable assumptions for minimum wind velocity in the trench (30 feet per minute) and for reasonable maximum cumulative exposure time (1 year) have been made in this calculation. The actual ELCR is higher for the trench workers than has been calculated in the Draft RI, and is outside the range that is generally considered acceptable.*

Response 7-6: We agree that the ELCR estimated for a trench worker's exposure to groundwater is outside the range that is considered acceptable. Risk estimates using the Virginia Department of Environmental Quality's trench worker model which assumes no wind velocity in the trench show a risk greater than 10^{-4} (6×10^{-4}) and an HI that exceeds 1 (34). Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study.

Appendix H - Human Health Risk Assessment

Executive Summary

Second Paragraph: "…there are no reasonable and unambiguous pathways for contaminant transport from the site to any wildlife or sensitive habitats including Oakland harbor (EPA 2004d).
Comment: *Groundwater is a reasonable and unambiguous pathway for contaminant transport to sensitive habitats south of the site.* Question: *Because no one knows how far the*

contaminated groundwater plume goes to the south of the site, doesn't this mean that the ecological risk south of the site should be examined?

Response H-1: Response 7-1 addresses the need for an ecological risk assessment.

ES.1 Study Area, Second Paragraph: "…in accordance with input from the community and regulatory agencies, the potential risk of using groundwater underneath the Site as drinking water is evaluated." Question: *Isn't it true that only the shallow groundwater, which cannot be used for drinking water, was evaluated and the deeper groundwater that can be used was not evaluated?*

Response H-2: Only the shallow groundwater was evaluated for use as drinking water as part of this Risk Assessment. Based on the results of the remedial investigation, contamination from the AMCO site has not penetrated the Older Bay Mud aquitard. Deep wells have been installed and results of groundwater sampling from the deep aquifer will be evaluated in the feasibility study.

ES.1 Study Area, Third Paragraph: "Soil was sampled at six residential parcels in the immediate vicinity of the facility." Question: *Isn't it true that the source of the alarmingly high lead contamination for these properties was not found, and that residences that are even closer to the lead source could have even higher levels of lead?*

Response H-3: Based on the data collected during the RI, we do not believe that the former AMCO facility is source of the lead found in the residential soil. US EPA's Emergency Response Group is evaluating lead contamination at residences located between Mandela, Peralta, 7th and 3rd Streets separate from the AMCO investigation.

ES.2 Risk Assessment Methodology, Exposure Assessment, Second Paragraph: "In addition, direct contact with groundwater and outdoor inhalation of vapors from groundwater was evaluated for excavation/trench workers." Comment: *An assumed wind velocity in the trench of about half a foot per second, and a cumulative lifetime exposure of one year were used in the risk calculations. A trench more than four feet deep is actually a confined space with potentially stagnant air; trench workers working construction in West Oakland could potentially be exposed for their working career. Usually a lifetime exposure of 25 years is used in risk calculations for such workers*. Question: *Isn't it true that the excess cancer risk to trench workers calculated in the Draft RI was barely within the generally acceptable range, and that if the air was assumed to be stagnant in the trench and a lifetime exposure for industrial workers of 25 years were used, the calculated excess cancer risk for trench workers would be many times higher than acceptable?*

Response H-4: We agree that the ELCR estimated for a trench worker's exposure to groundwater exceeds the range that is considered acceptable. Risk estimates using the Virginia Department of Environmental Quality's trench worker model which assumes no wind velocity in the trench show a risk greater than 10^{-4} (6×10^{-4}) and an HI that exceeds 1 (34). Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study.

ES.2 Risk Assessment Methodology, Toxicity Assessment, Third Paragraph: "The model equations were developed to calculate cleanup goals such that there would be no more than a 5 percent probability that fetuses exposed to lead would exceed a blood lead (PbB) of 10 µg/deciliter." Comment: *A standard of five unacceptable blood levels per hundred fetuses exposed does not seem like a sufficiently protective criterion.*

Response H-5: In the updated assessment, lead concentrations at the site are screened against the 2009 residential and industrial CHHSLs developed by OEHHA for lead.

No site-specific cleanup goals have been developed for the AMCO site. Cleanup goals for the site will be developed as part of the feasibility study.

<u>ES.4 Results for Screening Level Risk Evaluation, Residential Soil</u>: "As a result (of soil removals performed at the residences in the same block as the former AMCO facility), the samples collected during the RI are no longer representative of the soil conditions at these properties." … "Lead exceeded the site-specific screening level for soil at each of the residential properties." <u>Comment</u>: *It should be pointed out that the samples collected during the RI are no doubt representative of other properties in the area, particularly properties across Center Street that are close to the foundry, and that lead in these samples exceeded the site-specific screening level by many times.*

Response H-6: Based on the data collected during the RI, we do not believe that the former AMCO facility is source of the lead found in the residential soil. US EPA's Emergency Response Group is evaluating lead contamination at residences located between Mandela, Peralta, 7th and 3rd Streets separate from the AMCO investigation.

<u>1.0 Introduction, Third Paragraph:</u> "The CSM (conceptual site model) for the former AMCO facility is presented in Figure 1." <u>Comment</u>: *Figure 1 should show soil vapor as a secondary source of contamination to groundwater by the mechanism of dissolution.*

Response H-7: Considering the thin vadose zone, relatively low mass of VOCs in the soil gas, and the relatively low permeability of the soil, reduced further by moisture in the capillary fringe, migration of VOCs in the soil gas and dissolution into the soil and groundwater is not a significant transport mechanism.

<u>1.1.4 Preliminary Assessment and Site Investigation Report, First Bullet</u>: "Significant concentrations of chemicals have been found in soil on the on- and off-facility properties. However, the majority of the ground surface at these properties is covered with concrete. Therefore, the potential for workers and residents to come into direct contact with contaminated soil is minimized." <u>Comment</u>: *The potential for workers and residents to come into contact with contaminated soil is still quite great. Concrete and other pavements are often removed while modifications or repairs are made to property. Because West Oakland is undergoing significant redevelopment, the high potential for removal of concrete and other pavements needs to be accounted for.*

Response H-8: This comment is intended to address current site workers. The bullet has been revised to clarify.

<u>1.1.4 Preliminary Assessment and Site Investigation Report, Second Bullet</u>: "Significant concentrations of vinyl chloride and other chemicals have been found in groundwater monitoring wells on and near the former AMCO facility that establish a release of chemicals to the regional groundwater. However, the regional groundwater is not used for drinking water, and there are no drinking water wells within 4 miles of the Site." <u>Comment</u>: *The fact that usable drinking water underlies the site needs to be accounted for.*

Response H-9: Only the shallow groundwater was evaluated for use as drinking water as part of this Risk Assessment. Based on the results of the remedial investigation, contamination from the AMCO site has not penetrated the Older Bay Mud aquitard. Deep wells have been installed and results of groundwater sampling from the deep aquifer will be evaluated as part of the feasibility study.

1.1.4 Preliminary Assessment and Site Investigation Report, Third Bullet: "A release to air of hazardous substances was observed in 1996, during the excavation of a trench for an on-facility treatment system. A sample collected at the time of the observed release documented that vinyl chloride, trichloroethene, and other volatile organic compounds (VOCs) were present in vapor observed emanating from the trench." Question: *What were the concentrations of these compounds in the air, and how do these observed concentrations compare to the reasonable maximum exposure levels used in the risk calculations for trench workers?*

Response H-10: The Preliminary Assessment and Site Investigation Report does not provide the concentrations that were found in air in 1996. The risk calculations, included in the final Risk Assessment, are based on 2004 to 2009 crawl space and ambient air data, which represent current conditions. The on-facility treatment system, which extracted groundwater and soil gas from the trench location, was in operation for one year subsequent to the 1996 release. Therefore, conditions encountered prior to operation of the treatment facility are not necessarily representative of current conditions.

3.1.1 Exposed Populations, Last Paragraph: "Industrial, construction, and trench workers may be exposed to the same concentrations as a resident (by the same pathways), …" Comment: *If this statement in the Draft RI were true, one could say that a resident's exposure could be the same as a trench worker. This seems patently false. A trench worker's exposure will be to higher concentrations than a resident, or other types of workers, because a trench worker's breathing zone will be much closer to the groundwater and soil vapor sources of contaminants.*

Response H-11: The exposure point concentration assumptions are the same for all receptors. However, the assumptions are conservative to the resident in assessing risk using this value as opposed to not being protective to the trench worker. To evaluate risk from exposure to groundwater, the 95 percent Upper Confidence Limit on the Mean (UCL) or maximum detected concentration (for chemicals where the UCL exceeds the maximum) of the entire groundwater plume for each chemical was used for all receptors. This methodology for selecting an exposure point concentration is standard risk assessment procedure as outlined in *On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations* (EPA 2006). The 95 percent UCL takes into account the variability in the data set to ensure that the average exposure is not underestimated.

3.1.2 Exposure Pathways, Fourth Bullet: "(Construction/trench worker activity) is potentially the most significant exposure pathway for subsurface workers." Comment: *Therefore, a one-year cumulative exposure duration for trench workers, who could spend an entire career working on subsurface disturbance activities, is inordinately short as used in the risk calculations.*

Response H-12: The site-specific exposure assumption of an exposure duration of 1 year for a trench worker is based on the reasonableness of a worker working in a trench on or adjacent to the former AMCO facility (approximately 1 acre in size). Although redevelopment in West Oakland is likely to go on for decades, the trench worker would not be exposed to the concentrations found in the groundwater at the AMCO site when they are working in trenches outside of the AMCO site.

3.1.2 Exposure Pathways, Fifth Bullet: "This (ecological) pathway, while potentially complete, was not quantitatively evaluated …" Comment: *In view of the incomplete groundwater assessment down gradient, the Draft RI ignores potential impacts to sensitive ecological receptors in the Oakland Inner Harbor to the south and southwest of the site.*

Response H-13: Please see response to 7-1 regarding the need for an ecological risk assessment.

3.1.2 Exposure Pathways, Second to the Last Paragraph: "Inhalation of VOCs which (sic) volatilize from soil or groundwater into air can be absorbed into the bloodstream after being inhaled." Comment: *This exposure pathway is not mentioned directly in the narrative discussions of potential exposures to trench workers in the Draft RI, while the much less important dermal exposure pathway is mentioned frequently. The inhalation pathway was evaluated in the risk calculations. Even with some very liberal (not very protective) assumptions in the risk calculations, the health risks to trench workers from the inhalation pathway are significant, and should be mentioned in the narrative.*

Response H-14: The inhalation of VOCs pathway has been added to the Sections 7.2.2.2 and 7.3.2 of the RI discussions of potential exposures to trench workers.

3.3.1 General Exposure Assumptions, Second Bullet: "The construction worker is assumed to be exposed for a period of one year." Comment: *This is unreasonably short for a construction worker who may work on multiple projects in the contaminated area, given the widespread nature of the groundwater contamination down gradient, and the evidence for mobility of soil vapors in the subsurface.*

Response H-15: The site-specific exposure assumption of an exposure duration of 1 year for a trench worker is based on the reasonableness of a worker working in a trench on or adjacent to the former AMCO facility (approximately 1 acre in size). Although redevelopment in West Oakland is likely to go on for decades, the trench worker would not be exposed to the concentrations found in the groundwater at the AMCO site when they are working in trenches outside of the AMCO site.

4.2.3 Toxicity Values for Lead, First Paragraph: "EPA and Centers for Disease Control and Prevention (CDC) have identified childhood blood levels of 10 µg/dL as the level of concern above which significant health risks may occur (EPA 2003a)" Comment: *There are many studies that indicate much lower blood levels are harmful to children; lead can accumulate in bones and be released later, even though tests don't show a* 10 µg/dL blood lead level*. Besides brain damage and learning disabilities, recently publicized studies have shown a correlation between lead exposure in childhood and later criminal behavior. The Draft RI has identified very high lead levels in soil in the study area. High lead levels in soil have been shown to have a direct correlation with high blood levels in children. The source and extent of lead contamination around the AMCO site have not been identified in the Draft RI. This deficiency in the Draft RI is very serious, and needs to be corrected. It does not seem that the lead issue is taken seriously enough, or given enough weight, in the Draft RI HHRA.*

Response H-16: EPA considers lead contamination to be a very serious issue, as shown by the emergency response removal action of soil conducted at the residential properties. In 2009, OEHHA lowered the CHHSL for lead based on a blood level of 10 µg/dL to 1 µg/dL. The revised CHHSL is now used as a screening level for lead instead of the site-specific screening levels.

4.2.3 Toxicity Values for Lead, Last Paragraph: "The model equations (for workers exposed to lead in soil) were developed to calculate cleanup goals such that there would be no more than a 5% probability that fetuses exposed to lead would exceed a blood lead (PbB) of 10 µg/dL." Comment: *Given the extremely harmful effects of measurable blood lead levels in children, equations based on 5 known harmful levels in fetuses per 100 pregnant workers does not seem very protective of the health of pregnant workers or their unborn children.*

Response H-17: No site-specific cleanup goals have been developed for the AMCO site. Cleanup goals for the site will be developed as part of the feasibility study. In the updated assessment, lead concentrations at the site are screened against the 2009 residential and industrial CHHSLs developed by OEHHA for lead.

5.0 Risk Characterization, Third Paragraph: "Under (reasonable maximum exposure) conditions, the calculated risks are not likely to be exceeded by any member of the exposed population because of the health-protective exposure assumptions used. … In other words, the most vulnerable people (e.g., children) are carefully considered to make sure all members of the public will be protected." Comment: *It does not appear that this standard has been met in the assessment of lead exposure to pregnant industrial workers, or in the case of VOCs, exposure to trench workers.*

Response H-18: Exposure to lead in soil is evaluated by comparing a lead EPC to the residential (80 mg/kg) or industrial (320 mg/kg) CHHSL. The CHHSLs are health protective of children and other sensitive receptors.

As stated in responses to comments ES-11, 7-6, H-4, and H-22, we agree that the groundwater has unacceptable levels of VOCs for exposure by a trench worker.

5.4.5 Background Soil Risk Evaluation, Second Paragraph: "Risks and hazards from exposure to background concentrations of metals in soil were estimated using the City of Oakland *Survey of Background Metal Concentration Studies* (City of Oakland 1995). For a child resident, the ELCR is 2×10^{-4}. Arsenic contributed over 99% of the total background risk. The HI is 10 for the child resident and 1 for the adult. Thallium contributed 89% to the total background HI." Comment: *Given this already high risk to children from West Oakland background soil, i.e. twice what is normally regarded as minimally acceptable for excess lifetime cancer risk and ten times the generally acceptable level for non-cancer health risk, the most protective cleanup standards should be used for remediation of the AMCO site.*

Response H-19: Cleanup goals will be developed as part of the feasibility study. The most protective cleanup goals that are feasible will be selected.

5.5 Groundwater Risk Evaluation: "… It is extremely unlikely that residents would drink groundwater underneath the Site in the future; …TDS concentrations in all wells south of 3rd Street were above (the drinking water threshold of) 3,000 mg/L." Comment: *This is not true for the deep aquifer under the site, which is known to be usable.*

Response H-20: The sentence states that "TDS concentrations ***in all wells*** south of 3rd Street were above (the drinking water threshold of) 3,000 mg/L." All wells that are monitored as part of the RI are shallow aquifer wells. Deep wells have been installed and results of groundwater sampling from the deep aquifer will be evaluated in the feasibility study.

5.5.1 Shallow Groundwater, First Paragraph: "For the potential residential RME scenario, the excess lifetime cancer risk is 1×10^{-1} for groundwater. The HI for the child was 1,153 …"

Comment: *The health risk for groundwater is 1000 times what is normally considered to be acceptable. This result is consistent with other human health risk studies that have been done at the site, and points out the need for completing the down-gradient investigation of the shallow aquifer, assessing the deep aquifer, and performing an ecological assessment down gradient of the site.*

Response H-21: We agree that the health risk from shallow groundwater beneath the former AMCO facility is well above acceptable levels. Remediation alternatives will be evaluated as part of the feasibility study.

5.5.1 Shallow Groundwater, Second Paragraph: "(For the trench worker) the total lifetime-excess cancer risk was 1 x 10^{-4} for groundwater (Table 2-14). The HI for the trench worker was 34 (Attachment 2, Table 2-15)." Comment: *Examination of Table 6 shows that a wind velocity of approximately half a foot per second was assumed. This is very unrealistic for a trench 10 feet deep, which would be classified as a confined space due to poor ventilation,. Also, Table 6 shows that a cumulative lifetime exposure of 1 year was used for the trench workers. This is unrealistic for a worker who may spend a career working construction and could be exposed to subsurface conditions throughout that career. Use of more realistic assumptions for the trench workers' reasonable maximum exposure (RME) would result in a much higher risk result that would be many times higher than the calculated result in the Draft RI HHRA.*

Response H-22: We agree that the groundwater exposure to a trench worker exceeds risk criteria for inhalation of VOCs. For comparison to the risk calculations for the trench worker using the model that DTSC recommended, we calculated risk using the Virginia Department of Environmental Quality's trench worker model which assumes no wind velocity in the trench. The results show a risk greater than 10^{-4} (6 x 10^{-4}) and an HI that exceeds 1 (34). .

The site-specific exposure assumption of an exposure duration of 1 year for a trench worker is based on the reasonableness of a worker working in a trench on or adjacent to the former AMCO facility (approximately 1 acre in size). Although redevelopment in West Oakland is likely to go on for decades, the trench worker would not be exposed to the concentrations found in the groundwater at the AMCO site when they are working in trenches outside of the AMCO site.

Remedial alternatives for addressing groundwater contamination will be evaluated as part of the feasibility study.

5.5.1 Shallow Groundwater, Third Paragraph: "The chemicals that contribute most to the risk through exposure to groundwater include vinyl chloride, arsenic, …" Comment: *It should be noted that vinyl chloride contributes 55% of the risk, and that the next highest contributor is only 5% as shown in Tables 2-10 and 2-11. This type of information is important for the evaluation of remedial alternatives that will follow in the Feasibility Study phase of the work.*

Response H-23: We agree. Risk assessment data will be incorporated into the evaluation of remedial alternatives performed during the feasibility study.

5.6 Residential Soil Gas, Ambient Air, and Crawlspace Air, Numbered Paragraph 3: "… it is clear (from the high VOC concentrations) that the VOCs are coming from the groundwater." Comment: *High VOCs in groundwater northwest of the central and south-central areas of the site, in an apparent up-gradient direction, suggest that at least some of the soil vapors might* *be coming from vapor migration.* Question: *Was vapor migration considered by the EPA as one of the pathways?*

Response H-24: The assessment has been revised to include a quantitative evaluation of the risks and hazards posed by the presence of VOCs in crawl space air and ambient air. Soil vapor and groundwater data have been used as lines of evidence that vapor intrusion is occurring but not quantitatively evaluated. An evaluation of vapor intrusion using groundwater data was not conducted, however, it is acknowledged that in a worst case scenario, the risks and hazards may be as high as when residential use of the groundwater is considered. The cancer risks estimated for future residents using the groundwater as tap water in the home ranges from $1x10^{-4}$ to $7x10^{-2}$, which is significantly above the risk management range and clearly unacceptable. Hazard indices for a child is 628 and for an adult is 262 which are also significantly above the noncancer threshold of 1.

5.7.4 326 Center Street: "Lead was detected at concentrations ranging from 170 to 53,000 mg/kg." Comment: *The 53,000 mg/kg result is too high for airborne deposition and suggests that foundry waste(s) may have been improperly disposed at this property. If so, lead-contaminated hazardous waste could have been disposed at other properties in the vicinity as well.*

Response H-25: US EPA's Emergency Response Group is evaluating lead contamination at residences located between Mandela, Peralta, 7th and 3rd Streets separate from the AMCO investigation. We agree that the 53,000 mg/kg lead concentration is unlikely to be the result of airborne deposition. The improper disposal of foundry waste is one possible source of the lead at this location; however, other sources, including old lead-based paint, are possible. Lead-based paint manufactured prior to 1940 contained high percentages of lead - often 10 percent and sometimes as high as 50 percent.

7.0 Summary and Discussion of Human Health Risk Assessment Results, First Paragraph: "The risk assessment results will be one of the factors that EPA uses to determine if cleanup actions are warranted at the former AMCO facility." Comment: *For this reason, it is important that none of the risk levels, including risks from lead-contaminated media and groundwater, be understated. Because of the high levels of human health risk determined at this site, it is appropriate for this site to be given a high level of priority for cleanup.*

Response H-26: We agree that it is appropriate for this site to be given a high priority for remediation, which is why the site has been placed on the National Priorities List.

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Attachment 9
Comments on the HHRA from the California Department of Public Health

State of California—Health and Human Services Agency
California Department of Public Health

MARK B HORTON, MD, MSPH
Director

ARNOLD SCHWARZENEGGER
Governor

January 13, 2009

Ms. Bruni Davila
Remedial Project Manager
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
Mail Code SFD-7-4
San Francisco, CA 94105

Dear Ms. Davila,

The California Department of Public Health (CDPH), under a cooperative agreement with the Agency for Toxic Substances and Disease Registry, is writing this letter to the U.S. Environmental Protection Service (EPA) to provide a public health technical review of the February 2008 Remedial Investigation (RI) pertaining to the AMCO Chemical Superfund Site.

As you know, CDPH has been involved with the AMCO site in the past, having released a public health assessment (PHA) in September 2005.

The CDPH review of the RI document consisted of significant time analyzing both previous and recent data. Groundwater, soil and soil gas data were thoroughly reviewed in relevance to vapor intrusion issues and the CDPH reviewed calculations of exposure levels for hazardous chemicals reported above ATSDR screening levels. This letter addresses previous concerns raised by the CDPH in the PHA and presents an overall review of the RI.

The principal public health concern from the PHA was the need to further evaluate the possible volatile organic compound (VOCs) vapor intrusion pathway for the adjacent residences from the site and the office facility located on-site. EPA conducted several sampling events from May 2005 through October 2008 to address this issue.

Based on the laboratory analysis from sampling events reported in the RI, VOC vapors detected and believed to be originating via soil gas from the shallow groundwater are intruding into crawl spaces and indoor ambient air, but not at levels that would pose a health risk. However, the VOC detection suggests that people living in these residences or former/current workers in the on-site office may have inhaled VOC contaminants.

As reported in the RI, the shallow groundwater contamination is expanding generally to the south and away from the abutting residences located immediately west of the site. A change in groundwater direction towards the west could move the shallow VOC plume beneath the abutting residences and increase the VOC vapor intrusion exposure risk. Therefore, CDPH recommends continued monitoring of the shallow groundwater zone and associated shallow VOC plume. If analyses from groundwater monitoring events indicate a change in groundwater direction towards the abutting residences, CDPH recommends conducting full range VOC air monitoring of indoor, ambient, crawlspace, and soil gas.

Another concern raised in the PHA was to maintain the on-site pavement to prevent exposures occurring from the subsurface. As reported in the RI, concrete thickness and condition was characterized by concrete core sampling throughout the site. The sampling found that the medium concrete thickness at the site was 16 inches and the concrete condition to be relatively smoothly finished. CDPH recommends that a continued effort be in place to monitor and maintain the on-site pavement to prevent exposure to subsurface contamination.

An additional concern raised in the PHA was to include 1,4-dioxane in the groundwater analysis. The inclusion of 1,4-dioxane in groundwater analysis began in 2005.

The final concern raised in the PHA was in regards to exploring if there are private wells located within the vicinity and if so, if or how they are they being utilized and/or if they are contaminated. As reported in the RI, there are nine documented industrial or irrigation water wells located within a 1-mile radius of the site; however, the groundwater in those areas are not being affected by the contaminated groundwater beneath the site. One undocumented well was discovered in a residence located adjacent to the site. EPAsampled the well as a potential human health risk in September 2004 and June 2005. Both sampling events reported very low to below laboratory reporting limits for VOCs, SVOCs, 1,4-dioxane, TAL metals, mercury, hexavalent chromium, organochlorine pesticides or PCBs. The well was historically used for irrigation and is currently covered over with flooring materials, and is not being used by the property owner. Based on the results of the two sampling events and the location of the well away from the contaminant plume, CDPH agrees with EPA that further sampling is not justified.

Since the release of the PHA, soil sampling detected high levels of lead in residential backyard soils located within the block of the former AMCO facility. Based on the high levels of lead, EPA remediated all contaminated soil by excavating and removing the soil to a state certified off-site location. Excavations were carried out for all residences located within the site street block from July 23 through September 19, 2007. CDPH does not recommend that any further action is warranted regarding the removal of soil contaminated with lead. CDPH recommends that EPA maintain the local county health officials as collaborative partners concerning possible health effects resulting from lead exposure.

CDPH found the RI to be correct and consistent with the findings and conclusion in regards to public health and appreciates the opportunity to have continued collaborative communication regarding the AMCO site.

CDPH is always available to discuss their results of our evaluation. If you have any questions, please do not hesitate to call either Russell Bartlett at (510) 620-3671 or Marilyn Underwood at (510) 620-3610.

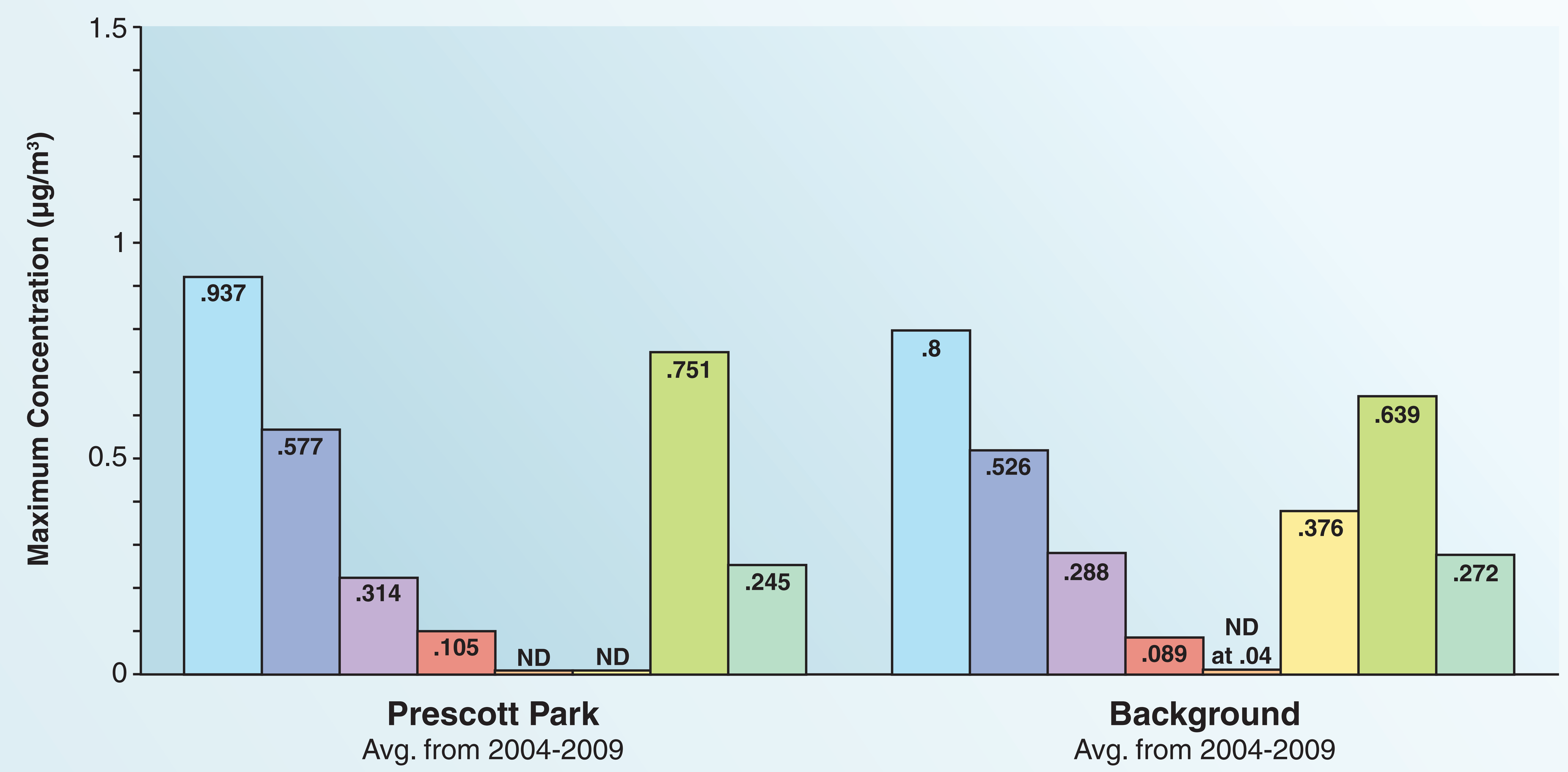
Sincerely,

Marilyn C. Underwood

Marilyn C. Underwood, Ph.D., REHS, Chief
Site Assessment Section
Environmental Health Investigations Branch

Attachment 10
Handouts Provided at October 16, 2010
Public Meeting

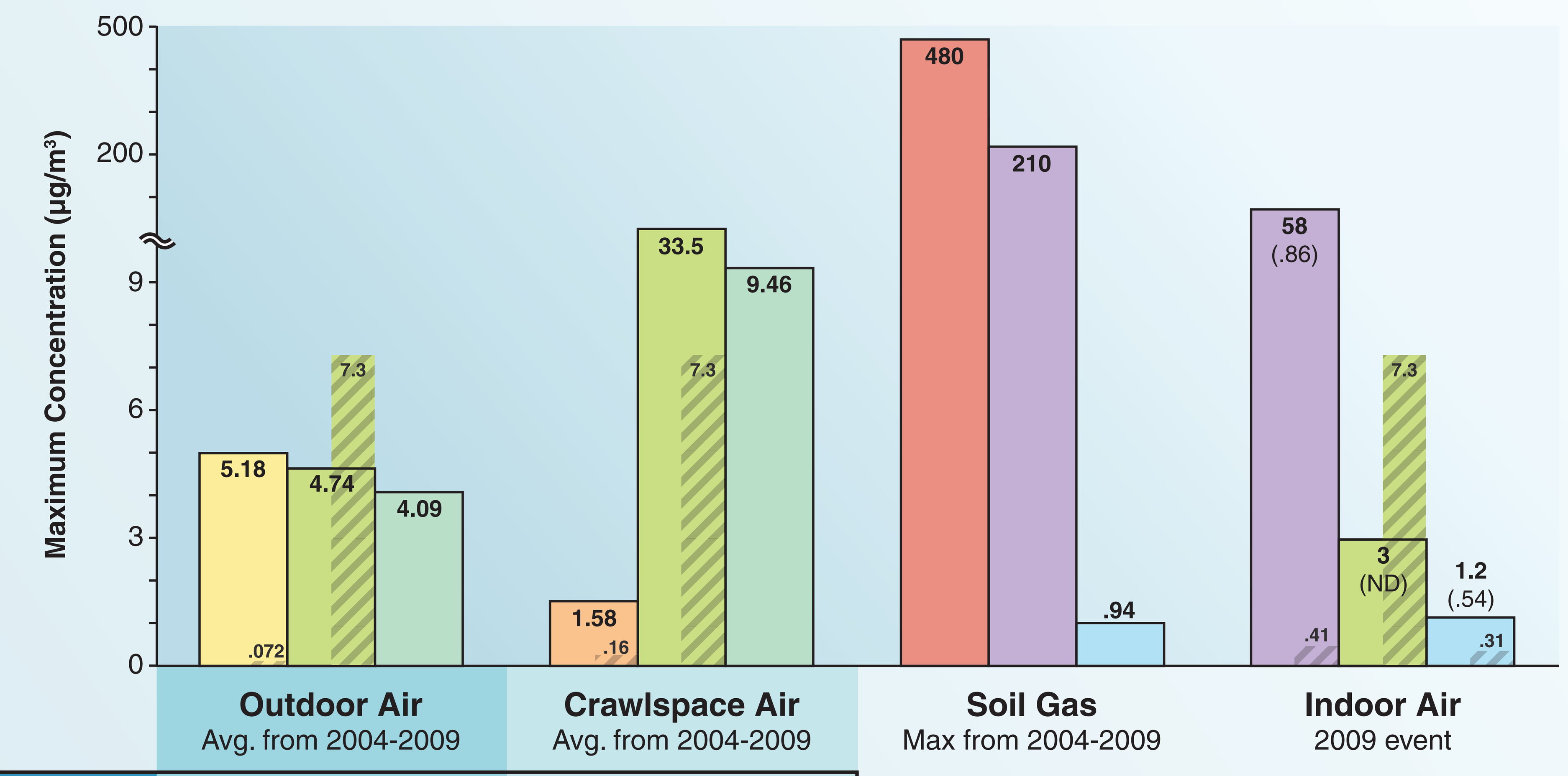
Outdoor Air Levels



Legend

- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

1428 3rd Street



	Outdoor Air Avg. from 2004-2009	Crawlspace Air Avg. from 2004-2009
Cancer Risk	2 in 10,000	3 in 10,000
Hazard (noncancer)	4	7

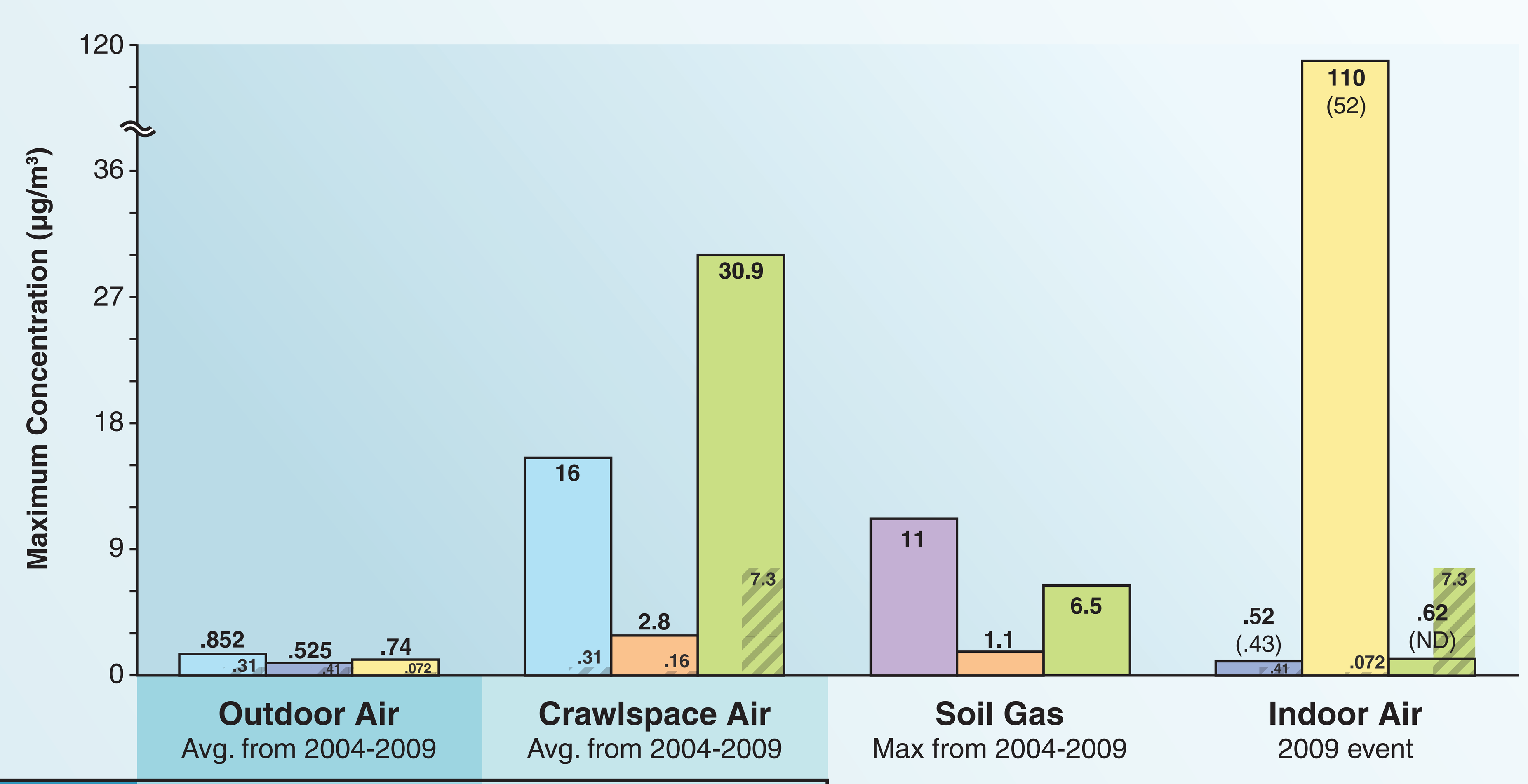
.31 Residential Screening Levels

(.25) = 2010 preliminary result, not quality assured and subject to change

Legend

- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

1432 3rd Street



	Outdoor Air Avg. from 2004-2009	Crawlspace Air Avg. from 2004-2009
Cancer Risk	4 in 100,000	6 in 10,000
Hazard (noncancer)	.8	8

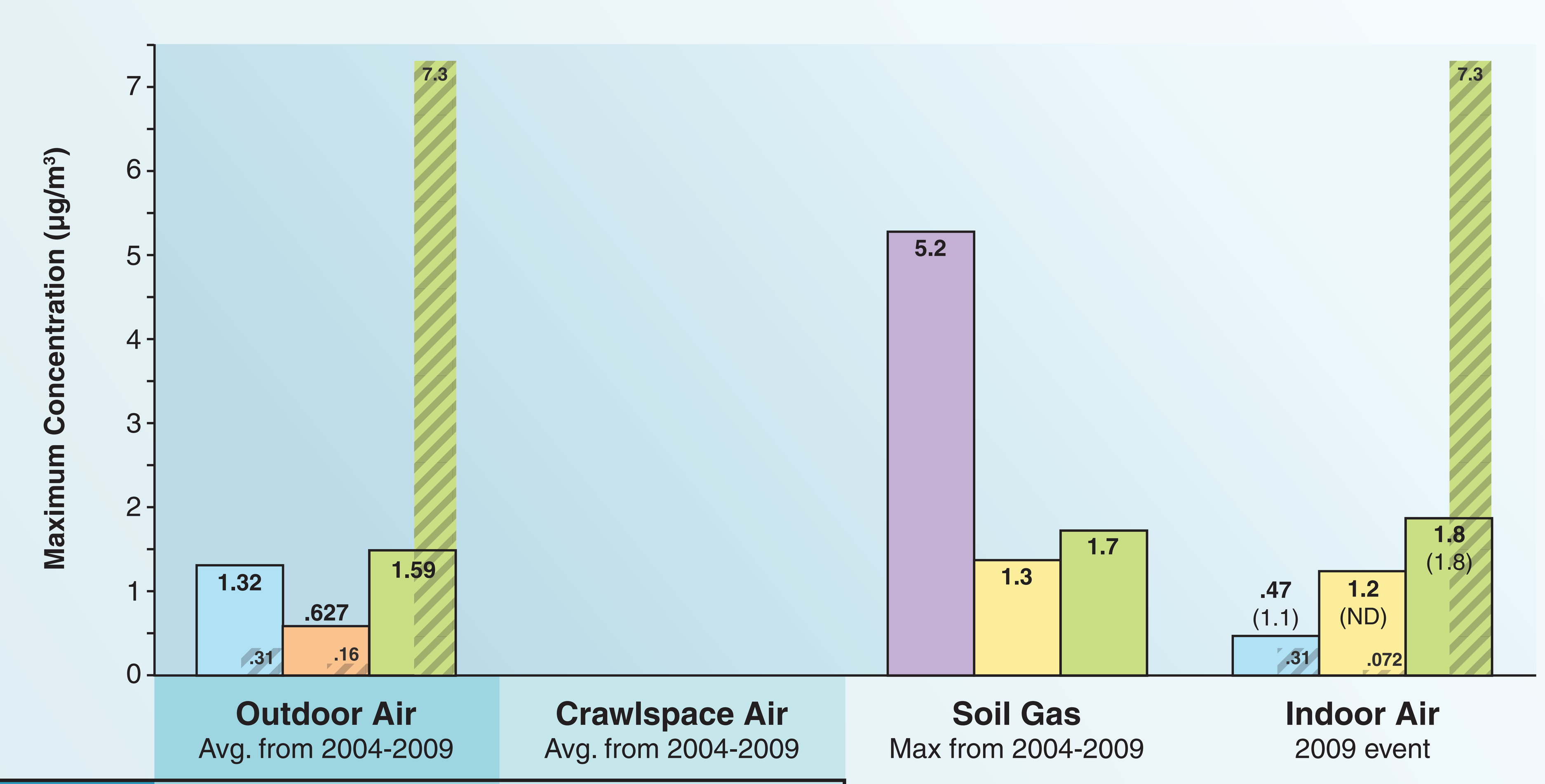
.31 Residential Screening Levels

(.25) = 2010 preliminary result, not quality assured and subject to change

Legend

- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

1436 3rd Street



	Outdoor Air Avg. from 2004-2009	Crawlspace Air Avg. from 2004-2009
Cancer Risk	1 in 10,000	–
Hazard (noncancer)	.8	–

.31 Residential Screening Levels

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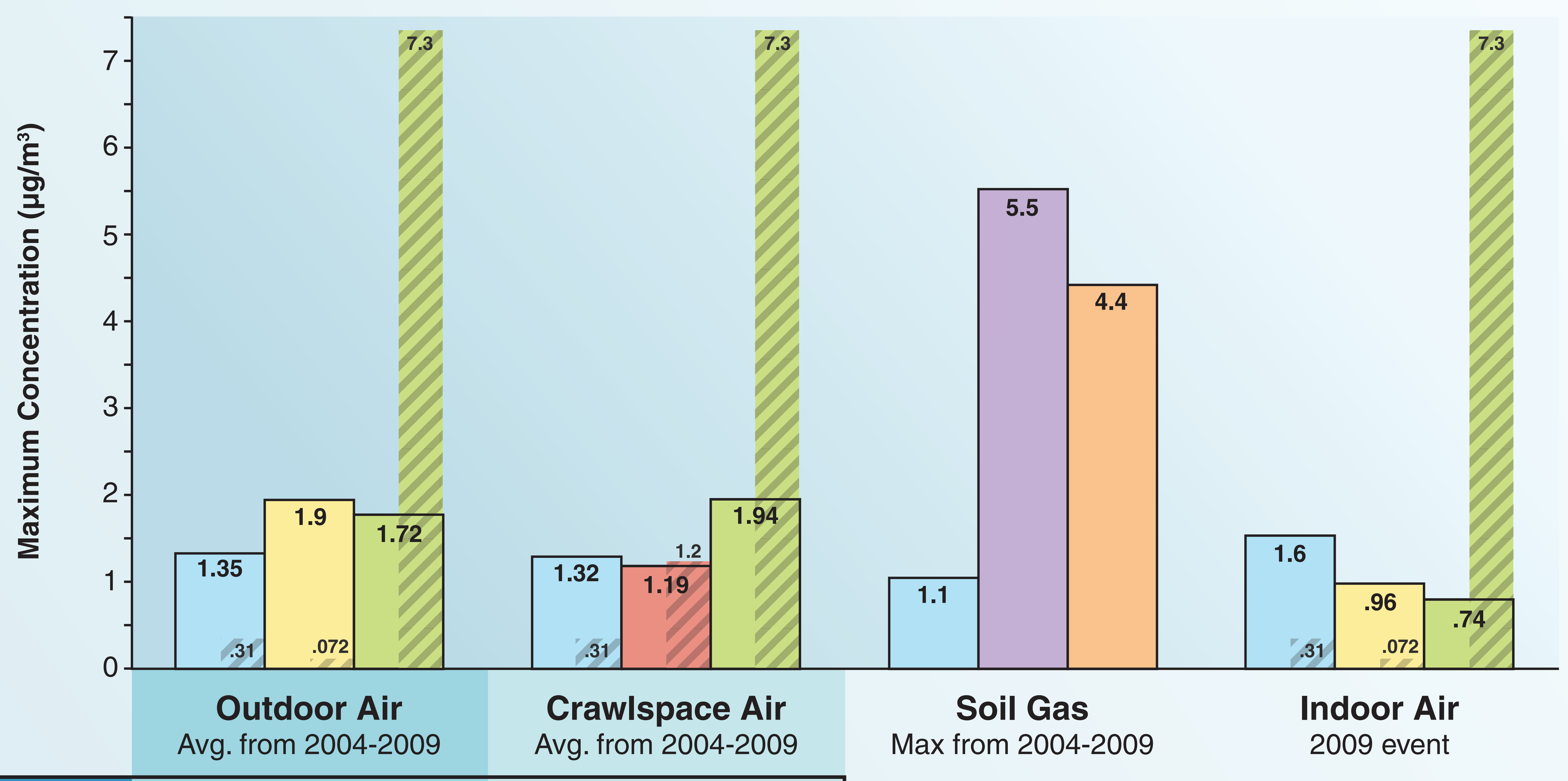
Legend

- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

320 Center



	Outdoor Air	Crawlspace Air
Cancer Risk	6 in 100,000	6 in 100,000
Hazard (noncancer)	1	.7

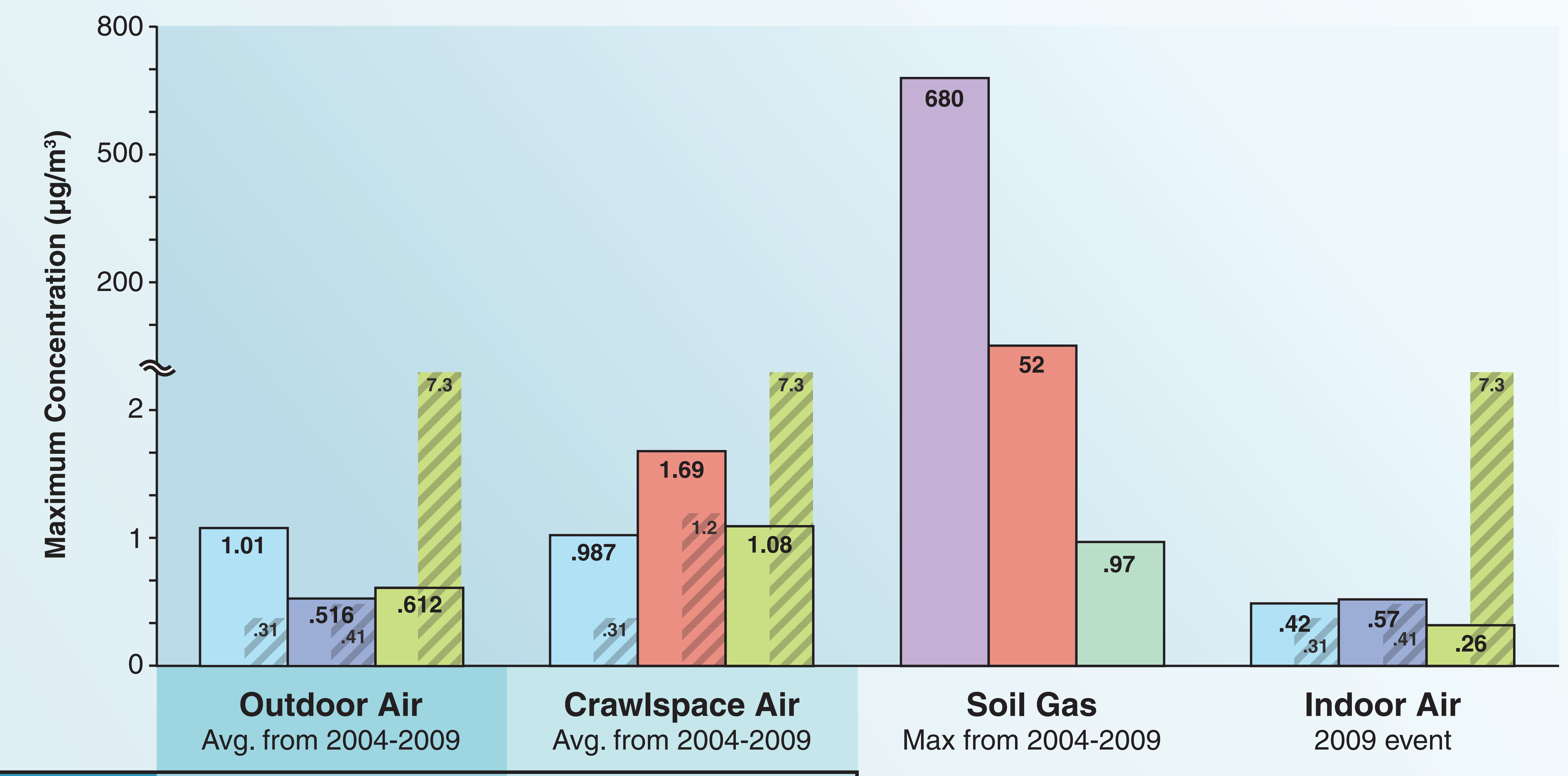
.31 Residential Screening Levels

This property was not sampled in 2010

Legend

Benzene · Carbon tetrachloride · Tetrachloroethene (PCE) · Trichloroethene (TCE) · Vinyl chloride · Naphthalene · 1,2,4-Trimethylbenzene · 1,3,5-Trimethylbenzene

326 Center



	Outdoor Air	Crawlspace Air
Cancer Risk	3 in 100,000	8 in 100,000
Hazard (noncancer)	.4	.5

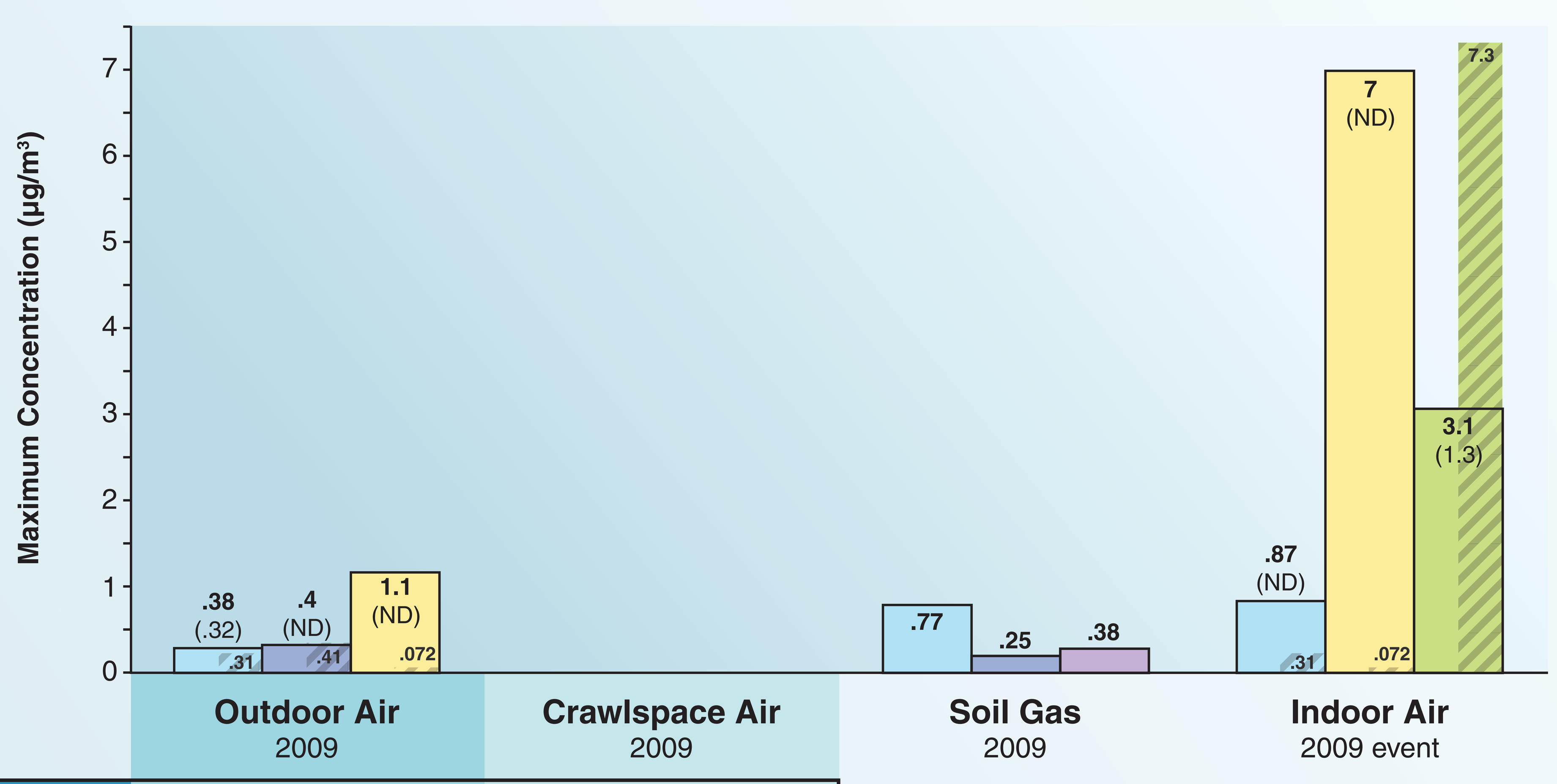
.31 Residential Screening Levels

This property was not sampled in 2010

Legend

Benzene · Carbon tetrachloride · Tetrachloroethene (PCE) · Trichloroethene (TCE) · Vinyl chloride · Naphthalene · 1,2,4-Trimethylbenzene · 1,3,5-Trimethylbenzene

339 Center



	Outdoor Air	Crawlspace Air
Cancer Risk	–	–
Hazard (noncancer)	–	–

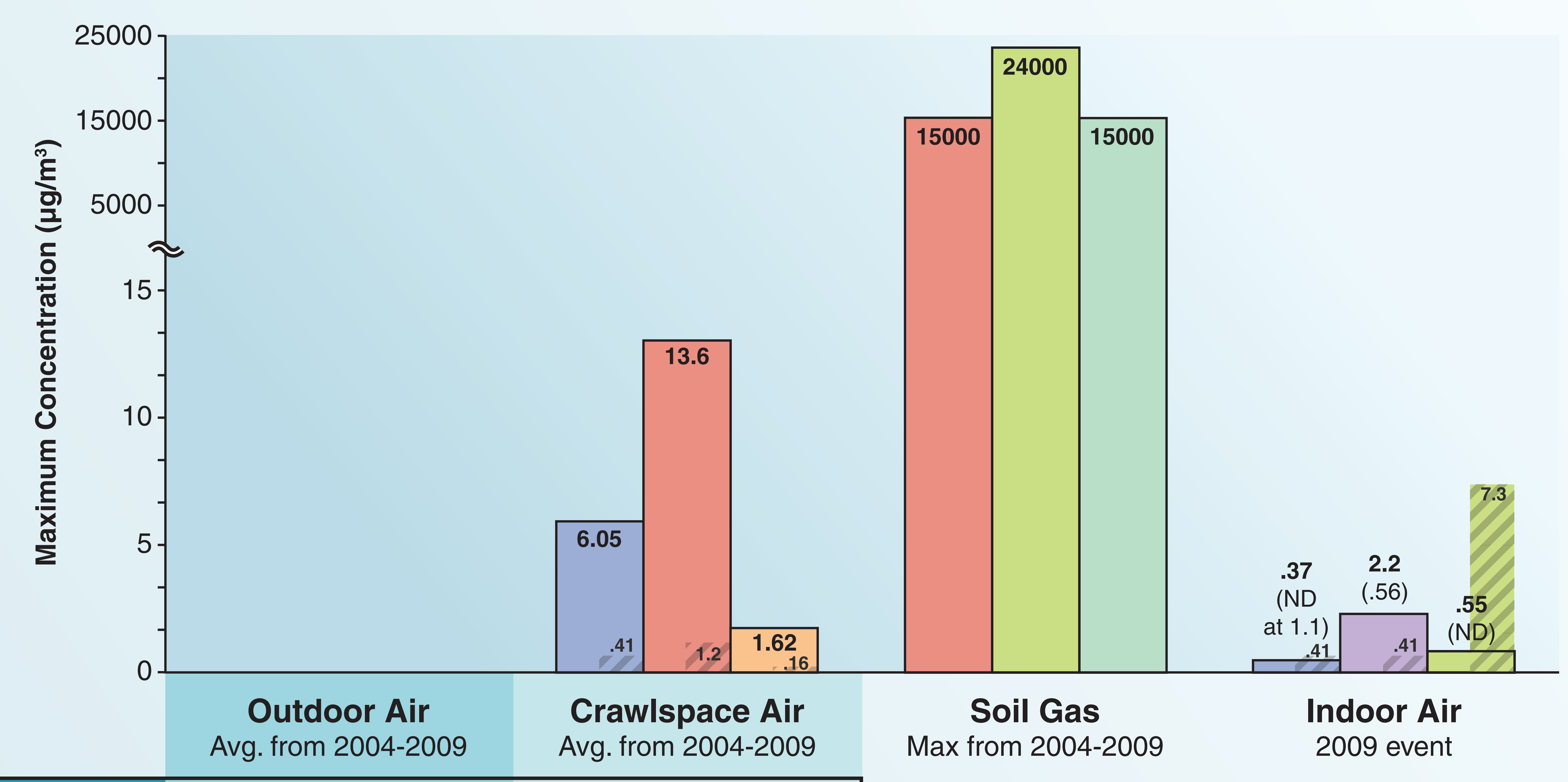
.31 Residential Screening Levels

(.25) = 2010 preliminary result, not quality assured and subject to change

Legend

Benzene · Carbon tetrachloride · Tetrachloroethene (PCE) · Trichloroethene (TCE) · Vinyl chloride · Naphthalene · 1,2,4-Trimethylbenzene · 1,3,5-Trimethylbenzene

1414 3rd Street



	Outdoor Air	Crawlspace Air
Cancer Risk	–	3 in 10,000
Hazard (noncancer)	–	2

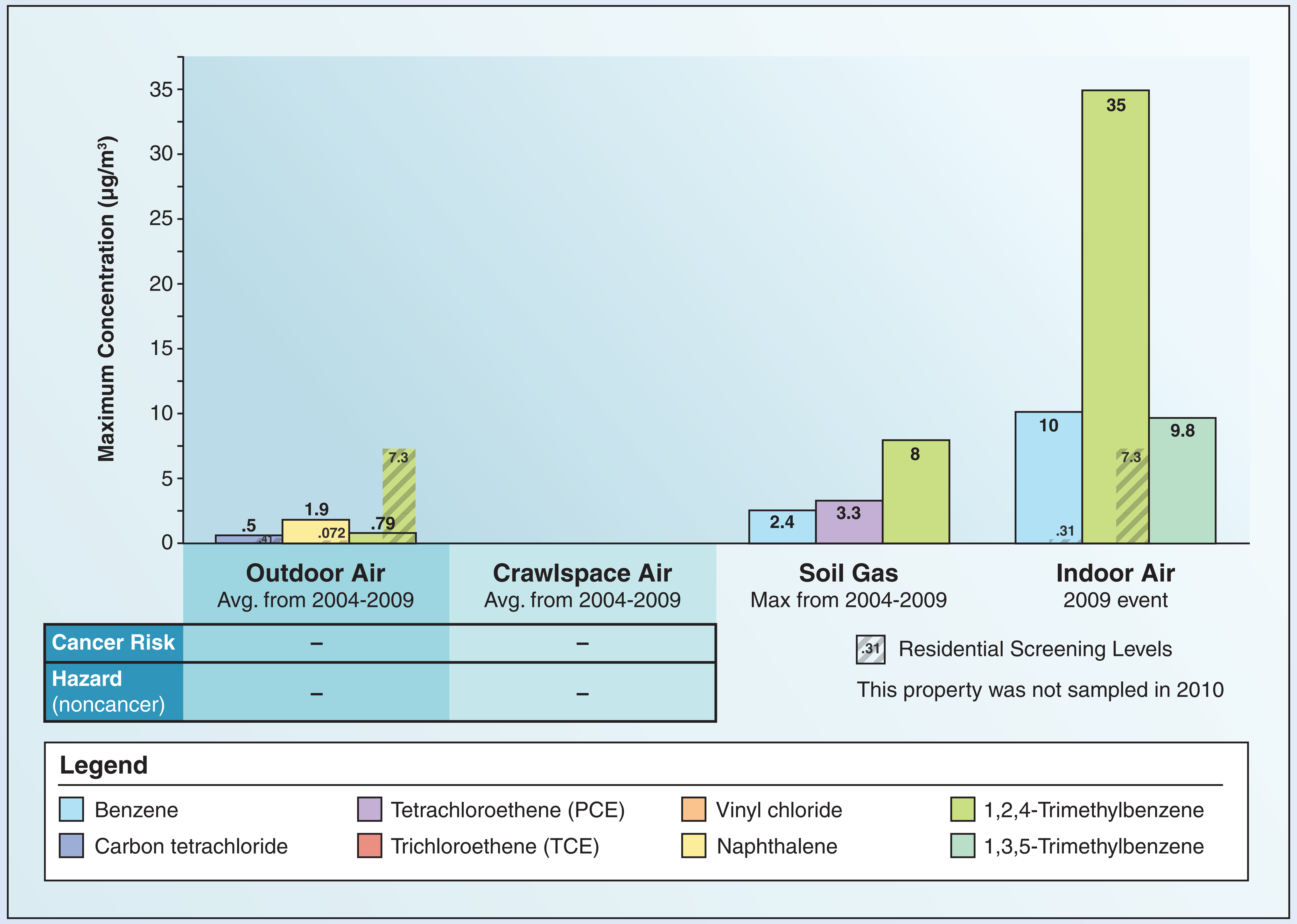
.31 Residential Screening Levels

(.25) = 2010 preliminary result, not quality assured and subject to change

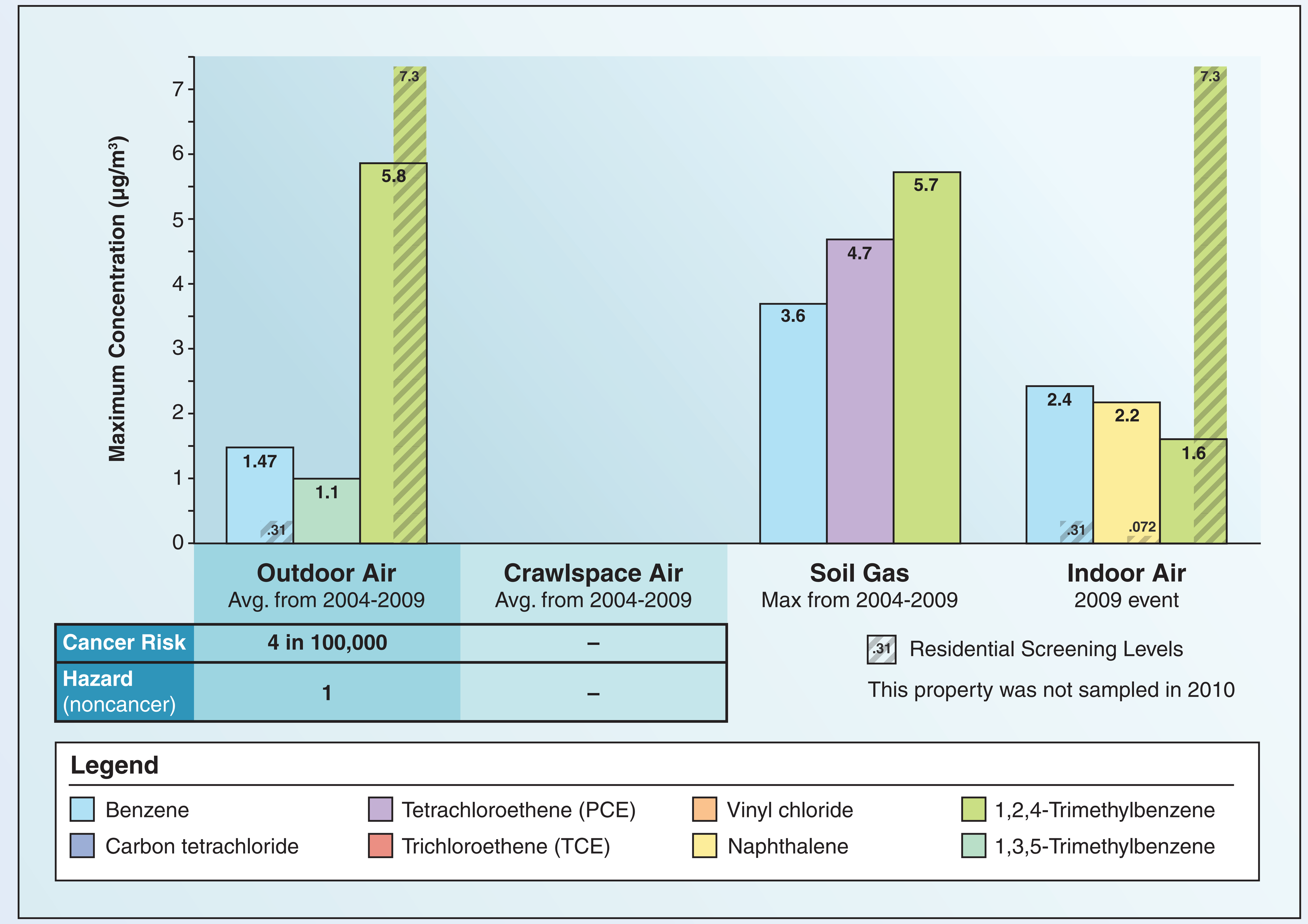
Legend

Benzene · Carbon tetrachloride · Tetrachloroethene (PCE) · Trichloroethene (TCE) · Vinyl chloride · Naphthalene · 1,2,4-Trimethylbenzene · 1,3,5-Trimethylbenzene

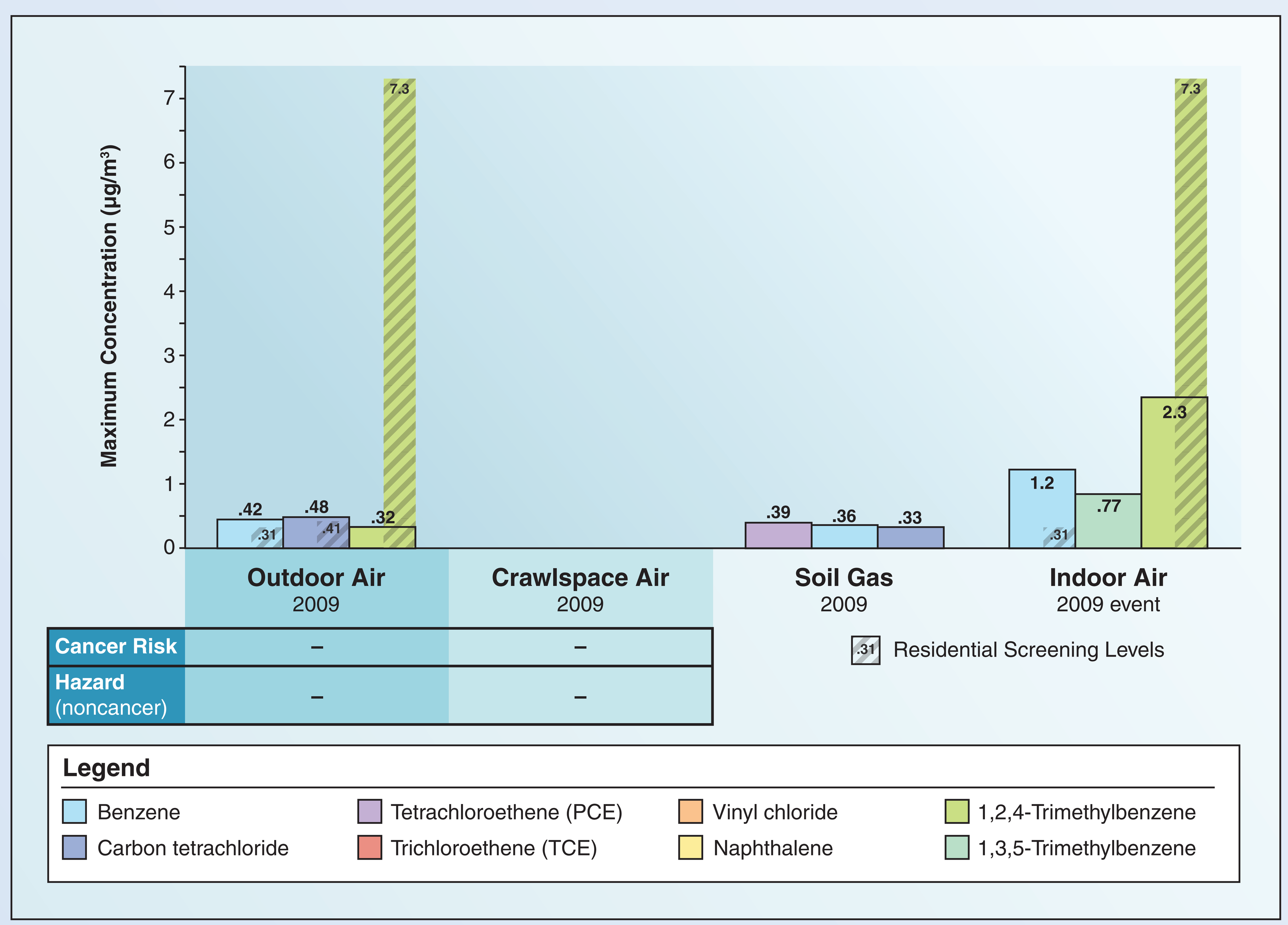
356 Center



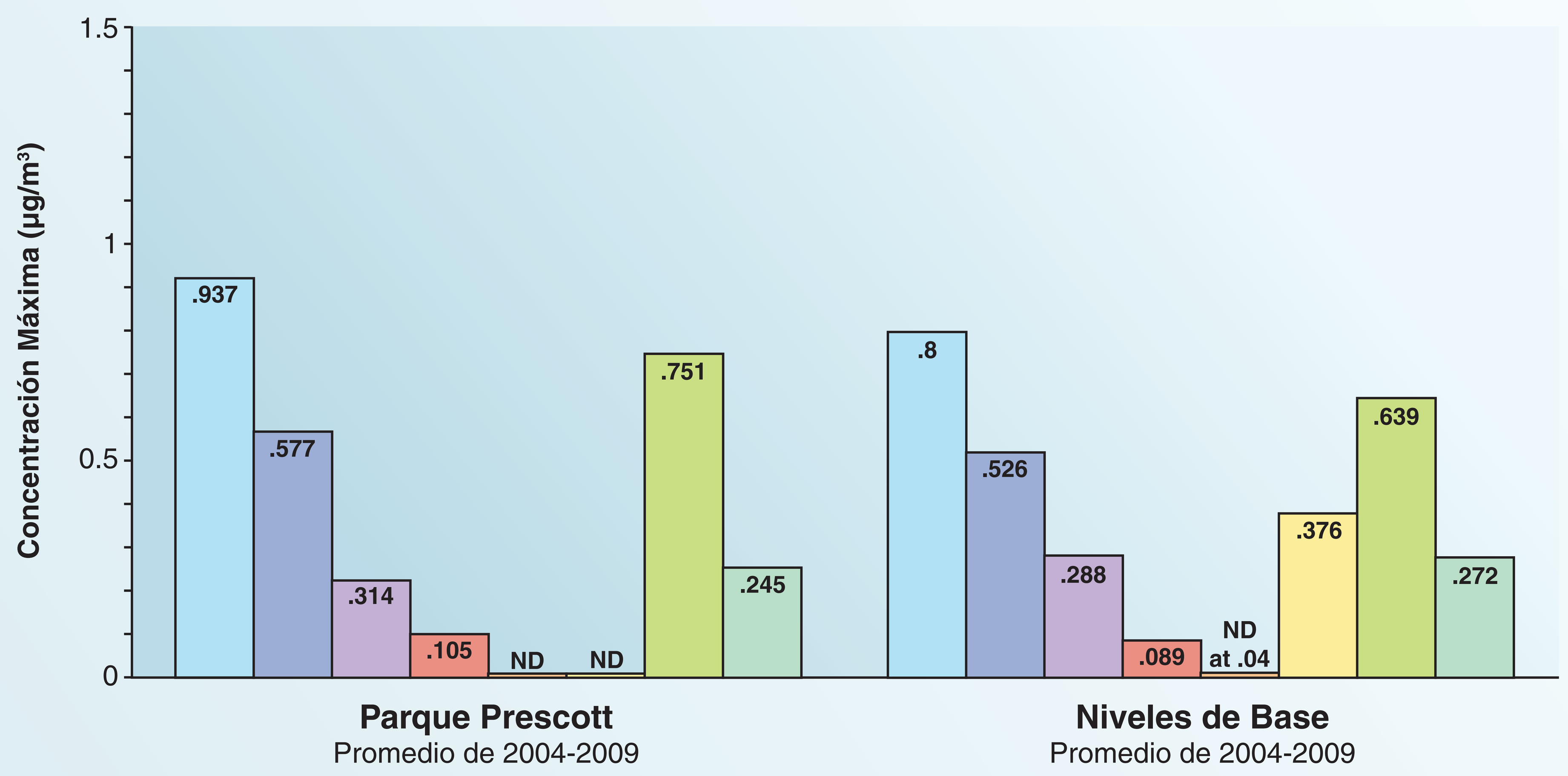
360 Center



366 Center



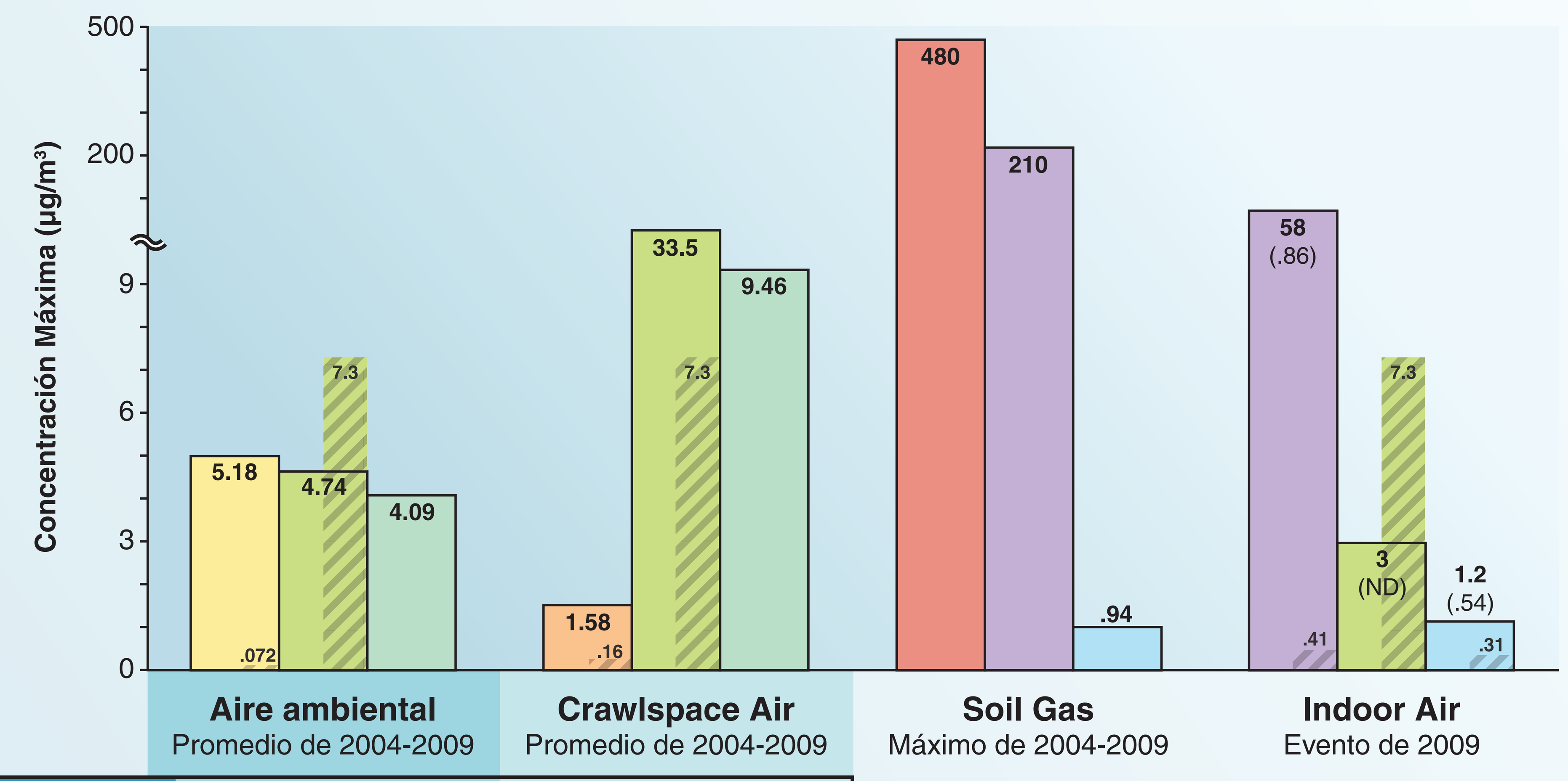
Niveles en el aire ambiental



Leyenda

Benceno · Tetracloroetano · Cloruro de vinilo · 1,2,4-Trimetilbenceno
Tetracloruro de carbono · Tricloroetano · Naftaleno · 1,3,5-Trimetilbenceno

1428 3rd Street



	Aire ambiental	Crawlspace Air
Riesgo de cáncer	2 en 10,000	3 en 10,000
Riesgo para la salud no relacionado con el cáncer	4	7

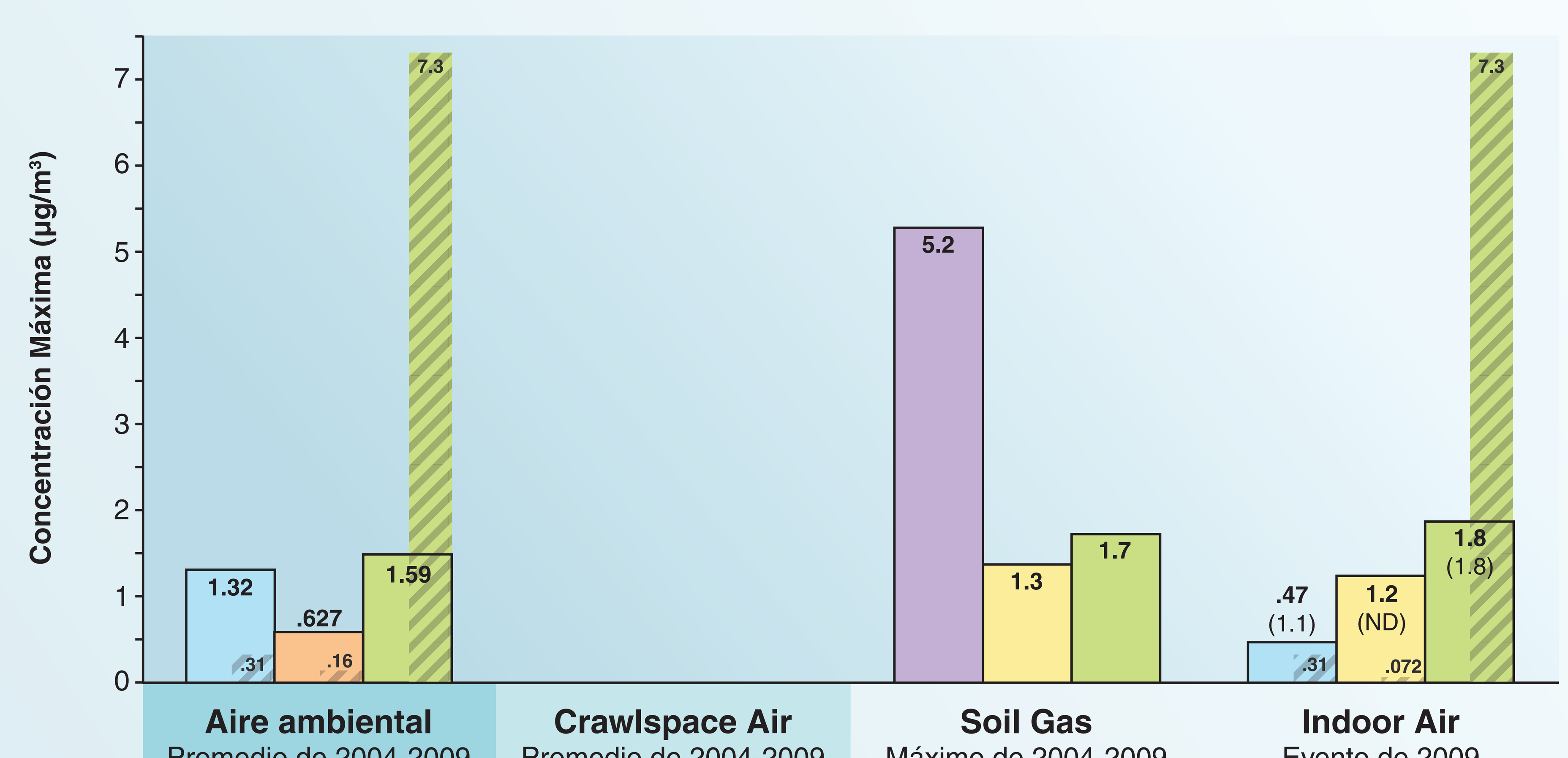
.31 Niveles Límites Residenciales

(.25) = Resultado preliminar, cacidad no guarantizada y sujeto a cambios

Leyenda

Benceno · Tetracloroetano · Cloruro de vinilo · 1,2,4-Trimetilbenceno
Tetracloruro de carbono · Tricloroetano · Naftaleno · 1,3,5-Trimetilbenceno

1436 3rd Street



	Aire ambiental	Crawlspace Air
Riesgo de cáncer	1 en 10,000	–
Riesgo para la salud no relacionado con el cáncer	.8	–

.31 Niveles Límites Residenciales

(.25) = Resultado preliminar, cacidad no guarantizada y sujeto a cambios

Leyenda

Benceno · Tetracloroetano · Cloruro de vinilo · 1,2,4-Trimetilbenceno
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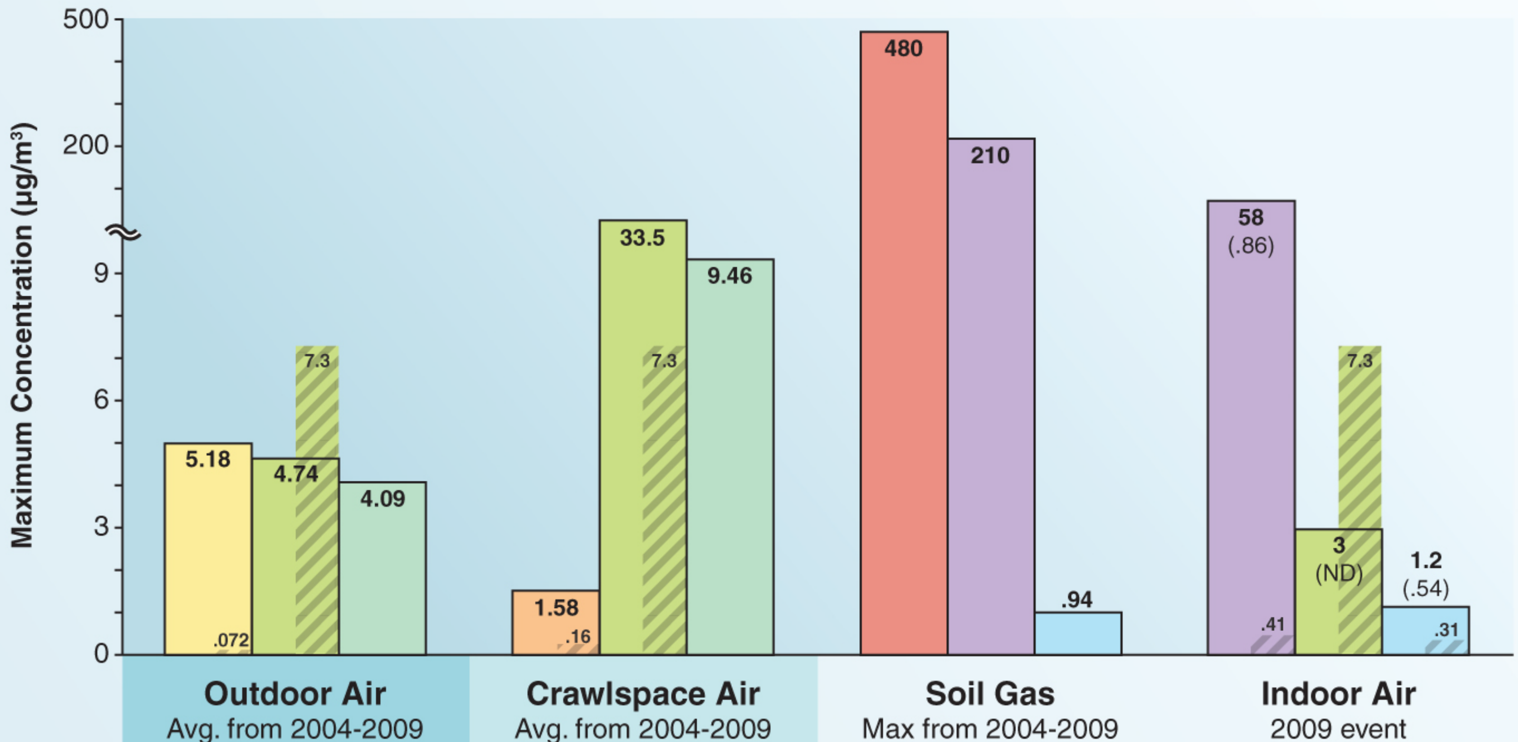

	Outdoor Air	Crawlspace Air
Cancer Risk	2 in 10,000	3 in 10,000
Hazard (noncancer)	4	7

.31 Residential Screening Levels

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Legend

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- Carbon tetrachloride
- Tetrachloroethene (PCE)
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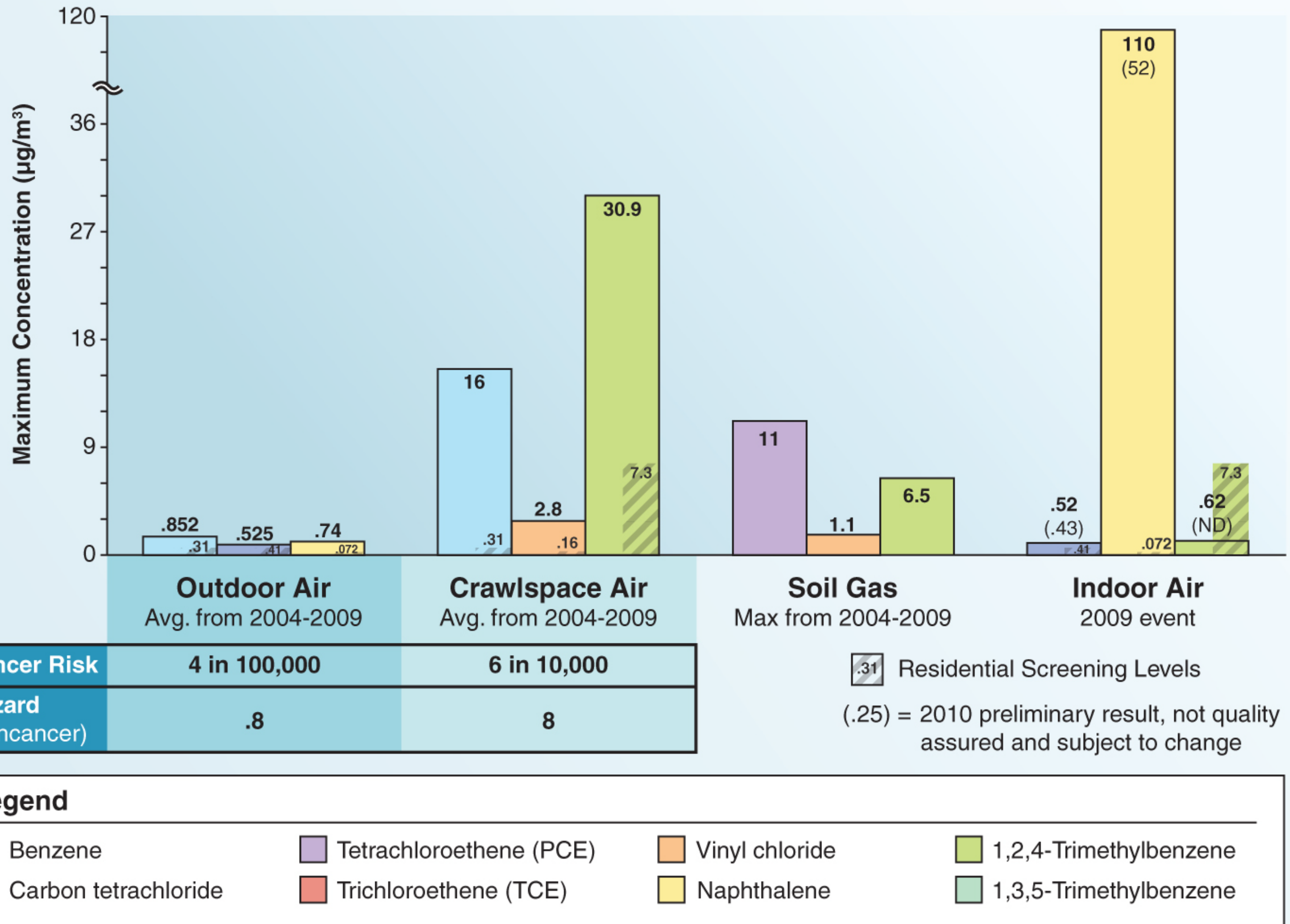
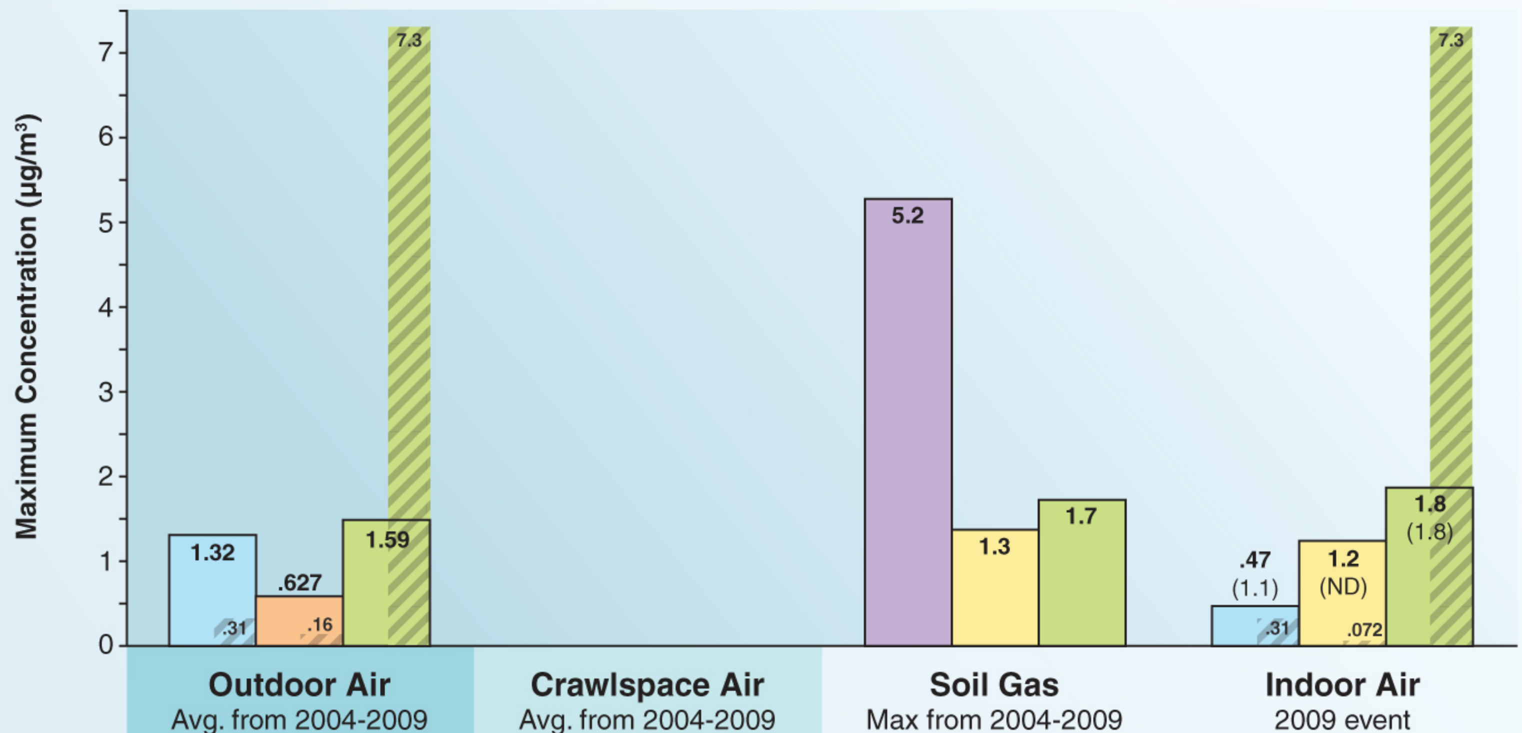


	Outdoor Air	Crawlspace Air
Cancer Risk	**4 in 100,000**	**6 in 10,000**
Hazard (noncancer)	**.8**	**8**

1436 3rd Street



	Outdoor Air	Crawlspace Air
Cancer Risk	1 in 10,000	–
Hazard (noncancer)	.8	–

.31 Residential Screening Levels

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Legend

- Benzene
- Carbon tetrachloride
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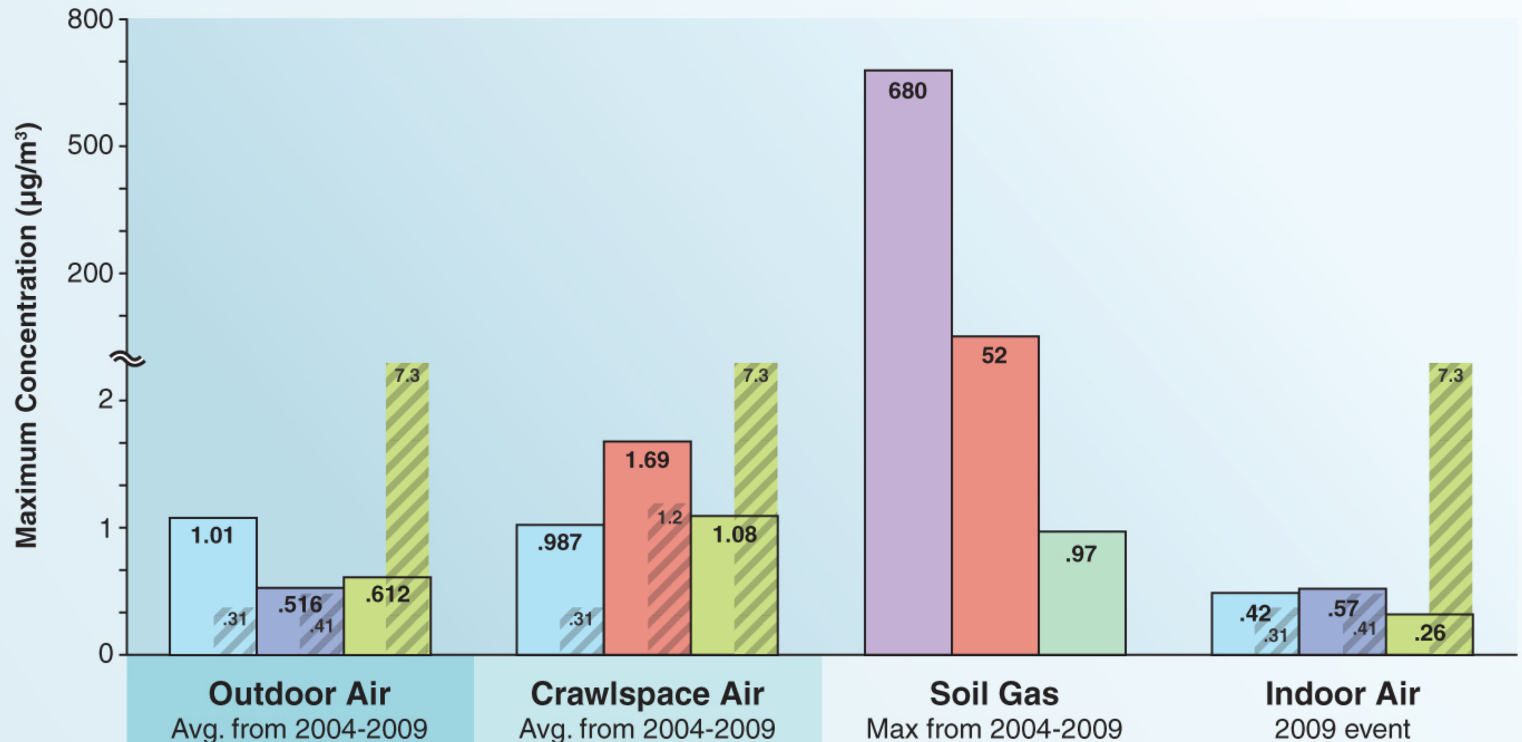
326 Center



	Outdoor Air	Crawlspace Air
Cancer Risk	**3 in 100,000**	**8 in 100,000**
Hazard (noncancer)	**.4**	**.5**

.31 Residential Screening Levels

This property was not sampled in 2010

Legend

- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
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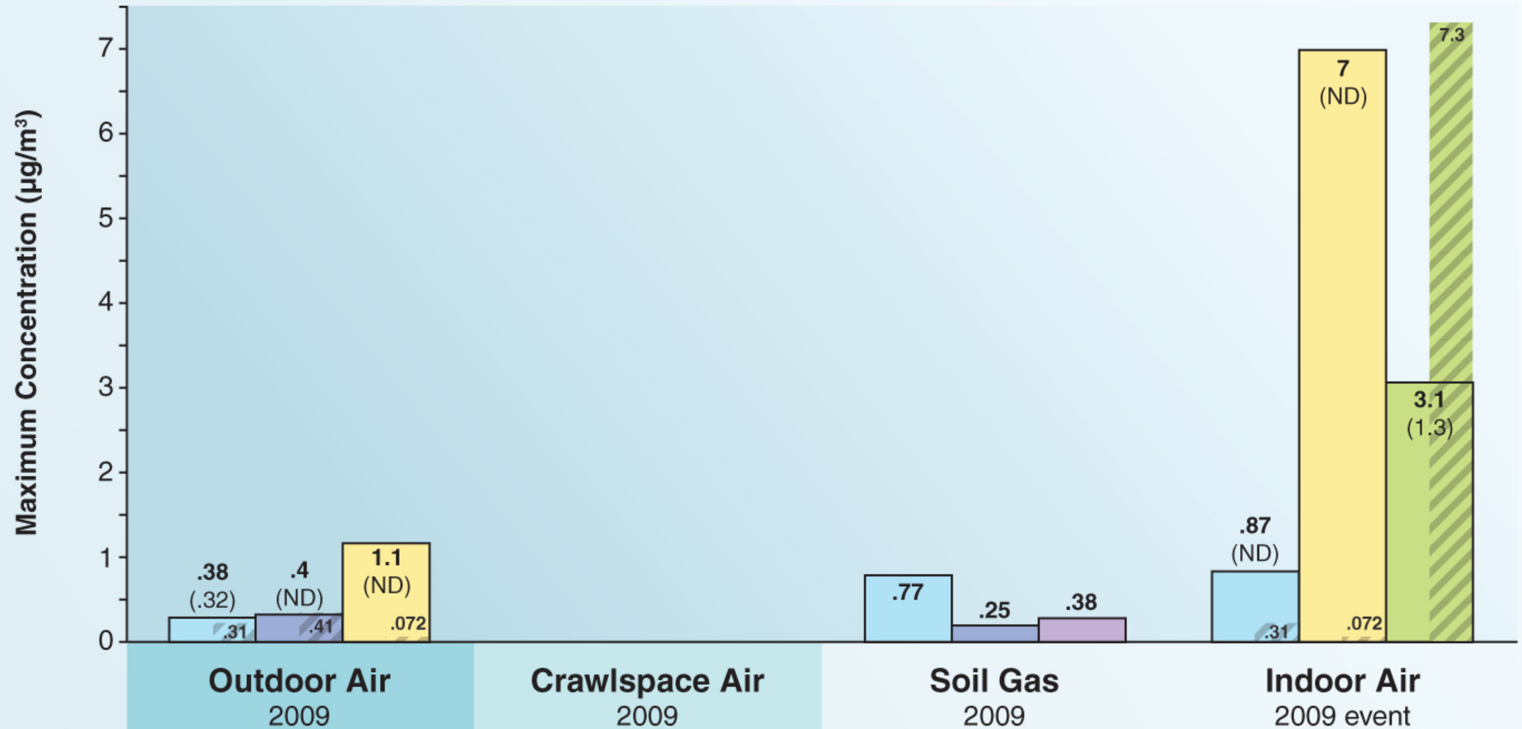
339 Center



	Outdoor Air 2009	Crawlspace Air 2009
Cancer Risk	–	–
Hazard (noncancer)	–	–

.31 Residential Screening Levels

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- Benzene
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- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
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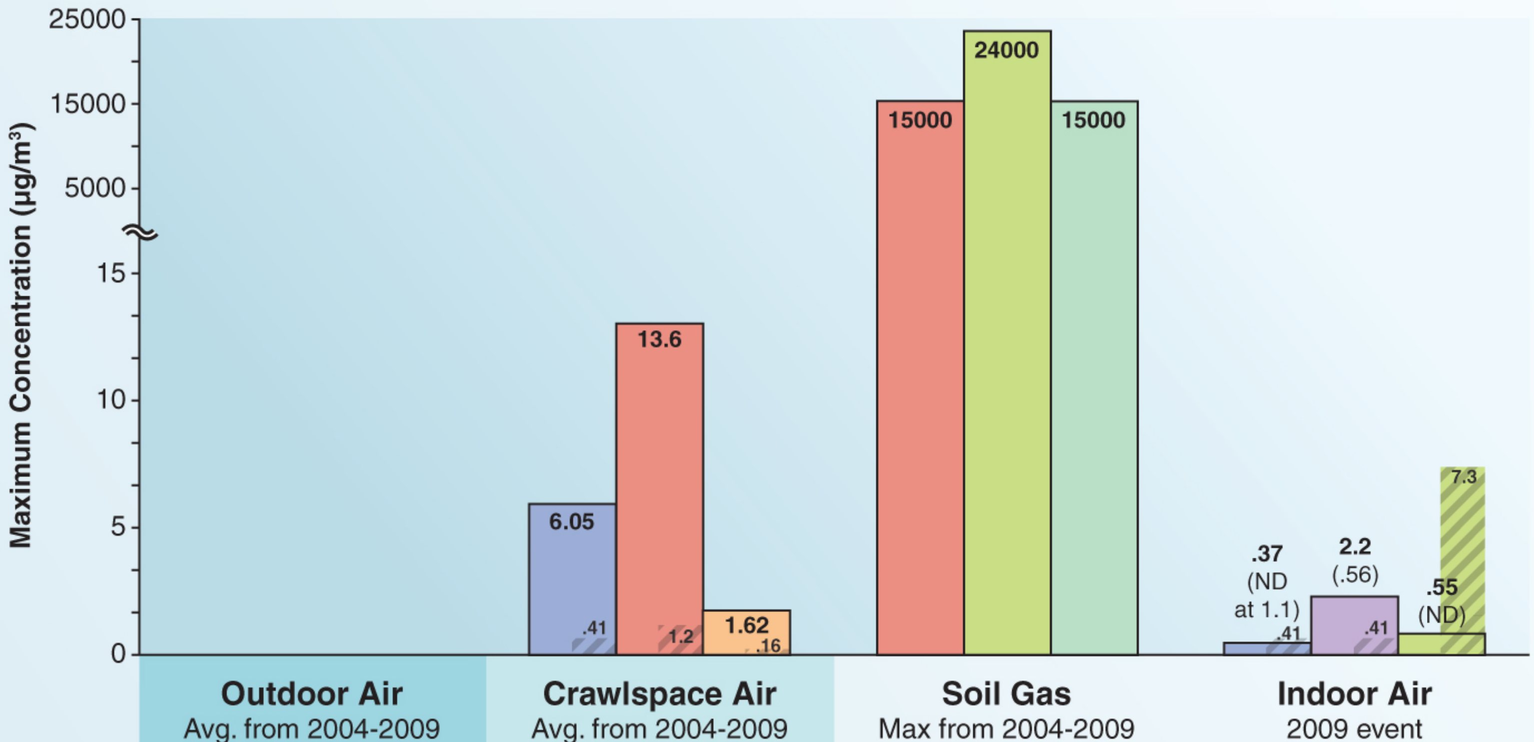

	Outdoor Air	Crawlspace Air
Cancer Risk	–	3 in 10,000
Hazard (noncancer)	–	2

.31 Residential Screening Levels

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- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
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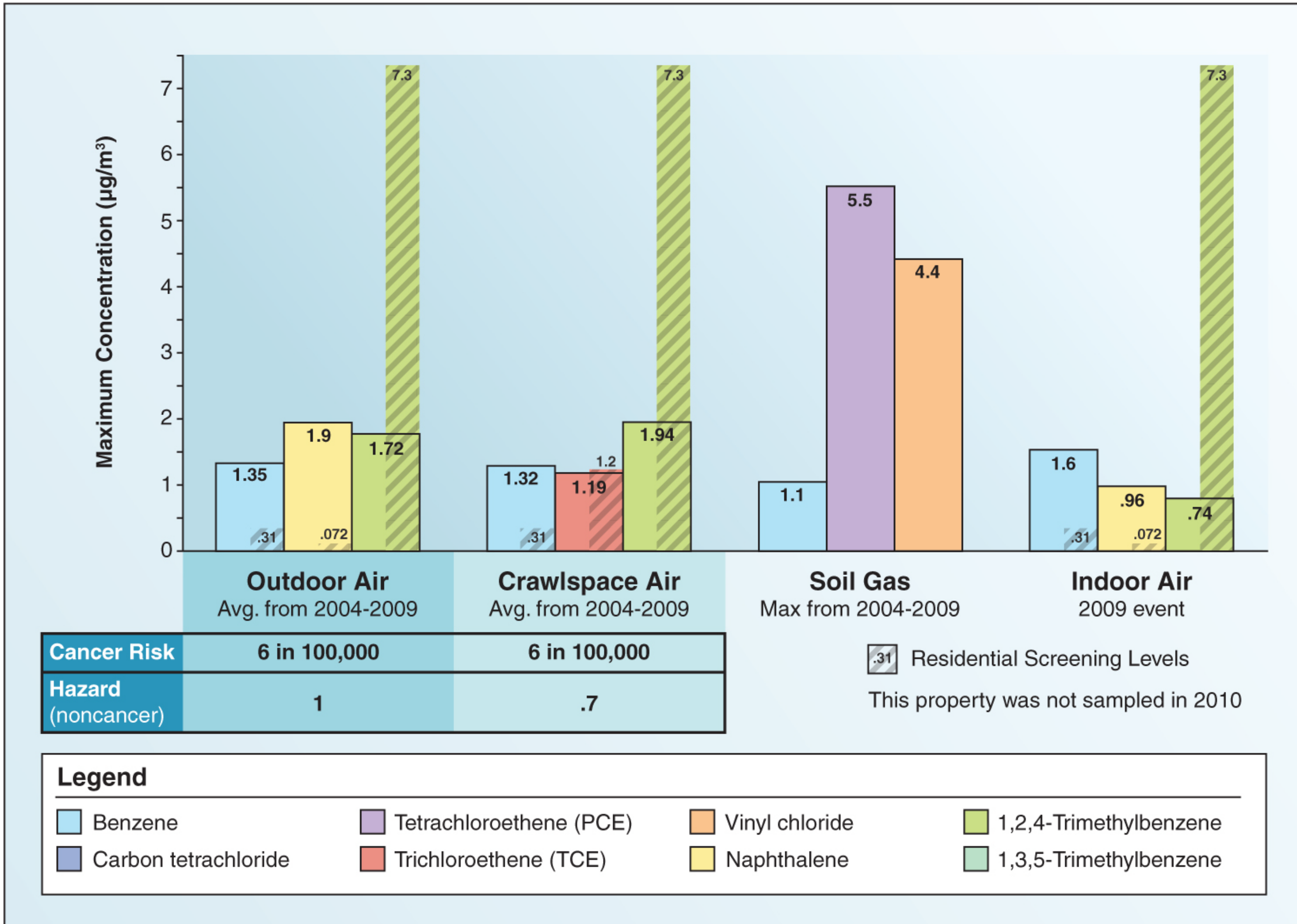
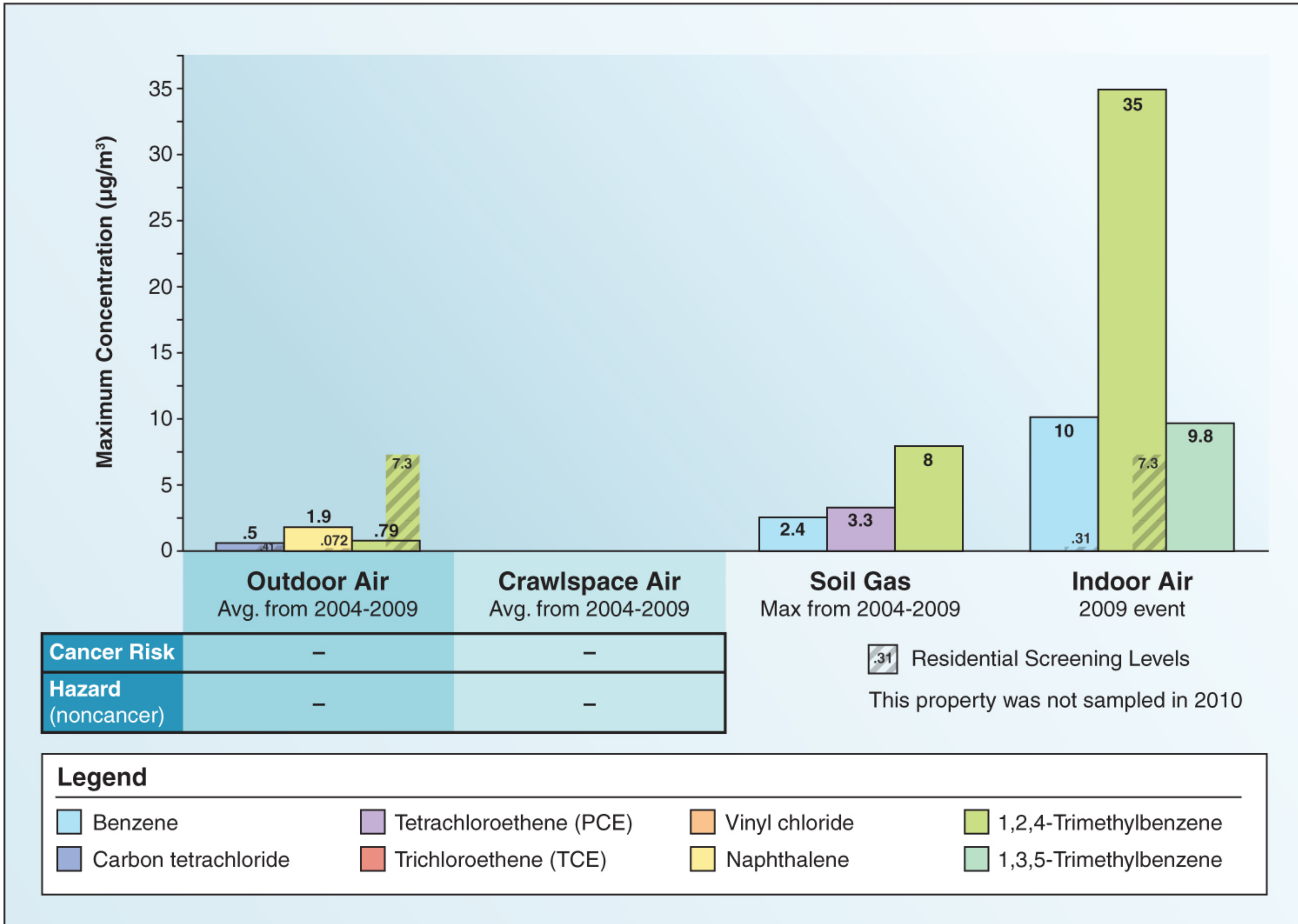
320 Center


Maximum Concentration (µg/m³)
0
1
2
3
4
5
6
7
1.35
.31
1.9
.072
1.72
7.3
1.32
.31
1.19
1.2
1.94
7.3
1.1
5.5
4.4
1.6
.31
.96
.072
.74
7.3
Outdoor Air
Avg. from 2004-2009
Crawlspace Air
Avg. from 2004-2009
Soil Gas
Max from 2004-2009
Indoor Air
2009 event
Cancer Risk
6 in 100,000
6 in 100,000
Hazard (noncancer)
1
.7
.31 Residential Screening Levels
This property was not sampled in 2010
Legend
Benzene
Carbon tetrachloride
Tetrachloroethene (PCE)
Trichloroethene (TCE)
Vinyl chloride
Naphthalene
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene

356 Center


Maximum Concentration (µg/m³)
0
5
10
15
20
25
30
35
.5
.41
1.9
.072
.79
7.3
2.4
3.3
8
10
.31
35
7.3
9.8
Outdoor Air
Avg. from 2004-2009
Crawlspace Air
Avg. from 2004-2009
Soil Gas
Max from 2004-2009
Indoor Air
2009 event
Cancer Risk
–
–
Hazard (noncancer)
–
–
.31 Residential Screening Levels
This property was not sampled in 2010
Legend
Benzene
Carbon tetrachloride
Tetrachloroethene (PCE)
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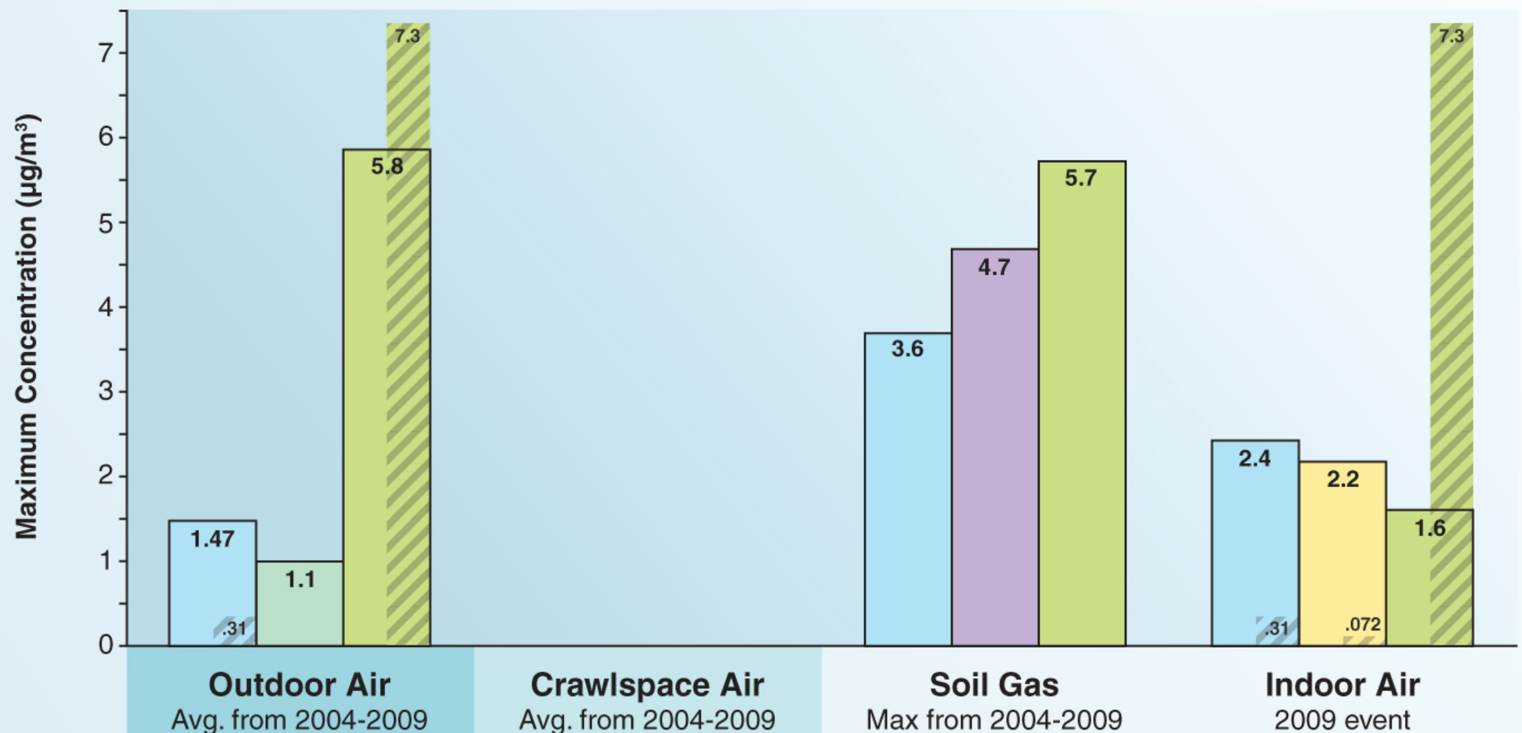
360 Center



	Outdoor Air	Crawlspace Air
Cancer Risk	**4 in 100,000**	–
Hazard (noncancer)	**1**	–

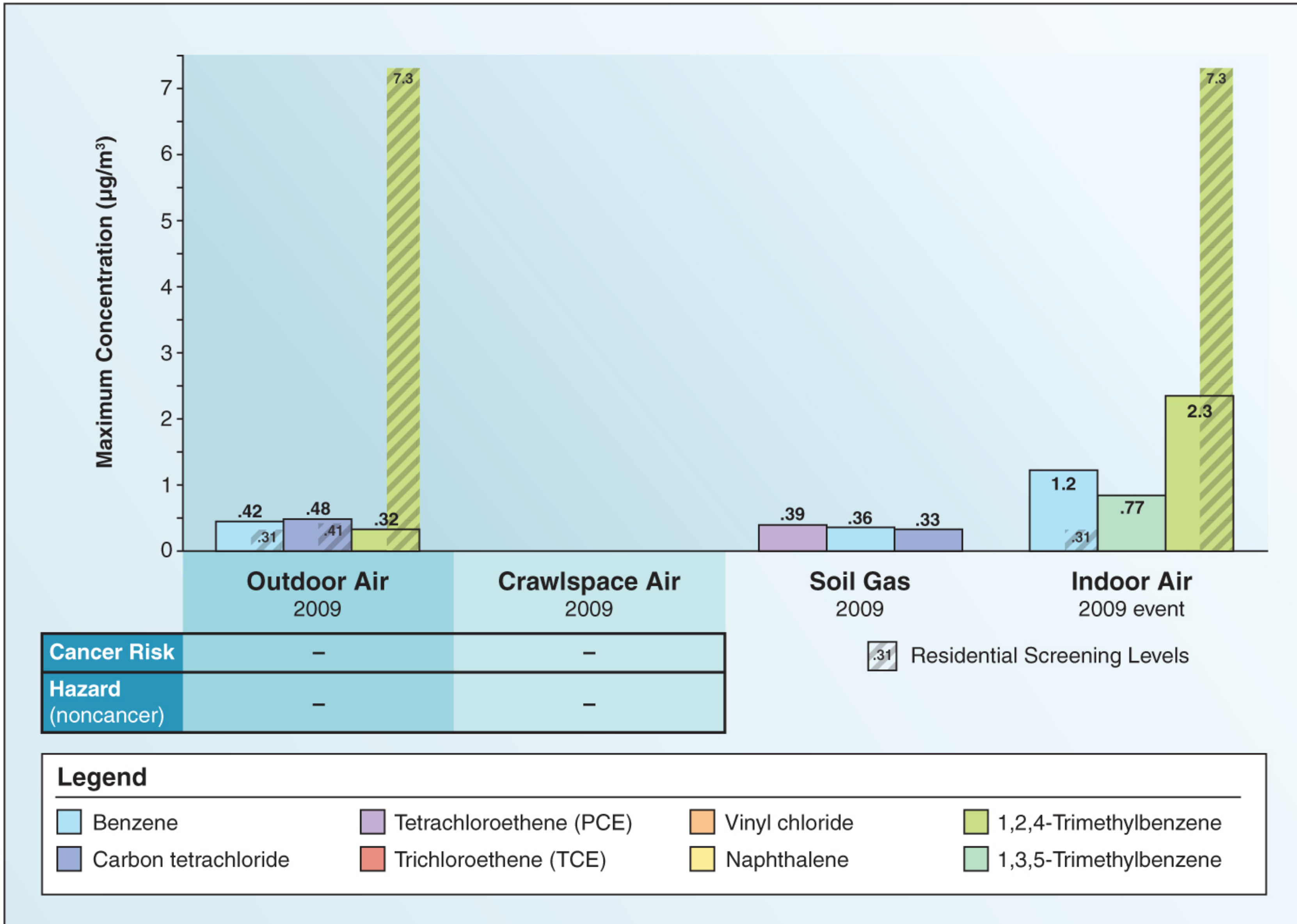
.31 Residential Screening Levels

This property was not sampled in 2010

Legend

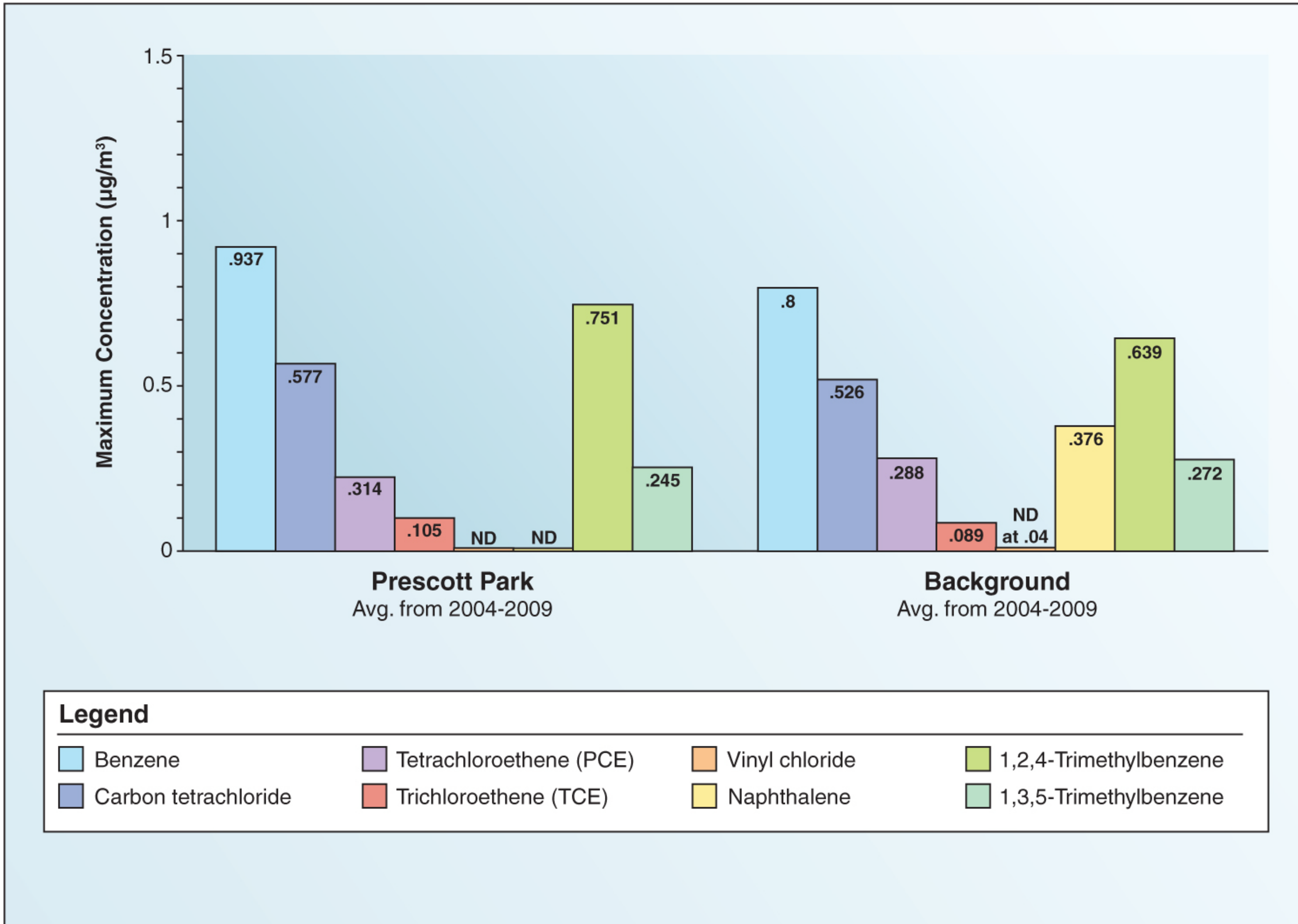
- Benzene
- Carbon tetrachloride
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Vinyl chloride
- Naphthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

366 Center



Maximum Concentration (µg/m³)
0
1
2
3
4
5
6
7
.42
.31
.48
.41
.32
7.3
.39
.36
.33
1.2
.31
.77
2.3
7.3
Outdoor Air
2009
Crawlspace Air
2009
Soil Gas
2009
Indoor Air
2009 event
Cancer Risk
–
–
Hazard
(noncancer)
–
–
.31
Residential Screening Levels
Legend
Benzene
Carbon tetrachloride
Tetrachloroethene (PCE)
Trichloroethene (TCE)
Vinyl chloride
Naphthalene
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene

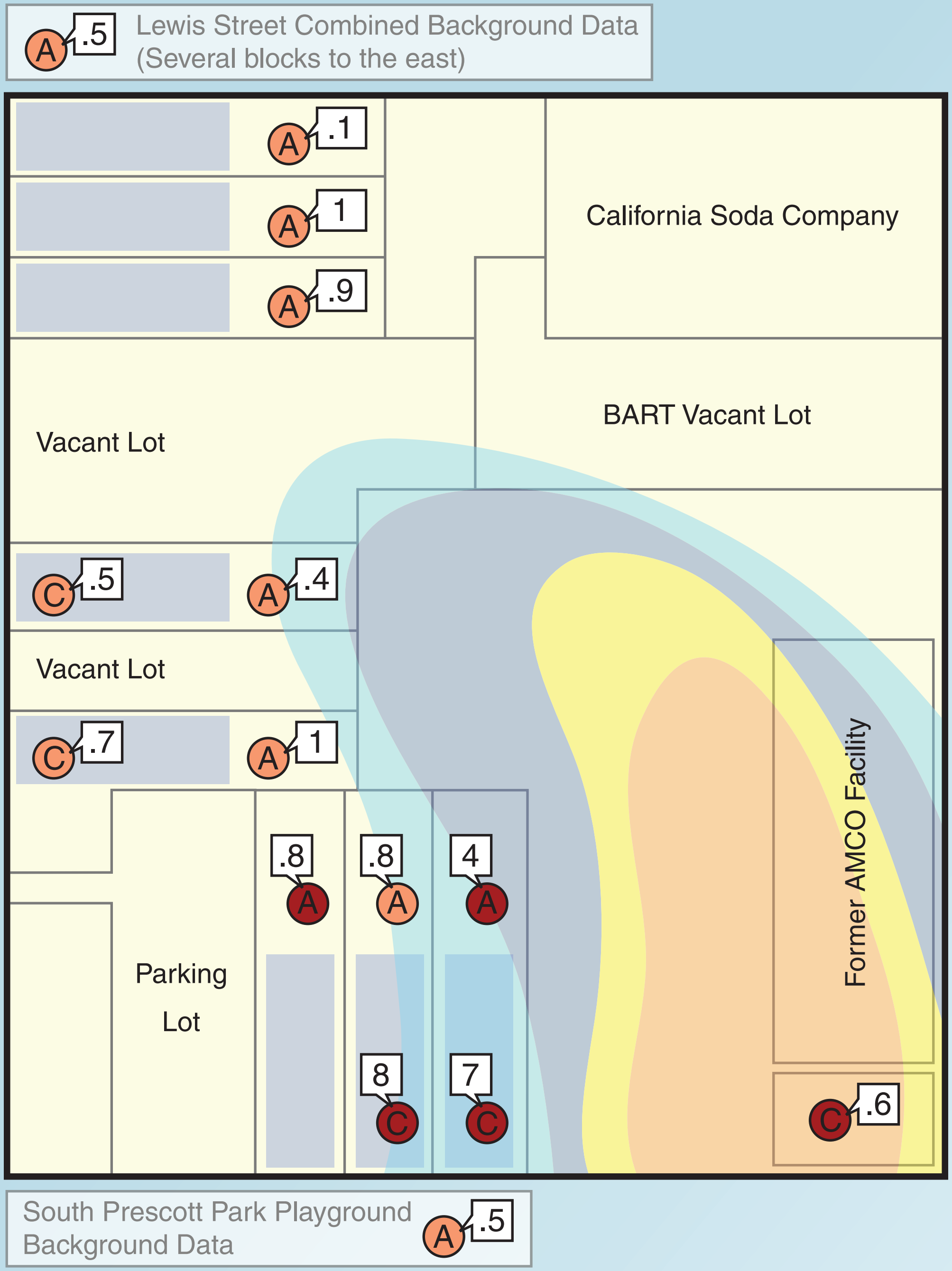
Outdoor Air Levels



AMCO CHEMICAL SUPERFUND SITE

Crawlspace and Ambient Air

Based on data from September 2004—June 2009



C **Crawlspace**

A **Ambient Air**

1-10 people in 10,000 (excess lifetime cancer risk)

1-10 people in 100,000 (excess lifetime cancer risk)

EPA's recommendation in this community is to take action when excess lifetime cancer risk exceeds 1 in 1,000,000.

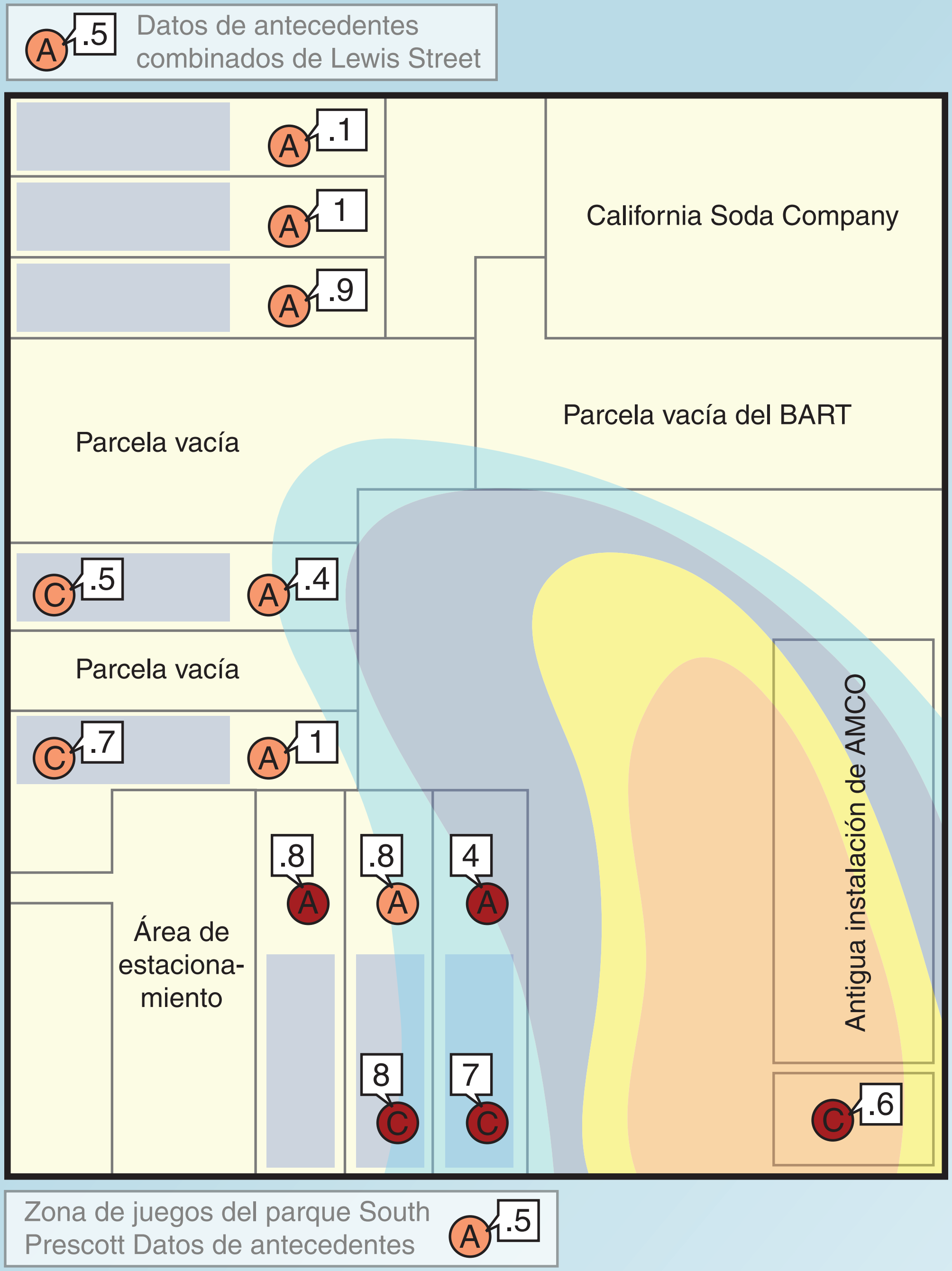
Chemicals Posing Cancer Risk and their Screening Levels	Concentrations Detected
Benzene (0.31 - 31μg/m³)	0.4 - 16μg/m³
Carbon tetrachloride (0.41 - 41μg/m³)	0.4 - 6μg/m³
Tetrachloroethene (0.41 - 41μg/m³)	0.1 - 9μg/m³
Trichloroethene (1.2 - 120μg/m³)	0.03 - 14μg/m³
Vinyl chloride (0.16 - 16μg/m³)	ND - 3μg/m³

2 **Non Cancer Health Hazard**
(for example worsening of asthma symptoms, headache)
>1 Could pose health risk and needs to be investigated.

Chemicals Posing Non-Cancer Health Hazard and their Screening Levels	Concentrations Detected
1,2,4-Trimethylbenzene (7μg/m³)	0.32 - 34μg/m³
1,3,5-Trimethylbenzene (6μg/m³)	0.11 - 11μg/m³
Naphthalene (3.1μg/m³)	ND - 5μg/m³

SITIO DEL SUPERFONDO AMCO CHEMICAL DE EPA

Aire ambiental y aire de espacios estrechos debajo de las viviendas



Ⓒ **Espacios estrechos debajo de viviendas**

Ⓐ **Aire ambiental**

● **1-10 personas de cada 10,000 (riesgo excesivo de cáncer a lo largo de la vida)**

● **1-10 personas de cada 100.000 (riesgo excesivo de cáncer a lo largo de la vida)**

La EPA recomienda para esta comunidad que se tomen medidas cuando el riesgo excesivo de cáncer a lo largo de la vida supere el índice de 1 de cada 1,000,000.

Sustancias químicas que suponen un riesgo de cáncer y sus niveles límites	Concentraciones detectadas
Benceno (0.31 - 31µg/m³)	0.4 - 16µg/m³
Tetracloruro de carbono (0.41 - 41µg/m³)	0.4 - 6µg/m³
Tetracloroetano (0.41 - 41µg/m³)	0.1 - 9µg/m³
Tricloroetano (1.2 - 120µg/m³)	0.03 - 14µg/m³
Cloruro de vinilo (0.16 - 16µg/m³)	ND - 3µg/m³

2 **Riesgo para la salud no relacionado con el cáncer** (por ejemplo, empeoramiento de los síntomas de asma o dolor de cabeza)
>1 podría suponer un riesgo para la salud y es necesario investigar su origen.

Sustancias químicas que suponen un riesgo para la salud no relacionado con el cáncer y sus niveles límites	Concentraciones detectadas
1,2,4-Trimetilbenceno (7µg/m³)	0.32 - 34µg/m³
1,3,5-Trimetilbenceno (6µg/m³)	0.11 - 11µg/m³
Naftaleno (3.1µg/m³)	ND - 5µg/m³

EPA

Sitio Superfund
AMCO Chemical

Agencia de Protección Ambiental de EE.UU. • Región 9 • San Francisco, CA • Octubre 2010

AMCO 2010 Resumen de la Evaluación del Riesgo para la Salud Humana

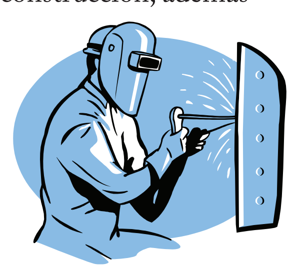
La Evaluación del Riesgo para la Salud Humana es un método para determinar la probabilidad de que las personas sufran un perjuicio por la exposición a contaminantes presentes en un sitio. Se evalúan tanto las propiedades tóxicas de las sustancias peligrosas, como las formas en las que las personas pueden estar expuestas a dichas sustancias. La evaluación del riesgo ayuda a determinar si existe un riesgo significativo para la salud de las personas que están dentro o cerca de un sitio contaminado, y también ayuda a determinar los niveles de limpieza de cada contaminante del sitio en función del riesgo. La evaluación del riesgo es un factor que utilizan los gerentes de proyecto para tomar decisiones sobre la forma en que se llevará a cabo la limpieza de un sitio contaminado. Otros factores son los reglamentos federales y estatales, los costos, las técnicas de tratamiento y su viabilidad, además de la aceptación por parte de la comunidad.

A fin de caracterizar los efectos potenciales no relacionados con el cáncer, se examina la ingestión de sustancias y sus valores de toxicidad. Los efectos carcinógenos potenciales se evalúan calculando la probabilidad de que una persona enferme de cáncer a lo largo de una vida de exposición, basándose en las proyecciones de ingestión y en la información sobre respuesta a dosis para cada sustancia química específica. Los efectos para la salud no relacionados con el cáncer se expresan en términos de un índice de riesgo (HI, por sus siglas en inglés) mientras que los efectos carcinógenos se expresan en términos de riesgo excesivo de cáncer a lo largo de la vida (ELCR, por sus siglas en inglés). Los riesgos para la salud de las personas se compararon con el intervalo de control del riesgo objetivo de la EPA de 10^{-6} a 10^{-4} para riesgo relacionado con el cáncer (en otras palabras, un riesgo de contraer cáncer de 1 a 100 personas entre 1 millón) y con el valor de referencia de HI de 1 para riesgo no relacionado con el cáncer (en otras palabras, se intenta evitar cualquier valor por encima de 1). Debido a que el vecindario alrededor del sitio es una comunidad vulnerable, EPA ha elegido usar un el ELCR más conservador de 10^{-6}, o una persona en un millón, como el punto que require acción en el sitio.

Los riesgos calculados durante la evaluación del riesgo se basan en supuestos conservadores, de manera que no es probable que los supere ningún miembro de la población expuesta, incluso en las condiciones de exposición máxima razonable. Una evaluación del riesgo no puede identificar qué persona dentro de una comunidad expuesta podrá o no enfermar debido a la exposición a agentes tóxicos; la evaluación del riesgo tampoco puede servir para asociar una enfermedad particular con un agente tóxico en concreto. Una evaluación del riesgo puede utilizarse de forma óptima como herramienta de predicción para identificar las circunstancias en las cuales la exposición a un agente tóxico puede causar efectos inaceptables para la salud. Esta información puede servir luego para elegir opciones que reduzcan o eliminen la exposición de la comunidad al agente tóxico en cuestión.

Riesgos potenciales para la salud por exposición al suelo

En la evaluación del riesgo en el sitio de AMCO se evaluaron cuatro zonas asociadas a actividades industriales realizadas en el pasado en el sitio, centrándose en dos tipos de trabajadores, industriales y de la construcción, además de evaluarse la exposición potencial futura de zonas residenciales. Estas zonas incluían la antigua instalación de AMCO, el área de estacionamiento, la parcela vacía grande y la parcela vacía pequeña.



Los trabajadores industriales pueden estar expuestos al suelo por ingestión accidental, contacto dérmico con el suelo o por inhalación de polvo. El riesgo estimado de cáncer se encuentra en el extremo superior o supera el intervalo de control del riesgo de la EPA para exposición tanto a suelo superficial como a suelo profundo en cada una de las cuatro zonas. Los efectos adversos para la salud no relacionados con el cáncer (HI) superan el umbral de valor 1 para efectos no relacionados con el cáncer solamente en la antigua instalación de AMCO. Concentraciones de plomo en las cuatro areas expuestas sobrepasan el Nivel de Control de Salúd Humana de California (CHHSL) para un scenario laboral de 320 mg/kg.

Los trabajadores de la construcción pueden estar expuestos al suelo por las mismas vías que los trabajadores industriales pero a niveles más elevados (p. ej., más polvo en el aire) durante un período de tiempo más breve. El riesgo estimado de cáncer se encontraba dentro del intervalo de control de riesgo de la EPA para exposición a suelo superficial y a suelo profundo en cada una de las cuatro zonas de exposición. El índice de riesgo superaba el umbral de valor 1 para efectos no relacionados con el cáncer en la antigua instalación de AMCO, el área de estacionamiento y la parcela vacía grande. Las concentraciones de plomo son las mismas que se describieron para el trabajador industrial.

Las cuatro zonas de exposición se evaluaron para futuros residentes en el caso de que cualquiera de las zonas se designara para usos residenciales. Se evaluó a los residentes para las mismas vías de exposición que para los trabajadores, pero por un período de exposición más prolongado. En la evaluación residencial se incluyó también a los niños porque ellos tienen un riesgo potencial mayor de sufrir efectos en su salud. El riesgo estimado de cáncer superaba el intervalo de control de riesgo de la EPA para exposición a suelo superficial y a suelo profundo en todas las zonas de exposición. El índice de riesgo también superaba el umbral de valor 1 para efectos no relacionados con el cáncer en las cuatro áreas de exposición. Todas las concentraciones de plomo superaron el CHHSL residencial de 80mg/kg. Consulte más abajo el riesgo para los residentes procedente del suelo de sus viviendas actuales.

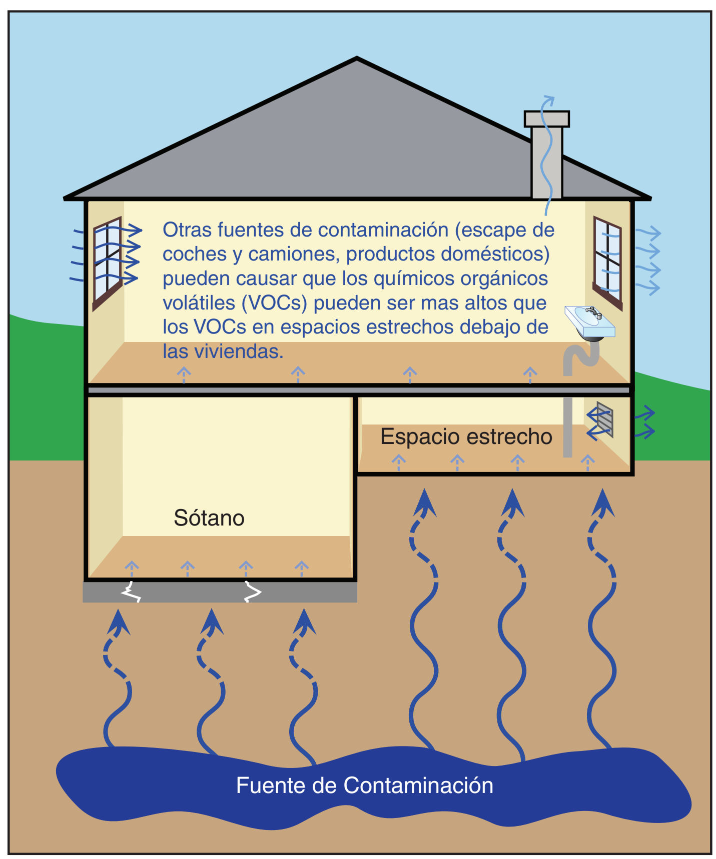
Riesgos potenciales para la salud por exposición al agua subterránea

El riesgo relacionado con el cáncer y los índices de riesgo no relacionados con el cáncer superan el intervalo de control de riesgo de la EPA cuando se considera el uso residencial del agua subterránea. No obstante, es poco probable que se utilice el agua subterránea como fuente de agua potable porque el suministro de agua municipal del EBMUD procede de Sierra Nevada.

Riesgos potenciales para la salud por intrusión de vapores

Actualmente estamos evaluando los datos del muestreo reciente del aire de las zonas interiores. A continuación se detallan algunas de las conclusiones de la evaluación en curso:

- Los datos del muestreo del aire de espacios estrechos debajo de las viviendas y del aire ambiental perteneciente a la Investigación correctiva indican que se está ba produciendo una intrusión de vapores en los espacios estrechos debajo de las viviendas. Como



Mecanismo de Intrusión de Vapores

medida de precaución, sistemas de mitigación fueron instaladas en las casas más adyecentes al sitio.

- Ninguno de los químicos orgánicos volátiles (VOCs) detectados supera su concentración de referencia aguda, lo que indica que no existe una amenaza inmediata para la salud de los residentes. Nota: "Amenaza inmediata para salud" significa que los niveles de contaminantes no sobrepasan los niveles límites de corto-plazo. Un análisis cumulativo de todos los factores que pueden afectar la salud de una persona no se usa para determinar riesgo para la salud en la programa Superfund.
- El origen de los VOCs detectados dentro de las viviendas es difícil de determinar.
- Si el nivel de VOCs detectados dentro de las viviendas supera el nivel de los VOCs detectados en el gas de suelo y en los espacios estrechos debajo de las viviendas, significa que existen indicios de que hay otras fuentes de VOCs diferentes de la intrusión de vapores (por ejemplo, procedente de los tubos de escape del tráfico por autopista, etc.).
- Los riesgos y peligros estimados a partir de los datos del aire de los espacios estrechos debajo de las viviendas y del aire exterior indican que la mayoría de las residencias muestreadas presentan riesgos y peligros similares a los de las muestras de referencia (recogidas en Lewis Street, ubicada a 3 bloques del sitio en dirección contraria al viento) y de las muestras del aire exterior tomadas en el parque Prescott. Esto indica que la calidad del aire es mala en toda la zona debido también a otras fuentes de contaminación.

Riesgos potenciales para la salud procedentes del suelo residencial

Se llevó a cabo una acción de eliminación de suelo en las propiedades residenciales adyacentes y próximas a la antigua instalación de AMCO como resultado de los niveles elevados de plomo y de otros compuestos detectados durante el muestreo del suelo dentro de la Investigación correctiva. Como consecuencia de la acción de eliminación, se ha reducido de forma significativa la exposición procedente del suelo, así como los riesgos y peligros derivados.

Riesgos potenciales para la salud procedentes de los productos cultivados en la residencia

La detección de TCE, PCE y cloruro de vinilo en el agua subterránea a poca profundidad y la migración potencial del agua subterránea contaminada a las zonas residenciales sembradas de árboles frutales motivó una serie de preocupaciones sobre la posibilidad de que el TCE, PCE, el cloruro de vinilo y otros VOCs fueran absorbidos y se trasladaran a las frutas y verduras comestibles. No se detectó ninguna de esas sustancias químicas en las frutas y verduras analizadas procedentes de los jardines adyacentes.

Las concentraciones de metales y VOCs en las frutas y verduras analizadas están por debajo de los niveles preocupantes de ingestión. De los 47 VOCs analizados, sólo se detectó acetato de metilo y estireno. Se detectaron algunos metales en los productos cultivados como el arsénico, el cromo y el plomo; sin embargo, los niveles detectados no resultarían perjudiciales.

Puesto que las muestras de productos cultivados se analizaron para detectar VOCs además de metales, no se enjuagó ni lavó ninguna de las muestras antes de su análisis. Como resultado, las concentraciones de metales pudieron reflejar el polvo o el suelo depositado sobre las superficies de las plantas además de los metales que habían sido absorbidos a través de las raíces. Los miembros de la comunidad deben lavar siempre las frutas y verduras cultivadas en sus residencias antes de consumirlas.

¿Y ahora qué?

La evaluación del riesgo indica que los niveles de riesgo siguen siendo elevados por exposición al suelo para cualquier persona que viviera o trabajara en la instalación de AMCO real si se retirara el pavimento. También muestra un riesgo elevado por ingestión potencial del agua subterránea. Por último existe un riesgo para la salud de los residentes de todo el vecindario de South Prescott debido a la mala calidad del aire afectado por diversas fuentes. Sin embargo, mejorar la calidad del aire exterior es una tarea de mucho mayor alcance que la limpieza realizada por el Superfondo. La evaluación de intrusión de aire indica que algunas de las sustancias químicas detectadas en los espacios estrechos debajo de las viviendas se están encontrando también en las muestras del aire interior. Como medida de precaución, sistemas de mitigación, incluyendo barreras de vapor y ventilación adicional, fueron instaladas en 2009 en las casas más cercanas al sitio. El objetivo de la limpieza es eliminar y/o limpiar el suelo y el agua subterránea contaminados de manera que se reduzcan todos estos niveles de riesgo y se sitúen dentro del intervalo de protección. Estas casas serán monitoreadas hasta que este objetivo se ha realizado.

Sitio Superfund AMCO Chemical

AMCO 2010 Resumen de la Evaluación del Riesgo para la Salud Humana

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AMCO Chemical Superfund Site

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AMCO 2010 Health Risk Assessment Summary

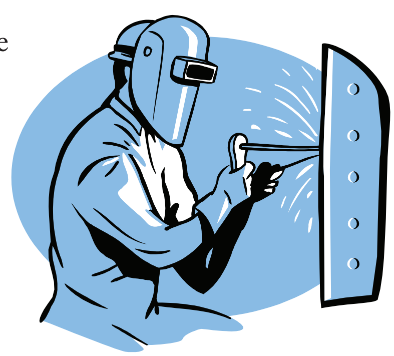
A Human Health Risk Assessment is a method of determining the probability of harm occurring to people from exposure to contaminants at a site. Both the toxic properties of hazardous substances and the ways that people may be exposed to these substances are evaluated. A risk assessment helps determine whether significant risks to people's health may exist at or near a contaminated site and also helps determine risk-based cleanup levels for contaminants at the site. The risk assessment is one factor project managers use to make decisions on how a contaminated site should be cleaned up. Other factors include state and federal regulations, costs, treatment techniques and their feasibility, and community acceptance.

To characterize potential non-cancer effects, estimated intakes of substances and their toxicity values are examined. Potential carcinogenic effects are evaluated by calculating probabilities that an individual will develop cancer over a lifetime of exposure based on projected intakes and chemical-specific dose-response information. Non-carcinogenic health effects are expressed in terms of hazard index (HI) while carcinogenic effects are expressed in terms of an excess lifetime cancer risk (ELCR). Human health risks were compared against EPA's target risk management range of 10^{-6} to 10^{-4} for cancer risks (in other words, a cancer risk of 1 to 100 people in 1 million) and the HI benchmark of 1 for non-cancer hazards (in other words, any value over 1 is avoided). Because the neighborhood surrounding the site is a vulnerable community, EPA has elected to use the most conservative ELCR of 10^{-6}, or 1 in a million people, as the point at which action will be required at this site.

The risks calculated during the risk assessment are based on conservative assumptions so that they are not likely to be exceeded by any member of the exposed population even under reasonable maximum exposure conditions. A risk assessment cannot identify who within an exposed community may or may not become ill due to exposure to toxic agents; nor can a risk assessment be used to associate a particular illness with a particular toxic agent. A risk assessment is best used as a predictive tool to identify those circumstances under which exposure to a toxic agent may potentially lead to unacceptable health outcomes. This information can then be used to select options that will reduce or remove the community's exposure to the toxic agent.

Potential Health Risks from Exposure to Soil

For the risk assessment at the AMCO site, four areas associated with historical industrial activities were evaluated for two types of workers, industrial and construction, and potential future residential exposures. The areas include the former AMCO facility, parking lot, large vacant lot, and small vacant lot.



Industrial workers may be exposed to soil through incidental ingestion, dermal contact with soil or inhalation of dust. Estimated cancer risks are at the upper end or exceed the EPA's risk management range for exposure to both shallow soil and deep soil at each of the four areas. Noncancer adverse health effects (HI) exceed the non-cancer threshold of 1 only at the former AMCO facility. Lead concentrations at all four soil exposure areas exceed the California Human Health Screening Level (CHHSL) for an Occupational Scenario of 320 mg/kg..

Construction workers may be exposed to soil through the same exposure pathways as the industrial worker but at higher levels (i.e., more dust in the air) for a shorter period of time. Estimated cancer risks were within EPA's risk management range for exposure to shallow soil and deep soil at each of the four exposure areas. The HIs exceed the non-cancer threshold of 1 at the former AMCO facility, parking lot, and the large vacant lot. Lead concentrations are the same as described for the industrial worker.

The four exposure areas were evaluated for a future resident in the event that any of the areas would be changed to residential. Residents are evaluated for the same exposure pathways as workers, but for a longer period of time. Children are also included in the residential evaluation because they have potential for greater risk of health effects. Estimated cancer risks exceeded EPA's risk management range for exposure to shallow soil and deep soil at all exposure areas. HIs also exceed the non-cancer threshold of 1 at all four of the exposure areas. Lead concentrations all exceed the AMCO residential CHHSL of 80 mg/kg. See below for residents' risk from soil at their actual homes.

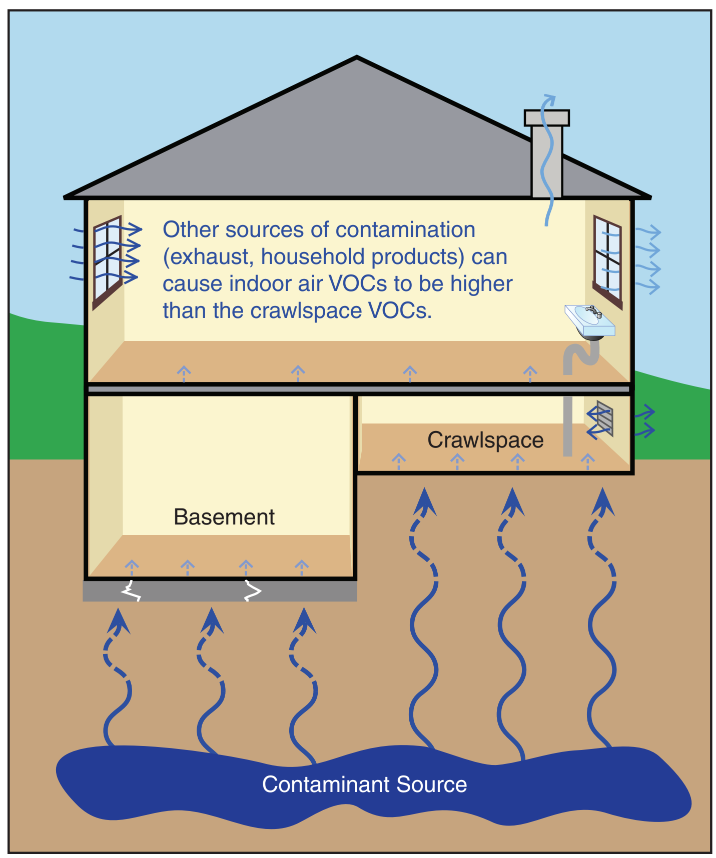
Potential Health Risks from Exposure to Groundwater

The cancer risks and non-cancer HIs are above EPA's risk management range when residential use of groundwater is considered. However, it is unlikely that groundwater will be used as a source of drinking water because the municipal water supply from EBMUD is from Sierra Nevada.

Potential Health Risks from Vapor Intrusion

Below are some of the conclusions of the vapor intrusion evaluation:

- The data from the RI sampling of crawl space and ambient air indicates that vapor intrusion was occurring in crawl spaces at the homes. As a precautionary measure, mitigation systems have been installed in selected homes nearest the site.



Vapor Intrusion Pathway

- None of the VOCs detected exceeds its acute reference concentration, indicating that there is no immediate health threat to residents. Please note that "immediate health threat" means that levels of site contaminants do not exceed short-term risk screening levels. A cumulative analysis of all of the factors that can affect a person's heath is not used by the superfund program to determine health risk.
- The source of the VOCs found inside homes is difficult to determine.
- If the level of VOCs inside homes is greater than level of VOCs found in soil gas and crawl space, it is an indication that there are other sources of than VOCs than from vapor intrusion (such as exhaust from freeway traffic, etc.).
- Risks and hazards estimated from the crawl space and outdoor air data indicates that the majority of residences sampled are similar to the risks and hazards estimated from the background samples (collected on Lewis Street located 3 blocks upwind of the site) and the outdoor air samples collected at Prescott Park. This indicates that air quality is poor in the whole area due to other sources of contamination as well.

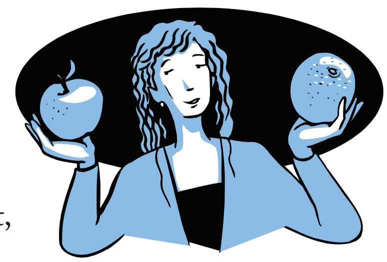
Potential Health Risks from Residential Soil

A soil removal action was performed at residential properties adjacent to and near the former AMCO facility as a result of the high levels of lead and other compounds found during the Remedial Investigation soil sampling. As a result of the removal action, the exposure to soil and the risk and hazard has been substantially reduced.

Potential Health Risks from Homegrown Produce

The detection of TCE, PCE, and vinyl chloride in shallow groundwater and the potential migration of contaminated shallow groundwater into residential areas containing fruit trees prompted concerns that TCE, PCE, vinyl chloride, and other VOCs could be taken up and transferred into edible fruit or vegetables. None of these chemicals were detected in the fruits and vegetables sampled from adjacent gardens.

Concentrations of metals and VOCs in sampled fruits and vegetables are below levels of concern for ingestion. Of the 47 VOCs analyzed for, only methyl acetate and styrene were detected. Some metals were found in or on the produce including arsenic, chromium, and lead, however, they were found at levels that would not be harmful.



Because produce samples were analyzed for VOCs as well as metals, none of the produce samples were rinsed or washed before analysis. As a result, the metals concentrations could reflect dust or soil deposited on the plant surfaces in addition to metals that were taken up through the root system. Community members should always wash their home grown fruits and vegetables before consuming them.

Now What?

The risk assessment shows that high risk levels from soil exposure remain for anyone who might live or work at the actual AMCO facility if the pavement is removed. It also shows high risk from possible ingestion of groundwater. Finally, there is a health risk for residents in the entire South Prescott neighborhood due to poor outdoor air quality as a result of many different sources. Improving the outdoor air quality, however, has a much larger scope than that of the Superfund cleanup. The vapor intrusion evaluation shows that the chemicals detected in the crawl space are being detected in the indoor air samples. As a precautionary measure, mitigation systems, including vapor barriers and additional ventilation, have been installed in selected homes nearest the site. The goal of the cleanup is to remove and/or clean the contaminated soil and groundwater so that all of the risk levels are brought down to the protective range. The homes will continue to be monitored until this goal has been attained.

AMCO Chemical Superfund Site

AMCO 2010 Health Risk Assessment Summary

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TOXIC MATTERS

Toxic substances are synthetic chemicals and metals that can harm your health. Everyone can be exposed to many toxic substances every day and these exposures can affect all aspects of reproductive health. This brochure provides information on steps you can take to prevent or reduce your exposure to toxic substances and to protect your health and your family's health.

Exposure to toxic substances can harm the reproductive systems of women and men and can make it more difficult to get pregnant. Because developing fetuses and children are especially vulnerable, exposure to even small amounts of toxic substances in the womb or during infancy, childhood or puberty can lead to disease early or later in life and across generations. Some toxic substances build up in our bodies and can affect our health and future pregnancies long after exposure has occurred. Therefore, the recommendations in this brochure are designed for women, men and children. They apply to everyone, whether or not you have children, are pregnant or want to have children in the future.

A Publication of the University of California, San Francisco
Program on Reproductive Health and the Environment
From Advancing Science to Ensuring Prevention (FASTEP)

FASTEP is an alliance of academic, government and non-governmental partners spanning the fields of reproductive, environmental, occupational and pediatric health and toxicology. Our goal is to secure each and everyone's right to optimal reproductive health by fostering environments that prevent exposure to toxic substances and support healthy pregnancies, children, adults and future generations.

This brochure offers practical recommendations on how to avoid exposure to common substances encountered in everyday life that can be harmful to reproductive health. It is not a complete list. For more information, please check the sources provided in the **To Learn More** section of this brochure.

5 THINGS TO DO

PREVENT EXPOSURE AT HOME

PREVENT EXPOSURE AT WORK

PREVENT EXPOSURE IN YOUR COMMUNITY

BECOME A SMART CONSUMER

MAKE THE GOVERNMENT WORK FOR YOU

To view this brochure online, go to: www.prhe.ucsf.edu/prhe/toxicmatters.html

PREVENT EXPOSURE AT HOME

Do not smoke.

- Talk to your doctor if you need help quitting.
- Do not let people smoke around you and stay away from public spaces where smoking is allowed.

Use non-toxic personal care products. Personal care products may contain many ingredients, such as phthlates, that can harm reproductive health.

- Find safer products at: www.prhe.ucsf.edu/prhe/tmlinks.html#personalcare

Do not spray bugs. Do not use pesticides, which are toxic chemicals made to kill unwanted insects, rodents, weeds, bacteria and mold.

- Keep insects and rodents out of your home: clean up food crumbs and spills; store food in tightly-closed containers; seal cracks around doors, window sills and baseboards; repair drips and holes; and get rid of standing water.
- Use baits and traps instead of sprays, dusts and bombs.
- Do not use chemical tick-and-flea collars, flea baths, applications or flea dips.
- Hire only *licensed* pesticide applicators.
- Find pesticide-free alternatives at: www.prhe.ucsf.edu/prhe/tmlinks.html#pestcontrol

Get out your wet mop. Toxic substances like lead, pesticides and flame retardants are present in house dust. Sweeping or dusting surfaces with dry cloths can spread the dust into the air instead of removing it from your home.

- Use a wet mop and wet cloth to clean floors and surfaces.
- Take off your shoes. Shoes can bring pesticides and toxic chemicals inside your home.
- Wipe shoes on a sturdy doormat if you choose to keep shoes on.

Clean your home with non-toxic cleaning products.

- It is easy and inexpensive to make effective, non-toxic cleaners using common items like vinegar and baking soda. Find out how to shop for non-toxic cleaning products and get recipes to make your own at: www.prhe.ucsf.edu/prhe/tmlinks.html#cleaningproducts

Avoid dry-cleaning your clothes. Most dry-cleaning systems use a chemical called perchloroethylene (PERC), which gets released from dry-cleaned clothes and pollutes the air in your home.

- Use water instead. Most clothes labeled as "dry-clean only" can be washed with water. Hand wash these clothes or ask your dry cleaner to wet clean them for you.

Pick your plastics carefully. Some plastics release toxic chemicals such as polyvinyl chloride (PVC), phthalates and bisphenol A (BPA).

- Do not buy products made with soft PVC. For example, some shower curtains and toys are made with soft PVC.
- Do not use plastic containers for hot food or drinks. Choose glass or stainless steel.
- Use glass instead of plastics in the microwave.
- Learn more about plastics at: www.prhe.ucsf.edu/prhe/tmlinks.html#plastics

Choose safer home improvements. Many paints, glues and flooring materials can release toxic chemicals long after the project is complete.

- Ask for *VOC-free* and *water-based* materials.
- If you are pregnant, do not work on remodeling projects and stay away from recently remodeled rooms.
- Learn more about safer materials at: www.prhe.ucsf.edu/prhe/tmlinks.html#remodeling

Keep mercury out of your diet, home and garbage.

- Choose fish that are less contaminated with mercury. Find information on healthy and environmentally sustainable fish at: www.prhe.ucsf.edu/prhe/tmlinks.html#mercury
- Check local fish advisories. If you or others go fishing, never eat your catch before checking fish advisories. Learn about fish advisories at: www.prhe.ucsf.edu/prhe/tmlinks.html#mercury
- Replace your mercury thermometer with a digital one. Do not throw your mercury thermometer or any other item containing mercury (like compact fluorescent light bulbs) in the trash. Your local health department can tell you where to bring these items for safe disposal. To contact your local health department, check the government section of your phone book or call the U.S. Centers for Disease Control and Prevention at: 800-232-4636.

Avoid pesticides and other toxic substances in food and water.

- Eat local, organic food when possible to reduce your exposure to pesticides. Buying organic produce also reduces global contamination of air, water and soil with pesticides. If you can't afford to buy organic produce all the time, choose the least pesticide-contaminated fruits and vegetables and avoid the most contaminated. Learn more about reducing pesticide exposure from food at: www.prhe.ucsf.edu/prhe/tmlinks.html#foodandwater
- Join a local organic Community Supported Agriculture (CSA) system. These systems are efficient and grow food in ways that protect our health and the environment. Find a CSA system in your area at: www.prhe.ucsf.edu/prhe/tmlinks.html#foodandwater
- Limit foods high in animal fat. Toxic substances that are persistent in the environment concentrate in animal fat.
- Avoid canned foods and beverages whenever possible. Eat fresh or frozen fruits and vegetables to avoid exposure to BPA, a toxic substance used in the resin that lines the majority of canned foods and drinks.
- Request a copy of your annual water quality report from your water district. If your drinking water comes from a private well, have it tested every year. In most cases, bottled water is not a solution, but instead creates further pollution.

Avoid lead exposure. Lead may be in household paint, dust and soil. Any home built before 1978 may have lead paint.

- Call the National Lead Information Center for information about how to prevent exposure to lead hazards at: 800-424-LEAD.
- If you have lead paint in your home, make sure it is covered with a fresh coat of paint, wallpaper or tiles.
- Never sand or remove lead paint yourself. Hire a contractor who is certified in lead abatement.

Test your home for radon, a radioactive gas found in many basements and ground floors.

- Purchase an inexpensive testing kit at your local hardware store.
- Learn more about radon by calling 1-800-SOS-RADON or at: www.prhe.ucsf.edu/prhe/tmlinks.html#radon

PREVENT EXPOSURE AT WORK

Many substances used in different jobs, present in office buildings or used in workplace renovation projects are toxic to reproductive health.

By law, you have the right to a safe and healthy work environment.

- Get information and training about hazardous substances in your workplace. Your employer is required by law to provide information and training about hazards in the workplace, including access to Material Safety Data Sheets (MSDS). Follow guidelines to avoid exposure and use protective gear. Ask your employer about substitutes for toxic substances and other hazard controls.
- If you are pregnant or planning a pregnancy and are exposed at work to substances that may cause harm, request modification of your duties. Talk to your doctor or your union for guidance.
- If somebody in your household works with toxic chemicals, he or she should change and shower after work and keep work tools and clothing away from people and living areas in the home. Wash work clothes separately.
- File a complaint with your regional Occupational Safety and Health Administration (OSHA) office if you believe that your employer is violating OSHA standards or that your workplace poses serious hazards. You can find a directory of regional OSHA offices where you can get more information or file a complaint by calling 800-232-4636 or at: www.prhe.ucsf.edu/prhe/tmlinks.html#work
- If you are a farm worker, you can find information about reducing your exposure to agricultural pesticides at: www.prhe.ucsf.edu/prhe/tmlinks.html#work

PREVENT EXPOSURE IN YOUR COMMUNITY

Outside your home, on the road, in parks and in schools, you can do things that reduce pollution in your community and limit your exposure to pollution in outdoor air.

Help create a better environment for your family and everyone around you.

- Drive less. Carpool, take public transportation, ride your bike or walk.
- Never burn trash, particularly furniture, tires and plastics.
- Do not use pesticides. If you have a garden or lawn or share a community or school garden, use organic or integrated pest management techniques to fight off weeds and unwanted insects. Learn more at: www.prhe.ucsf.edu/prhe/tmlinks.html#community
- Never throw toxic substances, including oil, gasoline, pesticides, paints, solvents and medicines, down drains or toilets or in the garbage. Your local health department will give you information on how to safely dispose of these substances. To contact your local health department, check the government section of your phone book or call the U.S. Centers for Disease Control and Prevention at 800-232-4636.

Reduce your exposure to pollution in outdoor air.

- Exercise as far away as possible from sources of air pollution, such as heavy traffic or factories.
- Do not exercise outdoors on bad air quality days. Check air quality forecasts in the newspaper, on TV or radio, or online at: www.prhe.ucsf.edu/prhe/tmlinks.html#airquality

BECOME A SMART CONSUMER

Many of the products you use everyday may be made with toxic substances. When you buy and use these products, you expose yourself and your family to toxic substances and contribute to a cycle of manufacturing, use and disposal that pollutes our environment. The use of toxic substances exposes workers, consumers and the general public. Choose safer, non-toxic alternatives. This will help stop the toxic cycle and send a message to companies that make and sell consumer goods that they need to switch to healthier options.

There are many consumer guides available to help you find non-toxic products. You can find links to many of these guides at: www.prhe.ucsf.edu/prhe/tmlinks.html#consumerguide

MAKE THE GOVERNMENT WORK FOR YOU

Individual actions alone cannot prevent exposure to substances in the environment that harm our reproductive health. This is because some toxic substances remain in the environment, concentrate in the food chain, and find their way into our bodies. Some substances can travel long distances in water and air currents, contaminating the environment and affecting communities far away from the place where those substances were released. Other toxic substances do not remain in the environment for long but are constantly being released, so we are exposed to them on a regular basis. These types of exposures can only be prevented by public policies that stop chemical pollution in the first place.

You can influence public policy.

- Become informed about these issues.
- Get involved with local, state and national organizations working to prevent pollution.
- Let your representatives know what you think. You can find contact information for your state and federal representatives at:www.prhe.ucsf.edu/prhe/tmlinks.html#government

Support policies that prevent pollution.

We need policies that:

- Identify existing toxic substances, phase out their use and replace them with alternatives that are safer for human health and the environment.
- Require that new chemicals be tested for health and safety before they are allowed to be produced or sold.
- Improve worker protection by reducing permissible occupational exposure levels and giving workers access to more complete and accurate information about workplace hazards.
- Expand the nature and extent of the information given to consumers about the ingredients in the products they buy.

To Learn More

This brochure lists just some of the many ways you can prevent exposure to substances that can harm reproductive health. The prevention measures described here are based on recommendations by the leading authorities on environmental and occupational health listed below. Find links to these resources at: www.prhe.ucsf.edu/prhe/tmlinks.html#authorities

American Academy of Pediatrics Committee on Environmental Health. Etzel RA, ed. *Pediatric Environmental Health,* 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003.

Physicians for Social Responsibility. *Pediatric Environmental Health Toolkit©*, endorsed by the American Academy of Pediatrics.

University of California, San Francisco and the Collaborative on Health and the Environment. *Shaping Our Legacy: Reproductive Health and the Environment.*

U.S. Environmental Protection Agency. For recommendations on how to protect the environment at home and in the garden, at work, at school, while shopping, in your community and on the road.

California Department of Public Health Hazard Evaluation System and Information Service (HESIS). For answers to questions or concerns about workplace hazards contact the HESIS helpline at: 866-282-5516.

Your local health department can also provide more information on preventing exposure to toxic substances. To contact your local health department, check the government section of your phone book or call the U.S. Centers for Disease Control and Prevention at 800-232-4636.

More Resources. Find links to many supplemental resources that provide practical tips for avoiding exposure to toxic substances at: www.prhe.ucsf.edu/prhe/tmlinks.html#tips

About Us

From Advancing Science to Ensuring Prevention is a project of the University of California, San Francisco Program on Reproductive Health and the Environment (PRHE). PRHE's mission is to create a healthier environment for human reproduction and development by advancing scientific inquiry, clinical care and health policies that prevent exposures to harmful chemicals in our environment.

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Ground Water Monitoring&Remediation

A Compilation of Statistics for VOCs from Post-1990 Indoor Air Concentration Studies in North American Residences Unaffected by Subsurface Vapor Intrusion

by Helen E. Dawson and Todd McAlary

Abstract

This paper provides a summary of a number of indoor air quality studies reporting concentrations of volatile organic compounds (VOCs) in indoor air samples collected from residential properties in North America and provides average values for certain statistics (percentiles, detection frequency, maximum). This compilation includes several VOCs that are commonly assessed in studies of subsurface vapor intrusion to indoor air, but may also be attributable to consumer products, building materials, or even outdoor air (ambient) sources, specifically benzene, carbon tetrachloride, chloroform, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, cis and trans-1,2-dichloroethene, ethylbenzene, methyl tert-butyl ether, methylene chloride, tetrachloroethene, trichloroethene, toluene, trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, vinyl chloride, and meta, para, and ortho-xylene. In studies spanning 1990 through 2005, eleven of these compounds were detected in more than 50% of samples collected, and for several compounds (benzene, carbon tetrachloride, chloroform, ethylbenzene, and tetrachloroethene) the lower and upper quintiles of the indoor air concentrations are within the range of typical risk-based target levels. These summary statistics may help interpret data collected during a vapor intrusion investigation and communicate the findings of indoor air quality studies to building occupants and other stakeholders. Similar studies have been published in the past, but there has been a gradual change in indoor air quality over time and a large amount of new data has been collected, so this paper provides more relevant information for current use than previous compilations.

Introduction

Because people spend a large fraction of their time in their homes, consideration of residential indoor exposures to air pollutants is a critical component of many health risk assessments. Volatile organic compounds (VOCs) are a class of pollutants that have been the subject of numerous residential indoor air studies. VOCs in indoor air may originate from several sources: ambient (outdoor) air, indoor sources (sources within a building), and—if present—subsurface sources. Any compounds present in ambient (outdoor) air will generally be present in indoor air because the air in most buildings is exchanged with outdoor air many times each day. Additional VOCs or incrementally higher concentrations of VOCs may be introduced to the indoor environment through the storage and use of consumer products (e.g., cleaners, air fresheners, aerosols, mothballs, scented candles, and insect repellants), emissions from building materials (e.g., carpets, insulation, paint, and wood finishing products), combustion processes (e.g., smoking, cooking, and home heating), and occupant activities (e.g., craft hobbies, home improvements, automotive repairs). For example, tetrachloroethene (PCE) is a common industrial solvent that is also emitted from dry-cleaned clothes. Benzene is a component of many hydrocarbon fuel mixtures, which may be released to the ground, and is also emitted from tobacco smoke or other interior combustion sources and fuel-powered tools or vehicles stored in attached garages. Other examples include naphthalene (hydrocarbon mixtures and mothballs), 1,1,1-trichloroethane (industrial solvent and aerosol propellant), some freons (solvent and air-conditioning component), and acetone (solvent used commercially as well as in nail-polish remover).

The potential for exposure to chemicals via migration of subsurface VOCs to indoor air (vapor intrusion) has become widely recognized in response to several case studies (e.g., Hers et al. 2001; Digiulio and Paul 2006; McDonald and Wertz 2007). However, because VOCs in

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indoor air also may be introduced through sources unrelated to vapor intrusion (sometimes referred to as background sources during vapor intrusion assessments), the health risks attributable to vapor intrusion from the subsurface to indoor air are often challenging to assess because of difficulties in resolving the relative contributions of the indoor, outdoor, and subsurface sources to indoor air quality. For example, the presence of indoor and outdoor sources of indoor air contaminants may confound calculation of empirical attenuation factors, analysis of compound ratios, and evaluation of the effectiveness of vapor intrusion mitigation systems. Information regarding expected ranges of indoor air VOC concentrations at properties where vapor intrusion is not occurring or is being prevented by operating mitigation systems is therefore expected to be useful during analysis and interpretation of data collected to assess the potential for subsurface vapor intrusion from contaminated soil or ground water beneath a building.

Several federal and state documents provide guidance on the characterization and evaluation of background in risk assessment (e.g., USEPA 2002a, 2002b; CDPHE 2004; MADEP 2008a). These guidance documents generally recommend including contaminant concentrations attributable to background sources in a baseline risk assessment to avoid losing important risk information for those potentially exposed. Risks attributable to background concentrations generally are considered separately only when evaluating cleanup options. For vapor intrusion assessment, this generally means that subsurface screening levels are developed by multiplying risk-based indoor air target concentrations by an empirical or modeled attenuation factor, without consideration of background concentrations. Some states (e.g., Massachusetts) have adopted a different approach when developing standards for ground water concentrations protective of inhalation exposures and set the standards at a level that are at or above background levels, even where risk-based target concentrations are lower (MADEP 2008a). In both cases, it is important to understand the background concentrations, and this paper is intended to facilitate that understanding.

Indoor air quality depends on the specific consumer products and building materials inside a building, and these vary considerably from house to house in response to consumer preferences. In addition, it is important to note that indoor air concentrations will vary spatially and temporally regardless of whether the source of a particular chemical is within or beneath the building (or both). Therefore, it may not be feasible to determine whether vapor intrusion is occurring or not simply by comparing the results of a single indoor air sample to typical or background levels of indoor air concentrations. Nevertheless, knowledge of typical concentrations is a line of evidence that will help with assessing whether vapor intrusion is occurring, simply by a qualitative comparison. Background levels may be determined on a site-specific basis, but these studies typically consist of a relatively small number of samples and, therefore, may not be as representative as the compilation of statistics from the large number of indoor air quality studies presented here.

Previous Compilations

There have been several previous compilations of indoor air studies (e.g., Shah and Singh 1988; Stolwijk 1990; Samfield 1992; Brown et al. 1994; Holcomb and Seabrook 1995; USEPA 1998; Hodgson and Levin 2003). One of the most comprehensive compilations is that of Shah and Singh (1988), who compiled a database of indoor air measurements for 66 VOCs representing 30 cities from 16 states (although most, 90%, of the data are from California and New Jersey). The sampling dates range from 1970 to 1987, with the majority, 98%, collected between 1981 and 1984. Shah and Singh reported central tendency (mean and median), maximum values, and other population statistics (lower and upper quartiles). Stolwijk (1990) also presented population statistics (arithmetic mean and 10th, 50th, 90th, and 98th percentiles) calculated from four large studies of indoor air in homes conducted prior to 1987: United States (355 homes), Germany (500 homes), Netherlands (300 homes), and Italy (15 homes). Covering a similar time period, Brown et al. (1994) consolidated data from 50 studies that measured indoor air concentrations of VOCs between 1978 and 1990 in dwellings, office buildings, schools, offices, and hospitals in several countries. Assuming the data were log-normally distributed, the authors estimated weighted average geometric means as well as the 90th and 98th percentile concentrations for each VOC. In a more recent compilation, Hodgson and Levin (2003) presented measures of central tendency (mean and median) and maximum concentrations for a large number of VOCs, and the 90th and 95th percentiles for a limited set of VOCs measured from 1990 to 2001 in 12 studies of indoor air quality in North American residences. By comparing the compiled mean values to the mean values reported in historical studies, the authors demonstrate that the average concentrations of a number of indoor air contaminants have decreased over time.

The other compilation studies presented only central tendency information. Samfield (1992) compiled measures of central tendency data from literature on organic compounds measured indoors using varying sampling methods and times from 1975 to 1990. Holcomb and Seabrook (1995) compiled mean VOC concentration data in commercial and residential buildings published between 1980 and 1993. USEPA (1998) reviewed several field studies and compilation reports to compile mean and median values of VOCs in indoor and ambient air.

In summary, nearly all of these compilations are more than a decade old or provided only central tendency (median, geometric mean, or average) and maximum values. The exception is the compilation by Hodgson and Levin (2003); however, in that compilation and most of the other compilations, limited information regarding the frequency distribution of indoor air concentrations was provided. Since background indoor air concentrations vary widely and indoor air quality has gradually been improving over time (Hodgson and Levin 2003; MADEP 2008b; Zhu et al. 2005), there is value in a new compilation based on more recent data, with an emphasis on the statistical distribution of background indoor air concentrations.

Background Indoor Air Quality Studies Analyzed for this Compilation

Eighteen background indoor air quality studies were reviewed and evaluated for inclusion in this compilation. Seventeen were baseline studies that targeted a specific population for a specific purpose. Most were conducted in urban or suburban settings, although seven also included residences in rural settings. The eighteenth study used in this compilation was that of Shah and Singh (2008), which was included because the study represents early data (before the 1990s) collected in residences (as well as commercial buildings, but not industrial buildings) in the United States and the study reported a range of order statistics. None of the results presented in these studies differentiated among urban, suburban, or rural settings.

Basic information regarding each of these studies is summarized in Table 1; additional information can be found in the comprehensive technical report describing the compilation (USEPA, Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences: A Compilation and Implications for Vapor Intrusion, submitted). These indoor air quality studies collectively report concentrations in indoor air for more than 40 VOCs in thousands of indoor air samples. The collective data span more than two decades, ranging from 1970 to 2005. The study sample sizes vary from about 10 to 2000, although the majority of the studies reported between 50 and 500 samples. Most of the earlier studies used adsorbent media for sample collection. Later studies favored stainless steel canisters, although one recent study (Zhu et al. 2005) used adsorbent media to achieve very low reporting limits. Sample collection periods ranged from 2 to more than 100 h, although the majority of the studies employed between 12- and 24-h sample collection periods. Reporting limits vary widely by chemical, and for any given chemical, reporting limits among the studies typically vary by at least an order of magnitude.

Data Compilation and Analysis Methods

Summary statistics of indoor air quality reported in the studies described were compiled in a spreadsheet. Ideally, the raw data (concentrations of individual chemicals in individual samples collected during each individual study) would have been compiled into a database and statistics generated from the consolidated data. However, the raw data were not available for most studies, so the reported statistics were compiled instead. The complete set of compiled order statistics (i.e., 25th, 50th, 75th, 90th, and 95th percentiles of the distribution of measured values), maximum values, reporting limits, and percent detections is presented in USEPA (submitted).

In compiling the order statistics, percentiles reported as lower than laboratory reporting limits, and which had been assigned a value of one-half the analytical reporting limit by the individual study authors, were replaced with "<RL". Mean values reported by the studies were not compiled, because in most cases the mean values were calculated using nondetect data for which some fraction of the reporting limit had been substituted, which can lead to inaccurate estimates of the mean (Singh et al. 2006). Also, statistics from homes specifically designated as "smoking" homes and statistics based on personal air monitors worn only in the daytime were excluded from the compilation.

Summary statistics calculated from the compiled indoor air quality statistics are presented in Table 2 for a subset of the VOCs included in the background indoor air studies that are also common ground water contaminants and therefore likely to be considered in vapor intrusion investigations. The approach used to develop the summary statistics is described next.

The statistical measures of indoor air concentrations reported by the individual studies vary widely, depending on the age, location, and detection limits of each study. For example, Figure 1 shows for benzene that the range of 25th to 95th percentiles measured in any individual study spans more than one order of magnitude and the value of any given order statistic reported by multiple studies also span more than one order of magnitude from lowest to highest. Figure 1 also shows that the highest concentrations at any percentile were typically reported by the earlier studies (e.g., USEPA 1987a, 1987b; Shah and Singh 1988). In general, indoor air quality has been improving over time as people have become more aware of air quality and related health concerns (e.g., cessation of smoking indoors), as manufacturers of consumer products have become more aware of environmentally friendly alternatives for household chemicals ("green" cleaners), and as emissions of VOCs to ambient air have decreased. Figure 2 shows 50th and 90th percentile concentration values vs. time for a selected group of VOCs typically encountered in vapor intrusion investigations. The dates plotted on the time scale are the starting sample dates for each individual study. The time trend plots show that the 50th and 90th percentiles of indoor air concentrations measured after about 1990 are considerably lower than those measured before that time. Thus, the summary statistics in Table 2 were calculated using post-1990 data to obtain statistics representative of the current distribution of VOC concentrations in residential indoor air. Of the 18 studies compiled, 13 have indoor air statistics for samples collected in 1990 and later (through 2005). The summary statistics collectively represent indoor air quality in urban, suburban, and rural residences, without differentiation as to setting.

Summary statistics were calculated for each chemical by computing the mean of the order statistics (percentiles) reported by the individual studies (i.e., mean of reported 25th percentiles, 50th, 75th 90th, and 95th percentile values, respectively). This is similar to the approach used to develop consensus means for samples analyzed by different laboratories, an approach that relies on the observation that sample means (and order statistics in this compilation) are normally distributed (if the sample sizes are large enough) even if the underlying populations are not normally distributed. Weighting the statistics by sample size did not substantial influence the calculated summary statistics (there was less than 10% difference), because most studies have a relatively large number of samples.

When any statistical measure was reported as below a given reporting limit, the summary statistics were

Table 1
Summary of Reviewed Background Indoor Air Quality Studies (1970–2005)

Reference	Location	Sample Dates	Season	Sample Size	Available Data (Statistics)	Collection Device	Collection Period	Analytical Method
Weisel 2006	NJ	2004-2005	Varies	100	Population Stats (25/50/75/90/95/Max)	Summa canister	24 h	EPA TO-15
NY DOH 2006	NY	1997-2003	All	400	Population Stats (25/50/75/90/95/Max)	Summa canister	2 h	TO-15
Rago et al. 2004, 2005	MA	2004-2005	Spring, Fall	100	Population Stats (25/50/75/90/Max)	Summa canister	24 h	TO-15
Zhu et al. 2005	Ottawa, CA	2002-2003	Winter	75	Population Stats (50/75/90/Max)	Sorbent tube, active sampling	1.7 h	GC/MS
Kurtz and Folkes 2002	Denver, CO	1998	All – Quarterly	375	Population Stats (25/50/75/90/95/Max)	Summa canister	24 h	EPA TO-14/15 SCAN
Sexton et al. 2004	Mineapolis, MN	1999	Spring, Summer, Fall	292	Population Stats (50/90)	3500 OVM Charcoal passive sampler	48 h	GC/MS
Foster et al. 2002; Kurtz and Folkes 2002	Denver, CO	1998-2001	All – Qrtly	427	Population Stats (25/50/75/90/95/Max)	Summa canister	24 h	EPA TO-14/15 SIM
Van Winkle and Scheff 2001	Chicago, IL	1994-1995	All	48	Population Stats (50/90/Max)	Summa	24 h	TO-14
Clayton et al. 1999	Midwest States	1995-1997	All	395	Actual Data (25/50/75/90/95/Max)	OVM 3520 passive sorbent sampler	6 d	GC/MS
Gordon et al. 1999	AZ	1995-1997	All	185	Population Stats (50/75/90/Max)	OVM 3520 passive sorbent sampler	6 d	GC/MS
Mukerjee et al.1997	Brownsville, TX	1993	Spring	9	Population Stats (50)	Multisorbent active canister	24 h	GC/MS
Heavner et al. 1996	NJ & PA	1992	Winter	61	Population Stats (50/Max)	Active multisorbent sampler	14 h	GC/MS
Heavner et al. 1995	Columbus OH	1995	Spring	24	Population Stats (50/Max)	Multisorbent sampler w/pump	3 h	GC/MS
Sheldon et al. 1992	Woodland, CA	1989	Fall	125	Population Stats (25/50/75/90/Max)	Canister	24 h	GC/MS
Shah and Singh 1988	US	1970-1987	Varies	2128	Population Stats (25/50/75)	Varies	Varies	Mixed
USEPA 1987a	Los Angeles, CA	1984	Winter, Summer	111	Population Stats (25/50/75/90/95/Max)	Tenax	12 h	GC/FID
USEPA 1987a	Contra Costa, CA	1984	Summer	111	Population Stats (25/50/75/90/95/Max)	Tenax	12 h	GC/FID
USEPA 1987b	NJ	1981	Fall	348	Population Stats (25/50/75/90/95/Max)	Tenax	12 h	GC/FID

Table 2
Summary Statistics for Background Indoor Air Concentrations Measured in North American Residences Since 1990 (All concentrations in μg/m^3)

Compound	N Studies	N Samples	%Detect	RL Range	25%	N	50%	N	75%	N	90%	N	95%	N	Max	N
Benzene	14	2615	87	0.05 - 1.6	1.9	7	2.5	13	4.5	9	10	11	17	5	93	10
Carbon tetrachloride	5	873	88	0.15 - 0.25	0.3	2	0.5	5	0.7	2	0.8	4	1.1	1	2.7	3
Chloroform	10	2178	73	0.02 - 2.4	0.5	4	1.1	9	2.2	6	3.9	8	6.0	5	20.2	7
Dichloroethane,1,1-	5	1309	0.3	0.08 - 2.0	<RL	5	<RL	5	<RL	5	<RL	5	<RL	4	0.9	5
Dichloroethane,1,2-	4	950	12.6	0.02 - 0.25	<RL	2	<RL	4	<RL	3	0.15	4	0.20	2	1.8	4
Dichloroethene, 1,1-	5	957	10	0.01 - 2.0	<RL	4	<RL	5	<RL	5	<RL	5	<RL	3	86.8	5
Dichloroethene, cis 1,2-	4	975	3	0.25 - 2.0	<RL	4	<RL	4	<RL	4	<RL	4	<RL	3	3.7	4
Dichloroethene, trans 1,2-	3	575	0	0.8 - 2.0	<RL	3	<RL	3	<RL	3	<RL	3	<RL	2	<RL	3
Ethylbenzene	10	1484	81	0.01 - 2.2	0.8	4	2.0	9	3.0	5	8.6	7	14	3	126	8
Methyl tert-butyl ether (MTBE)	4	502	47	0.05 - 1.8	<RL	3	1.2	4	5.7	4	26	4	72	2	242	4
Methylene chloride	7	1,649	73	0.4 - 3.5	0.42	3	1.10	7	3.6	5	10	7	20	4	506	6
Tetrachloroethene	13	2312	64	0.03 - 3.4	<RL	7	0.9	10	1.8	6	4.0	9	7.4	5	171.2	8
Toluene	12	2065	96	0.03 - 1.9	9	5	13	12	27	7	51	9	106	4	547	9
Trichloro-1,2, 2-trifluoroethane, 1,1	1	400	56	0.25	<RL	1	0.5	1	1.1	1	1.8	1	3.4	1	7	1
Trichloroethane, 1,1,1-	9	1877	60	0.12 - 2.7	0.5	7	1.9	9	2.7	7	5.5	7	10.2	5	196	8
Trichloroethene	13	2403	44	0.02 - 2.7	<RL		0.3	10	0.3	6	0.9	8	1.6	5	84	10
Vinyl chloride	6	1684	7	0.01 - 1.3	<RL	6	<RL	6	<RL	6	0.03	2	0.05	2	0.8	6
Xylene, m/p-	10	1920	90	0.4 - 2.2	2.9	6	5.5	10	9.4	7	27	9	41	4	593	8
Xylene, o-	12	2004	85	0.11 - 2.2	1.4	6	2.2	11	3.9	7	10	9	16	4	196	10

Note: "N" indicates number of studies reporting a particular statistic.

calculated using the Kaplan-Meier method, a robust nonparametric maximum likelihood estimator capable of considering censored or truncated data (i.e., data sets with nondetect values) with multiple reporting limits (Helsel, 2005a, 2005b, 2006). The Kaplan-Meier method was originally developed as a tool for medical researchers to estimate the survival probability function, i.e., the probability that a member of a given population will have a lifetime exceeding a certain age. Helsel (2005a) adapted the method to populations of data with "less than values," such as low-level concentrations. As described by Helsel (2005a), the survival function probability is the product of the $j = 1$ to k incremental probabilities to that point, going from high to low concentrations for the k detected observations. In effect, the Kaplan-Meier method assigns a percentile value to each detected observation, starting at the largest value and working down, on the basis of the number of observations above and below that observation. Percentiles are not assigned to data that are below reporting limits, but these data affect the percentiles calculated for the observations that are above reporting limits.

The summary statistics generated from the compiled indoor air statistics and presented in Table 2 provide more complete characterizations of the distributions of background indoor air concentrations typically found in residences than the single "representative" value reported in most previous compilations. This characterization allows for more robust statistical comparisons of background to measured indoor air concentrations obtained in vapor intrusion investigations.

Results and Discussion

Summary statistics were developed as described using 13 studies representing measured indoor air VOC concentrations from 1990 through 2005. Table 2 presents the summary statistics (arithmetic mean values for the 25th, 50th, 75th, 90th, and 95th percentiles, as well as the maximum values, reporting limits, and percent detected) for a subset of the VOCs reported in the compiled background studies that are also common ground water contaminants, and therefore likely to be considered in vapor intrusion investigations. Although a larger set of statistics is presented in this compilation, the population statistics in common with those in the recent compilation by Hodgson and Levin (2003) compare well: within a factor of 2 to 4.

As can be seen in Table 2, the average values for order statistics typically show more than one order of magnitude range from the 25th to the 95th percentile values and tend to be skewed toward high values in a way that is typical of log-normal distributions. This variability can be attributed to house-to-house variability in air exchange rates as well as building materials and consumer preferences and habits.

To provide a context for the assessment of health risks attributable to vapor intrusion, it is helpful to understand the health risks associated with average indoor air quality in buildings that are not affected by contaminated land. The VOCs most commonly detected in indoor air are presented in Figure 3, which ranks the compounds on the basis of the average percent detections. BTEX compounds (benzene, toluene, ethylbenzene, and xylene) are among

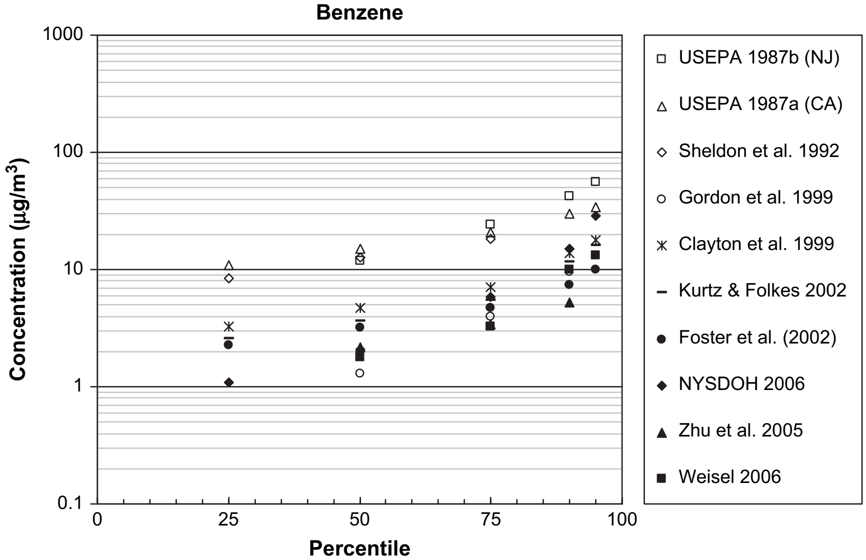

Figure 1. Indoor air concentration statistics for benzene reported by selected individual residential air quality studies.

the most commonly detected VOCs in indoor air. Several chlorinated hydrocarbons also are commonly detected, including carbon tetrachloride, chloroform, tetrachloroethene, and 1,1,1-trichloroethane. Note that the percent detections are a function of the reporting limits used in the studies. Some compounds (e.g., trichloroethene) have been analyzed using very low detection limits, while other compounds (e.g., cis-1,2-dichloroethene) have been analyzed using detection limits that are an order of magnitude higher.

Figure 4 shows that several of these commonly detected compounds have background concentrations that fall within the range of target concentrations corresponding to an incremental excess lifetime cancer risk of 10^{-4} to 10^{-6} for a typical residential exposure (based on USEPA's regional screening levels for chemical contaminants at Superfund sites; http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm). Thus, the presence of VOCs at levels of potential health concern in buildings overlying subsurface contamination may not necessarily be attributable to the vapor intrusion pathway. It is important to note that the background concentrations presented here are averages of the order statistics compiled from indoor air quality studies spanning 1990 through 2005. Background concentrations in the future may differ substantially if their uses in household or fuel products change. For example, starting in 2007, MTBE was no longer added to gasoline and, as a result, MTBE concentrations in outdoor air have decreased to very low levels. Thus, it is expected that indoor air values also will decrease as older fuel products stored in or near residences are replaced with current fuel products.

These results have several implications for evaluating indoor air data at vapor intrusion sites. Because of the wide variability in indoor air VOC concentrations, comparison of a single indoor air measurement obtained in a vapor intrusion investigation to a single value within the background concentration distribution is not likely to conclusively indicate whether subsurface vapor intrusion poses unacceptable risks or not. Most vapor intrusion assessments are based on a small number of samples, so it is generally not feasible to perform a rigorous statistical comparison of the site data to background data using, for example, an appropriate parametric test (e.g., Student's t-test) or nonparametric test (e.g., Wilcoxon rank sum). Nevertheless, a qualitative assessment can be very instructive. If several VOCs are detected in subsurface samples, and also are present in indoor air samples at concentrations above typical indoor air concentrations, there is a high likelihood that vapor intrusion was occurring at the time and location of sample collection. Additional confidence can be derived by comparing relative concentrations of any two or more compounds in subsurface samples to the relative concentrations of the same compounds in indoor air samples (also known as compound ratio analysis; ITRC [2007]), provided that either the compounds being compared are both equally resistant to degradation or the subsurface sample is from immediately beneath the building floor where the opportunity for degradation before entry to indoor air is very limited. For example, if two compounds are the dominant compounds in soil-gas samples, and both are detected in indoor air at concentrations above typical indoor air concentrations, and the relative proportion of the two compounds is similar in indoor and subsurface samples, vapor intrusion most likely is occurring. Conversely, if compounds are detected in subsurface samples, but are not present in indoor air samples at concentrations above typical indoor air concentrations, there is a high likelihood that vapor intrusion was either not occurring at the time and location of sample collection or, if occurring, the contribution to indoor air concentrations was low relative to the contribution of indoor sources.

Summary and Conclusions

Indoor air quality typically contains chemicals from consumer products, building materials, and outdoor

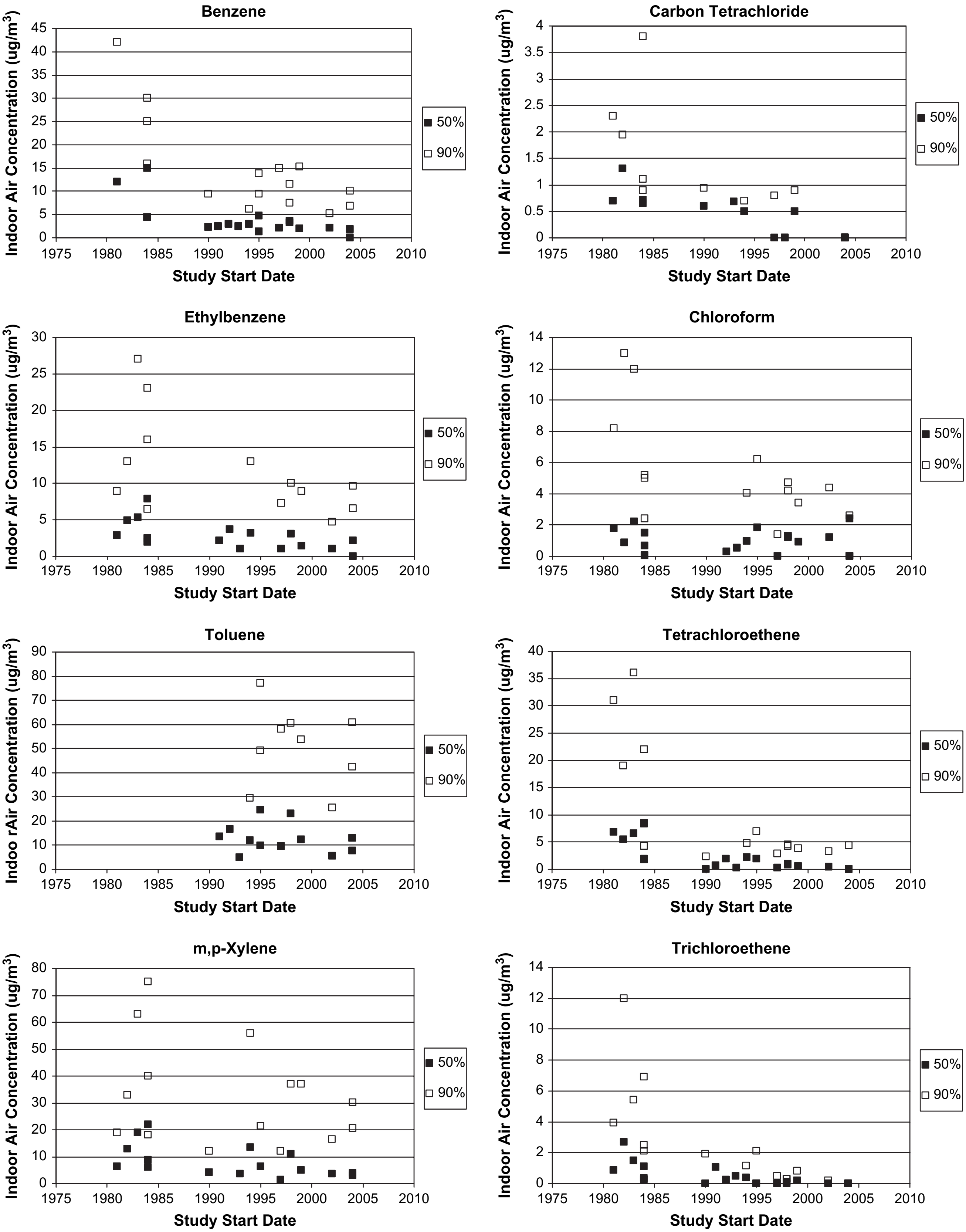

Figure 2. Concentration (μg/m^3) population statistics vs. time for selected VOCs in indoor air. The statistics are plotted vs. the starting sample date of the studies.

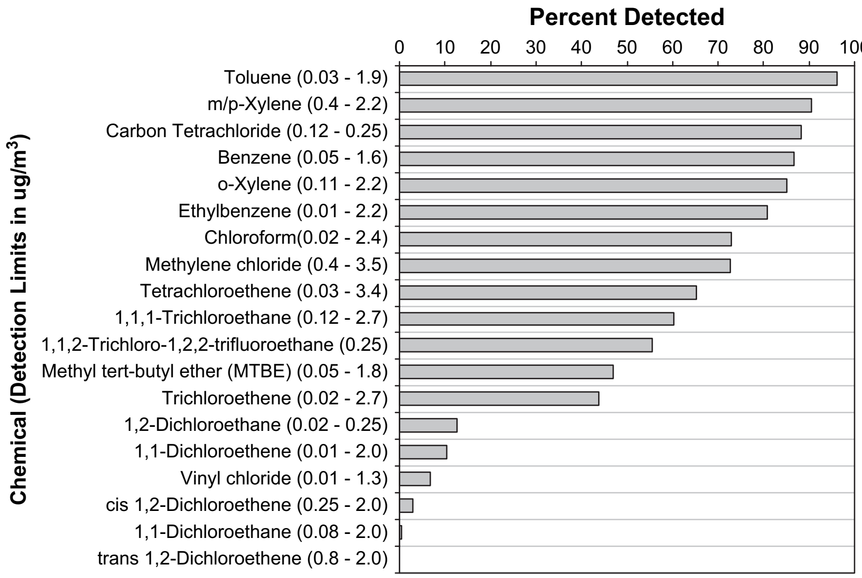

Figure 3. Average percent detection for selected VOCs in indoor air for studies listed in Table 1.

(ambient) air that may be detectable and may be present at levels that exceed health-based target concentrations. Any indoor air sample collected for assessment of subsurface vapor intrusion is likely to detect chemicals from these other sources, and in many cases, the compounds may be the same as the compounds present in soil or ground water attributable to contaminated land.

This paper provides summary statistics for typical indoor air concentrations of VOCs in North American residences for the purpose of providing a line of evidence to consider in evaluating vapor intrusion data. The summary statistics indicate that typical VOC concentrations, based on indoor air quality studies conducted from 1990 through 2005, range over one order of magnitude from the 25th to

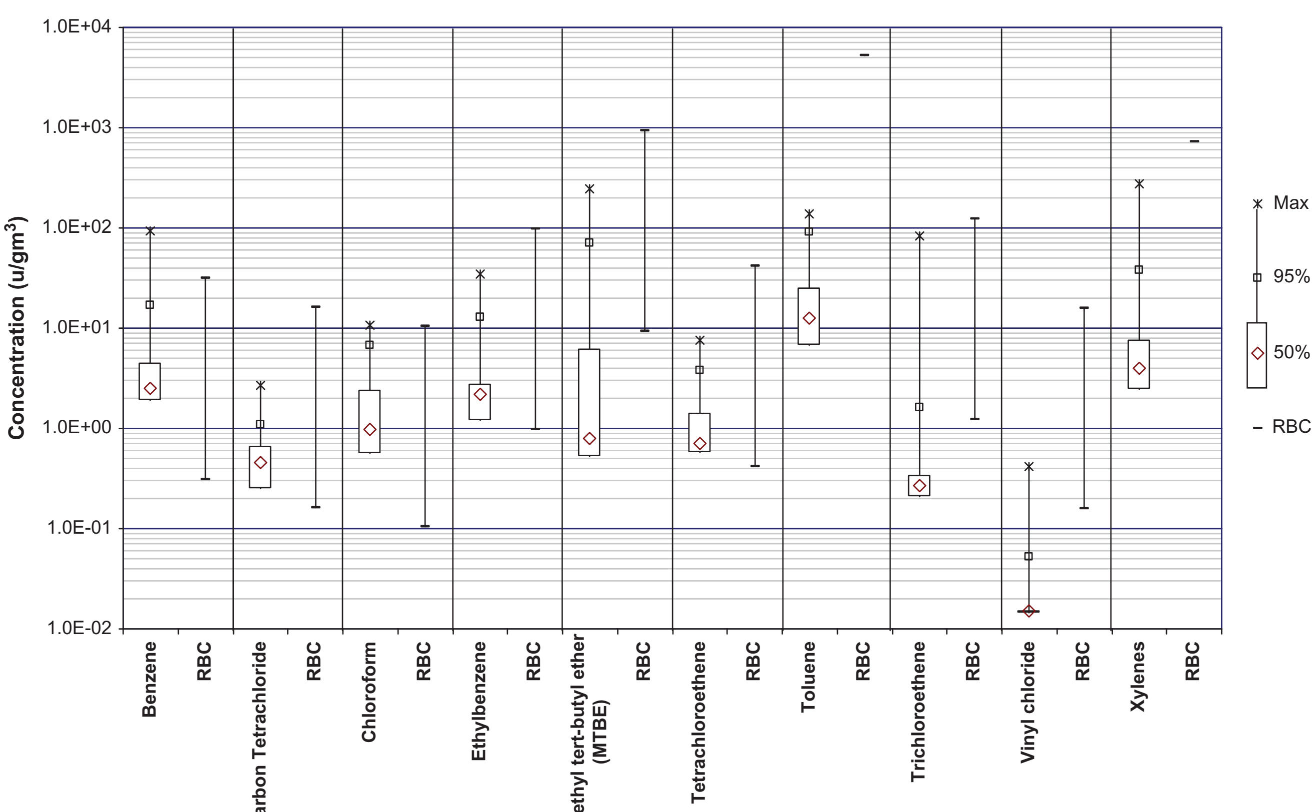

Figure 4. Residential indoor air concentration statistics listed in Table 2 compared to risk-based concentrations (RBC) for selected VOCs. The risk based concentrations shown are based on US EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites assuming a cancer risk range of 1E-06 to 1E-04 or hazard quotient of 1.

the 95th percentile values. Some very common chemicals, notably benzene, carbon tetrachloride, chloroform, tetrachloroethene, and occasionally others, have background indoor air concentrations that are similar to health-based target concentrations. Therefore, it is important to resolve the relative contributions of background sources of vapors before making a final determination of whether subsurface vapor intrusion is significant. If vapor intrusion assessments are conducted with a target risk level of 10^{-6}, background concentrations will frequently pose unacceptable risks. At a target risk level of 10^{-5}, background concentrations will occasionally pose unacceptable risks. At a target risk level of 10^{-4}, background concentrations will seldom pose unacceptable risks. It is not the intent of this paper to establish or advocate for any specific target risk level, only to raise awareness of how that selection relates to the complications posed by background concentrations during vapor intrusion assessments.

Indoor air quality varies from building to building in response to occupants' habits and choice of consumer products; therefore, indoor air monitoring at a few selected control properties (properties unaffected by vapor intrusion) is less likely to provide representative information regarding background concentrations compared to large databases of statistically significant number of control properties, such as the compilation presented in this paper. The order statistics may be useful for identifying compounds that are present at concentrations consistent with typical indoor air quality, and may help identify chemicals that are present at elevated concentrations. Elevated concentrations alone are not sufficient to implicate vapor intrusion as the root cause, and concentrations within typical ranges can still have a contribution from the subsurface. Therefore, this comparison is qualitative in nature and should be viewed in context with other lines of evidence in order to assess whether vapor intrusion is occurring.

The information presented in this paper may also be helpful to communicate to occupants of buildings before the conduct of a vapor intrusion investigation, so that they will be aware that several chemicals are likely to be detected and some may be present at concentrations that pose potentially unacceptable risks, even in the absence of any contribution from subsurface vapor intrusion.

Disclosure

The findings and conclusions in this paper have not been formally disseminated by USEPA and should not be construed to represent any Agency determination or policy.

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