Section 4. Nature and Extent of Solid Waste, Landfill Gas, and Chemicals in Soil

The information derived from the field investigations presented in Section 3 was used to define the nature and extent of solid waste, landfill gas, and chemicals in soil at Parcel E-2. The nature and extent evaluation presented in this section will document that an adequate amount of data, of sufficient quality, exist to support the HHRA and SLERA, to provide a basis for the RAOs, and to evaluate a focused set of remedial alternatives for Parcel E-2. As discussed in Section 1.1.4, this RI/FS Report addresses CERCLA hazardous substances except for radionuclides. Radionuclides in soil and groundwater are evaluated in the radiological addendum to this RI/FS Report.

The following subsections discuss the data evaluation methods (Section 4.1) and nature and extent findings for the Landfill Area (Section 4.2), the Panhandle Area (Section 4.3), and the East Adjacent Area (Section 4.4). Section 4.5 summarizes the findings of the nature and extent evaluation at Parcel E-2 for each area discussed in Sections 4.2, 4.3, and 4.4, including the analysis of deeper soil in the Shoreline Area. The nature and extent of sediment contamination within the intertidal Shoreline Area is presented, along with a SLERA for shoreline aquatic wildlife, in the Shoreline Characterization Technical Memorandum (SulTech, 2007; Appendix G to this report). The nature and extent of groundwater contamination is presented in Section 5.

4.1. EVALUATION METHODS

This subsection presents the methods used to evaluate the nature and extent of solid waste, landfill gas, and chemicals in soil in Parcel E-2. The results are presented for each of the three main areas (Landfill Area, Panhandle Area, and East Adjacent Area) of Parcel E-2 and are presented after this section. The goal of the evaluation is to characterize the nature and extent of contamination in a manner that supports the evaluation of remedial alternatives in the FS portion of this report. The nature and extent evaluations for solid waste and landfill gas are based on the NDGI findings, as summarized in the Landfill Gas Characterization and Landfill Lateral Extent Evaluation reports (TtEMI, 2003e and 2004f, which are provided in Appendices B and C to this report). The nature and extent of chemicals in soil were evaluated based on data collected during the RI, NDGI, and SDGI.

4.1.1. Solid Waste Extent Evaluation

In general, fill material at HPS can be grouped into five solid medium types:

- Native soil
- Soil and rock fill
- Dredged sediment
- Construction and demolition debris
- Industrial and municipal-type waste

The first three types are considered inert fill material based on waste definitions in 27 CCR § 20230. Inert waste does not contain hazardous waste or soluble pollutants at concentrations exceeding applicable water quality objectives, nor does it contain significant quantities of decomposable waste (as defined in 27 CCR § 20230). Inert fill material is not expected to generate leachate that would create potential risks to human health or the environment. For purposes of delineating the extent of the solid waste at HPS, native soil, soil and rock fill, and construction debris fill are considered to be the primary land mass in which the Parcel E-2 Landfill was constructed (TtEMI, 2004f).

Industrial and municipal-type waste may pose risk to humans or wildlife in two ways. First, putrescible waste (waste that contains significant quantities of biodegradable material) may decompose and generate potentially explosive levels of methane gas. The evaluation methodology discussed in this subsection focused on identifying solid waste areas with significant quantities of putrescible waste. Second, waste materials may contain toxic levels of substances that would pose a threat to exposed humans or wildlife. To evaluate this risk, chemical data from soil samples collected throughout Parcel E-2 were evaluated, as described in Section 4.1.3.

The identification of industrial and municipal-type waste within Parcel E-2 was performed in two steps: (1) defining the extent of contiguous putrescible waste within the Landfill Area; and (2) identifying isolated locations in the Panhandle Area and East Adjacent Area that contain industrial wastes, municipal-type wastes, or construction debris. The presence of construction debris, although typically considered an inert waste, was evaluated in the Panhandle and East Adjacent Areas because certain types of construction debris (mostly wood) readily biodegrade and may be considered putrescible. The following subsections discuss the methods followed in each step in the evaluation.

4.1.1.1. Contiguous Solid Waste within Landfill Area

Field logs from the test pits and soil borings installed during the RI and NDGI were reviewed to estimate the lateral and vertical extent of industrial and municipal-type waste within the Parcel E-2 Landfill and to assess the general composition of the waste. The review was supplemented with a review of historic aerial photographs and landfill design maps.

As discussed in Section 3, the NDGI included an investigation designed to better evaluate the lateral extent of industrial and municipal-type waste (TtEMI, 2004f; Appendix B to this report). Test pits were excavated at the boundary of the Parcel E-2 Landfill (adjacent to the interim cap) and in suspected areas of buried solid waste. Step-out test pits were excavated as necessary to assess the lateral extent of the solid waste. In total, 37 test pits were excavated as part of the lateral extent evaluation. The lateral extent was established at the test pit location where the solid waste (including construction debris) was 6 inches thick or less (Appendix B). Figure 3-1 presents the locations of the test pits in conjunction with the extent of solid waste. Soil borings were drilled at the final step-out test pit locations to confirm that solid waste was not present below the bottom of the test pits. In some locations near the landfill edge, soil borings were drilled to obtain additional information on the depth and thickness of solid waste.

4.1.1.2. Isolated Solid Waste Locations in Panhandle and East Adjacent Areas

The Navy reviewed aerial photographs and logs for more than 280 test pits, soil borings, monitoring wells, and GMPs from various investigations at (and adjacent to) Parcel E-2 to identify locations outside the landfill that contain industrial wastes, municipal-type wastes, or construction debris. The presence of putrescible waste, such as wood debris, was noted during the review process. Appendix J2 contains the logs from soil borings, wells, and test pits that were used for this evaluation. Figures 3-1 and 3-2 show the locations of the test pits, soil borings, monitoring wells, and GMPs in Parcel E-2. The vertical extent of solid waste is depicted in several cross sections presented in Section 2 and described in more detail in Section 4.2.2.

Several locations within the East Adjacent Area and Panhandle Area contained nonputrescible industrial waste, such as sandblast waste, and other locations contained putrescible construction debris. Waste identified in all other locations consisted of nonputrescible construction debris (such as brick, concrete, and metal). Figure 4-1 and the table below present the locations and number of borings and test pits within each area and the results of the evaluation, including locations that contained waste, and the subset of these locations that contained sandblast waste and putrescible construction debris. The results of the evaluation are discussed in more detail in Sections 4.3.1 and 4.4.1.

Waste Type	Number of Waste Locations in Panhandle Area [a]	Number of Waste Locations in East Adjacent Area [b]
Nonputrescible construction debris	28	10
Putrescible construction debris	20	21
Sandblast waste	0	9
Sandblast waste and putrescible construction debris	0	3
Total:	**48 (87 total borings and test pits)**	**43 (117 total borings and test pits)**

Notes:

a Includes borings in the shoreline area in close proximity to the Panhandle Area.

b Includes borings in the shoreline area in close proximity to the East Adjacent Area.

Figure 4-1 also includes geophysical results from the 2008 GDGI. Specifically, electromagnetic terrain conductivity anomalies, which may be indicative of potential waste deposits, were identified in the Panhandle Area (Geophysical Study Area 3 in Figure 4-1). In addition, vertical magnetic gradient anomalies, which are indicative of metal debris, were identified throughout Geophysical Study Area 3.

Figure 4-1 identifies locations within the PCB Hot Spot Area excavation where buried drums and containers were encountered. The drums and containers were removed, characterized, and disposed of off site, and their approximate locations are shown for reference. Waste types encountered during the removal action are summarized in Sections 4.2.1 and 4.4.1.

4.1.2. Landfill Gas Evaluation

The nature and extent of landfill gas was evaluated based on data collected during past investigations, including the landfill gas characterization (TtEMI, 2003e; Appendix A to this report) conducted under the NDGI and during the landfill gas TCRA (TtEMI, 2004a). As discussed in Section 3.2, the landfill gas characterization performed during the NDGI consisted of outdoor air and building atmosphere surveys, a soil gas survey using temporary sampling locations, and installation and monitoring of GMPs. Gas monitoring was initially performed using field instruments; laboratory samples were collected if field results exceeded action levels for methane and total NMOCs (TtEMI, 2002a). The following subsections discuss the evaluation methods used to assess the nature and extent of landfill gas at Parcel E-2.

4.1.2.1. Methane

Monitoring and control of landfill gas is regulated by 27 CCR. Performance standards for controlling methane gas at closed landfills are provided in 27 CCR § 20921. Concentrations of methane gas must not exceed 1.25 percent by volume in air (25 percent of the LEL) within on-site structures, and concentrations of methane gas migrating from the landfill must not exceed 5 percent by volume in air (the LEL) at the facility property boundary or an alternative boundary approved in accordance with 27 CCR § 20925. The evaluation methods for methane data involved comparing field and laboratory data against the 27 CCR standards. The methane data collection process is described in the following subsections. The methane evaluation results are discussed in Section 4.2.3.

Outdoor Air Monitoring

In 2002, outdoor air monitoring was performed throughout the Parcel E-2 Landfill and at buildings and subterranean structures (consisting of mainly well vaults) within 300 feet of the landfill. Additional buildings outside the 300-foot perimeter were surveyed based on the finding of methane concentrations greater than the LEL in GMPs along the northern perimeter of the landfill. No methane concentrations exceeded 25 percent of the LEL within any building. The Navy also collected confirmatory gas samples within the crawlspace of Building 830 because high methane levels were detected in the subsurface adjacent to the building during the soil gas survey conducted in 2002 (Appendix A).

Air monitoring continued to be performed at various surface and subsurface locations north and south of the Parcel E-2 Landfill, including the Building 830 crawlspace, under the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). Some subsurface structures (extraction well vaults) have been removed as part of the Navy's removal action in the PCB Hot Spot Area.

Soil Gas Survey

In 2002, a soil gas survey was performed around the perimeter of the landfill and at step-out locations to characterize the nature and horizontal extent of gas at the landfill. An initial soil boring was advanced at each location to the depth of groundwater to select the depths for soil gas sampling. Concentrations of methane and total NMOCs in soil gas were measured at a new boring immediately adjacent to (approximately 1 foot from) the initial boring. Step-out borings were advanced if concentrations of methane were detected above 25 percent of the LEL. During the initial soil gas survey, high levels of methane (above the LEL) were detected at various locations, and additional step-out locations were advanced to delineate the lateral extent of methane greater than the lower quantitation limit of the instrument (0.5 percent of the LEL) (Appendix A).

Gas Monitoring Probes

After the initial soil gas survey was completed in April 2002, 12 GMPs (GMP01 through GMP12) were installed at the boundary of the Parcel E-2 Landfill next to the fence line that separates the landfill from the UCSF compound. These GMPs were installed at locations where methane exceeded 25 percent of the LEL. These GMPs serve as the compliance GMPs under the landfill perimeter monitoring network to demonstrate that the migration of landfill gas is being controlled (through the gas control system installed during the landfill gas TCRA) below the LEL at the fence line between the landfill and the UCSF compound (TtEMI and ITSI, 2004c).

In May 2002, the Navy installed seven GMPs along Crisp Avenue (GMP13 through GMP19) to provide more data on the extent of landfill gas migration. In June 2002, the Navy installed GMP20 and GMP21 along the western boundary of the landfill, southwest of existing probe GMP10, to provide additional data about possible landfill gas migration west of the landfill, an area adjacent to non-Navy property. These GMPs were installed in areas where methane was not detected greater than the lower quantitation limit of the instrument (0.5 percent of the LEL) during the initial soil gas survey. These GMPs are also part of the landfill perimeter monitoring network to ensure that landfill gas at concentrations greater than action levels does not migrate toward structures to the west (TtEMI and ITSI, 2004c).

As part of the landfill gas TCRA (TtEMI, 2004a), five GMPs (GMP22 through GMP26) were installed within the UCSF compound to monitor the performance of the TCRA. Although these GMPs are not located on Navy property, they are included in the monitoring network to ensure that landfill gas at

concentrations greater than action levels does not migrate beneath the pavement on the UCSF compound above (TtEMI and ITSI, 2004c).

In February 2004, six additional GMPs (GMP27 through GMP32) were added in the area along Crisp Avenue to supplement seven wells installed in May 2002. These wells were installed at the request of the regulatory agencies to ensure that landfill gas is not migrating between the bottom of the utility trench and the lowest groundwater level (TtEMI and ITSI, 2004c). Although no landfill gas migration was detected along Crisp Avenue, the 13 Crisp Avenue GMPs are included in the monitoring network to ensure that landfill gas is not migrating north toward non-Navy property (former Parcel A) (TtEMI and ITSI, 2004c).

The landfill gas monitoring network was designed, in accordance with 27 CCR, to ensure that any landfill gas is not allowed to accumulate above action levels. The perimeter GMPs are monitored on a regular basis to ensure that methane gas does not exceed 5 percent by volume at the boundary, as specified in the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). GMPs on the UCSF compound and along Crisp Avenue act as secondary and tertiary lines of monitoring at increasing distances from the Parcel E-2 Landfill (TtEMI and ITSI, 2004c). The methane action level at all GMPs is set at 2.5 percent by volume in air to minimize the likelihood of exceeding the 27 CCR limit of 5 percent. All of the GMP locations are presented on Figure 3-6.

4.1.2.2. Nonmethane Organic Compounds

With regard to NMOCs at closed landfills, 27 CCR § 20921 states that trace gases should be controlled to prevent adverse acute and chronic exposure to toxic and cancer-causing chemicals. The evaluation methods for NMOCs involved comparing outdoor air data against the EPA Region 9 PRGs for outdoor air (EPA, 2004) and performing risk assessments on soil gas data collected from permanent GMPs. NMOC data collected from temporary soil gas probes installed during the landfill gas characterization were not evaluated, because site conditions had changed following implementation of the landfill gas TCRA.

To evaluate compliance with 27 CCR, the Navy has conducted several risk assessments to evaluate whether trace gases from the Parcel E-2 Landfill pose a potential risk to human health. The risk assessments were performed using the Johnson and Ettinger vapor intrusion model (EPA, 2003). Field data, analytical data, and risk assessment results for GMPs along Crisp Avenue (GMP13 through GMP16, GMP18, and GMP19) are presented in the Landfill Gas Characterization Report (Appendix A to this report). Field data, analytical data, and risk assessment results for GMP22 through GMP26 on the UCSF compound are presented in Appendices E, F, and G, respectively, of the Landfill Gas TCRA Closeout Report (Appendix F to this report). ELCR calculations for GMPs along Crisp Avenue, using the laboratory results, ranged from 6.4×10^{-7} to 2.0×10^{-8} for a residential exposure scenario. ELCR calculations for the GMPs on the UCSF compound ranged from 4.0×10^{-7} to 8.8×10^{-9} for an industrial

exposure scenario (TtEMI and ITSI, 2004c). These risk ranges are an order of magnitude below the NCP point of departure of 10^{-6} [40 CFR § 300.430(e)(2)(i)(A)(2); 55 Federal Register 8848 (1990)].

Field measurements for NMOCs, collected during the same time frame as the laboratory analytical data, ranged from 0 part per million by volume (ppmv) to 51 ppmv. Assuming that NMOCs remain at the same proportions in the landfill gas, the ELCR is directly proportionate to the total NMOC concentration. Thus, recognizing that a 10-fold increase in the ELCR would require a 10-fold increase in the NMOC measurements, 500 ppmv was selected as the action level for NMOCs detected at GMPs included in the monitoring network. If the concentration of total NMOCs increased from the 50-ppmv range to greater than 500 ppmv, then additional sampling and analysis for NMOCs and further evaluation of risk to human health is warranted in accordance with the interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c).

4.1.3. Soil Evaluation

Due to the quantity of soil data evaluated in this RI, the nature and extent evaluation of soil was focused to discuss chemicals that were detected at concentrations greater than the laboratory reporting limits (LRLs), exceeding outdoor levels or human health risk-based criteria developed for the RI. The development of the criteria is discussed in Section 4.1.3.2. All soil data, except for soil physically removed during interim actions, is summarized in Appendix J1 and is included in the HHRA and SLERA presented in this report.

Because the removal actions were performed concurrent with the Draft RI/FS Report, the nature and extent evaluation and risk assessments presented in this Draft Final RI/FS Report incorporate post-excavation soil samples from the removal action areas. At both the Metal Slag Area and PCB Hot Spot Area, post-excavation soil samples contained chemical concentrations that warrant further analysis in this Draft Final RI/FS Report. This analysis is presented in Sections 4.2.4, 4.3.2, and 4.4.2 of this RI/FS Report.

As discussed in Section 3, the Parcel E-2 soil data set consists of 1,113 samples analyzed for a wide variety of inorganic and organic chemicals. To facilitate review of the large data set, the evaluation was performed separately for each of the three study areas at Parcel E-2: the Landfill Area, the Panhandle Area, and the East Adjacent Area. The data set was further subdivided into three separate depth ranges (0 to 2 feet bgs, 2 to 10 feet bgs, and greater than 10 feet bgs) for consistency with the depth ranges evaluated in the HHRA.

Comprehensive data summary tables are presented in Appendix J1 by chemical category (i.e., metals, pesticides, PCBs, SVOCs, VOCs, and petroleum hydrocarbons) for each study area and depth interval. Each table presents a series of summary statistics of the data for each chemical, such as the number of samples collected; number of results that exceed the detection limit; minimum and maximum

concentrations detected; and median, mean, and standard deviation of the detected results for each chemical. In addition, each table lists all potential screening criteria and quantifies the number of results that exceeded each criterion.

4.1.3.1. Identification of Detected Chemicals and Comparison of Chemical Concentrations with Ambient Levels

All validated soil data collected during past investigations (i.e., the RI, the NDGI, and the SDGI, excluding data within the TCRA initial excavation boundaries) were first evaluated to determine which chemicals were detected at concentrations greater than laboratory method detection limits (MDLs). Statistical summary tables were prepared for each study area and depth interval. These tables summarize the detection frequency, range of MDLs, and range of detected concentrations. Metals data were compared with Hunters Point ambient levels (HPALs) (PRC, 1995a). The establishment of HPALs is discussed further in Section 4.1.3.3. The list of chemicals of potential concern (COPCs) within each study area and depth interval was refined by eliminating chemicals that were either not detected at concentrations greater than the MDL or did not exceed their established HPAL.

4.1.3.2. Soil Remedial Investigation Evaluation Criteria

Due to the large size of the soil data set and the wide range of detected chemicals, the evaluation of soil data focuses on chemicals with concentrations that contribute the greatest amount of potential risk to future site occupants. Summary tables were prepared for each study area and depth interval to identify those chemicals that are the primary contributors to the risk.

The risk-based thresholds used to identify COPCs are referred to as the Remedial Investigation Evaluation Criteria (RIEC). These criteria were selected as a conservative point of comparison that is generally consistent with the reasonably anticipated reuse of Parcel E-2 (open space) and the exposure pathways to be evaluated in the HHRA (direct exposure and inhalation). As discussed below, the soil RIEC were based on EPA Region 9 PRGs (EPA, 2004) and RWQCB environmental screening levels (ESLs) (RWQCB, 2005). These criteria were current when the data set was "locked" in January 2008 for the soil nature and extent evaluation and the HHRA. In May 2008, the RWQCB revised the ESLs (RWQCB, 2008) and, in September 2008, the EPA revised the PRGs (now referred to as regional screening levels, RSLs) (EPA, 2008). Because of the substantial effort associated with revising the soil nature and extent evaluation, the Navy compared the soil RIEC against the 2008 EPA RSLs and RWQCB ESLs. The results of this comparison revealed that, for the majority of COPCs, the soil RIEC were more conservative than the 2008 EPA RSLs and RWQCB ESLs. For COPCs with RIEC that were less conservative than either the 2008 RSLs or ESLs, the comparison determined that, with the exception of a single chemical (ethylbenzene), the difference did not affect the nature and extent evaluation because the RIEC exceedance frequency was comparable to the exceedance frequency relative to the more conservative 2008 criteria. As a result, the soil RIECs for all COPCs, except ethylbenzene, were not

revised for this Draft Final RI/FS Report. The nature and extent evaluation for ethylbenzene was updated to reflect the more conservative 2008 criteria.

The HHRA, presented in Section 7, evaluates the potential risk to humans for two future land use scenarios: open space (soil exposure from 0 to 2 feet bgs) and construction worker (soil exposure from 0 to 10 feet bgs). An evaluation relative to human health criteria is necessary to support the HHRA, particularly considering the wider range of chemicals and greater exposure depths, as compared with the SLERA. The SLERA, also presented in Section 7, evaluates the potential ecological risk to terrestrial wildlife (soil exposure from 0 to 3 feet bgs). The SLERA also presents a focused nature and extent evaluation using PSCs developed for terrestrial wildlife. Both of these risk assessments provide a separate analysis of COPCs and COPECs and, in general, are consistent with those chemicals selected for discussion in this section.

Table 4-1 presents the RIEC for each chemical. The various criteria that form the basis of the RIEC are also summarized in Table 4-1. The RIEC were selected using the following steps:

- Evaluation of current human health criteria for direct exposure to soil: RIEC were based on EPA Region 9 PRGs for industrial soil action levels (EPA, 2004). For chemicals with more stringent toxicity criteria, as established by the California Environmental Protection Agency (Cal/EPA), RIEC were adjusted based on information provided in the environmental screening level (ESL) document prepared by RWQCB (2005). The values specified in Table K-2 of the ESL document (direct exposure screening levels for commercial/industrial worker exposure scenario) were used because they were most comparable to the methods used in calculating the PRGs. In most cases, RIEC were established at concentrations corresponding to either a cancer risk of 1×10^{-6} or a noncancer HQ of 1.0 (if both a cancer and noncancer criteria were available, the lower value was selected). In some cases, RIEC were set at the saturation limit (as indicated in EPA Region 9 PRGs), if that concentration for a given chemical was lower than its corresponding cancer or noncancer concentration. The saturation limit is the chemical concentration at which soil pore air and pore water are saturated with the chemical and the adsorptive limits of the soil particles have been reached.
- Evaluation of current human health criteria for inhalation exposure: For volatile and semivolatile chemicals, the values specified in Table E-1b of the ESL document (soil screening levels for evaluation of potential vapor intrusion concerns) were used to provide an initial evaluation of the inhalation exposure pathway (RWQCB, 2005). The vapor intrusion screening values were calculated using the "User's Guide for Subsurface Vapor Intrusion into Buildings" (EPA, 2003).

  RIEC established based on the inhalation pathway correspond to either a cancer risk of 1×10^{-6} or a noncancer HQ of 1.0. In Table 4-1, this value is represented as ESL Industrial 2005 (inhalation).

- Identification of criteria for chemicals without current human health criteria: Several chemicals did not have any current criteria specified by either EPA Region 9 or RWQCB. For such chemicals, the SDGI industrial criteria were selected, if available, as the RIEC. SDGI industrial criteria were established based on the 2000 EPA Region 9 PRGs (TtEMI, 2002d). Although the SDGI industrial criteria are no longer current, they represent conservative screening criteria for those chemicals without current human health criteria.
- Evaluation of laboratory MDLs against human health criteria: The human health criteria for two PAHs, benzo(a)pyrene and dibenzo(a,h)anthracene, were lower than the laboratory MDL as specified in the SDGI. The RIEC for these compounds were set at the MDL of 0.33 mg/kg, consistent with the SDGI industrial criteria (TtEMI, 2002d).
- Comparison of HPALs against human health criteria: For metals with established ambient levels, the lowest risk-based value was compared with the HPAL and the greater value was selected as the RIEC. In the case of chromium, cobalt, and nickel, which have sample-specific HPALs (discussed further in Section 4.1.3.3), the RIEC selection was performed for each sample.
- Evaluation of petroleum hydrocarbon detections: Petroleum hydrocarbons are not classified as a CERCLA hazardous substance (42 USC § 9601[14]); therefore, they are excluded from consideration under the CERCLA process unless petroleum hydrocarbons are commingled with hazardous substances regulated under the CERCLA program. A screening evaluation was conducted to identify areas where petroleum hydrocarbons are commingled with other organic and inorganic chemicals that are regulated under CERCLA. The primary RIEC used in this evaluation is the HPS source criterion established under the HPS petroleum program (Shaw Environmental, Inc. [Shaw], 2007). This criterion sums all TPH categories (gasoline-range, diesel-range, and motor-oil range) and compares it against a total TPH criterion of 3,500 mg/kg. To provide a basis for evaluating detections of individual TPH categories, the values specified in Table K-2 of the ESL document (RWQCB, 2005) were used as supplemental RIEC.

4.1.3.3. Hunters Point Ambient Levels

HPALs were calculated using probability plots and histograms generated for 14 metals (antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, molybdenum, selenium, silver, thallium, vanadium, and zinc) and lithologic category using both original and logarithmically transformed data (PRC, 1995a). These plots were assessed to identify a cut-off value (threshold limit), separating the background population from the contaminated population. In some instances, these plots were also used to identify and exclude outliers from a data set of concern.

Magnesium-based regression plots were generated for three metals (chromium, cobalt, and nickel). To approximate a normal distribution, the original data sets were logarithmically transformed. The transformed data were then used to generate regression plots of magnesium versus chromium, cobalt, and nickel. Outliers were visually identified and excluded from each data set. A regression line was obtained for each data set using the least squares method. The regression line and the 90 percent confidence interval for the regression line are included on each plot. The 90 percent confidence interval represents the 95 percent one-sided (upper or lower) confidence limit for the regression line. A sample is considered

affected by site-related activities (that is, greater than the ambient level) when chromium, cobalt, or nickel concentrations exceed the calculated naturally occurring concentrations at a statistically significant level (95 percent upper confidence limit [UCL]).

Nickel was reevaluated based on a nickel-cobalt regression, and the results were used in the RIEC selection on a sample-by-sample basis. The nickel-cobalt regression equation was presented in the "Draft Final Technical Memorandum, Nickel Screening and Implementation Plan, Hunters Point Shipyard, San Francisco, California" (TtEMI, 1999).

4.1.3.4. Graphical Presentation of Focused Evaluation Results

To evaluate the spatial distribution of chemicals exceeding the RIEC, parcel-wide figures were prepared that show all chemical results relative to the corresponding RIEC. The figures present soil data in three separate depth ranges (0 to 2 feet bgs, 2 to 10 feet bgs, and greater than 10 feet bgs) to be consistent with the depth ranges evaluated in the HHRA. The figures are referenced in the nature and extent evaluations for each of the three study areas at Parcel E-2: the Landfill Area, the Panhandle Area, and the East Adjacent Area. It is important to note that these figures are intended to focus the nature and extent evaluation and should be used in conjunction with the text and tables presented later in this section, as well as with the complete analytical results provided in Appendix J1.

Soil data within the Landfill Area is presented in a similar manner as for the Panhandle Area and East Adjacent Area for consistency purposes. However, the methods used in the nature and extent evaluation for Landfill Area soil (Section 4.2.4) differ from the methods used for soil in the Panhandle and East Adjacent Areas (Sections 4.3.2 and 4.4.2), In the Landfill Area, soil is mixed within the contiguous solid waste (discussed in Section 4.1.1.1), and the nature of the solid waste combined with the chemical characteristics of the soil fill determines the nature of the material contained within the Landfill Area. Therefore, chemical data in Landfill Area soil are used only to assess (1) the general magnitude of chemical concentrations relative to the RIEC and (2) the general extent of RIEC exceedances relative to the landfill waste volume. This assessment will provide a basis for determining whether lesser quantities of hazardous wastes are present in the landfill as compared with municipal wastes, which is one evaluation factor outlined in EPA presumptive remedy guidance (provided in Appendix H of this report). The use of EPA presumptive remedy guidance in this RI/FS Report, as it pertains to the Landfill Area, was discussed in Sections 1.4.1 and 1.4.3.

In contrast, the Panhandle and East Adjacent Areas contain soil with isolated waste deposits (see Section 4.1.1.2) and, as discussed in Section 1.4.2, require consideration more typical of a standard RI/FS. As a result, a more detailed nature and extent evaluation is performed for chemicals in Panhandle Area and East Adjacent Area soil. This evaluation uses samples adjacent to RIEC exceedances to determine whether the extent of chemical contamination is adequately delineated. An RIEC exceedance within a

given depth range will be considered adequately delineated if there are four or more nearby samples (within 150 feet) surrounding the exceedance (in a general north, south, east, and west direction) with concentrations less than the RIEC. The 150-foot distance is consistent with the definition of the 0.5-acre exposure areas (approximately 150 feet by 150 feet) used in the HHRA. The spatial criterion (general north, south, east, and west direction) is consistent with the sampling approach developed during the SDGI to delineate chemical exceedances in the Panhandle and East Adjacent Areas.

In addition, the soil data will be used to identify potential hot spots within the Landfill, Panhandle, and East Adjacent Areas. Hot spots consist of highly toxic or highly mobile material and may present a principal threat to human health or the environment (EPA, 1991a). For the purpose of the RI portion of this report, soil hot spots are defined as locations containing chemical concentrations 100 times greater than the corresponding RIEC. This criterion is based on the following rationale:

- For most carcinogenic chemicals, the RIEC correspond to an approximate ELCR of 1×10^{-6}, which is the "point of departure" risk level specified in the NCP (55 Federal Register 8848, March 8, 1990).
- A concentration that is 100 times the RIEC would correspond to an approximate ELCR of 1×10^{-4}, which is the upper limit of the acceptable risk range specified in the NCP (55 Federal Register 8848, March 8, 1990).
- Concentrations greater than 100 times the RIEC would be considered outside of the acceptable risk range and, by extension, are a reasonable basis for assessing "highly toxic" material.

As an additional evaluation step for all areas, analytical results with LRLs greater than the corresponding RIEC are identified on each figure to evaluate the potential effect of elevated LRLs on the nature and extent evaluation.

4.2. LANDFILL AREA

The nature and extent of contamination at the Parcel E-2 Landfill was evaluated based on information from the previous investigations and TCRAs described in Section 3. Based on data from the 28 soil borings, 18 monitoring wells, and 25 test pits extended within the Landfill Area, the solid waste is composed primarily of domestic refuse and construction debris. However, the following information indicates that industrial wastes were also disposed of in or around the Parcel E-2 Landfill:

- The IAS indicated that sandblast waste, asbestos-containing debris, paint sludge, solvents, and waste oils were deposited in the Parcel E-2 Landfill (NEESA, 1984).
- The HRA indicated that the Parcel E-2 Landfill, along with other areas within Parcel E-2, was a disposal area for radioluminescent devices (primarily containing radium-226). The HRA also indicated that the landfill was a potential disposal area for (1) wastes from decontamination of ships used in atomic testing, (2) building debris from demolition of radiologically impacted buildings used by the NRDL, and (3) materials used in radiological experiments by NRDL (NAVSEA, 2004).

- An oily waste area was identified on Navy drawings along the western perimeter of the Landfill Area (Navy, 1974). During preliminary closure activities in 1974, ponded liquid was removed and the top 6 inches of soil at the oily waste area was scarified before the soil cover was placed. Based on borings and exploratory trenches, this area also was partially filled with solid waste during closure; therefore, this area is included within the boundaries of solid waste at the Parcel E-2 Landfill (Appendix B).
- Triple A allegedly disposed of industrial debris, sandblast waste, oily industrial sand, and asphalt over an area of approximately 5 acres along the shoreline of Parcel E-2. In addition, Triple A allegedly stored unlabeled, deteriorating, uncovered drums with their contents exposed to the elements in the southeast corner of Parcel E-2 (Figure 1-11 of this report; San Francisco District Attorney, 1986).
- Waste fuel and waste oil containing PCBs were used at the Parcel E-2 Landfill as dust suppressants (TtEMI, LFR, and U&A, 1997).

The following subsections discuss the nature and extent of solid waste (Section 4.2.1 and Section 4.2.2), landfill gas (Section 4.2.3), and chemicals within the soil fill (Section 4.2.4).

4.2.1. Fill and Solid Waste Characteristics

The nature and extent of solid waste at the Parcel E-2 Landfill was evaluated based on the physical presence of contiguous industrial or municipal-type wastes. Based on a review of soil borings drilled in the central portion of the landfill from 1988 to 1992, landfill waste consists of wood, paper, plastic, metal, glass, nails, foam, copper wire, cloth, rubber, plywood, ceramics, asphalt, concrete, and bricks, which are mixed with sand, clay, and gravel fill. The waste is usually brown to black. In many areas within the landfill, the waste is mixed with construction debris. Construction debris is typically inert. As discussed in Section 4.1.1, inert waste does not contain hazardous waste or soluble pollutants at concentrations exceeding applicable water quality objectives, nor does it contain significant quantities of decomposable waste (as defined in 27 CCR § 20230). Inert fill material is not expected to generate leachate that would create potential risks to human health or the environment.

In some areas in and near the Parcel E-2 Landfill, solid waste and soil fill or construction debris materials appear to have a sheen that may be from petroleum products (Appendix B). Some of the wood debris was noted in boring logs as exhibiting a creosote odor, and the fibrous material was noted as possible asbestos-containing material (TtEMI, LFR, and U&A, 1997). Because soil within the Landfill Area is mixed with solid waste, the chemical characteristics of the soil fill (Section 4.2.4) combined with the nature of the solid waste determine the nature of the material contained within the Landfill Area. These characterization data are used to evaluate whether the containment presumption, as outlined in EPA guidance (EPA, 1993a, 1993b, and 1996; provided in Appendix H of this report), is appropriate for Parcel E-2.

Information on the waste types encountered within the Landfill Area was obtained during remediation activities within the PCB Hot Spot Area, which extended into a small portion the Landfill Area (see Figure 1-3). Out of a total excavation volume of 44,500 cubic yards, 533 cubic yards of soil and fire brick was segregated as radiologically impacted. Also, 40 radiological devices, 78 cubic yards of metal debris, and 19 pieces of other radioactively contaminated debris were identified within the removal area (TtECI, 2007a). In addition, 41 pieces of MPPEH were encountered in the excavation area, consisting primarily of expended cartridge casings of various calibers and protective caps, but also included an empty 5-inch practice projectile and a 3-pound practice bomb (TtECI, 2010). Of the 41 MPPEH items discovered in the removal area, 20 items were verified to not present an explosive hazard and were reclassified as MDAS. The remaining 21 MPPEH items appeared to have been subject to previous demilitarization actions and could not be completely inspected by UXO technicians for possible explosive hazards. Although the type, age, and condition of these 21 MPPEH items did not suggest a high potential for residual energetic material, the Navy, as a precautionary measure, properly handled, transported, and disposed of these items as either material documented as an explosive hazard (MDEH) (20 items consisting of expended cartridge casings of various calibers) or munitions and explosives of concern (MEC) (1 item. 3-pound practice bomb) (TtECI, 2010). Additional information on the findings from the removal activities within the East Adjacent Area is provided in Section 4.4.1.

In September 1997, during installation of the sheet-pile wall in the Landfill Area, an obstruction was encountered at a depth of about 20 feet bgs, accompanied by a release of pressurized gas that escaped to the surface. The atmosphere in this area was monitored for health and safety purposes, specifically for explosive conditions (using an LEL meter) and various compounds, including natural gas, chlorine, and hydrogen sulfide (using colorimetric indicator tubes). Sporadic detections of atmospheric conditions greater than 10 percent of the LEL and chlorine gas greater than 5 ppm were encountered during health and safety monitoring. Approximately 80 feet of the sheet-pile wall (as originally designed) was realigned to avoid the subsurface obstructions. The alternate alignment consisted of an approximate 50-foot-long section that was offset approximately 20 feet from the design alignment, with the remaining portion gradually angling back to the design alignment. The remainder of the sheet-pile wall was completed with no additional releases of subsurface gas (IT, 1999).

Solid waste in the landfill is in contact with groundwater and constitutes the majority of the A-aquifer within the Landfill Area. Additional information on the fill and solid waste characteristics is provided in the Landfill Lateral Extent Evaluation Report (Appendix B to this report).

4.2.2. Landfill Solid Waste Extent

The Landfill Lateral Extent Evaluation Report presents the results of the evaluation of data collected from test pits and soil borings installed during the NDGI, along with historic soil and well boring log information, to assess the lateral and vertical extent of solid waste at the Parcel E-2 Landfill. All

information on the extent of solid waste at the landfill in this section is from the Landfill Lateral Extent Evaluation Report (Appendix B to this report).

4.2.2.1. Lateral Extent of Solid Waste

Figure 3-1 shows the estimated lateral extent of solid waste at the Parcel E-2 Landfill, along with the locations of test pits and soil borings used in the lateral extent evaluation. The lateral boundaries of the solid waste are based on the soil borings and test pits shown on Figure 3-1, as discussed below.

Along the northern perimeter of the Parcel E-2 Landfill, the landfill lateral extent was encountered along the fence line at boring TPBWE01 and test pits WE01, WE02B, WE03B, WE04B, WE05B, and WE06A. The northern extent continues just north of TPBWE09D, and then just south of TPBWE10C, where no solid waste was encountered. From this location, the extent of solid waste continues south through boring TPBWE11, which contained only minor amounts of wood debris.

The eastern edge of the solid waste is located beneath the interim landfill cap. Based on a review of historic information that included boring logs, aerial photographs, and maps, the lateral extent of solid waste ends approximately 10 feet before the eastern edge of the cap.

At the southern end of the Parcel E-2 Landfill, solid waste was not observed in test pits WE15, WE16, or WE22. Although solid waste was not encountered in WE22, this location is considered to define the southern extent of the solid waste, because debris placed by Triple A is present along the shoreline in this area. Because of the lack of solid waste in WE15 and WE16, solid waste is considered to extend just north of these test pits. Test pits WE21B and WE20B did not contain solid waste; therefore, they are considered as defining the western extent of solid waste at the landfill. The nearest test pits to these locations (WE21A and WE20A, respectively) contained solid waste. Farther south along the western perimeter, the extent of solid waste is considered to be located between test pits WE19C and WE19B, WE18D and WE18C, and WE17F and WE17E, because solid waste was present in test pits WE19B, WE18C, and WE17E, but not in test pits WE19C, WE18D, or WE17F, respectively. As shown on Figure 3-1, additional physical characterization was performed in the area between test pits WE16 and WE 17F that further delineates the landfill waste (see Figures 3-2 and 4-1).

These assessments provide a good estimate of the contiguous solid waste associated with the Parcel E-2 Landfill but, as discussed in Sections 4.3.1 and 4.4.1, isolated solid waste is present at numerous locations in the Panhandle and East Adjacent Areas. As discussed in Section 1.4.2, site conditions at these areas and their proximity to the Landfill Area present opportunities to streamline the remedy evaluation process by focusing on remediation technologies that can be closely aligned with actions at the Landfill Area. This type of focused remedy evaluation process for the Panhandle Area, East Adjacent Area, and Shoreline Area is consistent with the streamlining approach outlined in pages 8704-8705 of the 1990 NCP

Preamble (55 Federal Register 8704-8705, March 8, 1990) and in Section 4.1.3.1 of EPA's RI/FS guidance (EPA, 1988a).

4.2.2.2. Vertical Extent of Solid Waste

Figures 2-3 through 2-8 show the vertical extent of solid waste at the Parcel E-2 Landfill, along with the locations of the test pits and soil borings used in the extent evaluation. The vertical boundaries of the solid waste are discussed below.

Soil boring data confirm that the bottom of the solid waste is usually deeper than the test pit excavation depths. As a result, soil borings were drilled at most test pit locations to determine the depth of solid waste. Data from the test pits and historic soil borings were used to construct geologic cross sections that show the depth and extent of waste at the landfill (Figures 2-3 through 2-8).

The waste is generally located between 21 feet above and 14 feet below msl. The waste generally varies from 10 to 25 feet thick. The solid waste lies atop Bay Mud clays in the southern and eastern portions of the landfill and atop B-aquifer sands in the northwestern area of the landfill. In other areas, solid waste is bounded by fill (construction debris, sand, and gravel). In most borings, solid waste is located both above and below the water table. The only area where solid waste is located above the water table is in the northwest corner of the landfill.

4.2.3. Landfill Gas

This subsection discusses the nature and extent of landfill gas at Parcel E-2. The evaluation methods were discussed in Section 4.1.2. The results of relevant landfill gas investigations are summarized below, including those related to the landfill gas characterization study (Appendix A) and the landfill gas TCRA (Appendix F). This subsection also presents a description of the ongoing landfill gas activities, based on the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c).

4.2.3.1. Landfill Gas Characterization

As discussed in Sections 3.2 and 4.1.2, the landfill gas characterization investigation was conducted in 2002 as part of the NDGI to define the nature and extent of landfill gas within and immediately adjacent to the Parcel E-2 Landfill. Section 3.2 discusses field activities and the report associated with this investigation. Data evaluation and results for the main components of the investigation are described below and include (1) outdoor air monitoring and building atmosphere surveys, (2) a subsurface soil gas survey, and (3) GMP installation and monitoring. Unless otherwise indicated, all information in this subsection is from the Landfill Gas Characterization Report (provided in Appendix A of this report). Figure 3-1 shows the locations of the soil gas survey locations and GMPs at Parcel E-2. Outdoor air and building surveys locations are shown on Figure 3-4.

Outdoor Air Monitoring and Building Atmosphere Surveys

Data from outdoor air monitoring and building atmosphere surveys were evaluated to assess whether methane (the main component of landfill gas) was present in outdoor air, buildings, or subterranean structures within 300 feet of the Parcel E-2 Landfill at concentrations exceeding the 27 CCR regulatory limit of 1.25 percent by volume in air (25 percent of the LEL). Figure 4-2 shows the air monitoring locations within 300 feet of the landfill. Air monitoring data were also evaluated to assess whether NMOCs were present at concentrations exceeding EPA Region 9 PRGs for ambient air (EPA, 2004).

Results of the outdoor air survey indicated that landfill gas is not present in the breathing zone within the Landfill Area; in building atmospheres within 300 feet of the Landfill Area; or within surveyed, accessible buildings outside the 300-foot perimeter. Methane was not detected at locations to the east, south, or west of the landfill during the outdoor air survey. Methane was detected at several locations north of the landfill as summarized below.

- Methane exceeded the LEL at the ground surface around the light pole near the southwestern corner of the UCSF compound (Location F, subsequently referred to as simply the "light pole").
- Methane detections were between 5 and 18 percent of the LEL at two locations along a suspected utility corridor along the fence between the landfill and the UCSF compound (Locations A and C).
- Methane exceeded 25 percent of the LEL at a location on the basketball court on the UCSF compound, just west of the Building 830 crawlspace (Location B).

During additional outdoor air monitoring performed using field instruments within a month of the initial outdoor air survey during spring 2002, methane was not detected at Locations A, B, C, or F. Air samples were collected and analyzed at three locations around the light pole and four locations within the Building 830 crawlspace. Methane was detected at a maximum concentration of 0.6 percent of the LEL in one light pole sample; all gas samples from within the Building 830 crawlspace were less than 1 percent of the LEL. Based on these results, the concentrations of methane in outdoor air around the landfill were considered negligible. Outdoor air at the light pole and Locations A and B were monitored on a monthly basis for more than 2 years following the removal action to verify that methane concentrations remained less than 1 percent (TtEMI and ITSI, 2004c). Monitoring at these locations was discontinued in August 2006 after methane and NMOC concentrations were shown to consistently be less than action levels. The Navy's decision to discontinue monitoring at these locations was consistent with the rationale presented in the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c).

Outdoor air monitoring performed on the landfill surface (consisting of breathing zone measurements at cap penetrations and a surface transect over and around the cap surface) did not detect methane at concentrations exceeding 25 percent of the LEL. Methane was detected at concentrations exceeding 25 percent or more of the LEL at several wells (shown on Figure 4-2); however, these measurements were

taken at the top of the well casing, with the wells open to the atmosphere, and were not representative of outdoor air within the Landfill Area. Based on these results, the amount of landfill gas in outdoor air within the landfill limits was considered to be negligible. Methane results from the outdoor air survey are shown on Figure 4-2, and the outdoor air field data are presented in Table 3 in Appendix A.

Laboratory results (presented in Table 4 in Appendix A) indicated that certain NMOCs were present in outdoor air at concentrations exceeding their respective PRGs at two locations, as summarized below.

- At the light pole near the southwestern corner of the UCSF compound (Figure 4-2), 1,1,2,2-tetrachloroethane, 1,3,5-trimethylbenzene, benzene, and PCE exceeded the 2004 PRGs for ambient air. Chloromethane and ethylbenzene concentrations exceeded the 2002 PRGs for ambient air; however, changes reflected in the 2004 PRGs resulted in these compounds no longer exceeding the established risk-based criteria.
- In the Building 830 crawlspace, benzene and PCE exceeded the 2004 PRGs for ambient air. Chloromethane concentrations exceeded the 2002 PRGs for ambient air; however, changes reflected in the 2004 PRGs resulted in chloromethane no longer exceeding the established risk-based criteria.

No NMOCs were detected at concentrations greater than PRGs in samples collected at these locations in November 2002. The November 2002 monitoring was performed after the gas control system was installed and active gas extraction was initiated from the extraction wells within the UCSF compound, as part of the landfill gas TCRA.

Subsurface Soil Gas Survey

Data from the subsurface soil gas survey were evaluated to assess the nature and extent of methane and other landfill gas components (such as NMOCs) in the vadose zone at the Parcel E-2 Landfill. Data were evaluated to identify subsurface locations where methane exceeded 25 percent of the LEL (1.25 percent by volume) and where NMOCs exceeded a screening criterion of 5 ppmv above background concentrations, as measured at a location upwind from the sampling locations. Field screening data and laboratory results corresponded well to one another. The main findings of the data evaluation are summarized below.

- Methane was detected at concentrations exceeding 25 percent of the LEL along the northern side of the landfill, where solid waste extends up to the boundary of the UCSF compound. NMOCs were also detected in this area at concentrations exceeding 5 ppmv above background.
- Methane was detected on the UCSF compound at concentrations exceeding the LEL, indicating that methane had migrated north of the landfill beneath the UCSF compound.
- No methane was detected north of the UCSF compound on Crisp Avenue. Thus, methane had not migrated beyond the UCSF compound beneath non-Navy property north of Crisp Avenue (former Parcel A).

- Methane concentrations were not detected at levels exceeding 25 percent of the LEL along the east, south, and west sides of the landfill. Thus, methane dissipated quickly with distance from the landfill in these directions.
- During field screening, NMOCs were detected at 11 soil gas locations at concentrations exceeding 5 ppmv above background.
- At one location (SG12) east of the delineated extent of waste, near IR04MW13A, laboratory analysis detected PCE, TCE, and their degradation products at concentrations above the shallow soil gas screening levels for evaluation of potential vapor intrusions.

Figure 4-3 shows the extent of landfill gas based on the results of the subsurface soil gas survey. Tables 5 and 7 in Appendix A present field screening and laboratory analytical results of the soil gas survey, respectively. As discussed in Section 3.9, the Navy performed an interim removal action to remove landfill gas that had migrated beneath the UCSF compound and to control future migration north of the solid waste boundary.

The soil gas survey identified the nature and approximate lateral extent of landfill gas prior to the landfill gas removal action. The nature and extent delineation was further refined during several rounds of sampling conducted at GMPs installed in 2002, as discussed in the following subsection. The landfill gas barrier wall installed to control landfill gas migration is shown on Figure 4-3 and represents the current northern extent of landfill gas above 25 percent of the LEL.

Gas Monitoring Probe Installation and Monitoring

Data from GMPs installed in 2002 were evaluated to monitor the presence of landfill gas at Parcel E-2, the UCSF compound, and along Crisp Avenue. Monitoring was conducted on a weekly basis using field instruments. Four rounds of sampling were conducted between April and November 2002. Methane concentrations were compared with 27 CCR limits. NMOC concentrations were not compared with any specific criteria; rather, their concentrations were monitored over time during four rounds of sampling conducted in 2002. Table 4-2 lists the detection frequencies and range of results for NMOCs collected from GMPs during this time period. Findings of the data evaluation are summarized below.

During the first three rounds of monitoring from April to July 2002, methane concentrations exceeded the LEL (5 percent by volume) in GMP01A through GMP12; these GMPs are all located along the fence line on the northern edge of the Parcel E-2 Landfill. Methane was not detected in any of the GMPs located along Crisp Avenue (GMP13 through GMP19). Methane was also not detected in GMPs 20 and 21 located on the western edge of the landfill.

The fourth round of monitoring was conducted in November 2002, after the initiation of active gas extraction within the UCSF compound. Methane concentrations decreased to less than the LEL in all GMPs along the northern edge of the Parcel E-2 Landfill except at GMP08A, which is located on the northeastern side of the landfill. Results measured during this round also indicated that methane

concentrations in the UCSF compound GMPs were all less than the LEL for methane. As during previous sampling rounds, methane was not detected in the GMPs on Crisp Avenue (GMP13 through GMP19). This finding further supported the conclusion that methane had not migrated beyond the UCSF compound beneath non-Navy property north of Crisp Avenue (former Parcel A).

Several NMOCs were detected during GMP monitoring, with the highest concentrations detected in GMPs around the perimeter of the Parcel E-2 Landfill and within the UCSF compound. NMOC concentrations were detected in the GMPs located along Crisp Avenue, but at lower concentrations than concentrations detected at the GMPs along the fence line and within the UCSF compound. NMOC concentrations at all GMPs decreased after the landfill gas extraction system became operational in October 2002.

A risk assessment was conducted prior to operation of the gas extraction system to evaluate potential human health risks resulting from the low levels of NMOCs detected in GMPs along Crisp Avenue. An additional risk assessment was performed on NMOC data from GMPs within the UCSF compound. As discussed in Section 4.1.2.2, the assessments concluded that NMOC concentrations do not pose an unacceptable risk to human health.

4.2.3.2. Landfill Gas Removal Action

Based on the results of the landfill gas characterization investigation, the Navy initiated a TCRA to (1) remove landfill gas and reduce subsurface methane concentrations at the UCSF compound to less than the LEL (5 percent by volume in air); and (2) control future landfill gas migration to off-site areas. The TCRA consisted of active landfill gas extraction, post-extraction monitoring, and a response action to address potential methane migration pathways through the landfill gas control system. The results of each of these TCRA components are described in the following paragraphs. Unless otherwise indicated, all information in this subsection was derived from the Landfill Gas TCRA Closeout Report (TtEMI, 2004a; Appendix F).

Active Landfill Gas Extraction

The goals of the active extraction phase of the TCRA were to (1) reduce methane to concentrations equal to or less than 0.5 percent by volume in air in all extraction wells (EX-1 through EX-10); and (2) to reduce methane to concentrations equal to or less than 1 percent by volume in air in all GMPs within the UCSF compound (GMP22 through GMP26). Two cycles of active extraction were planned but not needed at all wells to achieve these goals. The active extraction phase of the TCRA was conducted from October 4, 2002, to January 20, 2003, when the TCRA goals for reducing the concentrations of methane were achieved. From January 2003 to present, active landfill gas extraction is conducted as necessary to ensure landfill gas concentrations do not exceed action levels.

Post-Extraction Monitoring

The landfill gas control system consists of an HDPE barrier wall, a gas collection trench sealed (on top) with bentonite, a horizontal perforated gas collection pipe, five gas vents, and a mobile active extraction unit to assist venting when necessary. Construction of the landfill gas control system was completed on October 3, 2002. After active gas extraction was halted on January 20, 2003, methane concentrations were monitored in extraction wells and GMPs, weekly for 4 weeks and then monthly for 4 months. At the end of each monitoring period (weekly and monthly), gas samples were collected in Summa™ canisters from GMP22 through GMP26 (located within the UCSF compound) and analyzed at an off-site stationary laboratory to confirm the field monitoring results. GMP analytical results are shown in Appendix J1.

During the first 2 weeks of monitoring, the landfill gas control system was operated passively. However, methane levels at GMP01A began to rise within 1 week after extraction was halted, with corresponding increases in adjacent GMPs to the east (GMP02A) and west (GMP12). To address these methane increases, the landfill gas control system was switched from passive to active mode on February 5, 2003, by extracting gas through passive vent (PV)-01 at a low-flow rate. Laboratory analysis of GMPs (Appendix J1) demonstrates that gas migration is effectively controlled through operation of the landfill gas control system. The activities of the TCRA have successfully controlled the migration of landfill gas beneath non-Navy property.

Methane Migration Response Action

During active gas extraction and subsequent monitoring, increases in methane concentrations were observed that were consistent with a physical problem with the landfill gas control system that allowed methane to migrate beyond the barrier wall. A detailed evaluation was conducted to determine the cause of the methane increases and to identify appropriate mitigative measures; the evaluation is documented in Appendix K to the Landfill Gas Removal Action Closeout Report (provided in Appendix F to this report) and briefly summarized below.

Data collected from temporary gas probes installed along the gas collection trench indicated that methane was migrating in two locations either through a tear in the barrier or over the barrier through the bentonite seal.

The following response actions were taken to address methane migration:

- A grout curtain was installed in the gas collection trench on the north (UCSF) side of the HDPE barrier wall to control the migration of methane gas through the barrier wall. The grout curtain was installed in June 2003 using pressure grouting to fill voids in gravel and soil along the northern side of the barrier wall and to seal any tears or separated seams. Figure 1-3 shows the grout curtain location.

- The bentonite cover was rehydrated to control the migration of methane gas above the barrier wall. Trenches were excavated to the top of the barrier wall in areas where temporary gas probe monitoring results indicated methane migration was occurring. Inspection of these trenches indicated several areas of inadequate hydration of the bentonite cover, with bentonite pellets clearly visible. The entire length of the bentonite cover was rehydrated by injecting water into the cover using a water jet constructed of perforated PVC pipe.
- A fifth PV (-05) was added to increase the venting capability of the trench. The vent was created by converting one of the risers connected to the main pipe of the barrier trench to a vent and connecting it to a treatment unit. The new passive vent was connected between PV-01 and PV-02, in the area of the observed methane increases. Figure 3-6 shows all the passive vent locations.

Based on subsequent monitoring, these response actions have reduced gas migration beneath the UCSF compound. Ongoing landfill gas monitoring and control system operation, in accordance with the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c), is performed to control gas migration beneath the UCSF compound.

4.2.3.3. Ongoing Landfill Gas Activities

The ongoing landfill gas monitoring and control system operation is based on the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). Monitoring is conducted to verify that hazardous levels of landfill gas are not migrating beyond the fence line of the landfill and onto the UCSF compound. The monitoring locations include 32 GMPs and 5 PVs, 4 groundwater wells on the landfill cap, and outdoor air and subterranean structure locations both on Parcel E-2 and within the UCSF compound (Figure 3-6). As discussed in Section 3.9, regular monitoring is being conducted at GMPs and along the gas control system. In addition, the gas control system is inspected and maintained on a regular basis. The gas monitoring reports present results of the landfill gas monitoring, the status of the gas extraction system (active operation and passive operation), maintenance observations on the gas control system, and meteorological data (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, 2008a through 2008c, 2008e, 2009a through 2009d, and 2010a through 2010c).

4.2.4. Chemicals Detected in Soil

Soil data within the Landfill Area is presented in a similar manner as for the Panhandle Area and East Adjacent Area for consistency purposes. However, as discussed in Section 4.1.3.4, chemical data in Landfill Area soil are used only to assess (1) the general magnitude of chemical concentrations relative to the RIEC and (2) the general extent of RIEC exceedances relative to the landfill waste volume. In addition, potential soil hot spots are identified at locations containing chemical concentrations 100 times greater than the corresponding RIEC. EPA recommends that hot spots in municipal landfills be identified and evaluated to decide if more extensive characterization and development of remedial alternatives is

appropriate (EPA, 1991a). The evaluation decision of whether or not these hot spots require more extensive characterization and development of remedial alternatives is summarized in Section 8.

As discussed in Section 4.1.3, comprehensive data summary tables for the Landfill Area are presented in Appendix J1 by chemical category (i.e., metals, pesticides, PCBs, SVOCs, VOCs, and petroleum hydrocarbons) and depth interval (0 to 2 feet, 2 to 10 feet, and greater than 10 feet). In addition, each table presents a series of summary statistics of the data for each chemical, such as the number of samples collected; the number of results that exceed the detection limit; minimum and maximum concentrations detected; and median, mean, and standard deviation of the detected results for each chemical. Each table also lists all potential screening criteria and quantifies the number of results that exceed each criterion.

The following subsections describe the chemical characteristics of the soil fill within the Landfill Area.

4.2.4.1. Landfill Area Surface Soil (0 to 2 feet bgs)

Table 4-3 presents a statistical summary for all of the analyses performed within the depth range of 0 to 2 feet below the surface of the landfill cap. Table 4-4 lists the chemicals that were detected within this depth range at concentrations exceeding the RIEC.

Metals

In total, 28 samples were analyzed for one or more metals. As shown in Table 4-3, nine metals (antimony, barium, beryllium, cobalt, copper, lead, manganese, mercury, and zinc) were detected at concentrations greater than HPALs. As shown in Table 4-4, one of the metals (lead) was detected at concentrations exceeding the selected RIEC. None of the LRLs for the metals exceeded the selected RIEC.

Lead was detected in all 22 samples analyzed. This metal was detected in 19 of the 22 samples at concentrations greater than the HPAL (8.99 mg/kg). One sample contained concentrations exceeding the selected RIEC (800 mg/kg). As shown on Figure 4-4, the sample results exceeding the RIEC are near samples with concentrations that are less than the RIEC. None of the LRLs for lead exceeded the selected RIEC. Based on the available characterization data, the extent of lead in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (9,700 mg/kg) is not indicative of a hot spot. However, lead concentrations greater than the RIEC were reported in the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Pesticides and PCBs

In total, 23 samples were analyzed for one or more pesticides and PCBs. As shown in Table 4-3, eight pesticides (4,4'-dichlorodiphenyldichloroethane [DDD], 4,4'-dichlorodiphenyldichloro-ethene [DDE], 4,4'-DDT, alpha-chlordane, endosulfan sulfate, heptachlor epoxide, methoxychlor, and trans-chlordane),

and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected at least once at concentrations greater than the LRL. One pesticide (heptachlor epoxide) and total high risk PCBs were detected at concentrations exceeding the selected RIEC.

Heptachlor epoxide was detected in 2 of 22 samples analyzed. One sample had a concentration exceeding the selected RIEC (0.19 mg/kg). As shown on Figure 4-5, the exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. None of the LRLs for heptachlor epoxide exceeded the selected RIEC. Based on this information, the extent of heptachlor epoxide in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (0.39 mg/kg) is not indicative of a hot spot.

Total PCBs (high risk) were detected in 5 of 23 samples analyzed. Two samples contained total PCBs (high risk) at concentrations exceeding the selected RIEC (0.74 mg/kg). As shown on Figures 4-6 and 4-7, the samples are within the portion of the PCB Hot Spot Area that extends into the Landfill Area. In addition, seven of the LRLs for individual PCB compounds exceeded the selected RIEC. Based on the available characterization data, the extent of total PCBs (high risk) in soil within this depth range is limited when compared to the overall Landfill Area. However, total PCBs (high risk) within this depth range are present at concentrations exceeding the RIEC throughout the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Semivolatile Organic Compounds

In total, 24 samples were analyzed for SVOCs. As shown in Table 4-3, 28 SVOCs were detected at least once at concentrations greater than the LRL. The following 13 SVOCs had LRLs that exceeded RIEC due to dilutions of samples and the limitations of analytical methods at the time: 1,4-dichlorobenzene (DCB), 3,3'-dichlorobenzidine, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)-fluoranthene, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobenzene, indeno(1,2,3-cd)pyrene, naphthalene, n-nitrosodimethylamine, and n-nitroso-di-n-propylamine. However, five SVOCs—benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and naphthalene—were detected at concentrations exceeding the selected RIEC (Table 4-4).

Benzo(a)anthracene was detected in 11 of 24 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-8, these benzo(a)anthracene exceedances are within the area of the landfill and are near samples with concentrations that are less than the RIEC. In addition, LRLs for benzo(a)anthracene exceeded the selected RIEC in one sidewall sample. Based on the available characterization data, the extent of benzo(a)anthracene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (2.3 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 11 of 24 samples analyzed. This SVOC was detected in nine samples at concentrations exceeding the selected RIEC (0.33 mg/kg). As shown on Figure 4-9, these benzo(a)pyrene exceedances are within the area of the landfill and, in addition, LRLs for benzo(a)pyrene exceeded the selected RIEC in 10 locations. Based on the available characterization data, benzo(a)pyrene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (3.1 mg/kg) is not indicative of a hot spot.

Benzo(b)fluoranthene was detected in 13 of 24 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-10, these benzo(b)fluoranthene exceedances are within the area of the landfill and are near locations with concentrations less than the RIEC. In addition, LRLs for benzo(b)fluoranthene exceeded the selected RIEC in one sidewall sample. Based on the available characterization data, the extent of benzo(b)fluoranthene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (4.1 mg/kg) is not indicative of a hot spot.

Indeno(1,2,3-cd)pyrene was detected in 10 of 24 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-11, these indeno(1,2,3-cd)pyrene exceedances are within the area of the landfill and are near locations with concentrations less than the RIEC. In addition, LRLs for indeno(1,2,3-cd)pyrene exceeded the selected RIEC in one sidewall sample. Based on the available characterization data, the extent of indeno(1,2,3-cd)pyrene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (3.1 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 8 of 24 samples analyzed. As shown on Figure 4-12, this SVOC was detected in one sample at a concentration exceeding the selected RIEC (1.5 mg/kg). In addition, LRLs for naphthalene exceeded the selected RIEC in one sidewall sample. Based on the available characterization data, the extent of naphthalene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (2.12589 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

In total, 21 samples were analyzed for VOCs. As shown in Table 4-3, four VOCs (1,1,1-TCA, carbon disulfide, toluene, and vinyl acetate) were detected at least once at concentrations greater than the LRLs. As shown in Table 4-4, none of these VOCs was detected at concentrations exceeding the selected RIEC. None of the LRLs for the VOCs exceeded the selected RIEC.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH as gasoline (TPH-g), TPH as diesel (TPH-d), TPH as motor oil (TPH-mo), TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007).

None of the 23 samples contained total TPH at concentrations greater than the source screening criterion (3,500 mg/kg). As shown in Table 4-4, one sample from boring IR01B011 had a total oil and grease (TOG) concentration (5,000 mg/kg) exceeding the source screening criterion (3,500 mg/kg).

4.2.4.2. Landfill Area Subsurface Soil (2 to 10 feet bgs)

Table 4-5 presents a statistical summary for all of the analyses performed within this depth range. Table 4-6 lists the chemicals that were detected within this depth range at concentrations exceeding RIEC.

Metals

In total, 113 samples were analyzed for one or more metals. As shown in Table 4-5, all metals were detected at least once at concentrations greater than the LRL. Seventeen metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, vanadium, and zinc) were detected at concentrations greater than HPALs. Eight metals (antimony, arsenic, cadmium, chromium (total), copper, iron, lead, and vanadium) were detected at concentrations exceeding the selected RIEC (Table 4-6).

Antimony was detected in 78 of 113 samples analyzed. As shown on Figure 4-13, this metal was detected in 33 samples at concentrations greater than the HPAL (9.05 mg/kg) and in four samples at concentrations exceeding the RIEC (380 mg/kg). None of the LRLs for antimony exceeded the RIEC. Based on the available characterization data, the extent of antimony in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (1,930 mg/kg) is not indicative of a hot spot.

Arsenic was detected in 108 of 113 samples analyzed. As shown on Figure 4-14, this metal was detected in five samples at concentrations greater than the HPAL (11.1 mg/kg), which is the selected RIEC. None of the LRLs for arsenic exceeded the selected RIEC. Based on the available characterization data, the extent of arsenic in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (66.6 mg/kg) is not indicative of a hot spot.

Cadmium was detected in 80 of 113 samples analyzed. As shown on Figure 4-15, this metal was detected in 15 samples at concentrations greater than the HPAL (3.14 mg/kg), and 8 samples, including 1 grid sidewall sample, contained cadmium concentrations exceeding the selected RIEC (7.4 mg/kg). None of the LRLs for cadmium exceeded the selected RIEC. Based on the available characterization data, the extent of cadmium in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (330 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in all 113 samples analyzed. This metal was detected in 16 samples at concentrations greater than the location-specific HPALs, and 8 samples contained chromium concentrations exceeding the selected RIEC, which is based on the HPAL and the 2004 industrial PRG

(450 mg/kg), whichever is the higher value. As shown on Figure 4-16, all chromium exceedances are within the area of the landfill and most exceedances are near locations with concentrations less than the RIEC. None of the LRLs for chromium exceeded the selected RIEC. Based on the available characterization data, the extent of chromium in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (6,940 mg/kg) is not indicative of a hot spot.

Copper was detected in all 113 samples. This metal was detected in 54 samples at concentrations greater than the HPAL (124.3 mg/kg). As shown on Figure 4-17, three samples contained concentrations exceeding the selected RIEC (38,000 mg/kg). None of the LRLs for copper exceeded the selected RIEC. Based on the available characterization data, the extent of copper in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (175,000 mg/kg) is not indicative of a hot spot.

Iron was detected in all 87 samples. This metal was detected in four samples at concentrations exceeding the selected RIEC (100,000 mg/kg). As shown on Figure 4-18, all four iron exceedances are within the area of the landfill and most exceedances are near locations with concentrations less than the RIEC. None of the LRLs for iron exceeded the selected RIEC. Based on the available characterization data, the extent of iron in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (201,000 mg/kg) is not indicative of a hot spot.

Lead was detected in 112 of 113 samples analyzed. This metal was detected in 106 samples at concentrations greater than the HPAL (8.99 mg/kg). Sixteen of the samples (14 locations) contained lead concentrations exceeding the selected RIEC (800 mg/kg). As shown on Figure 4-19, all lead exceedances are within the area of the landfill and most of the exceedances are near locations with concentrations less than the RIEC. None of the LRLs for lead exceeded the selected RIEC. Based on the available characterization data, the extent of lead in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (3,840 mg/kg) is not indicative of a hot spot. However, lead concentrations greater than the RIEC were reported throughout the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Vanadium was detected in all 113 samples analyzed. This metal was detected in ten samples at concentrations greater than the HPAL (117.2 mg/kg). One of the samples contained a concentration exceeding the RIEC (1,000 mg/kg). As shown on Figure 4-20, the vanadium exceedance is within the area of the landfill and is adjacent to a location with concentrations less than the RIEC. None of the LRLs for vanadium exceeded the selected RIEC. Based on the available characterization data, the extent of vanadium in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (24,900 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 122 samples were analyzed for pesticides and PCBs. As shown in Table 4-5, 18 pesticides and PCBs were detected at least once at concentrations greater than the LRL. As shown in Table 4-6, two pesticides (dieldrin and heptachlor epoxide), Aroclor-1016 (also referred to as total low risk PCBs), and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected at concentrations exceeding the selected RIEC. Most of the pesticides and PCBs exhibited LRLs greater than the screening criteria for one or more samples due to dilutions of samples and the limitations of analytical methods at the time.

Dieldrin was detected in 19 of 112 samples analyzed. Seven samples (five locations) had concentrations exceeding the selected RIEC (0.11 mg/kg). As shown on Figure 4-21, the exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Fourteen of the LRLs for dieldrin exceeded the selected RIEC. Based on this information, dieldrin within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (0.71 mg/kg) is not indicative of a hot spot.

Heptachlor epoxide was detected in 19 of 112 samples analyzed. Five samples (four locations) had concentrations exceeding the selected RIEC (0.19 mg/kg). As shown on Figure 4-22, the exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Eight of the LRLs for heptachlor epoxide exceeded the selected RIEC. Based on this information, the extent of heptachlor epoxide in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (1.0 mg/kg) is not indicative of a hot spot. However, heptachlor epoxide concentrations greater than the RIEC were reported in the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Total PCBs (high risk) were detected in 82 of 122 samples analyzed. Forty-five samples (28 locations) contained total PCBs (high risk) at concentrations exceeding the selected RIEC (0.74 mg/kg). As shown on Figure 4-23 and 4-24, the samples are within the area of the landfill. Nineteen of the LRLs for individual PCB compounds exceeded the selected RIEC. Based on the available characterization data, total PCBs (high risk) within this depth range are present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area. In addition, concentrations detected in three samples (Grid 171 Sidewall, 3 feet bgs, 380 mg/kg; Grid 165 Sidewall, 5 feet bgs, 99 mg/kg; and IR01MW05A, 8.31 feet bgs, 370 mg/kg) can be considered as hot spot contamination within the landfill when compared to the RIEC.

Aroclor-1016 was detected in 4 of 122 samples analyzed. Two samples contained Aroclor-1016 (also referred to as total low risk PCBs) at concentrations exceeding the selected RIEC (21 mg/kg). As shown on Figure 4-25, the samples are within the area of the landfill and are near samples with concentrations that are less than the RIEC. Two of the LRLs for individual PCB compounds exceeded the selected RIEC. Based on the available characterization data, the extent of total PCBs (low risk) in soil within this depth range is limited when compared to the overall Landfill Area, and the maximum detected concentration (740 mg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 113 samples were analyzed for SVOCs. As shown in Table 4-5, 38 SVOCs were detected at least once at concentrations greater than LRLs. Several SVOCs have LRLs exceeding the RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time. However, 11 SVOCs (1,4-DCB, 2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)-fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene) were detected at concentrations exceeding the selected RIEC (Table 4-6).

1,4-DCB was detected in 8 of 62 samples analyzed. As shown on Figure 4-26, this SVOC was detected in all eight samples (seven locations) at concentrations exceeding the selected RIEC (0.13 mg/kg). In addition, all but one of the LRLs for 1,4-DCB exceeded the selected RIEC. Based on the available characterization data, 1,4-DCB within this depth range is present, or may be present (at locations with elevated LRLs), at concentrations exceeding the RIEC throughout a large portion of the Landfill Area, and the maximum detected concentration (59 mg/kg) may be indicative of a hot spot.

2-Methylnaphthalene was detected in 26 of 61 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (550 mg/kg). As shown on Figure 4-27, the exceedance is adjacent to a location with a concentration less than the RIEC. None of the LRLs for 2-methylnaphthalene exceeded the selected RIEC. Based on the available characterization data, the extent of 2-methylnaphthalene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (650 mg/kg) is not indicative of a hot spot.

Anthracene was detected in 23 of 113 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (31 mg/kg). As shown on Figure 4-28, the exceedance is adjacent to a location with a concentration less than the RIEC. One of the LRLs for anthracene exceeded the selected RIEC. Based on the available characterization data, the extent of anthracene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (210 mg/kg) is not indicative of a hot spot.

Benzo(a)anthracene was detected in 37 of 113 samples analyzed. This SVOC was detected in five samples, including one grid sidewall sample, at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-29, most of the exceedances are near locations with concentrations less than the RIEC; however, 30 samples had LRLs for benzo(a)anthracene exceeding the selected RIEC. Based on the available characterization data, benzo(a)anthracene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (80 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 41 of 113 samples analyzed. This SVOC was detected in 11 samples at concentrations exceeding the selected RIEC (0.33 mg/kg). One location (Grid 167 Sidewall) had two samples with concentrations exceeding the RIEC; however, only one sample (the maximum concentration, 3 mg/kg) is shown on the figure. As shown on Figure 4-30, most of the exceedances are near locations with concentrations less than the RIEC; however, 41 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. Based on the available characterization data, benzo(a)pyrene within this depth range is present, or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (16 mg/kg) is not indicative of a hot spot.

Benzo(b)fluoranthene was detected in 47 of 113 samples analyzed. This SVOC was detected in seven samples at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-31, most of the exceedances are near locations with concentrations less than the RIEC; however, 27 of the LRLs for benzo(b)fluoranthene exceeded the selected RIEC. Based on the available characterization data, benzo(a)fluoranthene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (43 mg/kg) is not indicative of a hot spot.

Benzo(k)fluoranthene was detected in 33 of 113 samples analyzed. This SVOC was detected in six samples, including two grid sidewall samples, at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-32, most of the exceedances are near locations with concentrations less than the RIEC; however, 31 of the LRLs for benzo(k)fluoranthene exceeded the selected RIEC. Based on the available characterization data, benzo(k)fluoranthene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (13 mg/kg) is not indicative of a hot spot.

Chrysene was detected in 51 of 113 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (13 mg/kg). As shown on Figure 4-33, the exceedances are near locations with concentrations less than the RIEC. One of the LRLs for chrysene exceeded the selected RIEC. Based on the available characterization data, the extent of chrysene in soil within this

depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (77 mg/kg) is not indicative of a hot spot.

Dibenz(a,h)anthracene was detected in 7 of 113 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (0.33 mg/kg). As shown on Figure 4-34, 48 of the LRLs for dibenz(a,h)anthracene exceeded the selected RIEC. Based on the available characterization data, dibenz(a,h)anthracene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (1.5 mg/kg) is not indicative of a hot spot.

Indeno(1,2,3-cd)pyrene was detected in 27 of 113 samples analyzed. This SVOC was detected in four samples at concentrations exceeding the selected RIEC (1.3 mg/kg). As shown on Figure 4-35, most of the exceedances are near locations with concentrations less than the RIEC; however, 33 of the LRLs for indeno(1,2,3-cd)pyrene exceeded the selected RIEC. Based on the available characterization data, indeno(1,2,3-cd)pyrene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (5.6 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 32 of 113 samples greater than detection limits. This SVOC was detected in 11 samples at concentrations exceeding the selected RIEC (1.5 mg/kg). As shown on Figure 4-36, 24 of the LRLs for naphthalene exceeded the selected RIEC. Based on the available characterization data, naphthalene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area and the maximum detected concentration (1,400 mg/kg) may be indicative of a hot spot.

Volatile Organic Compounds

In total, 56 samples were analyzed for VOCs. As shown in Table 4-5, 11 VOCs (1,1,2-TCA, 2-butanone, 4-methyl-2-pentanone, acetone, benzene, carbon disulfide, chlorobenzene, ethylbenzene, styrene, toluene, and xylenes [total]) were detected in at least one sample. Seven VOCs (1,1,2,2-tetrichloroethane, 1,1,2-TCA, 1,1-dichloroethane [DCA], 1,2-DCA, 1,2-dichloropropane, chloroform, and TCE) had LRLs exceeding the RIEC due to dilutions of samples. One VOC (ethylbenzene) exceeded the RIEC (Table 4-6).

Ethylbenzene was detected in 18 of 56 samples greater than detection limits. As shown on Figure 4-37, this VOC was detected in four samples at concentrations exceeding the selected RIEC (5 mg/kg). Based on the available characterization data, the extent of ethylbenzene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (40 mg/kg) is not indicative of a hot spot.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 107 samples (Table 4-5). Ninety-two samples contained detectable concentrations of total TPH. As described in Section 4.1.3.2, the total value was mapped and the other compounds will be used as additional information. As shown on Figure 4-38, total TPH was detected exceeding the selected RIEC (3,500 mg/kg) in 13 samples, but most of these exceedances were near locations with concentrations less than the RIEC. Thirteen samples contained concentrations of TOG exceeding the selected RIEC (3,500 mg/kg), and 16 samples contained concentrations of TPH-d exceeding the selected RIEC (750 mg/kg). Three samples contained concentrations of TPH-mo exceeding the selected RIEC (4,600 mg/kg). Based on the available characterization data, the extent of total TPH in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected total TPH concentration (22,080 mg/kg) is not indicative of a hot spot. However, total TPH concentrations greater than the RIEC were reported throughout the shoreline portion of the PCB Hot Spot Area, which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

4.2.4.3. Landfill Area Deep Soil (greater than 10 feet bgs)

Table 4-7 shows all the chemicals that were detected in samples collected at depths greater than 10 feet, and Table 4-8 lists the chemicals that exceeded screening criteria at a depth greater than 10 feet.

Metals

In total, 108 samples were analyzed for one or more metals. As shown in Table 4-7, all metals were detected in at least one sample. Fifteen metals (antimony, arsenic, barium, beryllium, cadmium, chromium [total], cobalt, copper, lead, manganese, mercury, molybdenum, silver, vanadium, and zinc) were detected at concentrations greater than HPALs. As shown in Table 4-8, five metals (arsenic, cadmium, chromium [total], iron, and lead) were detected at concentrations exceeding the RIEC.

Arsenic was detected in 86 of 97 samples analyzed. As shown on Figure 4-39, this metal was detected in 21 samples (16 locations) at concentrations exceeding the HPAL (11.1 mg/kg), which is the selected RIEC. None of the LRLs for arsenic exceeded the selected RIEC. Based on the available characterization data, arsenic within this depth range is present at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (49 mg/kg) is not indicative of a hot spot.

Cadmium was detected in 51 of 97 samples analyzed. This metal was detected in 17 samples at concentrations greater than the HPAL (3.14 mg/kg). As shown on Figure 4-40, two samples contained concentrations of cadmium exceeding the selected RIEC (38 mg/kg). None of the LRLs for cadmium exceeded the selected RIEC. Based on the available characterization data, the extent of cadmium in soil

within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (113 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in 96 of 97 samples analyzed. This metal was detected in 23 samples at concentrations greater than the location-specific HPALs. As shown on Figure 4-41, 17 samples (12 locations) contained concentrations of chromium exceeding the selected RIEC, which is based on the HPAL and the 2004 industrial PRG (450 mg/kg), whichever is the higher value. None of the LRLs for chromium exceeded the selected RIEC. Based on the available characterization data, chromium within this depth range is present at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (3,590 mg/kg) is not indicative of a hot spot.

Iron was detected in all 96 samples analyzed. This metal was detected in two samples at concentrations exceeding the selected RIEC (100,000 mg/kg). As shown on Figure 4-42, the iron exceedances are near locations with concentrations less than the RIEC. None of the LRLs for iron exceeded the selected RIEC. Based on the available characterization data, the extent of iron in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (163,000 mg/kg) is not indicative of a hot spot.

Lead was detected in 96 of 97 samples analyzed. This metal was detected in 74 samples at concentrations greater than the HPAL (8.99 mg/kg). As shown on Figure 4-43, seven samples (five locations) contained concentrations of lead exceeding the selected RIEC (800 mg/kg). None of the LRLs for lead exceeded the selected RIEC. Based on the available characterization data, the extent of lead in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (15,700 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 103 samples were analyzed for pesticides and PCBs. As shown in Table 4-7, five pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan sulfate, and heptachlor epoxide), Aroclor-1016 (also referred to as total low risk PCBs), and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected in at least one sample. Most PCBs had LRLs exceeding the selected RIEC in some samples due to dilutions of samples and the limitations of analytical methods at the time. As shown in Table 4-8, only total high risk and low risk PCBs were detected at concentrations exceeding the RIEC; no pesticides were detected at concentrations exceeding the RIEC.

Total PCBs (high risk) were detected in 55 of 103 samples analyzed. As shown on Figure 4-44, 31 samples (23 locations) contained concentrations of total high risk PCBs exceeding the RIEC (0.74 mg/kg). In addition, fifteen of the LRLs for individual high risk PCB compounds exceeded the selected RIEC. Based on the available characterization data, the extent of total PCBs within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the

RIEC throughout a large portion of the landfill, and the magnitude of several PCB concentrations are indicative of potential hot spots. Concentrations (103.9, 2,540, and 32,000 mg/kg, respectively) detected in three samples from IR01B012 (at 16.97 feet bgs), IR01MW17B (at 11.25 feet bgs), and IR01B019 (at 16.25 feet bgs) can be considered as hot spot contamination within the landfill when compared to the RIEC.

Aroclor-1016 was detected in 2 of 103 samples analyzed. One sample contained Aroclor-1016 (also referred to as total low risk PCBs) at a concentration exceeding the RIEC (21 mg/kg). As shown on Figure 4-45, the exceedance is nearby a location with a concentration less than the RIEC. In addition, three of the LRLs for individual PCB compounds exceeded the selected RIEC. Based on the available characterization data, the extent of total PCBs (low risk) in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (250 mg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 98 samples were analyzed for SVOCs. As shown in Table 4-7, 35 SVOCs were detected at least once at concentrations greater than the LRL. Six SVOCs [1,4-DCB, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, naphthalene, and n-nitroso-di-n-propylamine] were detected at concentrations exceeding the selected RIEC (Table 4-8). Several SVOCs had LRLs greater than the screening criteria for some samples due to dilutions of samples and the limitations of analytical methods at the time.

1,4-DCB was detected in 13 of 81 samples analyzed. As shown on Figure 4-46, this SVOC was detected in nine samples (six locations) at concentrations exceeding the selected RIEC (0.13 mg/kg). In addition, 24 of the LRLs for 1,4-DCB exceeded the selected RIEC. Based on the available characterization data, 1,4-DCB within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (6.46 mg/kg) is not indicative of a hot spot.

Benzo(a)anthracene was detected in 15 of 97 samples analyzed. As shown on Figure 4-47, this SVOC was detected in one sample at a concentration exceeding the selected RIEC (2.1 mg/kg). In addition, 25 of the LRLs for benzo(a)anthracene exceeded the selected RIEC. Based on the available characterization data, benzo(a)anthracene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (3.78 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 10 of 97 samples analyzed. As shown on Figure 4-48, this SVOC was detected in six samples (five locations) at concentrations exceeding the selected RIEC (0.33 mg/kg). One location (IR01SH030) had two samples with concentrations exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, 39 of the LRLs for

benzo(a)pyrene exceeded the selected RIEC. Based on the available characterization data, benzo(a)pyrene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (1.8 mg/kg) is not indicative of a hot spot.

Benzo(b)fluoranthene was detected in 12 of 97 samples analyzed. As shown on Figure 4-49, this SVOC was detected in one sample at a concentration exceeding the selected RIEC (2.1 mg/kg). In addition, 30 of the LRLs for benzo(b)fluoranthene exceeded the selected RIEC. Based on the available characterization data, benzo(b)fluoranthene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (2.7 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 23 of 98 samples analyzed. As shown on Figure 4-50, this SVOC was detected in 13 samples (10 locations) at concentrations exceeding the selected RIEC (1.5 mg/kg). In addition, 23 of the LRLs for naphthalene exceeded the selected RIEC. Based on the available characterization data, naphthalene within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (31.1 mg/kg) is not indicative of a hot spot.

n-Nitroso-di-n-propylamine was detected in 1 of 97 samples analyzed. As shown on Figure 4-51, the detected concentration exceeded the selected RIEC (0.25 mg/kg). In addition, all of the LRLs for n-nitroso-di-n-propylamine exceeded the selected RIEC. Based on the available characterization data, n-nitroso-di-n-propylamine within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (0.43 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

In total, 78 samples were analyzed for VOCs. As shown in Table 4-7, 21 VOCs were detected at least once at concentrations greater than the LRL. In addition, four VOCs (carbon tetrachloride, ethylbenzene, PCE, and xylenes [total]) were detected at concentrations exceeding the selected RIEC (Table 4-8). Several VOCs had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

Carbon tetrachloride was detected in 1 of the 78 samples analyzed. As shown on Figure 4-52, the detected concentration exceeded the selected RIEC (0.034 mg/kg). In addition, eight of the LRLs for carbon tetrachloride exceeded the selected RIEC. Based on the available characterization data, carbon tetrachloride within this depth range is present or may be present (at locations with elevated LRLs) at concentrations exceeding the RIEC throughout a large portion of the Landfill Area; however, the maximum detected concentration (0.37 mg/kg) is not indicative of a hot spot.

Ethylbenzene was detected in 26 of 78 samples greater than detection limits. As shown on Figure 4-53, This VOC was detected in 3 samples at concentrations exceeding the selected RIEC (5 mg/kg). None of the LRLs for ethylbenzene exceeded the selected RIEC. Based on the available characterization data, the extent of ethylbenzene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (55.7 mg/kg) is not indicative of a hot spot.

Tetrachloroethene was detected in 1 of the 78 samples analyzed. As shown on Figure 4-54, the detected concentration exceeded the selected RIEC (0.24 mg/kg). In addition, five of the LRLs for tetrachloroethene exceeded the selected RIEC. Based on the available characterization data, the extent of tetrachloroethene in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (0.29 mg/kg) is not indicative of a hot spot.

Xylenes (total) was detected in 32 of 77 samples analyzed. As shown on Figure 4-55, this VOC was detected in one sample at a concentration exceeding the selected RIEC (420 mg/kg). None of the LRLs for xylenes (total) exceeded the selected RIEC. Based on the available characterization data, the extent of xylenes (total) in soil within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (519 mg/kg) is not indicative of a hot spot.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 89 samples (Table 4-7). Fifty-nine samples exhibited concentrations greater than the LRLs. As shown on Figure 4-56, total TPH was detected at concentrations exceeding the RIEC (3,500 mg/kg) in nine samples (seven locations), but most of these exceedances were near locations with concentrations less than the RIEC. Eighteen samples had concentrations of TOG exceeding the RIEC (3,500 mg/kg). TPH-d was detected in two samples at concentrations exceeding the RIEC (750 mg/kg). Based on the available characterization data, the extent of total TPH within this depth range is limited when compared to the overall Landfill Area and the maximum detected concentration (22,900 mg/kg) is not indicative of a hot spot. However, total TPH concentrations greater than the RIEC were reported near the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

4.3. PANHANDLE AREA

The nature and extent of contamination at the Panhandle Area was evaluated based on information from the previous investigations and TCRAs described in Section 3. Based on data from the 82 soil borings and five test pits extended within the Panhandle Area, fill material consists primarily of soil and rock fill, with lesser quantities of inert construction debris and isolated locations of putrescible construction debris (e.g., wood). Some of the industrial waste types reportedly disposed of in the Landfill Area may also be

present within the Panhandle Area. The following information summarizes the industrial wastes that may have been disposed of in or around the Panhandle Area:

- The HRA indicated that areas within IR Site 01/21, including areas outside of the landfill boundaries, were a disposal area for radioluminescent devices (primarily containing radium-226) and a potential disposal area for wastes from decontamination of ships used in atomic testing (NAVSEA, 2004).
- Previous shoreline investigations identified a Metal Slag Area within the Panhandle and Shoreline Areas. The metal slag is composed of discontinuous industrial debris and metal slag with radioactive anomalies. This area was excavated under an interim removal action (TtECI, 2007b).
- Triple A allegedly disposed of industrial debris, sandblast waste, oily industrial sand, and asphalt over an area of approximately 5 acres along the shoreline of Parcel E-2, which extends into the Panhandle Area (see Figure 1-11; San Francisco District Attorney, 1986).
- Waste fuel and waste oil containing PCBs were used at the Parcel E-2 Landfill as dust suppressants (TtEMI, LFR, and U&A, 1997).

As discussed in Section 4.1.3.4, chemical concentrations in soil that exceed the corresponding RIEC will be considered adequately delineated in a given direction if there are four or more nearby samples (within 150 feet) surrounding the exceedance (in a general north, south, east, and west direction) with concentrations less than the RIEC. The following subsections discuss the characteristics of the fill and isolated solid waste locations (Section 4.3.1) and the nature and extent of chemicals in soil (Section 4.3.2). The data presented in Section 4.3.2 include post-excavation data from the removal action at the Metal Slag Area. Some of this post-excavation data extended into the Shoreline Area, but is presented in this section because it represents soil conditions underlying the Metal Slag Area (as opposed to intertidal sediment evaluated in Appendix G).

4.3.1. Characteristics and Extent of Fill and Isolated Solid Waste Locations

The Panhandle Area includes isolated solid waste locations and soil within the Parcel E-2 boundary but outside the Landfill and Shoreline Area boundaries. The methods for identifying these isolated solid waste locations were discussed in Section 4.1.1.2.

The evaluation revealed 48 locations in the Panhandle Area where solid waste was encountered. Of these 48 locations, 28 contained inert construction debris and 20 contained putrescible construction debris. The isolated waste locations are shown on Figure 4-1.

Construction debris encountered in the Panhandle Area include concrete, brick, wood, gravel, sand, soil, and asphalt, with limited amounts of ceramic, glass, and metals. With the exception of wood, the remaining types of construction debris are considered inert and are not expected to generate methane gas or leachate that would create potential risks to human health or the environment.

The industrial and municipal-type wastes encountered within the Metal Slag Area include metal slag and debris containing low-level radiological material and devices (TtECI, 2007b). All excavated soil and waste removed from the Metal Slag Area was handled and screened as potential low-level radioactive waste (LLRW) based on the findings of the HRA (NAVSEA, 2004). Out of a total excavated volume of 8,200 cubic yards, approximately 74 cubic yards of soil and sediment was segregated as radiologically impacted. In addition, 32 radiological devices, 15 cubic yards of radiological debris (primarily fire bricks), and approximately 30 cubic yards of metal debris were identified within the removal area (Navy, 2006a and 2006b; TtECI, 2007b). In addition to this radiologically impacted debris, six waste drums were recovered from the removal area and were characterized prior to off-site disposal. The drums, which were discovered in varying degrees of deterioration, contained grease, soil, plastic, metal, and wood. Waste characterization data indicated that five of the six drums contained various chemicals, including PCBs and petroleum hydrocarbons; the sixth drum contained elevated activity levels of radium-226 (TtECI, 2007b).

4.3.2. Chemicals Detected in Panhandle Area Soil

Soil data within the Panhandle Area are presented in a similar manner as for the Landfill Area and East Adjacent Area for consistency purposes. As discussed in Section 4.1.3, comprehensive data summary tables for the Panhandle Area are presented in Appendix J1 by chemical category (i.e., metals, pesticides, PCBs, dioxins, furans, SVOCs, VOCs, and petroleum hydrocarbons) and depth interval (0 to 2 feet bgs, 2 to 10 feet bgs, and greater than 10 feet bgs). In addition, each table presents a series of summary statistics of the data for each chemical, such as the number of samples collected; number of results that exceed the detection limit; minimum and maximum concentrations detected; and median, mean, and standard deviation of the detected results for each chemical. Each table also lists all potential screening criteria and quantifies the number of results that exceed each criterion.

The following subsections describe the chemical characteristics of the soil fill within the Panhandle Area.

4.3.2.1. Panhandle Area Surface Soil (0 to 2 feet bgs)

Table 4-9 shows all of the chemicals that were detected in at least one sample collected at a depth of 2 feet bgs or less; Table 4-10 lists the detected chemicals that exceeded screening criteria at the 0- to 2-foot depth interval.

Metals

In total, 77 samples were analyzed for one or more metals. As shown in Table 4-9, all metals, except tin, were detected in at least one sample at concentrations greater than the LRL. Seventeen metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, selenium, silver, thallium, vanadium, and zinc) were detected at concentrations greater than HPALs. As shown in Table 4-10, only seven metals (antimony, arsenic, cadmium, iron, lead, mercury, and vanadium)

exceeded the selected RIEC. One metal (arsenic) had LRLs exceeding the selected RIEC due to dilutions of samples.

Antimony was detected in 27 of 77 samples analyzed. This metal was detected in 14 samples at concentrations greater than the HPAL (9.05 mg/kg). One sample had a concentration exceeding the selected RIEC (380 mg/kg). None of the LRLs for antimony exceeded the selected RIEC. As shown on Figure 4-57, the detected exceedance is surrounded to the west and south by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of antimony in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (530 mg/kg) is not indicative of a hot spot.

Arsenic was detected in 65 of 77 samples analyzed. This metal was detected in 12 samples (11 locations) at concentrations exceeding the RIEC (11.1 mg/kg). One location (IR01B368) had two samples with concentrations exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. Three of the LRLs for arsenic exceeded the selected RIEC. As shown on Figure 4-58, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of arsenic in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (215 mg/kg) is not indicative of a hot spot.

Cadmium was detected in 31 of 77 samples analyzed. This metal was detected in 14 samples at concentrations greater than the HPAL (3.14 mg/kg). Three samples from two locations contained concentrations exceeding the selected RIEC (7.4 mg/kg). One location (IR01B368) had two samples with concentrations exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. None of the LRLs for cadmium exceeded the selected RIEC. As shown on Figure 4-59, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of cadmium in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (37 mg/kg) is not indicative of a hot spot.

Iron was detected in 67 of 68 samples analyzed. No comparison against ambient levels was made because an HPAL has not been established for iron. Three samples contained concentrations of iron exceeding the selected RIEC (100,000 mg/kg). One location (IR01B368) had two samples with concentrations exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. None of the LRLs for iron exceeded the selected RIEC. As shown on Figure 4-60, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of iron in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (190,000 mg/kg) is not indicative of a hot spot.

Lead was detected in 75 of 77 samples analyzed. This metal was detected in 72 samples at concentrations greater than the HPAL (8.99 mg/kg). Sixteen samples (14 locations) contained concentrations exceeding the selected RIEC (800 mg/kg). Two locations (IR01B368 and IR01SW2) had results exceeding the RIEC; however, only one sample per location (the maximum concentration) is shown on the figure. None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-4, one detected exceedance at location IR01SW2 is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. The detected exceedances in the southwestern portion of the Panhandle Area are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. Although the maximum detected concentration (9,300 mg/kg) is not indicative of a hot spot, this concentration and other lead concentrations greater than the RIEC were reported throughout the Metal Slag Area.

Mercury was detected in 67 of 77 samples analyzed. This metal was detected in four samples at concentrations greater than the HPAL (2.28 mg/kg). One sample contained a concentration exceeding the selected RIEC (180 mg/kg). None of the LRLs for mercury exceeded the selected RIEC. As shown on Figure 4-61, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of mercury in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (190 mg/kg) is not indicative of a hot spot.

Vanadium was detected in 76 of 77 samples analyzed. This metal was detected in 9 samples at concentrations greater than the HPAL (117.2 mg/kg). One sample contained a concentration exceeding the selected RIEC (1,000 mg/kg). None of the LRLs for vanadium exceeded the selected RIEC. As shown on Figure 4-62, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of vanadium in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (2,100 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 77 samples were analyzed for pesticides and PCBs. As shown in Table 4-9, 26 pesticides and PCBs have at least one detection greater than the LRL. As shown in Table 4-10, two pesticides (4,4'-DDE, and dieldrin) and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected at concentrations exceeding the selected RIEC. Nine pesticides (aldrin, alpha-BHC, beta-BHC, delta-BHC, dieldrin, gamma-BHC [lindane], heptachlor, heptachlor epoxide, and toxaphene) had LRLs exceeding the selected RIEC due to dilutions of samples.

4,4'-DDE was detected in 20 of 77 samples analyzed. This pesticide was detected in one sample at a concentration exceeding the selected RIEC (6.3 mg/kg). None of the LRLs for 4,4'-DDE exceeded the selected RIEC. As shown on Figure 4-63, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of total 4,4'-DDE in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (7.7 mg/kg) is not indicative of a hot spot.

Dieldrin was detected in 15 of 77 samples analyzed. This pesticide was detected in two samples at concentrations exceeding the selected RIEC (0.11 mg/kg). In addition, four of the LRLs for dieldrin exceeded the selected RIEC. As shown on Figure 4-64, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dieldrin in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (6.4 mg/kg) is not indicative of a hot spot.

Total PCBs (high risk) were detected in 41 of 70 samples analyzed. This PCB was detected in eight samples at concentrations exceeding the selected RIEC (0.74 mg/kg). One additional exceedance (Grid 94) is located in the portion of the Metal Slag Area excavation that extended into the offshore parcel (Parcel F), thus the PCB concentrations at this location are not discussed in this report but are identified in Figure 4-6 for reference purposes. Two of the LRLs for individual PCB compounds exceeded the selected RIEC. As shown on Figure 4-6, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC, except for location IR01B390. Based on this information, the extent of total PCBs in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (20 mg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 61 samples were analyzed for SVOCs. As shown in Table 4-9, 23 SVOCs were detected at least once at concentrations greater than the LRL. Nine SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene] were detected at concentrations exceeding the selected RIEC in at least one sample (Table 4-10). Several of the SVOCs had LRLs exceeding the selected RIEC due to dilutions of samples and the limitations of analytical methods at the time.

Benzo(a)anthracene was detected in 24 of 61 samples analyzed. This SVOC was detected in five samples (four locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (IR01B390) had two samples with concentrations of benzo(a)anthracene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, four of the LRLs for

benzo(a)anthracene exceeded the selected RIEC. As shown on Figure 4-8, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC, except for location IR01B385. Based on this information, the extent of benzo(a)anthracene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (51 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 25 of 61 samples analyzed. This SVOC was detected in 10 samples (nine locations) at concentrations exceeding the selected RIEC (0.33 mg/kg). One location (IR01B390) had two samples with concentrations of benzo(a)pyrene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, 15 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. As shown on Figure 4-9, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(a)pyrene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (16 mg/kg) is not indicative of a hot spot.

Benzo(b)fluoranthene was detected in 39 of 61 samples analyzed. This SVOC was detected in seven samples (six locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (IR01B390) had two samples with concentrations of benzo(b)fluoranthene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, one of the LRLs for benzo(b)fluoranthene exceeded the selected RIEC. As shown on Figure 4-10, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(b)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (64 mg/kg) is not indicative of a hot spot.

Benzo(k)fluoranthene was detected in 30 of 61 samples analyzed. This SVOC was detected in nine samples (eight locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (IR01B390) had two samples with concentrations of benzo(k)fluoranthene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, one of the LRLs for benzo(k)fluoranthene exceeded the selected RIEC. As shown on Figure 4-65, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(k)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (53 mg/kg) is not indicative of a hot spot.

Bis(2-ethylhexyl)phthalate was detected in 7 of 61 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (120 mg/kg). None of the LRLs for bis(2-ethylhexyl)phthalate exceeded the selected RIEC. As shown on Figure 4-66, the detected

exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of bis(2-ethylhexyl)phthalate in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (740 mg/kg) is not indicative of a hot spot.

Chrysene was detected in 33 of 61 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (13 mg/kg). None of the LRLs for chrysene exceeded the selected RIEC. As shown on Figure 4-67, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of chrysene in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (57 mg/kg) is not indicative of a hot spot.

Dibenz(a,h)anthracene was detected in 5 of 61 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (0.33 mg/kg). In addition, 20 of the LRLs for dibenz(a,h)anthracene exceeded the selected RIEC. As shown on Figure 4-68, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of dibenz(a,h)anthracene within this depth range is not adequately delineated; however, the maximum detected concentration (5.3 mg/kg) is not indicative of a hot spot.

Indeno(1,2,3-cd)pyrene was detected in 20 of 61 samples analyzed. This SVOC was detected in four samples (three locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (IR01B390) had two samples with concentrations of indeno(1,2,3-cd)pyrene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, two of the LRLs for indeno(1,2,3-cd)pyrene exceeded the selected RIEC. As shown on Figure 4-11, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of indeno(1,2,3-cd)pyrene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (17 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 10 of 62 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.5 mg/kg). In addition, one of the LRLs for naphthalene exceeded the selected RIEC. As shown on Figure 4-12, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of naphthalene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (47 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

In total, 14 samples were analyzed for VOCs. As shown in Table 4-9, three VOCs were detected in at least one sample at concentrations greater than the LRL. None of the VOCs were detected at concentrations exceeding the selected RIEC (Table 4-10). Several of the VOCs had LRLs exceeding the RIEC due to dilutions of samples. Because none of the VOCs exceeded the RIEC, they are not shown on a figure.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Three samples contained total TPH at concentrations exceeding the RIEC (3,500 mg/kg). As shown on Figure 4-69, these exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. TPH-d was found in three samples at concentrations exceeding the RIEC (750 mg/kg). Based on this information, the extent of total TPH in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (7,000 mg/kg) is not indicative of a hot spot.

4.3.2.2. Panhandle Area Subsurface Soil (2 to 10 feet bgs)

Table 4-11 shows all of the chemicals that were detected in samples collected from 2 to 10 foot bgs; Table 4-12 lists the chemicals that exceeded the screening criteria at the 2- to 10-foot depth interval.

Metals

In total, 64 samples were analyzed for one or more metals. As shown in Table 4-11, all metals were detected in at least one sample at concentrations greater than the LRL. Sixteen metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, selenium, silver, vanadium, and zinc) were detected at concentrations greater than HPALs. As shown in Table 4-12, five metals (arsenic, cadmium, iron, lead, and zinc) were detected at concentrations exceeding the selected RIEC.

Arsenic was detected in 62 of 64 samples analyzed. This metal was detected in 12 samples (10 locations) at concentrations exceeding the RIEC (11.1 mg/kg). None of the LRLs for arsenic exceeded the selected RIEC. As shown in Figure 4-14, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of arsenic in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (315 mg/kg) is not indicative of a hot spot.

Cadmium was detected in 44 of 64 samples analyzed. This metal was detected in twelve samples at concentrations greater than the HPAL (3.14 mg/kg). Four samples contained concentrations exceeding the selected RIEC (7.4 mg/kg). None of the LRLs for cadmium exceeded the selected RIEC. As shown on Figure 4-15, none of the detected exceedances, except at MS-07A, MS-13B(1), and Grid 60, are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of cadmium in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (78.4 mg/kg) is not indicative of a hot spot.

Iron was detected in all 38 samples analyzed. Two samples had concentrations exceeding the selected RIEC (100,000 mg/kg). None of the LRLs for iron exceeded the selected RIEC. As shown on Figure 4-18, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of iron in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (471,000 mg/kg) is not indicative of a hot spot.

Lead was detected in all 64 samples analyzed. This metal was detected in 62 samples at concentrations greater than the HPAL (8.99 mg/kg). Thirteen samples (10 locations) contained lead at concentrations exceeding the selected RIEC (800 mg/kg). None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-19, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. Although the maximum detected concentration (5,600 mg/kg) is not indicative of a hot spot, lead concentrations greater than the RIEC were reported throughout the Metal Slag Area.

Zinc was detected in all 64 samples analyzed. This metal was detected in 43 samples at concentrations greater than the HPAL (109.9 mg/kg). One sample contained zinc at a concentration exceeding the selected RIEC (100,000 mg/kg). None of the LRLs for zinc exceeded the selected RIEC. As shown on Figure 4-70, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of zinc in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (116,000 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 64 samples were analyzed for pesticides and PCBs. As shown in Table 4-11, 20 pesticides and PCBs were detected in at least one sample at concentrations greater than the LRL. As shown in Table 4-12, total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected at concentrations exceeding the selected RIEC. Two pesticides (dieldrin and toxaphene) and six

Aroclor compounds (Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260) had LRLs exceeding the selected RIEC due to dilutions of samples.

Total PCBs (high risk) were detected in 38 of 64 samples analyzed. This PCB was detected in seven samples (five locations) at concentrations exceeding the selected RIEC (0.74 mg/kg). In addition, two of the LRLs for individual PCB compounds exceeded the selected RIEC. As shown on Figure 4-23, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of total PCBs in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (3.9 mg/kg) is not indicative of a hot spot.

Dioxins and Furans

Ten samples were analyzed for chlorinated dibenzo-p-dioxins (simply referred to as "dioxins") and chlorinated dibenzofurans (simply referred to as "furans"). As shown in Table 4-11, all of these chemicals were detected in at least one sample at concentrations greater than the LRL. Dioxins and furans are commonly assessed and reported as a single dioxin toxicity equivalent quotient (TEQ) concentration relative to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The dioxin and furan TEQ concentration is calculated by multiplying the concentration of each dioxin and furan congener by a toxicity equivalency factor established by the 2005 World Health Organization and based on each congener's toxicity relative to 2,3,7,8-TCDD (Van den Berg, et. al, 2006). As shown in Table 4-12, the dioxin and furan TEQs were reported at concentrations exceeding the selected RIEC. No dioxins and furans have LRLs exceeding the selected RIEC.

The dioxin and furan TEQ was reported in 8 of 10 samples at concentrations exceeding the selected RIEC (0.016 µg/kg). As shown on Figure 4-71, the reported exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dioxins and furans (as represented by the 2,3,7,8-TCDD TEQ) in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum reported concentration (0.183 µg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 52 samples were analyzed for SVOCs. As shown in Table 4-11, 32 SVOCs were detected in at least one sample at concentrations greater than the LRL. Three analytes [1,4-DCB, benzo(a)pyrene, and naphthalene] were detected at concentrations exceeding the selected RIEC (Table 4-12). Several of the SVOCs had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

1,4-DCB was detected in 2 of 50 samples analyzed. One sample had a concentration exceeding the selected RIEC (0.13 mg/kg). In addition, 25 of the LRLs for 1,4-DCB exceeded the selected RIEC. As shown on Figure 4-26, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of 1,4-DCB within this depth range is not adequately delineated; however, the maximum detected concentration (0.21 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 15 of 52 samples analyzed. Six samples (four locations) had concentrations exceeding the selected RIEC (0.33 mg/kg). In addition, 18 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. As shown on Figure 4-30, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(a)pyrene within this depth range is not adequately delineated; however, the maximum detected concentration (0.65 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 14 of 56 samples at concentrations greater than the LRL. This SVOC was detected in seven samples (six locations) at concentrations exceeding the selected RIEC (1.5 mg/kg). One location (IR01MW58A) had two samples with concentrations of naphthalene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, seven of the LRLs for naphthalene exceeded the selected RIEC. As shown on Figure 4-36, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of naphthalene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (120 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

In total, 35 samples were analyzed for VOCs. As shown in Table 4-11, 16 VOCs were detected in at least one sample at concentrations greater than the LRL. One VOC (ethylbenzene) exceeded the selected RIEC (Table 4-12). Several of the analytes had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

Ethylbenzene was detected in 3 of 35 samples greater than detection limits. This VOC was detected in one sample at concentrations exceeding the selected RIEC (5 mg/kg). As shown on Figure 4-37, three of the LRLs for ethylbenzene exceeded the selected RIEC. As shown on Figure 4-37, the exceedance is surrounded on three sides within 150 feet and to the east within 175 feet. Based on this information, the extent of ethylbenzene in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the single detected exceedance (6.7 mg/kg) is not indicative of a hot spot.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). In total, 29 samples were used to calculate total TPH values. As shown on Figure 4-38, none of the samples contained total TPH at concentrations exceeding the selected RIEC (3,500 mg/kg). TPH-d was detected in one sample at a concentration exceeding the RIEC (750 mg/kg). Two samples from IR01MW58A and IR01MW63A had TOG concentrations (3,900 and 5,800 mg/kg, respectively) exceeding the RIEC. Because none of the total TPH concentrations exceeded the RIEC, they are not shown on a figure.

4.3.2.3. Panhandle Area Deep Soil (greater than 10 feet)

Table 4-13 shows all of the chemicals that were detected in samples collected at depths greater than 10 feet bgs; Table 4-14 list the chemicals that exceeded the screening criteria at the greater than 10-foot depth interval.

Metals

In total, 62 samples were analyzed for one or more metals. As shown in Table 4-13, all metals, except tin, were detected in at least one sample at concentrations greater than the LRL. As shown in Table 4-14, 15 metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, selenium, silver, vanadium, and zinc) were detected at concentrations greater than HPALs. Three metals (arsenic, chromium [total], and lead) were detected at concentrations exceeding the selected RIEC. No metals have LRLs exceeding the selected RIEC.

Arsenic was detected in 36 of 40 samples analyzed. This metal was detected in six samples (five locations) at concentrations exceeding the HPAL (11.1 mg/kg), which is the selected RIEC. One location (MS-12A) had two samples with arsenic concentrations exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. None of the LRLs for arsenic exceeded the selected RIEC. As shown on Figure 4-39, none of the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of arsenic in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (20 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in all 40 samples analyzed. This metal was detected in two samples at concentrations exceeding the location-specific HPALs (171.57 mg/kg and 48.56 mg/kg, respectively) and the selected RIEC (450 mg/kg). None of the LRLs for chromium exceeded the selected RIEC. As shown on Figure 4-41, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) in all directions with concentrations less than the RIEC. Based on this information, the extent of chromium in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (700 mg/kg) is not indicative of a hot spot.

Lead was detected in 39 of 40 samples analyzed. This metal was detected in 28 samples at concentrations greater than the HPAL (8.99 mg/kg). Five samples (four locations) had concentrations exceeding the selected RIEC (800 mg/kg). One location (MS-12A) had two samples with concentrations of lead exceeding the RIEC; however, only the maximum concentration is shown on the figure. None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-43, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (3,200 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 38 samples were analyzed for pesticides and PCBs. As shown in Table 4-13, eight pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, beta-BHC, dieldrin, endrin ketone, heptachlor epoxide, and methoxychlor) and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected in at least one sample at concentrations greater than the LRL. One pesticide (aldrin) and five Aroclor compounds (Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1254, and Aroclor-1260) had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time. As shown in Table 4-14, none of the pesticides and PCBs have been detected at concentrations exceeding the selected RIEC. As a result, these chemicals are not shown on a figure for this depth interval.

Dioxins and Furans

Two samples were analyzed for chlorinated dibenzo-p-dioxins (simply referred to as "dioxins") and chlorinated dibenzofurans (simply referred to as "furans"). As shown in Table 4-13, all but three of these chemicals were detected in at least one sample at concentrations greater than the LRL. Dioxins and furans are commonly assessed and reported as a single dioxin TEQ concentration relative to 2,3,7,8-TCDD. The dioxin and furan TEQ concentration is calculated by multiplying the concentration of each dioxin and furan congener by a toxicity equivalency factor established by the 2005 World Health Organization and based on each congener's toxicity relative to 2,3,7,8-TCDD (Van den Berg, et. al, 2006). As shown in Table 4-14, the dioxin and furan TEQs were reported at concentrations exceeding the selected RIEC. No dioxins and furans have LRLs exceeding the selected RIEC.

The dioxin and furan TEQ was reported in both samples analyzed at concentrations exceeding the selected RIEC (0.016 µg/kg). As shown on Figure 4-72, the reported exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dioxins and furans (as represented by the 2,3,7,8-TCDD TEQ) in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the reported concentration (0.959 µg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 40 samples were analyzed for SVOCs. As shown in Table 4-13, 24 SVOCs were detected in at least one sample at concentrations greater than the LRL. Five SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and naphthalene] were detected at concentrations exceeding the selected RIEC (Table 4-14). Several of the SVOCs had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

Benzo(a)anthracene was detected in 4 of 40 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (2.1 mg/kg). In addition, three of the LRLs for benzo(a)anthracene exceeded the selected RIEC. As shown on Figure 4-47, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(a)anthracene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (3.3 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 5 of 40 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (0.33 mg/kg). In addition, 14 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. As shown on Figure 4-48, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(a)pyrene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (1.4 mg/kg) is not indicative of a hot spot.

Benzo(b)fluoranthene was detected in 4 of 40 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (2.1 mg/kg). In addition, three of the LRLs for benzo(a)fluoranthene exceeded the selected RIEC. As shown on Figure 4-49, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(a)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (3.6 mg/kg) is not indicative of a hot spot.

Indeno(1,2,3-cd)pyrene was detected in 1 of 40 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (2.1 mg/kg). In addition, three of the LRLs for indeno(1,2,3-cd)pyrene exceeded the selected RIEC. As shown on Figure 4-73, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of indeno(1,2,3-cd)pyrene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (2.7 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 7 of 40 samples analyzed. This SVOC was detected in three samples (two locations) at concentrations exceeding the selected RIEC (1.5 mg/kg). One location (IR01MW58A) had two samples with concentrations of naphthalene exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, one of the LRLs for naphthalene exceeded the selected RIEC. As shown on Figure 4-50, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations that are less than the RIEC. Based on this information, the extent of naphthalene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (110 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

In total, 34 samples were analyzed for VOCs. As shown in Table 4-13, four VOCs were detected in at least one sample at concentrations greater than the LRL. None of the VOCs were detected at concentrations exceeding the selected RIEC. As a result, VOCs greater than 10 feet bgs are not shown on a figure.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 33 samples. Total TPH concentrations in 17 samples are greater than the LRLs. As shown on Figure 4-56, one sample had a total TPH concentration exceeding the RIEC (3,500 mg/kg). This total TPH exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations that are less than the RIEC. Four samples contained concentrations of TOG exceeding the RIEC (3,500 mg/kg). Based on this information, the extent of total TPH in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single total TPH exceedance (6,700 mg/kg) is not indicative of a hot spot.

4.4. EAST ADJACENT AREA

The nature and extent of contamination at the East Adjacent Area was evaluated based on information from the previous investigations and TCRAs described in Section 3. Based on data from the 106 soil borings and nine test pits extended within the East Adjacent Area, fill material consists primarily of soil and rock fill, with lesser quantities of inert construction debris and isolated locations of putrescible construction debris (e.g., wood). Some of the industrial waste types reportedly disposed of in the Landfill Area may also be present within the East Adjacent Area. The following information summarizes the industrial wastes that may have been disposed of in or around the East Adjacent Area:

- The HRA indicated that areas within IR Site 01/21, including areas outside of the landfill boundaries, were a disposal area for radioluminescent devices (primarily containing radium-226) and a potential disposal area for wastes from decontamination of ships used in atomic testing (NAVSEA, 2004).
- The SDGI identified a hot spot of PCBs within the East Adjacent and Landfill Areas. The area contains elevated concentrations of PCBs and petroleum hydrocarbons that are attributed to the disposal of waste oils. This area was partially excavated under an interim removal action (TtECI, 2007a).
- The presence of sandblast waste was encountered in the East Adjacent Area in several borings and test pits installed during the RI and SDGI. Figure 4-1 identifies these borings and test pits. The presence of sandblast waste within the East Adjacent Area was confirmed during implementation of the PCB Hot Spot Area removal (Navy, 2005b and 2005c). Sandblast waste is of radiological concern because it contains naturally occurring radioactive materials and it was used in the decontamination of ships used in atomic testing.
- 110 drums and 537 assorted waste containers were recovered from the central portion of the PCB Hot Spot Area. The drums, which were discovered in varying degrees of decay, contained grease, oil, soil, asphalt, and tar substances. The small containers contained various laboratory chemicals, ranging from strong acids and bases to solvents, alcohols, and inorganic salts (TtECI, 2007a).
- Waste fuel and waste oil containing PCBs were used at the Parcel E-2 Landfill as dust suppressants (TtEMI, LFR, and U&A, 1997).
- Triple A allegedly disposed of lead-based paints, asbestos-containing debris, paint chips, chlorinated solvents, and other waste liquids in a disposal trench area located adjacent to Parcel E-2 (San Francisco District Attorney, 1986; TtEMI, LFR, and U&A, 1997). The area, known as Triple A Site 4 (Figure 1-11), was investigated by the Navy as part of IR Site 12 and is discussed in the Parcel E RI Report (Barajas & Associates, Inc., 2008).

As discussed in Section 4.1.3.4, chemical concentrations in soil that exceed the corresponding RIEC will be considered adequately delineated in a given direction if there are four or more nearby samples (within 150 feet) surrounding the exceedance (in a general north, south, east, and west direction) with concentrations less than the RIEC. The following subsections discuss the characteristics of the fill and isolated solid waste locations (Section 4.4.1), and the nature and extent of chemicals in soil (Section 4.4.2). The data presented in Section 4.4.2 include post-excavation data within the PCB Hot Spot Area.

4.4.1. Characteristics and Extent of Fill and Isolated Solid Waste Locations

The East Adjacent Area includes isolated solid waste locations and soil within the Parcel E-2 boundary but outside the Landfill and Shoreline Area boundaries. The methodology for identifying these isolated solid waste locations was discussed in Section 4.1.1.2.

The evaluation revealed 43 locations in the East Adjacent Area where solid waste was encountered. Of these 43 locations, 10 contained inert construction debris and 24 contained putrescible construction

debris. Sandblast waste was encountered in 12 locations, including 3 locations that also contained putrescible construction debris. Locations of the isolated waste locations are shown on Figure 4-1.

Construction debris encountered in the East Adjacent Area include concrete, brick, wood, gravel, sand, soil, and asphalt, with limited amounts of ceramic, glass, and metals (primarily as wire or rebar in concrete). With the exception of wood, the remaining types of construction debris are considered inert and are not expected to generate methane gas or leachate that would create potential risks to human health or the environment.

Additional information on the waste types encountered within the East Adjacent Area was obtained during remediation activities within the PCB Hot Spot Area, which encountered oily wastes, radioluminescent devices, and sandblast waste (Navy, 2005b through 2005f). All excavated soil and waste from the PCB Hot Spot Area removal action was handled and screened as potential LLRW based on the findings of the HRA (NAVSEA, 2004). Out of a total excavation volume of 44,500 cubic yards, 533 cubic yards of soil and fire brick was segregated as radiologically impacted. Also, 40 radiological devices, 78 cubic yards of metal debris, and 19 pieces of other radioactively contaminated debris were identified within the removal area (TtECI, 2007a).

Also, 110 drums and 537 assorted waste containers were recovered from the central portion of the PCB Hot Spot Area and were characterized prior to off-site disposal. The drums, which were discovered in varying degrees of decay, contained grease, oil, soil, asphalt, and tar substances. Waste characterization data indicated that the drums contained various chemicals, including PCBs and pesticides. Two of the drums contained mixed waste with radiological contamination. The small containers contained various laboratory chemicals, ranging from strong acids and bases to solvents, alcohols, and inorganic salts (TtECI, 2007a). In addition, 41 pieces of MPPEH were encountered in the excavation area, consisting primarily of expended cartridge casings of various calibers and protective caps, but also included a 5-inch empty practice projectile and a 3-pound practice bomb (TtECI, 2010). Of the 41 MPPEH items discovered in the removal area, 20 items were verified to not present an explosive hazard and were reclassified as MDAS. The remaining 21 MPPEH items appeared to have been subject to previous demilitarization actions and could not be completely inspected by UXO technicians for possible explosive hazards. Although the type, age, and condition of these 21 MPPEH items did not suggest a high potential for residual energetic material, the Navy, as a precautionary measure, properly handled, transported, and disposed of these items as either material documented as an explosive hazard (MDEH) (20 items consisting of expended cartridge casings of various calibers) or munitions and explosives of concern (MEC) (1 item. 3-pound practice bomb) (TtECI, 2010).

4.4.2. Chemicals Detected in East Adjacent Area Soil

Soil data within the East Adjacent Area are presented in a similar manner as for the Landfill Area and Panhandle Area for consistency purposes. As discussed in Section 4.1.3, comprehensive data summary tables for the East Adjacent Area are presented in Appendix J1 by chemical category (i.e., metals, pesticides, PCBs, SVOCs, VOCs, and petroleum hydrocarbons) and depth interval (0 to 2 feet bgs, 2 to 10 feet bgs, and greater than 10 feet bgs). In addition, each table presents a series of summary statistics of the data for each chemical, such as the number of samples collected; the number of results that exceed the detection limit; minimum and maximum concentrations detected; and median, mean, and standard deviation of the detected results for each chemical. Each table also lists all potential screening criteria and quantifies the number of results that exceed each criterion.

The following subsections describe the chemical characteristics of the soil fill within the East Adjacent Area.

4.4.2.1. East Adjacent Area Surface Soil (0 to 2 feet bgs)

Table 4-15 shows all of the chemicals that were detected in samples collected at less than 2 feet bgs; Table 4-16 list the chemicals that exceeded the screening criteria at a 0- to 2-foot depth interval.

Metals

In total, 55 samples were analyzed for one or more metals. As shown in Table 4-15, all but two metals (cyanide[7] and tin) were detected in at least one sample at concentrations greater than the LRL. Seventeen metals (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc) were detected greater than HPALs. One metal (arsenic) had an LRL exceeding the selected RIEC for some samples due to dilutions of samples. As shown in Table 4-16, six metals (antimony, arsenic, cadmium, chromium [total], iron, and lead) have been found at concentrations exceeding the selected RIEC.

Antimony was detected in 41 of 55 samples analyzed. This metal was detected in 13 samples at concentrations greater than the HPAL (9.05 mg/kg). One sample had a concentration exceeding the selected RIEC (380 mg/kg). None of the LRLs for antimony exceeded the selected RIEC. As shown on Figure 4-57, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of antimony in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the single detected exceedance (409 mg/kg) is not indicative of a hot spot.

[7] Cyanides are salts or esters of hydrogen cyanide (hydrocyanic acid) formed by replacing the hydrogen with a metal (e.g., sodium or potassium) or a radical (e.g., ammonium or ethyl) and are discussed as metals within this section.

Arsenic was detected in 50 of 55 samples analyzed. This metal was detected in five samples at concentrations exceeding the selected RIEC (11.1 mg/kg). In addition, one of the LRLs for arsenic exceeded the selected RIEC. As shown on Figure 4-58, most of the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of arsenic in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (22 mg/kg) is not indicative of a hot spot.

Cadmium was detected in 19 of 55 samples analyzed. This metal was detected in seven samples at concentrations greater than the HPAL (3.14 mg/kg). Two samples had concentrations exceeding the selected RIEC (7.4 mg/kg). None of the LRLs for cadmium exceeded the selected RIEC. As shown on Figure 4-59, the detected exceedances are surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC (including samples from adjacent Parcel E IR sites that are shown in Figure 4.3.7-2 of the Revised Parcel E RI Report [Barajas & Associates, Inc., 2008]). Based on this information, the extent of cadmium in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (11.8 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in all 55 samples analyzed. This metal was detected in two samples at concentrations greater than the location-specific HPAL (100.1 mg/kg) and the selected RIEC (450 mg/kg). None of the LRLs for chromium exceeded the selected RIEC. As shown on Figure 4-74, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC (including samples from adjacent Parcel E IR sites that are shown in Figure 4.3.7-2 of the Revised Parcel E RI Report [Barajas & Associates, Inc., 2008]). Based on this information, the extent of chromium in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (586 mg/kg) is not indicative of a hot spot.

Iron was detected in all 42 samples analyzed. No comparison against ambient levels was made because an HPAL has not been established for iron. Two samples had concentrations exceeding the selected RIEC (100,000 mg/kg). None of the LRLs for iron exceeded the selected RIEC. As shown on Figure 4-60, the detected exceedance at IR01B030 is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC (including samples from adjacent Parcel E IR sites that are shown in Figure 4.3.7-2 of the Revised Parcel E RI Report [Barajas & Associates, Inc., 2008]); however, the detected exceedance at IR02B452 is not surrounded by nearby sample locations (within 150 feet) with concentrations that are less than the RIEC. Based on this information, the extent of iron in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC in the southern portion of the East Adjacent Area; however, the maximum detected concentration (140,000 mg/kg) is not indicative of a hot spot.

Lead was detected in all 55 samples analyzed. This metal was detected in all 52 samples at concentrations greater than the HPAL (8.99 mg/kg). Nine samples had lead concentrations exceeding the selected RIEC (800 mg/kg). None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-4, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (11,200 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 68 samples were analyzed for pesticides and PCBs. As shown in Table 4-15, 16 pesticides and PCBs were detected in at least one sample. As shown in Table 4-16, two pesticides (dieldrin and heptachlor epoxide) and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected at concentrations exceeding the selected RIEC. Several of the LRLs for the pesticides and PCBs exceeded the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

Dieldrin was detected in 10 of 52 samples analyzed. Four samples (three locations) had concentrations exceeding the selected RIEC (0.11 mg/kg). One location (Grid 56 Sidewall) had two samples with concentrations of dieldrin **e**xceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, eight of the LRLs for dieldrin exceeded the selected RIEC. As shown on Figure 4-64, most of the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dieldrin in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (0.25 mg/kg) is not indicative of a hot spot.

Heptachlor epoxide was detected in 9 of 52 samples analyzed. Two samples had concentrations exceeding the selected RIEC (0.19 mg/kg). One of the LRLs for dieldrin exceeded the selected RIEC. As shown on Figure 4-5, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dieldrin in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (3.2 mg/kg) is not indicative of a hot spot.

Total PCBs (high risk) were detected in 39 of 55 samples analyzed. Total PCBs was detected in 30 samples (27 locations) at concentrations exceeding the selected RIEC (0.74 mg/kg). Eleven of the LRLs for individual PCB compounds exceeded the selected RIEC. As shown on Figures 4-6 and 4-7, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of total high risk PCBs in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. Also, the total high risk PCB concentrations detected in two samples (sidewall sample at Grid 110 and boring

IR02B512) are greater than 100 times the RIEC, and confirm the known conditions along the shoreline portion of the PCB Hot Spot Area.

Semivolatile Organic Compounds

In total, 52 samples were analyzed for SVOCs. As shown in Table 4-15, 50 SVOCs were detected in at least one sample at concentrations greater than the LRL. Four SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene] were detected at concentrations exceeding the selected RIEC (Table 4-16). Several of the SVOCs had LRLs exceeding the selected RIEC for some samples due to dilutions of samples and the limitations of analytical methods at the time.

Benzo(a)anthracene was detected in 26 of 52 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). In addition, nine of the LRLs for benzo(a)anthracene exceeded the selected RIEC. As shown on Figure 4-8, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(a)anthracene within this depth range is not adequately delineated by adjacent concentrations less than the RIEC ; however, the maximum detected concentration (2.3 mg/kg) is not indicative of a hot spot.

Benzo(a)pyrene was detected in 26 of 52 samples analyzed. This SVOC was detected in 10 samples at concentrations exceeding the selected RIEC (0.33 mg/kg). In addition, 17 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. As shown on Figure 4-9, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(a)pyrene within this depth range is not adequately delineated by adjacent concentrations less than the RIEC ; however, the maximum detected concentration (3.4 mg/kg) is not indicative of a hot spot. In addition, several benzo(a)pyrene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Benzo(b)fluoranthene was detected in 26 of 52 samples analyzed. This SVOC was detected in five samples at concentrations exceeding the selected RIEC (1.3 mg/kg). In addition, eight of the LRLs for benzo(b)fluoranthene exceeded the selected RIEC. As shown on Figure 4-10, the detected exceedances are not surrounded by nearby samples (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(b)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (6.6 mg/kg) is not indicative of a hot spot. In addition, several benzo(b)fluoranthene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Benzo(k)fluoranthene was detected in 13 of 52 samples at concentrations greater than detection limits. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). In addition, 10 of the LRLs for benzo(k)fluoranthene exceeded the selected RIEC. As shown on Figure 4-65, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(k)fluoranthene within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (2.1 mg/kg) is not indicative of a hot spot. In addition, several benzo(k)fluoranthene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Volatile Organic Compounds

In total, 24 samples were analyzed for VOCs. As shown in Table 4-15, 16 VOCs were detected in at least one sample at concentrations greater than the LRL. One VOC (1,1,2,2-tetrachloroethane) was detected at a concentration exceeding the selected RIEC (Table 4-16). Three of the LRLs exceeded the selected RIEC.

1,1,2,2-Tetrachloroethane was detected in 2 of 22 samples analyzed. This VOC was detected in two samples at concentrations exceeding the selected RIEC (0.025 mg/kg). Three of the LRLs for 1,1,2,2-tetrachloroethane exceeded the selected RIEC. As shown on Figure 4-75, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of 1,1,2,2-tetrachloroethane in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (0.74 mg/kg) is not indicative of a hot spot.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 51 samples. Seven samples contained total TPH at concentrations exceeding the RIEC (3,500 mg/kg). As shown on Figure 4-69, these exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Six samples contained concentrations of TOG exceeding the RIEC (3,500 mg/kg). TPH-d was detected at concentrations exceeding the RIEC (750 mg/kg) in 8 samples. Similarly, TPH-mo was detected exceeding the RIEC (4,600 mg/kg) in three samples. Based on this information, the extent of total TPH in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (83,500 mg/kg) is not indicative of a hot spot. In addition, several total TPH concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

4.4.2.2. East Adjacent Area Subsurface Soil (2 to 10 feet bgs)

Table 4-17 shows all of the chemicals that were detected in samples collected between 2 and 10 feet bgs; Table 4-18 lists the chemicals that exceeded the screening criteria at a 2- to 10-foot depth interval.

Metals

In total, 126 samples were analyzed for metals. As shown in Table 4-17, all metals, except tin, were detected in at least one sample at concentrations greater than the LRL. Eighteen metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc) were detected at concentrations greater than HPALs. As shown in Table 4-18, four metals (antimony, arsenic, chromium [total], and lead) were detected at concentrations exceeding the selected RIEC. One of the metals had an LRL exceeding the selected RIEC.

Antimony was detected in 87 of 126 samples analyzed. This metal was detected in 26 samples at concentrations exceeding the HPAL (9.05 mg/kg). Two samples had concentrations exceeding the selected RIEC (380 mg/kg). None of the LRLs for antimony exceeded the selected RIEC. As shown on Figure 4-13, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of antimony in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (976 mg/kg) is not indicative of a hot spot.

Arsenic was detected in 97 of 126 samples analyzed. This metal was detected in 14 samples (11 locations) at concentrations exceeding the RIEC (11.1 mg/kg). One location (IR01MW09B) had three samples with concentrations of arsenic exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. Another location (IR72B037) had two samples with concentrations of arsenic exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, one of the LRLs for arsenic exceeded the selected RIEC. As shown on Figure 4-14, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations that are less than the RIEC. Based on the available characterization data, arsenic within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (106 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in all 126 samples analyzed. This metal was detected in four samples at concentrations greater than the location-specific HPALs. One sample had a concentration exceeding the selected RIEC, which is based on the location-specific HPAL (913.7 mg/kg). None of the LRLs for chromium exceeded the selected RIEC. As shown on Figure 4-16, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of chromium in soil within this depth range is not adequately delineated by

adjacent concentrations less than the RIEC; however, the single detected exceedance (924 mg/kg) is not indicative of a hot spot.

Lead was detected in 117 of 126 samples analyzed. This metal was detected in 95 samples at concentrations greater than the HPAL (8.99 mg/kg). Eleven samples (ten locations) had concentrations exceeding the selected RIEC (800 mg/kg). One location (IR04B025) had two results exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-19, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. In addition, lead is present in the central portion of the East Adjacent Area (IR04B020 and IR04B025) at concentrations greater than 100 times the RIEC and thus indicative of potential hot spots.

Pesticides and PCBs

In total, 232 samples were analyzed for pesticides and PCBs. As shown in Table 4-17, 18 pesticides and PCBs were detected in at least one sample. As shown in Table 4-18, four pesticides (4,4'-DDE, 4,4'-DDT, dieldrin, and heptachlor epoxide) and total high risk PCBs (consisting of all Aroclor compounds except Arolcor-1016) were detected at concentrations exceeding the selected RIEC. Several pesticides and Aroclor-1016 had LRLs greater than the selected RIEC in some samples due to dilutions of samples and the limitations of analytical methods at the time.

4,4'-DDE was detected in 37 of 128 samples analyzed. One sample had a concentration exceeding the selected RIEC (6.3 mg/kg). One of the LRLs for 4,4'-DDE exceeded the selected RIEC. As shown on Figure 4-76, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of 4,4'-DDE in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (24 mg/kg) is not indicative of a hot spot.

4,4'-DDT was detected in 47 of 128 samples analyzed. Three samples had concentrations exceeding the selected RIEC (6.3 mg/kg). One of the LRLs for 4,4'-DDT exceeded the selected RIEC. As shown on Figure 4-77, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of 4,4'-DDT in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (110 mg/kg) is not indicative of a hot spot.

Dieldrin was detected in 25 of 128 samples analyzed. Nine samples (five locations) had concentrations exceeding the selected RIEC (0.11 mg/kg). Four locations had two samples with concentrations of dieldrin exceeding the RIEC; however, only one sample per location (the maximum concentration) is

shown on the figure. In addition, 10 of the LRLs for dieldrin exceeded the selected RIEC. As shown on Figure 4-21, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of dieldrin in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (7.9 mg/kg) is not indicative of a hot spot. In addition, several dieldrin concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Heptachlor epoxide was detected in 35 of 128 samples analyzed. Eleven samples (seven locations) had concentrations exceeding the selected RIEC (0.19 mg/kg). Five of the LRLs for heptachlor epoxide exceeded the selected RIEC. As shown on Figure 4-22, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of heptachlor epoxide in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (at the Grid 159 sidewall along the shoreline portion of the PCB Hot Spot Area) is indicative of a potential hot spot. In addition, several other heptachlor epoxide concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Total PCBs (high risk) were detected in 157 of 232 samples analyzed. Total PCBs (high risk) was detected in 81 samples (52 locations) at concentrations exceeding the selected RIEC (0.74 mg/kg). As shown on Figures 4-23 and 4-24, most of the exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. In addition, 24 of the LRLs for individual high risk PCB compounds exceeded the selected RIEC. Based on the available characterization data, the extent of total high risk PCBs within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. Also, the total high risk PCB concentrations detected in 11 post-excavation samples are greater than 100 times the RIEC, and confirm the known conditions along the along the shoreline portion of the PCB Hot Spot Area. In addition, total high risk PCBs are present in the central portion of the East Adjacent Area (IR01TA07A and IR01TA07B) at concentrations greater than 100 times the RIEC and thus indicative of potential hot spots.

Semivolatile Organic Compounds

In total, 127 samples were analyzed for SVOCs. As shown in Table 4-17, 58 SVOCs were detected in at least one sample at concentrations greater than the LRL. Ten SVOCs (1,2,4-trichlorobenzene, 1,4-DCB, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)-anthracene, indeno(1,2,3-cd)pyrene, and naphthalene) were detected at concentrations exceeding the

selected RIEC (Table 4-18). Several SVOCs had samples with LRLs exceeding the RIEC due to dilutions of samples and the limitations of analytical methods at the time.

1,2,4-Trichlorobenzene was detected in 3 of 76 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (5 mg/kg). In addition, four of the LRLs for 1,2,4-trichlorobenzene exceeded the selected RIEC. As shown on Figure 4-78, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of 1,2,4-trichlorobenzene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the single detected exceedance (280 mg/kg) is not indicative of a hot spot.

1,4-DCB was detected in 1 of 76 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (0.13 mg/kg). In addition, 41 of the LRLs for 1,4-DCB exceeded the selected RIEC. As shown on Figure 4-26, the detected exceedance is not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, 1,4-DCB within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (5.8 mg/kg) is not indicative of a hot spot.

Benzo(a)anthracene was detected in 38 of 127 samples analyzed. This SVOC was detected in seven samples (six locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (Grid 60 Sidewall) had two results (one was a duplicate) exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, 17 of the LRLs for benzo(a)anthracene exceeded the selected RIEC. As shown on Figure 4-29, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of benzo(a)anthracene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (7.3 mg/kg) is not indicative of a hot spot. In addition, several benzo(a)anthracene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Benzo(a)pyrene was detected in 37 of 127 samples at concentrations greater than detection limits. This SVOC was detected in 14 samples (9 locations) at concentrations exceeding the selected RIEC (0.33 mg/kg). In addition, 44 of the LRLs for benzo(a)pyrene exceeded the selected RIEC. As shown on Figure 4-30, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(a)anthracene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (13 mg/kg) is not indicative of a hot

spot. In addition, several benzo(a)pyrene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Benzo(b)fluoranthene was detected in 43 of 127 samples analyzed. This SVOC was detected in 13 samples (9 locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). In addition, 16 of the LRLs for benzo(b)fluoranthene exceeded the selected RIEC. As shown on Figure 4-31, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(b)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (5.9 mg/kg) is not indicative of a hot spot. In addition, several benzo(b)fluoranthene concentrations greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

Benzo(k)fluoranthene was detected in 33 of 127 samples analyzed. This SVOC was detected in five samples (four locations) at concentrations exceeding the selected RIEC (1.3 mg/kg). One location (Grid 58-1 Sidewall) had two results exceeding the RIEC; however, only one (the maximum concentration) is shown on the figure. In addition, 17 of the LRLs for benzo(k)fluoranthene exceeded the selected RIEC. As shown on Figure 4-32, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of benzo(b)fluoranthene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (6.6 mg/kg) is not indicative of a hot spot.

Chrysene was detected in 58 of 127 samples analyzed. This SVOC was detected in one sample at a concentration exceeding the selected RIEC (13 mg/kg). In addition, three of the LRLs for chrysene exceeded the selected RIEC. As shown on Figure 4-33, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of chrysene in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the detected exceedance is not indicative of a hot spot.

Dibenz(a,h)anthracene was detected in 4 of 127 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (0.33 mg/kg). In addition, LRLs for dibenz(a,h)anthracene exceeded the selected RIEC in most samples. As shown on Figure 4-34, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on the available characterization data, the extent of dibenz(a,h)anthracene in soil within this depth range is not adequately delineated by adjacent

concentrations less than the RIEC; however, the maximum detected concentration (0.71 mg/kg) is not indicative of a hot spot.

Indeno(1,2,3-cd)pyrene was detected in 16 of 127 samples analyzed. This SVOC was detected in two samples at concentrations exceeding the selected RIEC (1.3 mg/kg). In addition, 18 of the LRLs for indeno(1,2,3-cd)pyrene exceeded the selected RIEC. As shown on Figure 4-35, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of indeno(1,2,3-cd)pyrene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (5.1 mg/kg) is not indicative of a hot spot.

Naphthalene was detected in 13 of 127 samples analyzed. This SVOC was detected in three samples (two locations) at concentrations exceeding the selected RIEC (1.5 mg/kg). One location (Grid 57-1 Sidewall) had two results exceeding the RIEC; however, only one sample (the maximum concentration) is shown on the figure. In addition, 18 of the LRLs for naphthalene exceeded the selected RIEC. As shown on Figure 4-36, one of the two detected exceedances, located along the shoreline portion of the PCB Hot Spot Area, are not surrounded by nearby sample locations with concentrations less than the RIEC. Based on the available characterization data, the extent of naphthalene in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (7.9 mg/kg) is not indicative of a hot spot.

Volatile Organic Compounds

Up to 69 samples were analyzed for VOCs. As shown in Table 4-17, 16 VOCs were detected at least once at concentrations greater than the LRL. One VOC (1,1,2,2-tetrachloroethane) was detected at concentrations greater than the selected RIEC (Table 4-18). Several of the VOCs had LRLs greater than the selected RIEC due to dilutions of samples and the limitations of analytical methods at the time.

1,1,2,2-Tetrachloroethane was detected in 7 of 76 samples analyzed. This VOC was detected in seven samples (five locations) at concentrations exceeding the selected RIEC (0.025 mg/kg). In addition, three of the LRLs for 1,1,2,2-tetrachloroethane exceeded the selected RIEC. As shown on Figure 4-79, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of 1,1,2,2-tetrachloroethane in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (1.2 mg/kg) is not indicative of a hot spot.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 231 samples. Two-hundred and five samples contained total TPH at concentrations greater than the LRLs. Total TPH was detected in

27 samples (17 locations) at concentrations exceeding the selected RIEC (3,500 mg/kg). As shown on Figure 4-38, most of the exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Six samples contained concentrations of TOG exceeding the RIEC (3,500 mg/kg). TPH-d exceeded the RIEC (750 mg/kg) in 36 samples. TPH-mo exceeded the RIEC (4,600 mg/kg) in 18 samples. Based on this information, the extent of total TPH in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC. Although the maximum detected concentration (34,120 mg/kg) is not indicative of a hot spot, this total TPH concentration and several others greater than the RIEC were reported along the shoreline portion of the PCB Hot Spot Area which, as discussed in Section 3.8.8, was not excavated during the removal action (2006–2007) because of its proximity to San Francisco Bay.

4.4.2.3. East Adjacent Area Deep Soil (greater than 10 feet bgs)

Table 4-19 shows all of the chemicals that were detected in samples collected at greater than 10 feet bgs Table 4-20 list the chemicals that exceeded the screening criteria at greater than 10 feet bgs.

Metals

In total, 85 samples were analyzed for metals. As shown in Table 4-19, all but three metals (chromium VI, thallium, and tin) were detected in at least one sample at concentrations greater than the LRL. Twelve metals (antimony, arsenic, barium, beryllium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, and zinc) were detected at concentrations greater than HPALs. One of the metals had an LRL greater than the selected RIEC. As shown in Table 4-20, three metals (arsenic, chromium [total], and lead) were detected at concentrations exceeding the selected RIEC.

Arsenic was detected in 46 of 60 samples analyzed. This metal was detected in 12 samples (7 locations) at concentrations exceeding the RIEC (11.1 mg/kg). One of the LRLs for arsenic exceeded the selected RIEC. As shown on Figure 4-39, the detected exceedances are not surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of arsenic in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (26 mg/kg) is not indicative of a hot spot.

Chromium (total) was detected in all 60 samples analyzed. This metal was detected in three samples at concentrations greater than the location-specific HPALs. One sample had a concentration exceeding the selected RIEC, which is based on the location-specific HPAL (719.1 mg/kg). None of the LRLs for chromium exceeded the selected RIEC. As shown on Figure 4-41, the detected exceedance is not surrounded by nearby sample locations (within 150 feet to the west) with concentrations less than the RIEC. Based on this information, the extent of chromium in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (903 mg/kg) is not indicative of a hot spot.

Lead was detected in 57 of 60 samples analyzed. This metal was detected in 37 of the samples at concentrations greater than the HPAL (8.99 mg/kg). One sample had a concentration exceeding the selected RIEC (800 mg/kg). None of the LRLs for lead exceeded the selected RIEC. As shown on Figure 4-43, the detected exceedance is surrounded by nearby sample locations (within 150 feet) with concentrations less than the RIEC. Based on this information, the extent of lead in soil within this depth range is adequately delineated by adjacent concentrations less than the RIEC, and the maximum detected concentration (24,600 mg/kg) is not indicative of a hot spot.

Pesticides and PCBs

In total, 55 samples were analyzed for pesticides and PCBs. As shown in Table 4-19, seven pesticides (4,4'-DDD, 4,4'-DDE, beta-BHC, endosulfan I, endosulfan sulfate, endrin ketone, and heptachlor epoxide) and total high risk PCBs (consisting of all Aroclor compounds except Aroclor-1016) were detected in at least one sample at a concentration greater than the LRL. As shown in Table 4-20, only total high risk PCBs were detected at concentrations exceeding the selected RIEC.

Total PCBs (high risk) were detected in 18 of 55 samples analyzed. Total PCBs (high risk) were detected in three samples at concentrations exceeding the selected RIEC (0.74 mg/kg). One of the LRLs for individual Aroclor compounds exceeded the selected RIEC. As shown on Figure 4-44, the detected exceedances are not surrounded by nearby sample locations with a concentration less than the RIEC. Based on this information, the extent of total PCBs in soil within this depth range is not adequately delineated by adjacent concentrations less than the RIEC; however, the maximum detected concentration (8.6 mg/kg) is not indicative of a hot spot.

Semivolatile Organic Compounds

In total, 62 samples were analyzed for SVOCs. As shown in Table 4-19, 36 SVOCs were detected in at least one sample at concentrations greater than the LRL. Several SVOCs had LRLs exceeding the selected RIEC due to dilutions of samples and the limitations of analytical methods at the time. None of the SVOCs were detected at concentrations exceeding the RIEC (Table 4-20). As a result, SVOCs at depths greater than 10 feet bgs are not shown on a figure.

Volatile Organic Compounds

In total, 62 samples were analyzed for VOCs. As shown in Table 4-19, 14 VOCs were detected in at least one sample at concentrations greater than the LRL. None of the VOCs were detected at concentrations exceeding the selected RIEC (Table 4-20). As a result, VOCs at depths greater than 10 feet bgs are not shown on a figure.

Petroleum Hydrocarbons

Total TPH is the sum of the concentrations of TPH-g, TPH-d, TPH-mo, TPH as unknown purgeables, and TPH as unknown extractables (Shaw, 2007). Total TPH was calculated for 55 samples. None of the samples contained total TPH at concentrations exceeding the RIEC (3,500 mg/kg) (Table 4-20). As a result, total TPH at depths greater than 10 feet bgs are not shown on a figure.

4.5. SUMMARY OF FINDINGS

The nature and extent evaluation presented in this section demonstrates that an adequate quantity of data, of sufficient quality, exist to support the HHRA and SLERA, to provide the basis for the RAOs, and to evaluate a focused set of remedial alternatives for Parcel E-2. The following subsections summarize the nature and extent findings for solid waste (Section 4.5.1), landfill gas (Section 4.5.2), and chemicals in soil (Section 4.5.3). Each subsection discusses the resolution of data quality objectives (DQOs) and outlines potential data gaps. Section 4.5.4 summarizes the data gaps identified during the nature and extent evaluation.

4.5.1. Nature and Extent of Solid Waste

Evaluation of the nature and extent of solid waste at the Parcel E-2 Landfill is based on the physical presence of contiguous industrial or municipal-type wastes. Based on data from 28 soil borings, 18 monitoring wells, and 25 test pits extended within the Landfill Area, solid waste comprises primarily municipal-type waste and construction debris. Solid waste includes wood, paper, plastic, metal, glass, asphalt, concrete, and bricks that are mixed with sand, clay, and gravel fill. Historic information indicates that industrial wastes were also disposed of in or around the Landfill Area, including sandblast waste, radioluminescent devices, asbestos-containing debris, paint sludge, solvents, and waste oils (NEESA, 1984; NAVSEA, 2004). The available characterization data suggest that the quantity of industrial waste within the Landfill Area is less than the quantity of municipal-type waste and construction debris.

The nature of hazardous substances within the Landfill Area, based on an evaluation of soil data, is summarized in Section 4.5.3. According to EPA guidance, characterization of a landfill's contents is not necessary or appropriate for selecting a response action for these sites, when applying the presumptive remedy methodology for remedial alternatives evaluation (EPA, 1993a; provided in Appendix H to this report). The evaluation summarized in Section 4.5.3 consists of identifying potential hot spots within the Landfill Area. EPA recommends that hot spots in municipal landfills be identified and evaluated to decide if more extensive characterization and development of remedial alternatives is appropriate (EPA, 1991a). The evaluation decision whether or not these hot spots require more extensive characterization and development of remedial alternatives is summarized in Section 8.

The lateral and vertical extent of solid waste at the Parcel E-2 Landfill was delineated during fieldwork performed under the RI and NDGI. All information on the extent of solid waste at the landfill in this

section is from the Landfill Lateral Extent Evaluation report (Appendix B to this report). The lateral extent of waste at the Landfill Area is shown on Figure 3-1. Along the northern perimeter of the Parcel E-2 Landfill, the landfill lateral extent was determined to be along the fence line separating Parcel E-2 from the UCSF compound. The eastern edge of the solid waste is located beneath the interim landfill cap (estimated to end approximately 10 feet before the eastern edge of the cap). The southeastern edge of solid waste is located adjacent to the shoreline, and the southwestern edge of the solid waste is located adjacent to the freshwater wetlands within the Panhandle Area. The western edge of solid waste is located adjacent to the drainage channel along the western property boundary.

The waste is generally located between 21 feet above and 14 feet below msl. The waste generally varies from 10 to 25 feet thick. In all areas of the Parcel E-2 Landfill, solid waste extends beneath the water table.

Isolated solid waste locations are present within the Panhandle and East Adjacent Areas (Figure 4-1). Waste at these locations is not contiguous with the Landfill Area and consists primarily of construction debris, with lesser quantities of nonputrescible industrial waste (including sandblast waste).

4.5.1.1. Resolution of Data Quality Objectives

DQOs were presented in the Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) for the Parcel E NDGI (TtEMI, 2002a) to outline the decision questions to be answered by the landfill lateral extent evaluation. The nature and extent evaluation presented in this report is based primarily on the landfill lateral extent evaluation. Therefore, an assessment of how the data for landfill lateral extent compares with the DQOs will help verify whether or not the existing data are sufficient to support this RI/FS.

The DQOs focus on (1) delineating the edge of waste for the southwest, northwest, and northern portions of the Parcel E-2 Landfill and (2) determining the thickness of waste at the northern portion of the landfill to support future RDs (TtEMI, 2002a). DQO evaluations are summarized in Table 4-21. Based on an evaluation of the available data, the installation of primary and step-out test pits adequately delineated the landfill lateral extent. In addition, the installation of test pit borings provided additional data on the thickness of waste at the edge of the landfill. This determination supports the nature and extent evaluation of solid waste as presented in this report.

4.5.1.2. Data Gaps

Upon completion of the NDGI, the extent of solid waste at the Parcel E-2 Landfill has been adequately delineated with no data gaps remaining. Overall, characterization data on the nature and extent of solid waste are sufficient to support the focused remedy evaluation process that will accelerate cleanup and transfer of Parcel E-2.

4.5.2. Nature and Extent of Landfill Gas

Upon completion of the landfill gas characterization study, the extent of landfill gas beyond the landfill perimeter was determined to be at the northern edge of the UCSF compound. To the east, west, and south, landfill gas had not migrated beyond the perimeter of the Parcel E-2 Landfill (Appendix A). The landfill gas TCRA was conducted to remove landfill gas that had migrated onto the UCSF compound and to control future migration north of the solid waste boundary. Ongoing monitoring of landfill gas and operation of the gas control system is performed on a regular basis to verify that hazardous levels of landfill gas are not migrating beyond the fence line of the landfill and onto the UCSF compound. The ongoing landfill gas control program, which is based on the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c), includes notification and response procedures in the event that hazardous levels of landfill gas are detected beyond the fence line of the landfill and beneath the UCSF compound. The data collected as part of the landfill gas characterization study, the TCRA, and the ongoing landfill gas monitoring have adequately defined the nature and extent of landfill gas at Parcel E-2.

4.5.2.1. Resolution of Data Quality Objectives

The nature and extent evaluation presented in this report is supported by the data collected as part of the landfill gas characterization study, the landfill gas TCRA, and the ongoing landfill gas monitoring and control system operation. Two sets of DQOs were established to outline decision questions to be answered by the landfill gas characterization study (which identified landfill gas migration onto the UCSF compound) and the ongoing landfill gas monitoring and control system operation (which is effectively controlling landfill gas migration following implementation of the TCRA). An evaluation of how the data from both the landfill gas characterization study and the landfill gas and control system operation compares with the respective DQOs will help verify whether or not the existing data are sufficient to support this RI/FS.

DQOs were presented in the FSP/QAPP for the Parcel E NDGI (TtEMI, 2002a) to outline the decision questions to be answered by the landfill gas characterization study. These decision questions focused on defining the nature and extent of landfill gas in and around the Parcel E-2 Landfill. DQO evaluations for the landfill gas characterization study are summarized in Table 4-22. The data collected during the landfill gas characterization study determined that subsurface gas from the Parcel E-2 Landfill had not resulted in unacceptable levels of methane and NMOCs in outdoor or indoor air. In addition, the data defined the extent of subsurface methane and NMOCs surrounding the Parcel E-2 Landfill.

The findings of the landfill gas characterization study prompted the Navy to initiate a TCRA to (1) remove landfill gas and reduce subsurface methane concentrations at the UCSF compound to below the LEL (5 percent by volume in air); and (2) control future landfill gas migration to off-site areas. DQOs were presented in the Interim Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c) to

outline the decision questions to be answered by the ongoing landfill gas monitoring and control system operation. The DQOs were developed using 27 CCR as guidance, and set limits for landfill gas concentrations at the various locations that make up the monitoring network. DQOs were developed for landfill gas monitoring at all GMPs, UCSF surface locations, the Building 830 crawlspace, on-site utilities, and the landfill gas control system. The DQOs focus on the monitoring criteria to (1) ensure that hazardous levels of landfill gas are not migrating beyond the fence line of the Parcel E-2 Landfill and onto the UCSF compound, (2) demonstrate that landfill gas is not migrating under Crisp Avenue toward non-Navy property, and (3) monitor the performance of the landfill gas control system (TtEMI and ITSI, 2004c).

DQO evaluations are summarized in Table 4-23. Based on an evaluation of the available data from January 2004 through June 2010, the control system is functioning to control the migration of hazardous levels of methane beyond the fence line of the Parcel E-2 Landfill. In January and February 2006, hazardous levels of methane were detected at the fence line of the landfill. The Navy promptly performed active extraction at these locations to control the migration of hazardous levels of methane beyond the fence line of the landfill. Ongoing monitoring performed since February 2006 supports the nature and extent of landfill gas (for both methane and NMOCs) as presented in this report.

4.5.2.2. Data Gaps

Sufficient landfill gas data exist to evaluate remedial alternatives for Parcel E-2. However, the potential presence of subsurface utilities within the eastern portion of the Landfill Area (Figure 1-4) should be verified during the RD. Such utilities may serve as preferential pathways for gas migration; however, previous soil gas measurements in the vicinity (Figure 4-3) have not detected methane above 25 percent of the LEL. Additional studies are planned, in conjunction with the RD, to more thoroughly evaluate soil gas concentrations in the Panhandle Area and East Adjacent Area and assess whether methane or NMOCs are present in the areas at concentrations that may be hazardous to human health.

4.5.3. Nature and Extent of Soil Contamination

This subsection summarizes the nature and extent of chemicals in soil within Parcel E-2. Data from the 1,113 soil samples collected within Parcel E-2 are sufficient to support the HHRA and SLERA, to provide the basis for the RAOs, and to evaluate a focused set of remedial alternatives for Parcel E-2.

Metals, pesticides, PCBs, dioxins, furans, SVOCs, VOCs, and petroleum hydrocarbons were detected at concentrations exceeding the RIEC in soil samples collected at Parcel E-2. As shown in Table 4-24, chemical concentrations exceeding RIEC were found in all three study areas at Parcel E-2 and all depth ranges evaluated. The following list provides a general summary of the distribution of these chemicals throughout Parcel E-2, and the frequency at which concentrations exceeded the RIEC.

- Ten metals (antimony, arsenic, cadmium, chromium, copper, iron, lead, mercury, vanadium, and zinc) were detected at concentrations exceeding the RIEC in soil at Parcel E-2. Arsenic, chromium, and lead were the prevalent metals detected at concentrations exceeding the RIEC, with exceedances in greater than 10 percent of the samples analyzed within a given depth range. Two lead concentrations in the East Adjacent Area were greater than 100 times the RIEC and, as defined in Section 4.1.3.4, may be considered potential hot spots. Overall, metals concentrations in the Landfill Area (0 to 2 feet bgs) and the East Adjacent Area (greater than 10 feet bgs) exceeded the RIEC less frequently as compared to other Parcel E-2 areas and depth ranges. Most of the metals were detected in samples collected between 0 and 10 feet bgs, and the greatest number of RIEC exceedances was present in the Landfill and Panhandle Areas.
- Four pesticides (4,4'-DDE, 4,4'-DDT, dieldrin, and heptachlor epoxide) were detected at concentrations exceeding the RIEC in soil from 0 to 10 feet bgs at Parcel E-2. Dieldrin and heptachlor epoxide were the most prevalent pesticides detected at concentrations exceeding the RIEC, and most of these exceedances were located at the edges of the PCB Hot Spot Area excavation.
- Total high risk PCBs were detected at concentrations exceeding the RIEC in all soil except Panhandle Area soil greater than 10 feet bgs. PCB exceedances were most frequent at the edges of the PCB Hot Spot Area excavation, which comprises portions of the Landfill and East Adjacent Areas, and at depths from 0 to 10 feet bgs. Outside of the PCB Hot Spot Area excavation, four PCB concentrations in the Landfill Area and two in the East Adjacent Area were greater than 100 times the RIEC (0.74 mg/kg) and, as defined in Section 4.1.3.4, may be considered potential hot spots.
- Two dioxins and six furans were detected at concentrations exceeding the RIEC in pre-excavation soil samples collected from the Metal Slag Area (southwest portion of the Panhandle Area). These exceedances were reported in the majority of samples analyzed between 2.5 and 19 feet bgs. Although the exceedance frequency is high, the magnitudes of these exceedances were relatively low, with all but one exceedance less than 10 times the RIEC. The highest exceedance was for the furan 2,3,4,7,8-PeCDF, which was detected at a concentration of 0.986 µg/kg or 18 times the RIEC (0.055 µg/kg).
- Fourteen SVOCs were detected in soil at concentrations exceeding the RIEC in Parcel E-2. Benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 1,4-DCB, and naphthalene were the prevalent SVOCs detected at concentrations exceeding the RIEC, with exceedances in greater than 10 percent of the samples analyzed within a given depth range. Benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene exceedances were dispersed throughout Parcel E-2, but were found infrequently in deep (greater than 10 feet bgs) soil. 1,4-DCB, and naphthalene exceedances were more frequent in and around the Landfill Area (at depths greater than 2 feet bgs), including one 1,4-DCB concentration and one naphthalene concentration that were greater than 100 times the RIEC and, as defined in Section 4.1.3.4, may be considered potential hot spots within the landfill.

- VOCs were detected at concentrations exceeding the RIEC in soil samples greater than 10 feet bgs in the Landfill Area and in soil samples from between 0 to 10 feet bgs in the East Adjacent Area. 1,1,2,2-tetrachloroethane was the most prevalent VOC detected at concentrations exceeding the RIEC, with exceedances in greater than 10 percent of the samples analyzed within a given depth range. These exceedances were concentrated in the northern portion of the East Adjacent Area.
- Petroleum hydrocarbons (including TPH-g, TPH-d, TPH-mo, and TOG) were detected in soil at concentrations exceeding the RIEC for total TPH in most Parcel E-2 areas. Total TPH exceedances were most frequent at the edges of the PCB Hot Spot Area excavation, which comprises portions of the Landfill and East Adjacent Areas, and at depths from 0 to 10 feet bgs.

Based on the data presented in Table 4-24, soil contamination is less extensive between 0 and 2 feet bgs within the Landfill Area and greater than 10 feet bgs within the East Adjacent Area. In the Landfill Area from 0 to 2 feet bgs, only two chemicals (total high risk PCBs and benzo(a)pyrene) exceeded the RIEC in more than 10 percent of samples analyzed. In the East Adjacent Area greater than 10 feet bgs, only one chemical (arsenic) exceeded the RIEC in more than 10 percent of samples analyzed. These observations contrast with conditions found in other depth ranges, where no less than 4 (and in some areas up to 10) chemicals exceeded the RIEC in more than 10 percent of samples analyzed. The conclusion that contamination is less extensive in the surface soil within the Landfill Area and deep soil within the East Adjacent Area is attributed to the fact that most fill material in these areas was not associated with shipyard operations. Specifically, surface soil within the Landfill Area was placed during closure activities in 1974, and residual contamination in this interval can be attributed to surface releases after 1974. In addition, deep soil within the East Adjacent Area consists of either natural sediments or fill material placed during expansion of the shipyard in the early 1940s.

Soil contamination is more widely distributed in the Panhandle Area and the shallow zones (0 to 10 feet bgs) of the East Adjacent Area. The heterogeneous distribution of chemicals in these areas indicates that fill material placed at Parcel E-2 during shipyard operations may contain unacceptable levels of contamination. The heterogeneous distribution of chemicals makes delineation of potential areas of concern problematic. This problem is evidenced by the findings of the SDGI, which was only partially successful in delineating known and potential soil contamination in the Panhandle and East Adjacent Areas (further discussed in Section 4.5.4). RIEC exceedances in the Panhandle and East Adjacent Areas that are not completely delineated are shown in bold text (inside shaded cells) in Table 4-24. Despite the inherent difficulty in delineating potential point sources of soil contamination within heterogeneous fill material, the characterization efforts from the RI, NDGI, and SDGI have provided sufficient data to evaluate potential risk to humans and wildlife at Parcel E-2.

As discussed in Section 4.1.3.4, soil characterization data within the Landfill Area are used to assess the general extent of RIEC exceedances relative to the landfill waste volume. This assessment provides a basis for determining whether lesser quantities of hazardous wastes are present in the landfill as compared

with municipal wastes, which is one evaluation factor outlined in EPA presumptive remedy guidance (provided in Appendix H of this report). Based on the information presented in Section 4.2.4, nearly all of the hazardous substances detected in Landfill Area soil were of a limited extent relative to the overall waste volume. Several SVOCs and PCBs, such as benzo(a)pyrene and total high risk PCBs, were detected throughout a large portion of the Landfill Area at concentrations exceeding the RIEC but at concentrations that were not indicative of hot spots. These findings demonstrate that lesser quantities of hazardous wastes are present in the landfill as compared with municipal-type waste and construction debris.

4.5.3.1. Identification of Potential Hot Spots

As discussed in Section 4.1.3.4, soil hot spots are defined as locations containing chemical concentrations 100 times greater than the corresponding RIEC. Based on the information presented in Sections 4.2.4, 4.3.2, and 4.4.2, the following potential hot spots were identified at Parcel E-2:

- Edges of PCB Hot Spot Area excavation within Landfill and East Adjacent Areas (0 to 10 feet bgs): 19 samples (18 locations) contained total high risk PCBs at concentrations greater than 100 times the RIEC (0.74 mg/kg). The majority of these locations were along the western and southwestern sidewall of the PCB Hot Spot Area excavation. As discussed in Section 3.8.8, oil-stained soil and free-phase product were observed along and adjacent to this sidewall during the removal action. In addition, one of these 18 locations (Grid 159 sidewall) also contained heptachlor epoxide at a concentration greater than 100 times the RIEC (0.19 mg/kg).
- East Adjacent Area (2 to 10 feet bgs): Two samples (IR01TA07A and IR01TA07B, 4 feet bgs) contained total high risk PCBs at concentrations greater than 100 times the RIEC (0.74 mg/kg). IR01TA07A and IR01TA07B are located about 50 feet apart. Also, two samples (IR04B020 and IR04B025; both at a depth of 4 feet bgs) contained lead at concentrations greater than 100 times the RIEC (800 mg/kg). IR04B020 and IR04B025 are located about 70 feet apart.
- Landfill Area (2 to 10 feet bgs): One sample (IR01MW05A, 8 feet bgs) contained total high risk PCBs at a concentration greater than 100 times the RIEC (0.74 mg/kg). In addition, one sample (IR01MW02B, 9 feet bgs) contained 1,4-DCB at a concentration greater than 100 times the RIEC (0.13 mg/kg). Also, one sample (IR01B021A, 9 feet bgs) contained naphthalene at a concentration greater than 100 times the RIEC (1.5 mg/kg). These locations are over 300 feet apart.
- Landfill Area (greater than 10 feet bgs): Three samples (IR01MW17B, 11 feet bgs; IR01B012, 17 feet bgs; IR01B019, 16 feet bgs) contained total high risk PCBs at concentrations greater than 100 times the RIEC (0.74 mg/kg). These locations are more than 400 apart from each other.

The potential hot spots within the Landfill Area will be analyzed in further detail in Section 8.2.3.2. The potential hot spots within the East Adjacent Area, as well as the western and southwestern sidewall of the PCB Hot Spot Area excavation, will be further evaluated in the FS portions of this report (Sections 11 through 14). Because of the inadequate delineation of most RIEC exceedances in the East Adjacent Area, additional characterization may be required for potential hot spots considered for removal in the FS.

4.5.3.2. Resolution of Data Quality Objectives

DQOs were presented in the Sampling and Analysis Plan for the SDGI (TtEMI, 2002d) to focus the additional soil characterization efforts needed to complete the RI. The nature and extent evaluation presented in this report relies heavily on the SDGI characterization efforts. Therefore, an evaluation of how the soil and sediment characterization data compares with the DQOs will help verify whether or not the existing data are sufficient to support this RI/FS.

DQO evaluations are summarized in Table 4-25. The SDGI was successful in delineating several source areas in the Parcel E-2 onshore areas, most notably the PCB Hot Spot Area in the East Adjacent Area. However, based on the data presented in the SDGI Data Summary Report (TtEMI, 2005c), a number of locations have not been completely delineated. As discussed in Section 4.5.3, this finding is consistent with the heterogeneous distribution of chemicals in the Panhandle and East Adjacent Areas.

The shoreline component of the SDGI is also summarized in Table 4-25. The shoreline investigation found contaminated sediment within the intertidal Shoreline Area that may pose a risk to aquatic receptors. The findings of the shoreline investigation are discussed in more detail in Appendix G.

4.5.4. Data Gaps

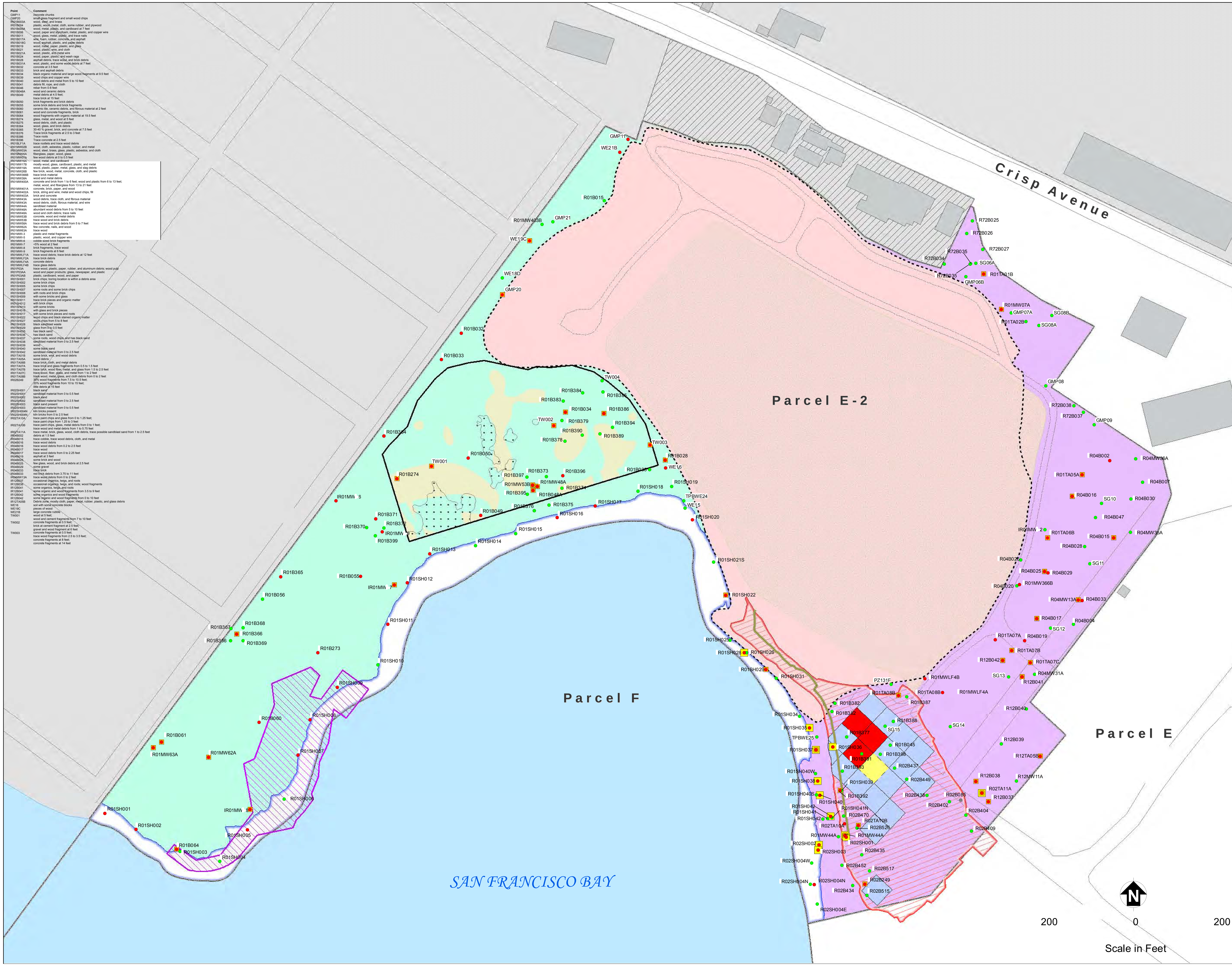
Although the SDGI was only partially successful in delineating known and potential soil contamination in the Panhandle and East Adjacent Areas, it substantially increased the soil data set in the Panhandle Area and East Adjacent Area. The inability to delineate potential point sources of soil contamination within heterogeneous fill material does not necessarily constitute a data gap. Overall, the SDGI data did not affect the overall maximum concentrations of chemicals in soil relative to the original RI data set from 1997. For most chemicals detected at Parcel E-2, the maximum detected concentration in the post-SDGI data set is within 10 percent of the maximum detected concentration in the original RI data set. This finding helps demonstrate that the heterogeneous site conditions at Parcel E-2 present severe challenges to completing a standard investigation and cleanup for a point source or sources.

Data gaps may exist at locations along the Parcel E-2 boundary where exceedances of the RIEC are not adequately delineated. Table 4-26 identifies locations of exceedances of the RIEC that are located adjacent to the Parcel E-2 boundary (within 150 feet) that are not delineated by data from adjacent borings. The locations are identified for consideration during development of remedial alternatives at Parcels E and E-2. The need to collect additional data in the areas will depend on the types of remedial alternatives evaluated. For example, additional data may be required for remedial alternatives involving excavation of chemical concentrations exceeding risk-based concentrations (RBCs) (that may be comparable with RIECs) because such data would be needed to refine the excavation limits or demonstrate compliance with remediation goals. However, for remedial alternatives involving containment and excavation of chemical hot spots (areas with chemical concentrations exceeding RBCs

by one to two orders of magnitude), additional data may not be required in areas where no excavation is required to meet the RAOs.

In summary, the adequacy of the data set should be measured against the remediation decision to be made for Parcel E-2. Given the focused set of remedial alternatives envisioned for the FS component of this report, complete delineation of known and potential soil contamination in the Panhandle and East Adjacent Areas is not necessary. Overall, characterization data are sufficient to support the risk assessments and a more focused remedy evaluation process that will accelerate cleanup and transfer of Parcel E-2. However, it is acknowledged that additional characterization may be required to support future remediation activities. For example, if hot spot removal is implemented in conjunction with containment technologies, additional characterization would be needed prior to the removal. Specific DQOs for additional characterization, as needed to support future remediation activities, will be developed during the RD (or, for an interim removal action, during work planning process).

Figures



- Contains Waste
- No Waste Found
- No Data Available
- Putrescible Construction Debris
- Sandblast Waste
- Estimate of Solid Waste Extent
- PCB Hot Spot Area (2007 excavation limit)[a]
- Metal Slag Area (2007 excavation limit)[a]
- Interim Landfill Cap Extent
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- Parcel Boundary
- Building
- UCSF Compound
- Non-Navy Property
- Sheet-Pile Wall
- Road
- Gravel Road

Geophysical Study Results (2008)

- Near-surface debris observed during geophysical survey
- Anomalies based on terrain conductivity (may be indicative of waste deposits)
- Geophysical Study Area 3

Excavaton Grids from PCB Hot Spot Area (2005 - 2007)

- Various bottles, jars, and containers with laboratory wastes were recovered from these grids
- 110 drums with content were removed from these approximate areas
- Both bottles and drums were found in this area

Notes

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

1 Additional bottles were recovered on the conveyor system used for the radiological screening process.

2 Various debris, including tires, concrete, metal, wood, and Material Potentially Presenting an Explosive Hazard that were encountered during excavation activities were not included in this figure.

PCB = polychlorinate biphenyl
UCSF = University of California, San Francisco

Source

CE2-Kleinfelder Joint Venture. 2008e. "Draft Final Technical Memorandum for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California." September 26.

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

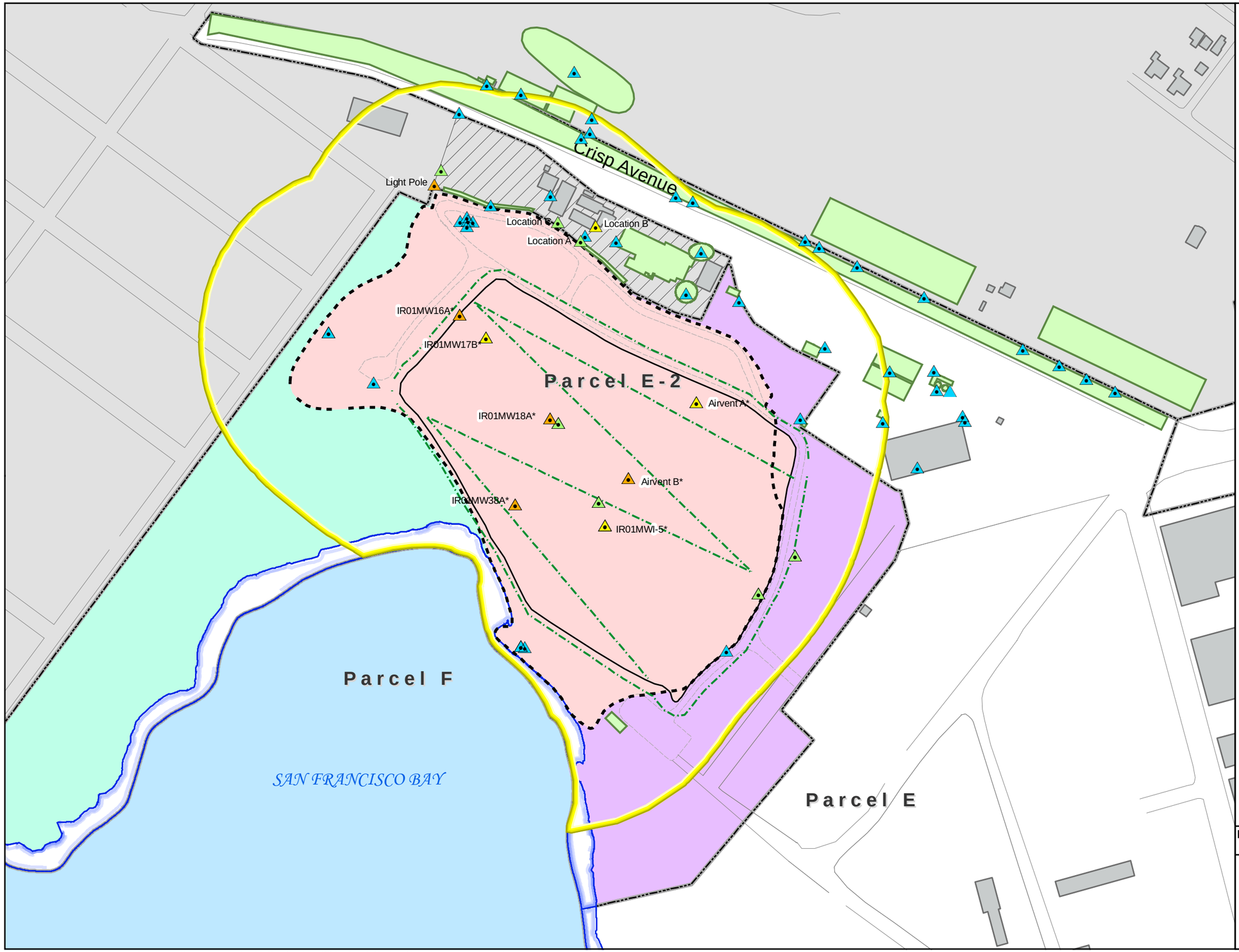
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-1

ISOLATED WASTE LOCATIONS IN ADJACENT AREAS

Remedial Investigation/Feasibility Study for Parcel E-2

P:\2005_Projects\25-049_Navy_HPS_E-2_RI-FS\IN_Maps&Drawings\GIS\Projects\Landfill\Section 4\Waste\Isolated Waste Locations in Adjacent Areas.mxd



Outdoor Air Survey Results (2002)

- >100% LEL
- 25-<100% LEL
- 1-<25% LEL
- <1% LEL
- Transect Location
- Building/Area Survey Location
- 300-foot Landfill Buffer
- Parcel Boundary
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- Estimate of Solid Waste Extent
- Interim Landfill Cap Extent
- Non-Navy Property
- UCSF Compound
- Building
- Road
- Gravel Road

Notes:

LEL readings measured by a gas indicator or a flame ionization detector. All LEL results associated with methane concentrations in ambient air.

LEL = lower explosive limit
UCSF = University of California, San Francisco

Outdoor air survey was performed in 2002 (prior to landfill gas removal action); subsequent air monitoring at locations A, B, and C, and the light pole showed methane levels to be less than 1 percent.

* Air monitoring was performed at the top of the well casing with the well/vent open to the atmosphere; results are not considered representative of outdoor air within the landfill area.

N

250 0 250

Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

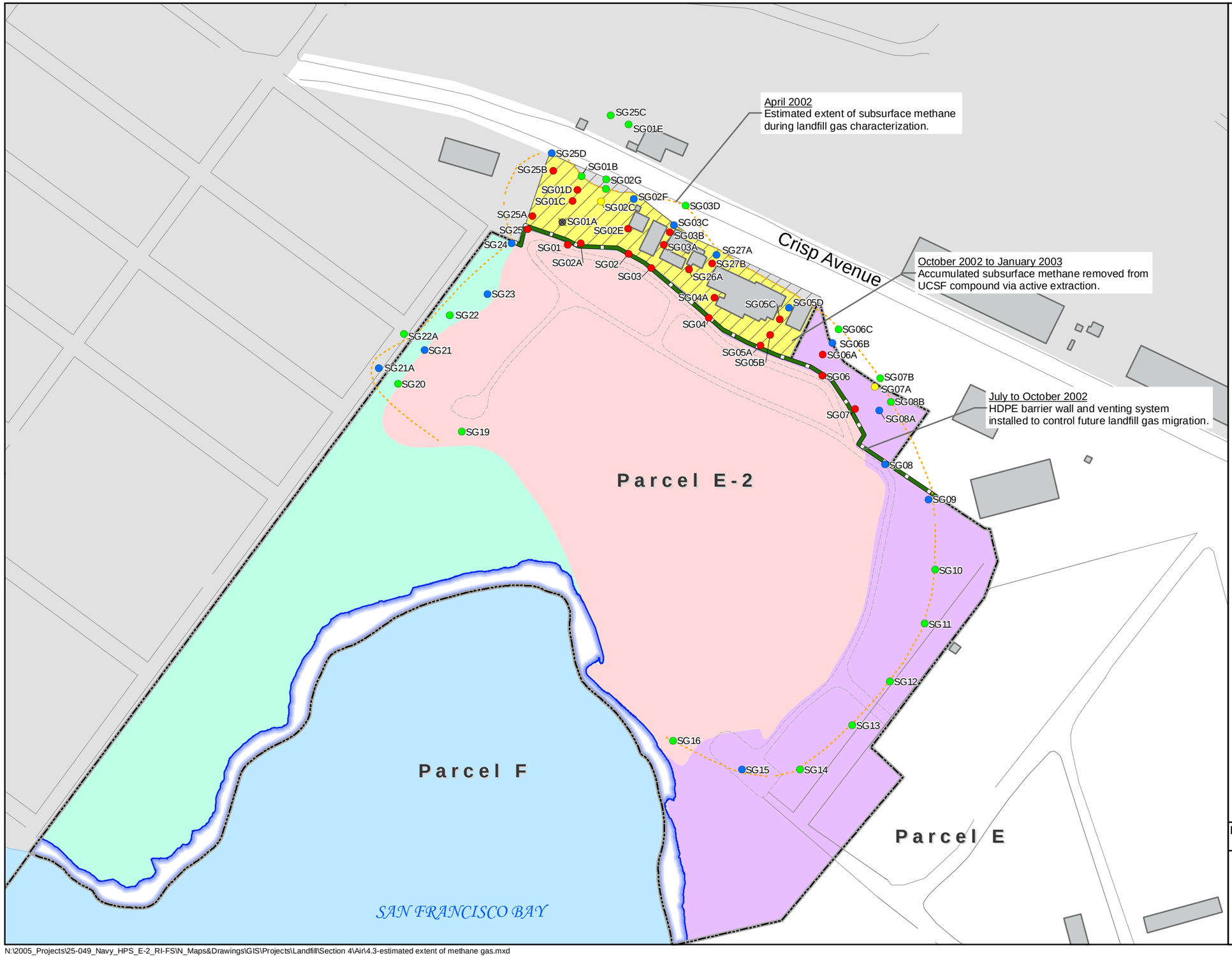
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-2

OUTDOOR AIR SURVEY RESULTS FOR METHANE

Remedial Investigation/Feasibility Study for Parcel E-2

N:\2005_Projects\25-049_Navy_HPS_E-2_RI-FS\N_Maps&Drawings\GIS\Projects\Landfill\Section 4\Air\4.2-ambient air survey results.mxd



April 2002 Soil Gas Survey*

- No Survey Conducted
- Methane Not Detected
- Methane Less Than 25% LEL
- Methane Equal to or Greater than 25% LEL and Less than 100% LEL
- Methane Greater Than 100% LEL
- Estimated Extent of Methane Detected During April 2002 Field Survey
- HDPE Barrier Wall
- Area within UCSF Compound Targeted for Active Gas Extraction
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- Parcel Boundary
- Non-Navy Property
- UCSF Compound
- Building
- Road
- Gravel Road

Notes:
EPA = U.S. Environmental Protection Agency
HDPE = high-density polyethylene
LEL = lower explosive limit
UCSF = University of California, San Francisco

LEL for methane is 5 percent by volume

* Soil gas survey performed using field instruments (with lower quantitation limit for methane at 0.5% of the LEL) and supplemented with laboratory data (analyzed for methane by EPA Method 3C).

250 0 250

Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-3

EXTENT OF SUBSURFACE METHANE PRIOR TO REMOVAL ACTION

Remedial Investigation/Feasibility Study for Parcel E-2

N:\2005_Projects\25-049_Navy_HPS_E-2_RI-FS\N_Maps&Drawings\GIS\Projects\Landfill\Section 4\Air\4.3-estimated extent of methane gas.mxd

Evaluation Criteria Summary	mg/kg
HPAL	8.99
SDGI Industrial Criteria	750
EPA Region 9 Industrial PRG 2004	800
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**800**

IR01B368
9,300 J2 mg/kg
2 ft bgs

IR01B367
1,600 J3 mg/kg
2 ft bgs

IR01B366
810 J2 mg/kg
2 ft bgs

IR01B369
6,500 J2 mg/kg
2 ft bgs

IR01SW2
6,270 mg/kg
0 ft bgs

GRID 86 SIDEWALL
2,000 mg/kg
1 ft bgs

GRID 71
8,600 mg/kg
0 ft bgs

GRID 70 SIDEWALL
1,000 mg/kg
0 ft bgs

GRID 87
1,000 mg/kg
2 ft bgs

GRID 96
1,700 mg/kg
2 ft bgs

GRID 68/69 SIDE2WALL
1,500 mg/kg
0.5 ft bgs

GRID 91
1,000 mg/kg
0 ft bgs

GRID 94
1,800 mg/kg
0.5 ft bgs

GRID 92/93 SIDE2WALL
1,600 mg/kg
1 ft bgs

GRID 165 SIDEWALL
9,700 mg/kg
1.3 ft bgs

IR04B030
6,915.16 mg/kg
1 ft bgs

IR04B047
11,215.9 mg/kg
1 ft bgs

IR01TA06B
5,760 mg/kg
1 ft bgs

IR04B025
2,412.29 mg/kg
1.7 ft bgs

IR04B015
3,165.72 mg/kg
1 ft bgs

IR04B028
4,179.44 mg/kg
1 ft bgs

IR04MW13A
4,915.46 mg/kg
1.7 ft bgs

IR12B042
1,500 J24 mg/kg
0.7 ft bgs

IR04B017
9,001.96 mg/kg
1.7 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-4

LEAD IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.27
EPA Region 9 Industrial PRG 2004	0.19
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.31
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.19**

IR01B390
<2.1 mg/kg
1 ft bgs

IR01B394
<0.24 mg/kg
1 ft bgs

IR01SS350
<0.21 mg/kg
0.5 ft bgs

GRID 165 SIDEWALL
0.39 mg/kg
1.3 ft bgs

GRID 86 SIDEWALL
0.55 mg/kg
1 ft bgs

GRID 110 SIDEWALL
3.2 mg/kg
1.8 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-5

HEPTACHLOR EPOXIDE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	0.74
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.74**

IR01MW02B
<1.7 mg/kg
3.64 ft bgs

IR01MW03A
<0.9 mg/kg
0.68 ft bgs

IR01MW16A
<0.83 mg/kg
1.25 ft bgs

IR01MW05A
<1.7 mg/kg
0.81 ft bgs

IR01SS351
<0.9 mg/kg
0.5 ft bgs

IR01SS350
1.4 mg/kg
0.5 ft bgs

IR04B002
<0.89 mg/kg
1.25 ft bgs

IR04B007
<0.82 mg/kg
1.75 ft bgs

IR01B386
12 mg/kg
1 ft bgs

IR01B029
<0.86 mg/kg
1.25 ft bgs

IR01B394
0.82 mg/kg
1 ft bgs

IR01B373
0.9 mg/kg
2 ft bgs

IR01MW53B
<0.84 mg/kg
1.25 ft bgs

IR01B390
17 mg/kg
2 ft bgs

IR01MW38A
<0.88 mg/kg
1 ft bgs

IR04B030
8.89 mg/kg
1.25 ft bgs

IR04B047
2.62 mg/kg
1.25 ft bgs

IR04B028
3.67 mg/kg
1.25 ft bgs

IR01TA06B
<17 mg/kg
1 ft bgs

IR01B374
14 mg/kg
1 ft bgs

IR01B372
20 mg/kg
1 ft bgs

IR04B025
0.983 mg/kg
1.75 ft bgs

IR04MW13A
25.1 mg/kg
1.75 ft bgs

IR04B015
14.3 mg/kg
1.25 ft bgs

IR01B368
0.78 mg/kg
2 ft bgs

IR12B042
37 mg/kg
0.77 ft bgs

IR04B017
2.78 mg/kg
1.75 ft bgs

IR12B041
26 mg/kg
0.72 ft bgs

IR12B038
1.3 mg/kg
1.3 ft bgs

IR12SS19
2.35 mg/kg
0 ft bgs

IR02TA11A
1.3 mg/kg
1.56 ft bgs

IR12B037
1.4 mg/kg
0.55 ft bgs

GRID 94
0.84 mg/kg
0.5 ft bgs

See Figure 4-7
For PCB Hot Spot Area Detail

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

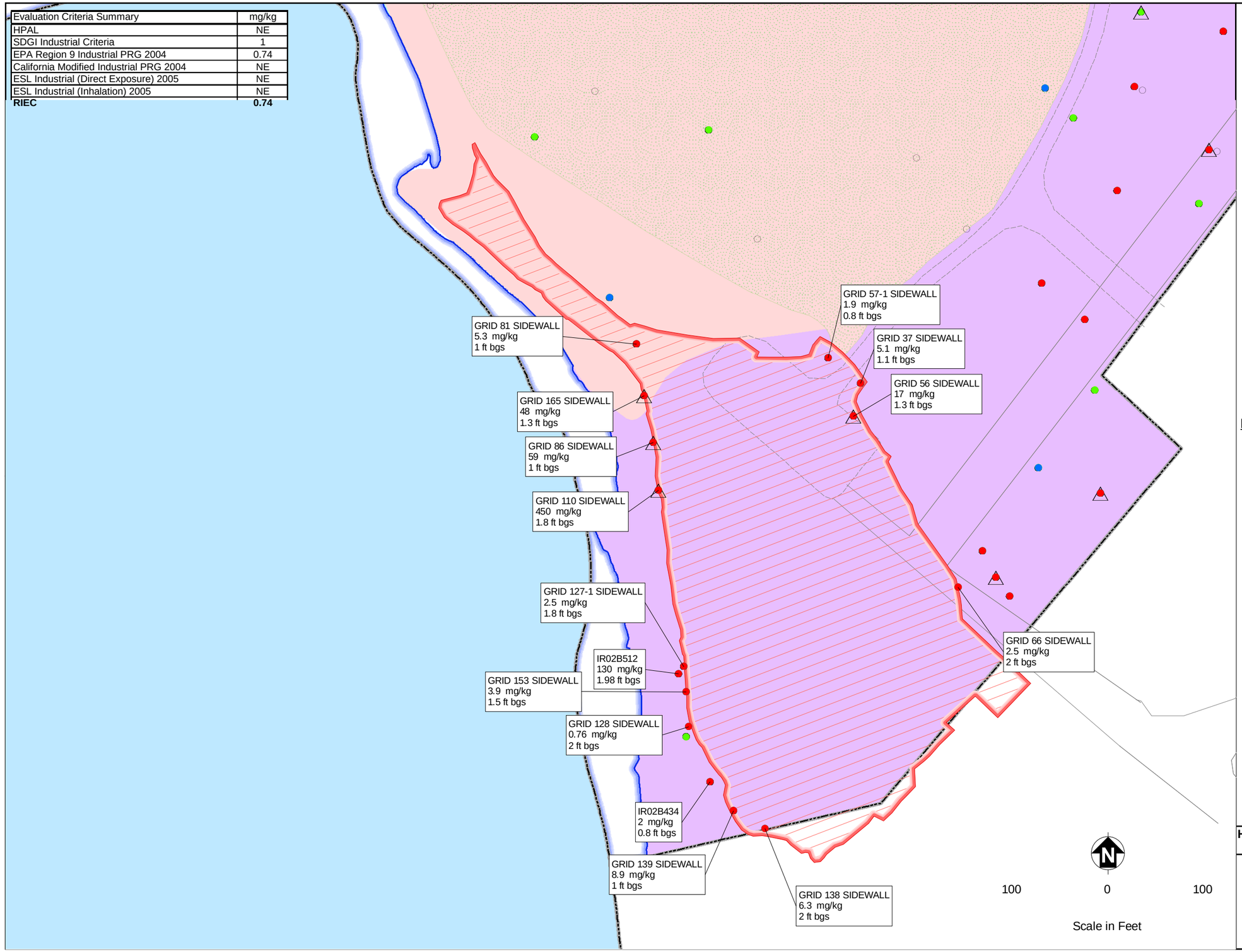
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-6

TOTAL PCBS (HIGH RISK) IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	0.74
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.74**



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Landfill Area
- East Adjacent Area
- Shoreline Area
- San Francisco Bay

Notes:

[a] The post-excavation boundary in the PCB Hot Spot Area is consistent with information presented in final removal action completion report (Tetra Tech EC Inc., 2007a).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-7

TOTAL PCBS (HIGH RISK)
PCB HOT SPOT AREA
IN 0 - 2' SOIL
Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR72B025
<7 mg/kg
1 ft bgs

IR01MW16A
1.5 mg/kg
1.25 ft bgs

IR01B385
6.1 mg/kg
1 ft bgs

IR01MW07A
<1.7 mg/kg
-0.07 ft bgs

IR72SS22
<10 mg/kg
0 ft bgs

IR01B383
1.4 mg/kg
1 ft bgs

IR01B386
0.058 J mg/kg
2 ft bgs

IR01B386
<1.5 mg/kg
1 ft bgs

IR01B378
<1.5 mg/kg
1 ft bgs

IR01B378
0.11 J0 mg/kg
2 ft bgs

IR01B394
4 mg/kg
1 ft bgs

IR04B030
<3.6 mg/kg
1.25 ft bgs

IR01B390
51 mg/kg
2 ft bgs

IR04B047
<1.8 mg/kg
1.25 ft bgs

IR01B371
<1.5 mg/kg
2 ft bgs

IR01TA06B
2.3 J mg/kg
1 ft bgs

IR01B275
2.3 mg/kg
1 ft bgs

IR04B017
<1.7 mg/kg
1.75 ft bgs

IR04B028
<1.7 mg/kg
1.25 ft bgs

IR04MW13A
<3.5 mg/kg
1.75 ft bgs

IR01B369
<1.5 mg/kg
2 ft bgs

GRID 165 SIDEWALL
<4.1 mg/kg
1.3 ft bgs

GRID 110 SIDEWALL
<3.6 mg/kg
1.8 ft bgs

GRID 139 SIDEWALL
1.7 J mg/kg
1 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-8

BENZO (A) ANTHRACENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.33
EPA Region 9 Industrial PRG 2004	0.21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.13
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.33**

IR01B004
0.51 mg/kg
1 ft bgs

IR01MW16A
2.4 mg/kg
1 ft bgs

IR01B385
0.74 mg/kg
1 ft bgs

IR01B030
0.43 J mg/kg
1 ft bgs

IR01B386
3.2 mg/kg
1 ft bgs

IR01B029
1.1 mg/kg
1 ft bgs

IR01B018G
0.56 mg/kg
1 ft bgs

IR01B011
1.1 mg/kg
1 ft bgs

IR01B383
1.9 J0 mg/kg
1 ft bgs

IR01B394
3.8 mg/kg
1 ft bgs

IR72B038
0.59 mg/kg
1.33 ft bgs

IR01B378
3.1 mg/kg
1 ft bgs

IR01MW26B
1.1 mg/kg
1 ft bgs

IR01B390
16 mg/kg
2 ft bgs

IR01B397
0.53 J0 mg/kg
1 ft bgs

IR01MW38A
0.86 J mg/kg
1 ft bgs

IR01TA06B
3.4 J mg/kg
1 ft bgs

IR01B396
0.34 mg/kg
1 ft/bgs

IR01B373
0.54 mg/kg
1 ft bgs

IR01B275
3.1 mg/kg
1 ft bgs

GRID 59 SIDEWALL
0.77 mg/kg
1 ft bgs

IR12SS19
0.61 J mg/kg
0 ft bgs

IR02TA11A
0.72 mg/kg
1 ft bgs

IR12B037
1.1 J0 mg/kg
0 ft bgs

IR02B512
0.62 J mg/kg
1.98 ft bgs

GRID 128 SIDEWALL
0.37 mg/kg
2 ft bgs

IR02B434
0.58 J mg/kg
0.8 ft bgs

GRID 139 SIDEWALL
1.2 J mg/kg
0 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-9

BENZO (A) PYRENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR72B025
<7 J0 mg/kg
1 ft bgs

IR01MW16A
3.1 mg/kg
1 ft bgs

IR01MW07A
<1.7 mg/kg
-0.07 ft bgs

IR01B385
4.9 mg/kg
1 ft bgs

IR01B383
2.1 J0 mg/kg
1 ft bgs

IR01B386
4.4 mg/kg
1 ft bgs

IR01B394
4.7 mg/kg
1 ft bgs

IR01B378
3.7 mg/kg
1 ft bgs

IR01B390
64 mg/kg
2 ft bgs

IR04B030
<3.6 mg/kg
1.25 ft bgs

IR04B047
<1.8 mg/kg
1.25 ft bgs

IR01TA06B
6.6 mg/kg
1 ft bgs

IR04B028
<1.7 mg/kg
1.25 ft bgs

IR01B275
4.1 mg/kg
1 ft bgs

IR04MW13A
<3.5 mg/kg
1.75 ft bgs

IR04B017
<1.7 mg/kg
1.75 ft bgs

IR01B369
0.084 mg/kg
1 ft bgs

IR01B369
<1.5 mg/kg
2 ft bgs

GRID 165 SIDEWALL
<4.1 mg/kg
1.3 ft bgs

GRID 110 SIDEWALL
<3.6 mg/kg
1.8 ft bgs

IR02TA11A
2.7 mg/kg
1 ft bgs

IR02B512
1.7 Y mg/kg
1.98 ft bgs

IR12B037
1.6 J0Y mg/kg
0.55 ft bgs

GRID 139 SIDEWALL
1.4 J mg/kg
0 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco
Y = chromatogram indicates the presence of petroleum fuel

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-10

BENZO (B) FLUORANTHENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR72B025
<7 J0 mg/kg
1 ft bgs

IR01MW16A
2.9 mg/kg
1 ft bgs

IR01MW07A
<1.7 mg/kg
-0.07 ft bgs

IR01B386
4.5 mg/kg
1 ft bgs

IR01B394
3.4 mg/kg
1 ft bgs

IR01B378
<1.5 mg/kg
1 ft bgs

IR01B390
17 mg/kg
2 ft bgs

IR72B038
<3.5 mg/kg
1.33 ft bgs

IR04B030
<3.6 mg/kg
1.25 ft bgs

IR04B047
<1.8 mg/kg
1.25 ft bgs

IR01TA06B
<21 mg/kg
1 ft bgs

IR01B275
3.1 mg/kg
1 ft bgs

IR04B028
<1.7 mg/kg
1.25 ft bgs

IR04B017
<1.7 mg/kg
1.75 ft bgs

IR04MW13A
<3.5 mg/kg
1.75 ft bgs

IR01B369
<1.5 mg/kg
2 ft bgs

GRID 165 SIDEWALL
<4.1 mg/kg
1.3 ft bgs

GRID 110 SIDEWALL
<3.6 mg/kg
1.8 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

IR04B025
<37 mg/kg
2.0 ft bgs
- Location ID
- Reporting Limit
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-11

INDENO (1,2,3 - CD) PYRENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	190
EPA Region 9 Industrial PRG 2004	190
California Modified Industrial PRG 2004	4.2
ESL Industrial (Direct Exposure) 2005	3.8
ESL Industrial (Inhalation) 2005	1.5
RIEC	**1.5**

IR72B025
<7 mg/kg
1 ft bgs

IR01MW07A
<1.7 mg/kg
-0.07 ft bgs

IR01B011
2.1 mg/kg
1.25 ft bgs

IR72SS22
<10 mg/kg
0 ft bgs

IR01B390
1.5 mg/kg
1 ft bgs

IR01B390
<10 mg/kg
2 ft bgs

IR72B038
<3.5 mg/kg
1.33 ft bgs

IR04B030
<3.6 mg/kg
1.25 ft bgs

IR04B047
<1.8 mg/kg
1.25 ft bgs

IR01TA06B
<21 mg/kg
1 ft bgs

IR04B028
<1.7 mg/kg
1.25 ft bgs

IR04MW13A
<3.5 mg/kg
1.75 ft bgs

IR04B017
<1.7 mg/kg
1.75 ft bgs

IR01B368
20 mg/kg
2 ft bgs

IR01B369
47 mg/kg
2 ft bgs

GRID 165 SIDEWALL
<4.1 mg/kg
1.3 ft bgs

GRID 110 SIDEWALL
<3.6 mg/kg
1.8 ft bgs

IR02B434
<1.8 mg/kg
0.8 ft bgs

GRID 139 SIDEWALL
<3.6 mg/kg
1 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-12

NAPHTHALENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	9.05
SDGI Industrial Criteria	820
EPA Region 9 Industrial PRG 2004	410
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	380
ESL Industrial (Inhalation) 2005	NE
RIEC	**380**

IR01B018G
1,930 J3 mg/kg
8.75 ft bgs

IR01B021A
487 J3 mg/kg
5.75 ft bgs

IR01B021
675 J3 mg/kg
8.75 ft bgs

IR04B020
762 mg/kg
4.16 ft bgs

IR04B025
976 J3 mg/kg
3.75 ft bgs

GRID 84 SIDEWALL
400 mg/kg
5.6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs

Location ID
Concentration and Qualifier
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-13

ANTIMONY IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	11.1
SDGI Industrial Criteria	22
EPA Region 9 Industrial PRG 2004	1.6
California Modified Industrial PRG 2004	0.25
ESL Industrial (Direct Exposure) 2005	0.24
ESL Industrial (Inhalation) 2005	NE
RIEC	**11.1**

IR01MW05A
12.6 J3 mg/kg
8.31 ft bgs

IR01B018G
47.8 J3 mg/kg
8.75 ft bgs

IR72B037
106 mg/kg
4.04 ft bgs

IR01MW09B
20.62 mg/kg
8.75 ft bgs

IR04B002
22.5 mg/kg
6.25 ft bgs

IR01MW26B
17.4 mg/kg
3.75 ft bgs

IR01B021A
66.6 J3 mg/kg
5.75 ft bgs

IR01B021
13.6 J3 mg/kg
8.75 ft bgs

IR04B020
24.5 mg/kg
4.16 ft bgs

IR04B025
14.1 mg/kg
3.75 ft bgs

IR04B017
<13 mg/kg
3.75ft bgs

IR01MW58A
315 J3 mg/kg
6.25 ft bgs

GRID 59 SIDEWALL
27 mg/kg
3 ft bgs

MS-12A
14 mg/kg
7.5 ft bgs

GRID 60
30 mg/kg
3 ft bgs

MS-13B(1)
20 mg/kg
5 ft bgs

MS-14
25 mg/kg
7.5 ft bgs

GRID 101
12 mg/kg
4.5 ft bgs

MS-07A
19 mg/kg
5 ft bgs

MS-08
18 mg/kg
7.5 ft bgs

MS-06C
88 mg/kg
10 ft bgs

GRID 89 BOTTOM
12 mg/kg
6.1 ft bgs

GRID 159 SIDEWALL
26 mg/kg
6 ft bgs

GRID 156 SIDEWALL
17 mg/kg
7 ft bgs

IR02B452
21 mg/kg
3.27 ft bgs

GRID 139 SIDEWALL
13 mg/kg
3 ft bgs

GRID 65 SIDEWALL
16 mg/kg
3 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-14

ARSENIC IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	3.14
SDGI Industrial Criteria	15
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	7.4
ESL Industrial (Inhalation) 2005	NE
RIEC	**7.4**

IR01MW16A
13.2 mg/kg
8.75 ft bgs

IR01B029
209 J2 mg/kg
3.75 ft bgs

IR01MW26B
15.4 mg/kg
8.75 ft bgs

IR01B021A
10.3 mg/kg
5.75 ft bgs

IR01B021
330 mg/kg
8.75 ft bgs

IR01B275
12 mg/kg
2.75 ft bgs

IR01B024
8.2 J2 mg/kg
8.75 ft bgs

IR01MW58A
78.4 mg/kg
6.25 ft bgs

GRID 60
11 mg/kg
3 ft bgs

MS-13B(1)
8.9 mg/kg
7.5 ft bgs

MS-07A
19 mg/kg
5 ft bgs

GRID 81 SIDEWALL
17 mg/kg
5.9 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-15

CADMIUM IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	(a)
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**(b)**

(a) location specific value

(b) value is either the HPAL if above the PRG or the lowest PRG

IR01MW05A
511 J3 mg/kg
8.31 ft bgs

IR01MW03A
960 J3 mg/kg
5.68 ft bgs

IR01MW16A
499 J3 mg/kg
8.75 ft bgs

IR01B013
801 mg/kg
7.74 ft bgs

IR01B018G
4,770 J3 mg/kg
8.75 ft bgs

IR01B011
591 mg/kg
8.75 ft bgs

IR01B021
960 J3 mg/kg
8.75 ft bgs

IR01B021A
6,940 J3 mg/kg
5.75 ft bgs

IR12B041
924 mg/kg
2.72 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California

U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-16

CHROMIUM (TOTAL) IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	124.3
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	41,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	38,000
ESL Industrial (Inhalation) 2005	NE
RIEC	**38,000**

IR01B018G
167,000 mg/kg
8.75 ft bgs

IR01B021
42,200 mg/kg
8.75 ft bgs

IR01B021A
175,000 mg/kg
5.75 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-17

COPPER IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	100,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**100,000**

IR01MW02B
201,000 mg/kg
8.64 ft bgs

IR01MW05A
147,000 mg/kg
8.31 ft bgs

IR01B018G
112,000 mg/kg
8.75 ft bgs

IR01MW53B
471,000 mg/kg
8.75 ft bgs

IR01B021A
165,000 mg/kg
5.75 ft bgs

IR01MW58A
217,000 mg/kg
6.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-18

IRON
IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	8.99
SDGI Industrial Criteria	750
EPA Region 9 Industrial PRG 2004	800
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**800**

IR01MW03A
869 mg/kg
5.68 ft bgs

IR01MW16A
1,020 mg/kg
8.75 ft bgs

IR01B029
3,840 mg/kg
8.75 ft bgs

IR72B037
893 mg/kg
4.04 ft bgs

IR01B021A
3,720 mg/kg
5.75 ft bgs

IR01B021
2,250 mg/kg
8.75 ft bgs

IR04B026
813.75 mg/kg
4.22 ft bgs

IR04B020
113,153 mg/kg
4.16 ft/bgs

IR04B025
255,684 mg/kg
3.75 ft bgs

IR01TA07A
1,540 mg/kg
4.19 ft bgs

IR04B019
5,565.2 mg/kg
4.75 ft bgs

IR01TA07B
2,150 mg/kg
3.93 ft bgs

GRID 177 SIDEWALL
1,800 mg/kg
6 ft bgs

GRID 172 SIDEWALL
1,300 mg/kg
2.9 ft bgs

GRID 174 SIDEWALL
1,400 J mg/kg
3 ft bgs

GRID 170 SIDEWALL
2,200 J mg/kg
3 ft bgs

GRID 85 SIDEWALL
1,200 J mg/kg
3 ft bgs

GRID 167 SIDEWALL
930 mg/kg
4.6 ft bgs

GRID 59-1 SIDEWALL
840 mg/kg
5 ft bgs

GRID 81 SIDEWALL
930 J mg/kg
5.9 ft bgs

IR01SH033
840 J3 mg/kg
10 ft bgs

GRID 86 SIDEWALL
9,300 J mg/kg
7 ft bgs

GRID 110 SIDEWALL
950 mg/kg
6 ft bgs

GRID 109 SIDEWALL
1,000 mg/kg
2.5 ft bgs

IR01MW58A
4,740 mg/kg
6.25 ft bgs

MS-12A
1,900 mg/kg
7.5 ft bgs

GRID 59 SIDEWALL
1,900 mg/kg
3 ft bgs

GRID 60
5,400 mg/kg
3 ft bgs

MS-15
940 mg/kg
10 ft bgs

MS-14
4,500 mg/kg
7.5 ft bgs

MS-13B(1)
1,900 mg/kg
2.5 ft bgs

MS-09
1,000 mg/kg
5 ft bgs

MS-08
5,600 mg/kg
7.5 ft bgs

MS-07A
3,000 mg/kg
5 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

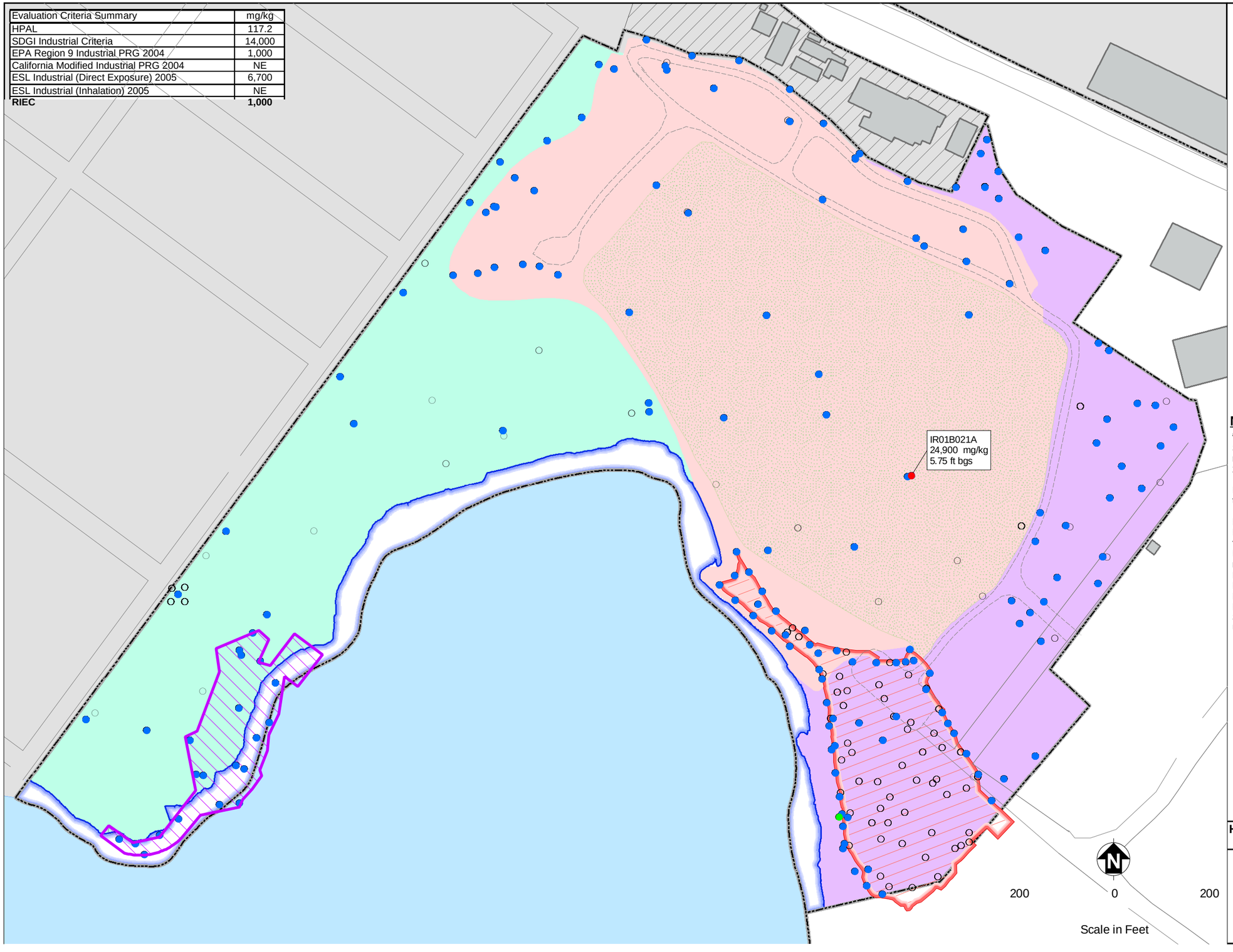
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-19

LEAD IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	117.2
SDGI Industrial Criteria	14,000
EPA Region 9 Industrial PRG 2004	1,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6,700
ESL Industrial (Inhalation) 2005	NE
RIEC	**1,000**



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-20

VANADIUM IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.15
EPA Region 9 Industrial PRG 2004	0.11
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.13
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.11**

IR01MW31A
<0.18 mg/kg
8.75 ft bgs

IR01MW02B
<0.18 mg/kg
3.64 ft bgs

IR01MW03A
<0.19 mg/kg
3.18 ft bgs

IR01B004
<2 mg/kg
9.41 ft bgs

IR01MW05A
<0.93 mg/kg
5.81 ft bgs

WE07B
<0.76 mg/kg
4.76 ft bgs

IR01MW16A
<492 mg/kg
8.75 ft bgs

IR01B018G
<0.92 mg/kg
6.25 ft bgs

IR01B029
<0.19 mg/kg
3.75 ft bgs

IR01MW53B
<0.16 mg/kg
6.25 ft bgs

IR01MW38A
<0.19 mg/kg
3.5 ft bgs

IR01MW26B
<1.4 mg/kg
8.75 ft bgs

IR01TA07A
<1.8 mg/kg
4.19 ft bgs

IR01B024
<0.17 mg/kg
6.25 ft bgs

GRID 171 SIDEWALL
0.15 mg/kg
3 ft bgs

GRID 84 SIDEWALL
0.44J mg/kg
5.6 ft bgs

GRID 172 SIDEWALL
0.71 mg/kg
2.9 ft bgs

GRID 170 SIDEWALL
0.24 mg/kg
3 ft bgs

GRID 59-1 SIDEWALL
0.12J mg/kg
8.1 ft bgs

IR01TA07B
<17 mg/kg
3.93 ft bgs

GRID 58 SIDEWALL
0.24J mg/kg
2.1 ft bgs

GRID 57-1 SIDEWALL
<0.2 mg/kg
8 ft bgs

GRID 86 SIDEWALL
7.9 mg/kg
7 ft bgs

GRID 165 SIDEWALL
<0.22 mg/kg
5 ft bgs

IR01TA08B
<0.86 mg/kg
2.03 ft bgs

GRID 109 SIDEWALL
2.7 mg/kg
2.5 ft bgs

GRID 110 SIDEWALL
<0.44 mg/kg
6 ft bgs

GRID 37 SIDEWALL
6.8 mg/kg
4.6 ft bgs

GRID 159 SIDEWALL
<27 mg/kg
6 ft bgs

GRID 60 SIDEWALL
0.17J mg/kg
2.8 ft bgs

GRID 111 SIDEWALL
<5.1 mg/kg
6 ft bgs

GRID 156 SIDEWALL
<0.17 mg/kg
2.5 ft bgs

IR02B249
<0.111 mg/kg
9.13 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-21

DIELDRIN IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.27
EPA Region 9 Industrial PRG 2004	0.19
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.31
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.19**

IR01MW02B
<1 mg/kg
8.64 ft bgs

IR01MW03A
<0.47 mg/kg
5.68 ft bgs

IR01B004
<1 mg/kg
9.41 ft bgs

IR01MW05A
<0.47 mg/kg
5.81 ft bgs

WE07B
<0.38 mg/kg
4.76 ft bgs

IR01MW16A
<46 mg/kg
8.75 ft bgs

IR01B018G
<0.46 mg/kg
6.25 ft bgs

IR01MW26B
<1.4 mg/kg
8.75 ft bgs

GRID 172 SIDEWALL
0.32 mg/kg
2.9 ft bgs

IR01TA07A
<0.88 mg/kg
4.19 ft bgs

GRID 84 SIDEWALL
0.59 mg/kg
5.6 ft bgs

GRID 81 SIDEWALL
0.61 mg/kg
5.9 ft bgs

IR01TA07B
<8.7 mg/kg
3.93 ft bgs

GRID 165 SIDEWALL
1 J mg/kg
5 ft bgs

GRID 37 SIDEWALL
2.6 mg/kg
4.6 ft bgs

GRID 86 SIDEWALL
<1.1 mg/kg
7 ft bgs

GRID 55 SIDEWALL
0.41 mg/kg
5 ft bgs

IR01SH036
<0.62 mg/kg
10 ft bgs

GRID 110 SIDEWALL
2.9 mg/kg
6 ft bgs

GRID 109 SIDEWALL
4.1 mg/kg
2.5 ft bgs

GRID 159 SIDEWALL
86 mg/kg
6 ft bgs

GRID 111 SIDEWALL
8.7 mg/kg
6 ft bgs

GRID 156 SIDEWALL
0.46 mg/kg
2.5 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-22

HEPTACHLOR EPOXIDE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	0.74
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.74**

IR01MW02B
<10 mg/kg
8.64 ft bgs

IR01B004
24 mg/kg
9.41 ft bgs

WE20B
1.8 mg/kg
10 ft bgs

IR01MW03A
<4.7 mg/kg
5.68 ft bgs

IR01MW05A
370 mg/kg
8.31 ft bgs

IR01MW05A
<4.7 mg/kg
5.81 ft bgs

WE07B
7.2 mg/kg
4.76 ft bgs

IR01MW31A
2.3 mg/kg
8.75 ft bgs

WE18C
1.8 mg/kg
4 ft bgs

IR01MW16A
<460 mg/kg
8.75 ft bgs

IR01B029
1.2 mg/kg
3.75 ft bgs

IR01B029
<0.98 mg/kg
6.25 ft bgs

IR01B018G
9.3 mg/kg
6.25 ft bgs

WE10
0.93 mg/kg
4.76 ft bgs

IR01B011
1.5 mg/kg
8.75 ft bgs

IR01B028
<0.95 mg/kg
6.25 ft bgs

IR01MW38A
<0.95 mg/kg
3.5 ft bgs

IR01MW26B
<14 mg/kg
8.75 ft bgs

IR01MW367A
1.8 mg/kg
2.77 ft bgs

IR01MW53B
<1.6 mg/kg
6.25 ft bgs

IR04B016
1.47 mg/kg
7.39 ft bgs

IR01B275
5.9 mg/kg
2.75 ft bgs

IR04B025
3.41 mg/kg
3.75 ft bgs

IR04B019
11.5 mg/kg
2.75 ft bgs

IR01TA07B
150 mg/kg
3.93 ft bgs

IR01TA07A
75 mg/kg
4.19 ft bgs

IR01B024
<0.94 mg/kg
8.75 ft bgs

IR01B024
3.4 mg/kg
6.25 ft bgs

MS-13B(1)
2.1 mg/kg
5 ft bgs

GRID 101
3.9 mg/kg
4.5 ft bgs

MS-09
1.04 mg/kg
5 ft bgs

GRID 99
1.01 mg/kg
5 ft bgs

See Figure 4-24
For PCB Hot Spot Area Detail

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-23

TOTAL PCBS (HIGH RISK) IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	0.74
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.74**

GRID 174 SIDEWALL 18.8 mg/kg 3 ft bgs
GRID 85 SIDEWALL 1.83 mg/kg 3 ft bgs
GRID 81 SIDEWALL 51 mg/kg 5.9 ft bgs
GRID 84 SIDEWALL 14.9 mg/kg 3 ft bgs
GRID 59-1 SIDEWALL 19 mg/kg 8.1 ft bgs
GRID 177 SIDEWALL 2.35 mg/kg 6 ft bgs
GRID 83 BOTTOM 2 mg/kg 3.09 ft bgs
GRID 172 SIDEWALL 5.6 mg/kg 3.6 ft bgs
GRID 83 SIDEWALL 9.9 mg/kg 3 ft bgs
GRID 59 SIDEWALL 2.17 mg/kg 8.6 ft bgs
GRID 171 SIDEWALL 380 mg/kg 3 ft bgs
GRID 60 SIDEWALL 26 mg/kg 2.8 ft bgs
GRID 58 SIDEWALL 34 mg/kg 2.1 ft bgs
GRID 58-1 SIDEWALL 2.2 mg/kg 2.2 ft bgs
GRID 170 SIDEWALL 1.5 mg/kg 3 ft bgs
GRID 169 SIDEWALL 1.6 mg/kg 3 ft bgs
IR01TA08B 1.4 mg/kg 2.03 ft bgs
IR01TA08B <0.86 mg/kg 1.4 ft bgs
IR01SH030 9.3 mg/kg 10 ft bgs
GRID 37 SIDEWALL 200 mg/kg 4.6 ft bgs
GRID 82 BOTTOM 11 mg/kg 6.61 ft bgs
GRID 56 SIDEWALL 15 mg/kg 7.4 ft bgs
GRID 167 SIDEWALL 1.9 mg/kg 4.6 ft bgs
IR01SH033 8 mg/kg 10 ft bgs
GRID 56 BOTTOM 1.6 mg/kg 8 ft bgs
GRID 165 BOTTOM 19 mg/kg 6 ft bgs
GRID 77 BOTTOM 41 mg/kg 3 ft bgs
GRID 77 BOTTOM <2.3 mg/kg 8 ft bgs
GRID 165 SIDEWALL 99 mg/kg 5 ft bgs
GRID 55 SIDEWALL 51 mg/kg 5 ft bgs
GRID 86 BOTTOM <2.8 mg/kg 8.4 ft bgs
GRID 86 BOTTOM 43 mg/kg 8.4 ft bgs
GRID 86 SIDEWALL 1,500 mg/kg 7 ft bgs
GRID 54 SIDEWALL 24 mg/kg 3 ft bgs
IR01SH036 <87 mg/kg 10 ft bgs
IR01SH036 1,300 mg/kg 10 ft bgs
IR01B045 16.7 mg/kg 5.02 ft bgs
GRID 76 BOTTOM 22 mg/kg 8 ft bgs
GRID 110 SIDEWALL <26 mg/kg 6 ft bgs
GRID 110 SIDEWALL 400 mg/kg 6 ft bgs
GRID 64 SIDEWALL 1.8 mg/kg 2.9 ft bgs
GRID 109 BOTTOM 0.9 mg/kg 8 ft bgs
GRID 90 BOTTOM 1.7 mg/kg 5 ft bgs
GRID 109 SIDEWALL 640 mg/kg 2.5 ft bgs
GRID 65 SIDEWALL 1.8 mg/kg 3 ft bgs
GRID 159 SIDEWALL 12,000 mg/kg 6 ft bgs
GRID 65 BOTTOM 240 mg/kg 5.5 ft bgs
GRID 108 BOTTOM <2.9 mg/kg 10 ft bgs
GRID 108 BOTTOM 39 mg/kg 10 ft bgs
GRID 66 BOTTOM 8.2 mg/kg 5.6 ft bgs
GRID 107 BOTTOM 4.3 mg/kg 6 ft bgs
GRID 159 BOTTOM 950 mg/kg 7 ft bgs
GRID 74 BOTTOM 12 mg/kg 3 ft bgs
GRID 111 SIDEWALL 750 mg/kg 6 ft bgs
GRID 104 BOTTOM 3 mg/kg 4 ft bgs
GRID 105 BOTTOM 5.5 mg/kg 3 ft bgs
GRID 156 SIDEWALL 52 mg/kg 2.5 ft bgs
IR02B452 120 mg/kg 3.27 ft bgs
GRID 116 BOTTOM 0.75 mg/kg 3 ft bgs
GRID 112 BOTTOM 57 mg/kg 5 ft bgs
GRID 127-1 SIDEWALL 4.3 mg/kg 8 ft bgs
GRID 131 BOTTOM 1.07 mg/kg 9.34 ft bgs
IR02B512 220 mg/kg 2.98 ft bgs
IR02SH001 2.1 mg/kg 10 ft bgs
GRID 128 BOTTOM 6.2 mg/kg 7.75 ft bgs
GRID 130 BOTTOM 6.3 mg/kg 9.8 ft bgs
GRID 153 SIDEWALL 8 mg/kg 7 ft bgs
GRID 127 BOTTOM 35 mg/kg 3 ft bgs
IR02B434 0.82 mg/kg 2.3 ft bgs
GRID 139 SIDEWALL 9.8 mg/kg 8 ft bgs
GRID 138 SIDEWALL 21 mg/kg 6 ft bgs

100 0 100
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Landfill Area
- East Adjacent Area
- Shoreline Area
- San Francisco Bay

Notes:

[a] The post-excavation boundary in the PCB Hot Spot Area is consistent with information presented in final removal action completion report (Tetra Tech EC Inc., 2007a).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-24

TOTAL PCBS (HIGH RISK)
PCB HOTSPOT AREA
IN 2 - 10' SOIL
Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**21**

IR01B004
130 mg/kg
9.41 ft bgs

IR01MW16A
740 mg/kg
8.75 ft bgs

IR01MW05A
<420 mg/kg
8.31 ft bgs

IR01TA07B
<87 mg/kg
3.93 ft bgs

GRID 86 SIDEWALL
<31 mg/kg
7 ft bgs

IR01SH036
<44 mg/kg
10 ft bgs

GRID 109 SIDEWALL
<49 mg/kg
2.5 ft bgs

GRID 159 SIDEWALL
<780 mg/kg
6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Landfill Area
- East Adjacent Area
- Shoreline Area
- San Francisco Bay

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-25

TOTAL PCBS (LOW RISK) IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	4.5
EPA Region 9 Industrial PRG 2004	7.9
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	4.5
ESL Industrial (Inhalation) 2005	0.13
RIEC	**0.13**

IR01B004
3.4 mg/kg
9.41 ft bgs

IR01B004
<1.9 mg/kg
4.41 ft bgs

IR01MW02B
<0.37 mg/kg
3.64 ft bgs

IR01MW02B
59 mg/kg
8.64 ft bgs

IR01B015
<0.761 mg/kg
8.75 ft bgs

IR01B015
0.00568 mg/kg
8.75 ft bgs

IR01MW03A
11 J3 mg/kg
5.68 ft bgs

IR01MW03A
<0.39 mg/kg
3.18 ft bgs

IR01B021
0.29 J mg/kg
8.75 ft bgs

IR01B021A
6.6 J mg/kg
5.75 ft bgs

IR01B021A
<0.4 mg/kg
3.75 ft bgs

IR01MW53B
<22 mg/kg
6.25 ft bgs

IR01MW53B
0.21 J mg/kg
3.75 ft bgs

IR01B275
<1.5 mg/kg
2.75 ft bgs

IR01B275
0.26 J mg/kg
8.75 ft bgs

IR01B024
7 J mg/kg
8.75 ft bgs

IR01B024
<0.37 mg/kg
3.75 ft bgs

IR01SH036
5.8 mg/kg
10 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-26

1,4 - DICHLOROBENZENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	190
EPA Region 9 Industrial PRG 2004	NE
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6,500
ESL Industrial (Inhalation) 2005	550
RIEC	**550**

IR01B021A
650 mg/kg
5.75 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-27

2 - METHYLNAPHTHALENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	100,000
EPA Region 9 Industrial PRG 2004	100,000
California Modified Industrial PRG 2004	NA
ESL Industrial (Direct Exposure) 2005	160,000
ESL Industrial (Inhalation) 2005	31
RIEC	**31**

IR01MW02B
0.1 J mg/kg
3.64 ft bgs

IR01MW02B
<52 mg/kg
8.64 ft bgs

IR01B021A
210 mg/kg
5.75 ft bgs

IR01TA07A
<44 mg/kg
4.19 ft bgs

IR04B019
<37 mg/kg
7.75 ft bgs

200 0 200

Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-28

ANTHRACENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

WE17E
3.5 J mg/kg
5 ft bgs

IR01MW02B
0.41 mg/kg
3.64 ft bgs

IR01MW02B
<52 mg/kg
8.64 ft bgs

IR01MW05A
0.21 J mg/kg
3.31 ft bgs

IR01MW05A
<2.8 mg/kg
8.31 ft bgs

IR01MW16A
0.11 J mg/kg
6.25 ft bgs

IR01MW16A
<4.6 mg/kg
8.75 ft bgs

IR01B029
<1.6 mg/kg
6.25 ft bgs

IR01B029
0.067 J mg/kg
3.75 ft bgs

IR01B018G
<7.6 mg/kg
6.25 ft bgs

IR01B018G
0.084 J mg/kg
8.75 ft bgs

IR01B019
2.1 mg/kg
8.25 ft bgs

IR72B038
7.3 J08 mg/kg
3.33 ft bgs

IR01MW26B
0.18 J mg/kg
3.75 ft bgs

IR01MW26B
<5.6 mg/kg
8.75 ft bgs

IR01B021
1.3 mg/kg
8.75 ft bgs

IR01B021A
80 mg/kg
5.75 ft bgs

IR01B024
11 J mg/kg
8.75 ft bgs

IR01MW53B
0.15 J mg/kg
3.75 ft bgs

IR01MW53B
<22 mg/kg
6.25 ft bgs

IR01B275
<1.5 mg/kg
2.75 ft bgs

IR01B275
0.17 J mg/kg
8.75 ft bgs

GRID 60 SIDEWALL
1.8 J mg/kg
4.6 ft bgs

GRID 58-1 SIDEWALL
3.3 mg/kg
2.2 ft bgs

GRID 167 SIDEWALL
1.4 mg/kg
4.6 ft bgs

GRID 109 SIDEWALL
2.1 J mg/kg
6.5 ft bgs

GRID 159 SIDEWALL
3.3 J mg/kg
3 ft bgs

GRID 58 SIDEWALL
0.39 J mg/kg
2.1 ft bgs

GRID 58 SIDEWALL
<3.6 mg/kg
6 ft bgs

GRID 156 SIDEWALL
<4.6 mg/kg
7 ft bgs

GRID 156 SIDEWALL
0.25 J mg/kg
2.5 ft bgs

GRID 138 SIDEWALL
4.6 mg/kg
6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-29

BENZO (A) ANTHRACENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.33
EPA Region 9 Industrial PRG 2004	0.21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.13
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.33**

IR01MW02B <0.44 mg/kg 6.14 ft bgs
IR01MW02B 0.55 mg/kg 3.64 ft bgs
IR01MW03A 0.58 mg/kg 3.18 ft bgs
IR01MW05A 0.17 J mg/kg 3.31 ft bgs
IR01MW05A <2.8 mg/kg 8.31 ft bgs
IR01MW31A <0.36 mg/kg 3.75 ft bgs
IR01B031A 0.039 J mg/kg 3.5 ft bgs
WE17E 6.9 mg/kg 5 ft bgs
IR01MW16A <4.6 mg/kg 8.75 ft bgs
IR01MW16A 0.05 J mg/kg 6.25 ft bgs
IR01MW07A 0.16 J mg/kg 4.93 ft bgs
IR01MW07A <0.38 mg/kg 2.43 ft bgs
IR01B029 <1.6 mg/kg 6.25 ft bgs
IR01B029 0.052 J mg/kg 3.75 ft bgs
IR01B018G 0.018 J mg/kg 3.75 ft bgs
IR01B018G <7.6 mg/kg 6.25 ft bgs
IR72B038 12 mg/kg 3.33 ft bgs
IR72B038 <0.36 mg/kg 6.33 ft bgs
IR01B019 <0.71 mg/kg 3.75 ft bgs
IR01B019 1.28 mg/kg 8.25 ft bgs
IR01MW26B 0.18 J mg/kg 3.75 ft bgs
IR01MW26B <0.38 mg/kg 6.25 ft bgs
IR01B028 <0.38 mg/kg 8.75 ft bgs
IR01B028 0.092 J mg/kg 3.75 ft bgs
IR01B021A 16 J mg/kg 5.75 ft bgs
IR01B021A <0.4 mg/kg 3.75 ft bgs
IR01B275 <0.41 mg/kg 6.25 ft bgs
IR01B275 0.2 J mg/kg 2.75 ft bgs
IR01B024 7.5 J mg/kg 8.75 ft bgs
GRID 58-1 SIDEWALL 2.9 mg/kg 2.2 ft bgs
IR04B026 0.22 J mg/kg 4.22 ft bgs
IR04B026 <0.36 mg/kg 2.22 ft bgs
IR01MW53B <22 mg/kg 6.25 ft bgs
IR01MW53B 0.1 J mg/kg 3.75 ft bgs
GRID 177 SIDEWALL 0.43 mg/kg 6 ft bgs
GRID 60 SIDEWALL 1.1 J mg/kg 4.6 ft bgs
IR01SH030 0.35 J0 mg/kg 10 ft bgs
GRID 167 SIDEWALL 3 J mg/kg 4.6 ft bgs
GRID 58 SIDEWALL 0.48 J mg/kg 2.1 ft bgs
GRID 109 SIDEWALL 1.9 J mg/kg 6.5 ft bgs
GRID 159 SIDEWALL 2.2 J mg/kg 3 ft bgs
MS-13B(1) 0.65 J mg/kg 2.5 ft bgs
GRID 111 SIDEWALL 0.86 J mg/kg 6 ft bgs
MS-11 0.4 J mg/kg 7.5 ft bgs
MS-09 0.43 J mg/kg 7.5 ft bgs
GRID 156 SIDEWALL <4.6 mg/kg 7 ft bgs
GRID 156 SIDEWALL 0.28 J mg/kg 2.5 ft bgs
IR02B512 1.1 mg/kg 2.98 ft bgs
MS-06C 0.55 mg/kg 10 ft bgs
GRID 139 SIDEWALL <0.76 mg/kg 8 ft bgs
GRID 139 SIDEWALL 0.23 mg/kg 3 ft bgs
GRID 138 SIDEWALL 4.5 mg/kg 6 ft bgs

200 0 200
Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-30

BENZO (A) PYRENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR01MW02B
0.71 mg/kg
3.64 ft bgs

IR01MW02B
<52 mg/kg
8.64 ft bgs

IR01MW16A
0.16 J mg/kg
6.25 ft bgs

IR01MW16A
<4.6 mg/kg
8.75 ft bgs

WE17E
4.1 mg/kg
5 ft bgs

IR01B029
0.13 J mg/kg
3.75 ft bgs

IR01B029
<1.7 mg/kg
8.75 ft bgs

IR01B018G
0.11 J mg/kg
8.75 ft bgs

IR01B018G
<7.6 mg/kg
6.25 ft bgs

IR72B038B
5.9 mg/kg
3.33 ft bgs

IR01MW53B
<22 mg/kg
6.25 ft bgs

IR01MW53B
0.24 J mg/kg
3.75 ft bgs

IR01B019
2.1 mg/kg
8.25 ft bgs

IR01MW26B
0.3 J mg/kg
3.75 ft bgs

IR01MW26B
<5.6 mg/kg
8.75 ft bgs

IR01B021A
43 mg/kg
5.75 ft bgs

IR01B024
10 J mg/kg
8.75 ft bgs

IR04B020
1.4 J mg/kg
4.16 ft bgs

IR01MW58A
<28 mg/kg
6.25 ft bgs

IR01MW58A
0.043 J mg/kg
3.75 ft bgs

GRID 59-1 SIDEWALL
2.7 J mg/kg
8.1 ft bgs

GRID 60 SIDEWALL
2.6 J mg/kg
4.6 ft bgs

GRID 167 SIDEWALL
4.7 J mg/kg
4.6 ft bgs

GRID 109 SIDEWALL
3.8 J mg/kg
2.5 ft bgs

GRID 58-1 SIDEWALL
2.7 mg/kg
2.2 ft bgs

GRID 159 SIDEWALL
2 J mg/kg
3 ft bgs

GRID 58 SIDEWALL
0.75 J mg/kg
2.1 ft bgs

GRID 58 SIDEWALL
<14 mg/kg
6 ft bgs

GRID 111 SIDEWALL
1.6 J mg/kg
6 ft bgs

GRID 156 SIDEWALL
<4.6 mg/kg
7 ft bgs

GRID 156 SIDEWALL
0.25 J mg/kg
2.5 ft bgs

IR02B512
3.6 Y mg/kg
2.98 ft bgs

GRID 138 SIDEWALL
5.8 mg/kg
6 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco
Y = chromatogram indicates the presence of petroleum fuel

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-31

BENZO (B) FLUORANTHENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

WE21A <3.8 mg/kg 4.34 ft bgs
WE02B <3.7 mg/kg 3.90 ft bgs
WE03B <3.7 mg/kg 3.57 ft bgs
WE04B <3.8 mg/kg 3.70 ft bgs
WE21B <3.8 mg/kg 5.98 ft bgs
IR01MW05A 0.11 J mg/kg 3.31 ft bgs
IR01MW05A <2.8 mg/kg 8.31 ft bgs
IR01MW02B <52 mg/kg 8.64 ft bgs
IR01MW02B 0.24 J mg/kg 3.64 ft bgs
WE20B <3.9 mg/kg 4 ft bgs
IR01B004 <1.9 mg/kg 4.41 ft bgs
WE05 <3.6 mg/kg 4.07 ft bgs
WE06A <3.7 mg/kg 4.05 ft bgs
IR72B025 <3.5 mg/kg 2.5 ft bgs
WE19C <3.9 mg/kg 4 ft bgs
IR01B006 <3.8 mg/kg 8.77 ft bgs
IR72B027 <3.8 mg/kg 10 ft bgs
IR01MW16A 0.039 J mg/kg 6.25 ft bgs
IR01MW16A <4.6 mg/kg 8.75 ft bgs
WE19B <3.8 mg/kg 4 ft bgs
WE19A <3.8 mg/kg 4 ft bgs
WE07B <4.1 mg/kg 8.76 ft bgs
IR01TA02B <1.4 mg/kg 3.5 ft bgs
WE18D <3.7 mg/kg 3 ft bgs
WE17B <3.7 mg/kg 4 ft bgs
IR01B012 <3.6 mg/kg 2.47 ft bgs
WE17F <3.9 mg/kg 4 ft bgs
IR01B018G <7.6 mg/kg 6.25 ft bgs
IR01B018G 0.046 J mg/kg 8.75 ft bgs
WE08 <3.9 mg/kg 4.77 ft bgs
WE09 <3.9 mg/kg 4.96 ft bgs
IR72B038 6.6 mg/kg 3.33 ft bgs
WE17E 5.8 mg/kg 5 ft bgs
WE17D <3.8 mg/kg 5 ft bgs
WE17C <3.8 mg/kg 4 ft bgs
IR01B364 <2 mg/kg 3.25 ft bgs
IR01B019 2.1 mg/kg 8.25 ft bgs
IR01B011 <7.5 mg/kg 8.75 ft bgs
IR01B029 <1.6 mg/kg 6.25 ft bgs
WE16 <3.7 mg/kg 4 ft bgs
IR01MW38A <2 mg/kg 3.5 ft bgs
IR01MW26B 0.086 J mg/kg 3.75 ft bgs
IR01MW26B <5.6 mg/kg 8.75 ft bgs
IR04B016 <3.6 mg/kg 2.89 ft bgs
IR01MW53B <22 mg/kg 6.25 ft bgs
IR01B021A 13 J mg/kg 5.75 ft bgs
IR01B275 0.054 J mg/kg 8.75 ft bgs
IR01B275 <1.5 mg/kg 2.75 ft bgs
GRID 177 SIDEWALL <1.6 mg/kg 6 ft bgs
IR01B024 3.4 J mg/kg 8.75 ft bgs
IR01TA07A <44 mg/kg 4.19 ft bgs
IR04B019 <3.5 mg/kg 4.75 ft bgs
IR01MW58A <28 mg/kg 6.25 ft bgs
GRID 174 SIDEWALL <1.5 mg/kg 3 ft bgs
GRID 174 SIDEWALL 0.11 mg/kg 3 ft bgs
GRID 59-1 SIDEWALL 3.8 J mg/kg 8.1 ft bgs
GRID 167 SIDEWALL 2 J mg/kg 4.6 ft bgs
GRID 59 SIDEWALL <7.9 mg/kg 8.6 ft bgs
IR01TA07B <22 mg/kg 3.93 ft bgs
GRID 81 SIDEWALL <3.7 mg/kg 5.9 ft bgs
GRID 58-1 SIDEWALL 3.8 mg/kg 2.2 ft bgs
GRID 165 SIDEWALL <2.7 mg/kg 5 ft bgs
GRID 57-1 SIDEWALL <8 mg/kg 8 ft bgs
GRID 86 SIDEWALL <2.6 mg/kg 7 ft bgs
GRID 58 SIDEWALL 0.29 J mg/kg 2.1 ft bgs
GRID 58 SIDEWALL <3.6 mg/kg 6 ft bgs
GRID 110 SIDEWALL <4.4 mg/kg 6 ft bgs
GRID 109 SIDEWALL <3.4 mg/kg 2.5 ft bgs
GRID 109 SIDEWALL 1.2 J mg/kg 6.5 ft bgs
GRID 159 SIDEWALL 3.5 J mg/kg 3 ft bgs
GRID 111 SIDEWALL <3.1 mg/kg 6 ft bgs
GRID 111 SIDEWALL 0.73 J mg/kg 2.8 ft bgs
GRID 156 SIDEWALL <4.6 mg/kg 7 ft bgs
GRID 156 SIDEWALL 0.36 J mg/kg 2.5 ft bgs
GRID 138 SIDEWALL 2.8 mg/kg 6 ft bgs

200 0 200
Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-32

BENZO (K) FLUORANTHENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	18
EPA Region 9 Industrial PRG 2004	210
California Modified Industrial PRG 2004	13
ESL Industrial (Direct Exposure) 2005	13
ESL Industrial (Inhalation) 2005	NE
RIEC	**13**

IR01MW02B
0.64 mg/kg
3.64 ft bgs

IR01MW02B
<52 mg/kg
8.64 ft bgs

IR01MW53B
0.2 J mg/kg
3.75 ft bgs

IR01MW53B
<22 mg/kg
6.25 ft bgs

IR01MW58A
0.04 J mg/kg
3.75 ft bgs

IR01MW58A
<28 mg/kg
6.25 ft bgs

IR01B275
14 mg/kg
2.75 ft bgs

IR01B021A
77 mg/kg
5.75 ft bgs

IR04B019
<37 mg/kg
7.75 ft bgs

GRID 58 SIDEWALL
1.5 J mg/kg
2.1 ft bgs

GRID 58 SIDEWALL
<14 mg/kg
6 ft bgs

GRID 109 SIDEWALL
15 mg/kg
6.5 ft bgs

84-GRID 159 SIDEWALL
<27 mg/kg
6 ft bgs

GRID 159 SIDEWALL
8 mg/kg
3 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

200 0 200
Scale in Feet

ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-33

CHRYSENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.33
EPA Region 9 Industrial PRG 2004	0.21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.38
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.33**

IR01MW02B
<0.44 mg/kg
6.14 ft bgs

IR01MW02B
0.066 J mg/kg
3.64 ft bgs

IR01B024
1.5 J mg/kg
8.75 ft bgs

IR01B024
<0.37 mg/kg
3.75 ft bgs

GRID 174 SIDEWALL
0.72 J mg/kg
3 ft bgs

GRID 58-1 SIDEWALL
0.61 J mg/kg
2.2 ft bgs

GRID 58-1 SIDEWALL
<1.4 mg/kg
2.2 ft bgs

GRID 139 SIDEWALL
<0.76 mg/kg
8 ft bgs

GRID 139 SIDEWALL
0.046 J mg/kg
3 ft bgs

GRID 138 SIDEWALL
0.71 J mg/kg
6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-34

DIBENZ (A,H) ANTHRACENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR01MW02B <52 mg/kg 8.64 ft bgs
IR01MW02B 0.53 mg/kg 3.64 ft bgs
IR01B004 <1.9 mg/kg 4.41 ft bgs
WE03B <3.7 mg/kg 3.57 ft bgs
WE21B <3.8 mg/kg 5.98 ft bgs
WE21A <3.8 mg/kg 4.34 ft bgs
IR01MW05A 0.071 J mg/kg 3.31 ft bgs
IR01MW05A <2.8 mg/kg 8.31 ft bgs
WE05 <3.6 mg/kg 4.07 ft bgs
WE02B <3.7 mg/kg 3.90 ft bgs
WE04B <3.8 mg/kg 3.70 ft bgs
IR72B025 <3.5 mg/kg 2.5 ft bgs
WE19C <3.9 mg/kg 4 ft bgs
WE06A <3.7 mg/kg 4.05 ft bgs
WE19B <3.8 mg/kg 4 ft bgs
IR01MW16A 0.054 J mg/kg 6.25 ft bgs
IR01MW16A <4.6 mg/kg 8.75 ft bgs
IR72B027 <3.8 mg/kg 10 ft bgs
WE20B <3.9 mg/kg 4 ft bgs
WE18D <3.7 mg/kg 3 ft bgs
WE07B <4.1 mg/kg 8.76 ft bgs
IR01B006 <3.8 mg/kg 8.77 ft bgs
WE19A <3.8 mg/kg 4 ft bgs
IR01TA02B <1.4 mg/kg 3.5 ft bgs
WE17F <3.9 mg/kg 4 ft bgs
WE17B <3.7 mg/kg 4 ft bgs
IR01B029 0.047 J mg/kg 3.75 ft bgs
IR01B029 <1.6 mg/kg 6.25 ft bgs
IR01B012 <3.6 mg/kg 2.47 ft bgs
WE08 <3.9 mg/kg 4.77 ft bgs
WE09 <3.9 mg/kg 4.96 ft bgs
WE17C <3.8 mg/kg 4 ft bgs
IR72B038 4.2 J0 mg/kg 3.33 ft bgs
WE17E 4.5 mg/kg 5 ft bgs
IR01B364 <2 mg/kg 3.25 ft bgs
IR01B018G <7.6 mg/kg 6.25 ft bgs
IR01MW26B 0.1 J mg/kg 3.75 ft bgs
IR01MW26B <5.6 mg/kg 8.75 ft bgs
IR01B011 <7.5 mg/kg 8.75 ft bgs
WE17D <3.8 mg/kg 5 ft bgs
WE16 <3.7 mg/kg 4 ft bgs
IR01MW38A <2 mg/kg 3.5 ft bgs
IR01MW53B <22 mg/kg 6.25 ft bgs
IR01B021A 5.6 J mg/kg 5.75 ft bgs
IR04B016 <3.6 mg/kg 2.89 ft bgs
IR01MW58A <28 mg/kg 6.25 ft bgs
IR01B275 0.13 J mg/kg 8.75 ft bgs
IR01B275 <1.5 mg/kg 2.75 ft bgs
IR01B024 4.9 J mg/kg 8.75 ft bgs
IR01TA07A <44 mg/kg 4.19 ft bgs
IR04B020 <1.8 mg/kg 4.16 ft bgs
GRID 177 SIDEWALL <1.6 mg/kg 6 ft bgs
GRID 174 SIDEWALL <1.5 mg/kg 3 ft bgs
GRID 174 SIDEWALL 0.078 J mg/kg 3 ft bgs
GRID 59-1 SIDEWALL <7.2 mg/kg 8.1 ft bgs
IR04B019 <3.5 mg/kg 4.75 ft bgs
GRID 171 SIDEWALL <1.4 mg/kg 4.3 ft bgs
GRID 59 SIDEWALL <7.9 mg/kg 8.6 ft bgs
GRID 167 SIDEWALL 1.9 J mg/kg 4.6 ft bgs
IR01TA07B <22 mg/kg 3.93 ft bgs
GRID 81 SIDEWALL <3.7 mg/kg 5.9 ft bgs
GRID 165 SIDEWALL <2.7 mg/kg 5 ft bgs
GRID 57-1 SIDEWALL <8 mg/kg 8 ft bgs
GRID 58 SIDEWALL <2.1 mg/kg 2.1 ft bgs
GRID 86 SIDEWALL <2.6 mg/kg 7 ft bgs
GRID 110 SIDEWALL <4.4 mg/kg 6 ft bgs
GRID 109 SIDEWALL <3.4 mg/kg 2.5 ft bgs
GRID 111 SIDEWALL 0.42 J mg/kg 2.8 ft bgs
GRID 111 SIDEWALL <3.1 mg/kg 6 ft bgs
GRID 159 SIDEWALL <27 mg/kg 6 ft bgs
GRID 156 SIDEWALL 4.6 mg/kg 7 ft bgs
GRID 156 SIDEWALL 0.31 J mg/kg 2.5 ft bgs
GRID 138 SIDEWALL 2 mg/kg 6 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-35

INDENO (1,2,3-CD) PYRENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	190
EPA Region 9 Industrial PRG 2004	190
California Modified Industrial PRG 2004	4.2
ESL Industrial (Direct Exposure) 2005	3.8
ESL Industrial (Inhalation) 2005	1.5
RIEC	**1.5**

WE21B <3.8 mg/kg 5.98 ft bgs
IR01MW02B 28 J mg/kg 8.64 ft bgs
WE03B <3.7 mg/kg 3.57 ft bgs
WE04B <3.8 mg/kg 3.70 ft bgs
WE20B <3.9 mg/kg 4 ft bgs
WE21A <3.8 mg/kg 4.34 ft bgs
WE05 <3.6 mg/kg 4.07 ft bgs
IR72B025 <3.5 mg/kg 2.5 ft bgs
WE19C <3.9 mg/kg 4 ft bgs
IR01B004 1.8 J mg/kg 9.41 ft bgs
WE06A <3.7 mg/kg 4.05 ft bgs
IR72B027 <3.8 mg/kg 10 ft bgs
WE19B <3.8 mg/kg 4 ft bgs
WE19A <3.8 mg/kg 4 ft bgs
IR01B006 <3.8 mg/kg 8.77 ft bgs
WE18D <3.7 mg/kg 3 ft bgs
WE07B <4.1 mg/kg 8.76 ft bgs
WE09 <3.9 mg/kg 4.96 ft bgs
WE17B <3.7 mg/kg 4 ft bgs
IR01MW16A 2.6 J mg/kg 8.75 ft bgs
IR01B012 19 mg/kg 6.97 ft bgs
WE17F <3.9 mg/kg 4 ft bgs
IR01B029 16 mg/kg 8.75 ft bgs
WE08 <3.9 mg/kg 4.77 ft bgs
WE17C <3.8 mg/kg 4 ft bgs
IR72B038 <6.4 mg/kg 3.33 ft bgs
WE17E 1.9 J mg/kg 5 ft bgs
IR01B018G 3.9 J mg/kg 6.25 ft bgs
IR01B011 <7.5 mg/kg 8.75 ft bgs
WE17D <3.8 mg/kg 5 ft bgs
IR01B364 <2 mg/kg 3.25 ft bgs
IR01MW38A <2 mg/kg 3.5 ft bgs
IR01MW53B 3.9 J mg/kg 6.25 ft bgs
IR04B016 <3.6 mg/kg 2.89 ft bgs
IR01B021 2.2 mg/kg 8.75 ft bgs
IR01B021A 1,400 mg/kg 5.75 ft bgs
IR04B020 <1.8 mg/kg 4.16 ft bgs
WE16 <3.7 mg/kg 4 ft bgs
IR01B368 80 mg/kg 7 ft bgs
GRID 81 SIDEWALL <3.7 mg/kg 5.9 ft bgs
IR01B024 9.1 J mg/kg 8.75 ft bgs
IR01TA07A <44 mg/kg 4.19 ft bgs
IR01MW58A 120 mg/kg 6.25 ft bgs
GRID 59-1 SIDEWALL <7.2 mg/kg 8.1 ft bgs
GRID 177 SIDEWALL <1.6 mg/kg 6 ft bgs
IR01B367 4.4 J3 mg/kg 8 ft bgs
GRID 59 SIDEWALL <7.9 mg/kg 8.6 ft bgs
IR01B369 13 J mg/kg 9 ft bgs
IR04B019 <3.5 mg/kg 4.75 ft bgs
GRID 167 SIDEWALL <1.7 mg/kg 4.6 ft bgs
IR01B366 <23 mg/kg 9 ft bgs
GRID 60 SIDEWALL <2.1 mg/kg 4.6 ft bgs
IR01TA07B <22 mg/kg 3.93 ft bgs
GRID 165 SIDEWALL <2.7 mg/kg 5 ft bgs
GRID 57-1 SIDEWALL 7.5 J mg/kg 8 ft bgs
GRID 86 SIDEWALL <2.6 mg/kg 7 ft bgs
GRID 58 SIDEWALL <2.1 mg/kg 2.1 ft bgs
GRID 110 SIDEWALL 7.9 mg/kg 6 ft bgs
IR01MW63A 1.7 mg/kg 8.75 ft bgs
GRID 109 SIDEWALL <3.4 mg/kg 2.5 ft bgs
GRID 159 SIDEWALL <27 mg/kg 6 ft bgs
GRID 111 SIDEWALL <3.1 mg/kg 6 ft bgs
GRID 156 SIDEWALL <4.6 mg/kg 7 ft bgs
GRID 138 SIDEWALL <1.8 mg/kg 6 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

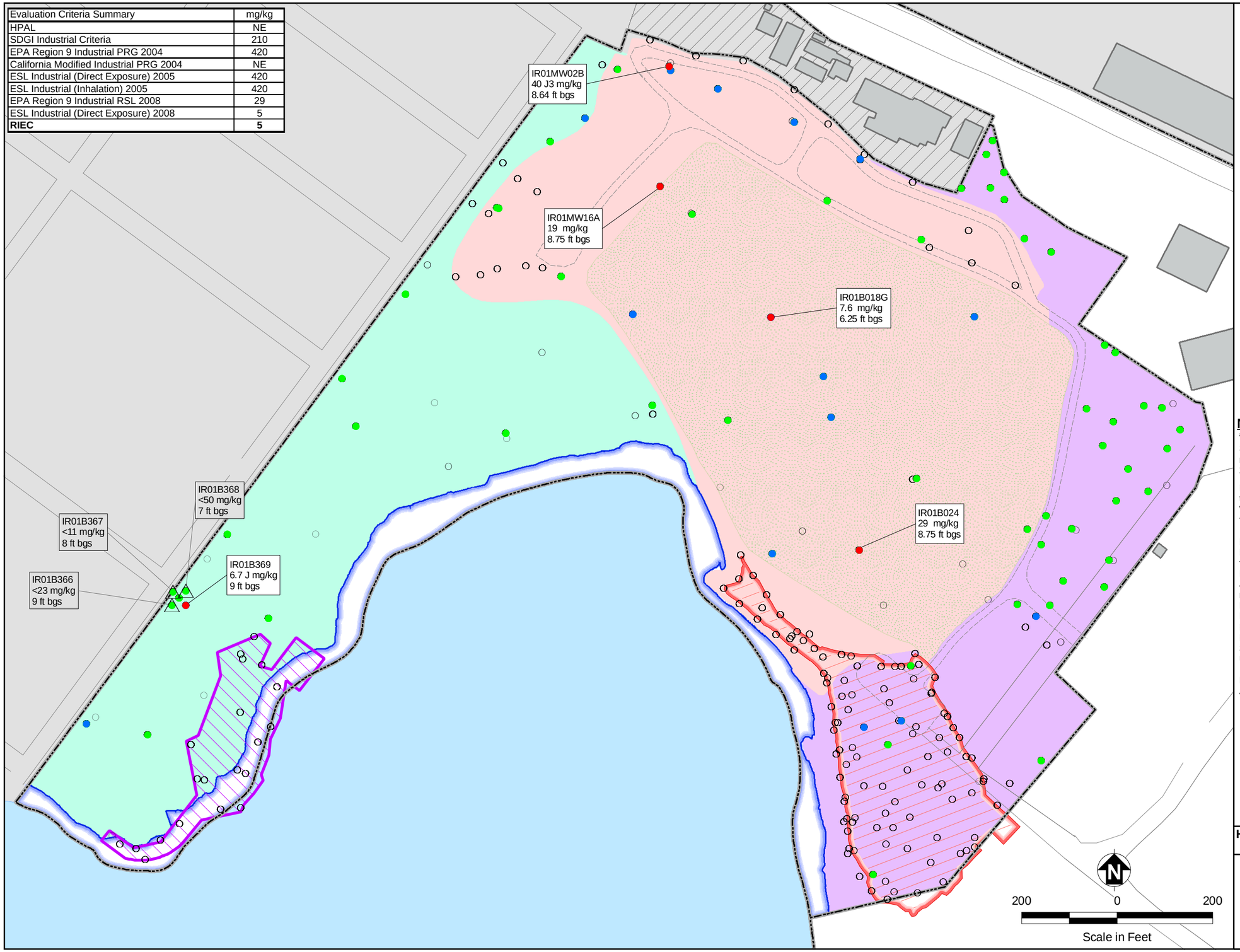
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-36

NAPHTHALENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	210
EPA Region 9 Industrial PRG 2004	420
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	420
ESL Industrial (Inhalation) 2005	420
EPA Region 9 Industrial RSL 2008	29
ESL Industrial (Direct Exposure) 2008	5
RIEC	**5**



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-37

ETHYLBENZENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	NE
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**3,500**

IR01MW03A
4,200 mg/kg
6 ft bgs

IR01MW16A
4,600 mg/kg
9 ft bgs

IR01B011
11,360 mg/kg
9 ft bgs

IR01B019
5,223 mg/kg
8 ft bgs

GRID 172 SIDEWALL
4,380 mg/kg
3.6 ft bgs

IR01SH027
3,981 mg/kg
10 ft bgs

GRID 84 SIDEWALL
7,913 mg/kg
3 ft bgs

IR01B024
5,500 mg/kg
9 ft bgs

GRID 60 SIDEWALL
22,300 mg/kg
4.6 ft bgs

GRID 83 SIDEWALL
5,349 mg/kg
3 ft bgs

GRID 58-1 SIDEWALL
5,600 mg/kg
2.2 ft bgs

IR01TA07A
9,900 mg/kg
4 ft bgs

GRID 171 SIDEWALL
4,050 mg/kg
3 ft bgs

GRID 82 BOTTOM
4,901 mg/kg
6.61 ft bgs

GRID 165 BOTTOM
13,149 mg/kg
6 ft bgs

GRID 57-1 SIDEWALL
16,844 mg/kg
8 ft bgs

GRID 165 SIDEWALL
22,080 mg/kg
5 ft bgs

GRID 37 SIDEWALL
3,900 mg/kg
4.6 ft bgs

GRID 86 SIDEWALL
13,931 mg/kg
7 ft bgs

GRID 110 SIDEWALL
33,550 mg/kg
6 ft bgs

GRID 58 SIDEWALL
26,902 mg/kg
6 ft bgs

GRID 109 SIDEWALL
25,080 mg/kg
6.5 ft bgs

IR01B045
7,800 mg/kg
5.02 ft bgs

GRID 159 SIDEWALL
34,120 mg/kg
6 ft bgs

GRID 107 BOTTOM
5,460 mg/kg
6 ft bgs

GRID 111 SIDEWALL
20,271 mg/kg
6 ft bgs

IR02B512
3,900 mg/kg
2.98 ft bgs

GRID 156 SIDEWALL
12,001 mg/kg
7 ft bgs

GRID 153 SIDEWALL
18,102 mg/kg
7 ft bgs

GRID 128 BOTTOM
16,812 mg/kg
7.75 ft bgs

200 0 200
Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-38

TOTAL TPH IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	11.1
SDGI Industrial Criteria	22
EPA Region 9 Industrial PRG 2004	1.6
California Modified Industrial PRG 2004	0.25
ESL Industrial (Direct Exposure) 2005	5.5
ESL Industrial (Inhalation) 2005	NE
RIEC	**11.1**

IR01MW05A
15.1 J3 mg/kg
26.81 ft bgs

IR01B006
20 mg/kg
11.27 ft bgs

IR01MW16A
49 J3 mg/kg
11.25ft bgs

IR01MW17B
14.5 mg/kg
31.25 ft bgs

IR01B012
22.8 mg/kg
11.97 ft bgs

IR01MW07A
11.8 mg/kg
24.93 ft bgs

IR01B013
13.2 J3 mg/kg
27.74 ft bgs

IR01B029
17.3 mg/kg
26.25ft bgs

IR01MW18A
38.4 J3 mg/kg
11.25ft bgs

WE10
32.4 J4 mg/kg
10.76 ft bgs

IR01B011
13.2 J3 mg/kg
26.25 ft bgs

IR01MW38A
14.3 mg/kg
24.5 ft bgs

IR01B019
12.7 mg/kg
26.25 ft bgs

IR04B002
15.3 mg/kg
26.25 ft bgs

IR01MW53B
11.4 mg/kg
21.25 ft bgs

IR01MW26B
17.2 mg/kg
41.25 ft bgs

IR01MW09B
26 mg/kg
11.25 ft bgs

IR01B365
11.7 mg/kg
21.25 ft bgs

TPBWE14
12.5 J2 mg/kg
15.5ft bgs

IR01B024
12 mg/kg
26.25 ft bgs

IR04B017
<13.5 mg/kg
36.25 ft bgs

IR01B273
13.5 mg/kg
21.25 ft bgs

MS-12A
20 mg/kg
15 ft bgs

MS-15
14 mg/kg
17.5 ft bgs

IR01MW43A
16.5 mg/kg
22.75 ft bgs

IR01B045
12.56 mg/kg
17.52 ft bgs

IR01MW47B
14.99 mg/kg
16.82 ft bgs

IR01MW44A
18.1 mg/kg
17.11 ft bgs

IR02B249
12.21 mg/kg
11.63 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-39

ARSENIC IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	3.14
SDGI Industrial Criteria	15
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	38
ESL Industrial (Inhalation) 2005	NE
RIEC	**38**

IR01B006
113 mg/kg
13.27 ft bgs

IR01B024
79.1 J2 mg/kg
16.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-40

CADMIUM IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	(a)
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**(b)**

(a) location specific value

(b) value is either the HPAL if above the PRG or the lowest PRG

IR01B015
467 mg/kg
16.25 ft bgs

IR01MW05A
2,400 J3 mg/kg
26.81 ft bgs

IR01B006
3,590 mg/kg
11.27 ft bgs

IR01MW16A
495 J3 mg/kg
11.25 ft bgs

TPBWE08B
854 mg/kg
18.68 ft bgs

IR01B013
1,330 mg/kg
12.74 ft bgs

IR01B012
1,810 mg/kg
21.97 ft bgs

IR01MW18A
537 J3 mg/kg
11.25 ft bgs

IR01B011
1,200 mg/kg
11.25 ft bgs

IR01B019
770 mg/kg
16.25 ft bgs

IR01MW26B
2,650 mg/kg
21.25 ft bgs

IR01MW38A
1,240 J3 mg/kg
19 ft bgs

IR04B016
903 mg/kg
12.89 ft bgs

IR01B021
1,630 J3 mg/kg
10.75 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-41

CHROMIUM (TOTAL) IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	100,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**100,000**

IR01B006
134,000 mg/kg
11.27 ft bgs

IR01MW26B
163,000 mg/kg
21.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-42

IRON
IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	8.99
SDGI Industrial Criteria	750
EPA Region 9 Industrial PRG 2004	800
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	750
ESL Industrial (Inhalation) 2005	NE
RIEC	**800**

IR01B006
15,700 mg/kg
11.27 ft bgs

IR01MW18A
1,850 mg/kg
11.25 ft bgs

IR01B011
1,720 mg/kg
11.25 ft bgs

IR01MW26B
14,500 J3 mg/kg
21.25 ft bgs

IR01B021
2,070 mg/kg
21.25 ft bgs

IR04B025
24,600 mg/kg
11.25 ft bgs

IR01MW58A
991 mg/kg
16.25 ft bgs

MS-12A
3,200 mg/kg
15 ft bgs

IR01MW62A
1,150 mg/kg
11.25 ft bgs

MS-08
1,100 mg/kg
19.5 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-43

LEAD IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	0.74
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.74**

IR01MW02B
<11 mg/kg
23.14 ft bgs

IR01B004
<0.92 mg/kg
4.41 ft bgs

IR01MW05A
0.88 mg/kg
26.81 ft bgs

WE20A
3.7 mg/kg
11 ft bgs

IR01MW03A
<1.1 mg/kg
25.68 ft bgs

IR01B006
5.45 mg/kg
11.27 ft bgs

WE19B
6.3 mg/kg
11 ft bgs

IR01B013
5.94 mg/kg
10.24 ft bgs

IR01B012
103.9 mg/kg
16.97 ft bgs

WE19A
12 mg/kg
16 ft bgs

WE18B
1.9 mg/kg
13 ft bgs

IR01MW16A
<87 mg/kg
11.25 ft bgs

IR01MW17B
2,540 mg/kg
11.25 ft bgs

IR01MW18A
2.43 mg/kg
11.25 ft bgs

WE17C
5.4 mg/kg
16 ft bgs

IR01B011
45.18 mg/kg
21.25 ft bgs

IR01MW38A
<1.7 mg/kg
19 ft bgs

IR01B019
32,000 mg/kg
16.25 ft bgs

IR01MW53B
<0.93 mg/kg
13.75 ft bgs

IR01MW26B
<25 mg/kg
21.25 ft bgs

TPBWE14
1.2 mg/kg
15.5 ft bgs

IR01B275
1.9 mg/kg
11.25 ft bgs

GRID 177 BOTTOM
16.8 mg/kg
10.5 ft bgs

IR01B024
16.2 mg/kg
16.25 ft bgs

IR01MW58A
<1 mg/kg
11.25 ft bgs

GRID 172 BOTTOM
2.79 mg/kg
10.5 ft bgs

GRID 173 BOTTOM
1.6 mg/kg
10.5 ft bgs

GRID 84 BOTTOM
6.9 mg/kg
10.5 ft bgs

GRID 171 BOTTOM
2.32 mg/kg
10.5 ft bgs

GRID 83 BOTTOM
14.2 mg/kg
10.5 ft bgs

IR01SH030
8.6 mg/kg
18 ft bgs

IR01MW63A
<0.92 mg/kg
11.25 ft bgs

IR01MW47B
0.84 mg/kg
26.82 ft bgs

GRID 61 BOTTOM
4.7 mg/kg
15.1 ft bgs

IR01MW44A
8.6 mg/kg
12.11 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

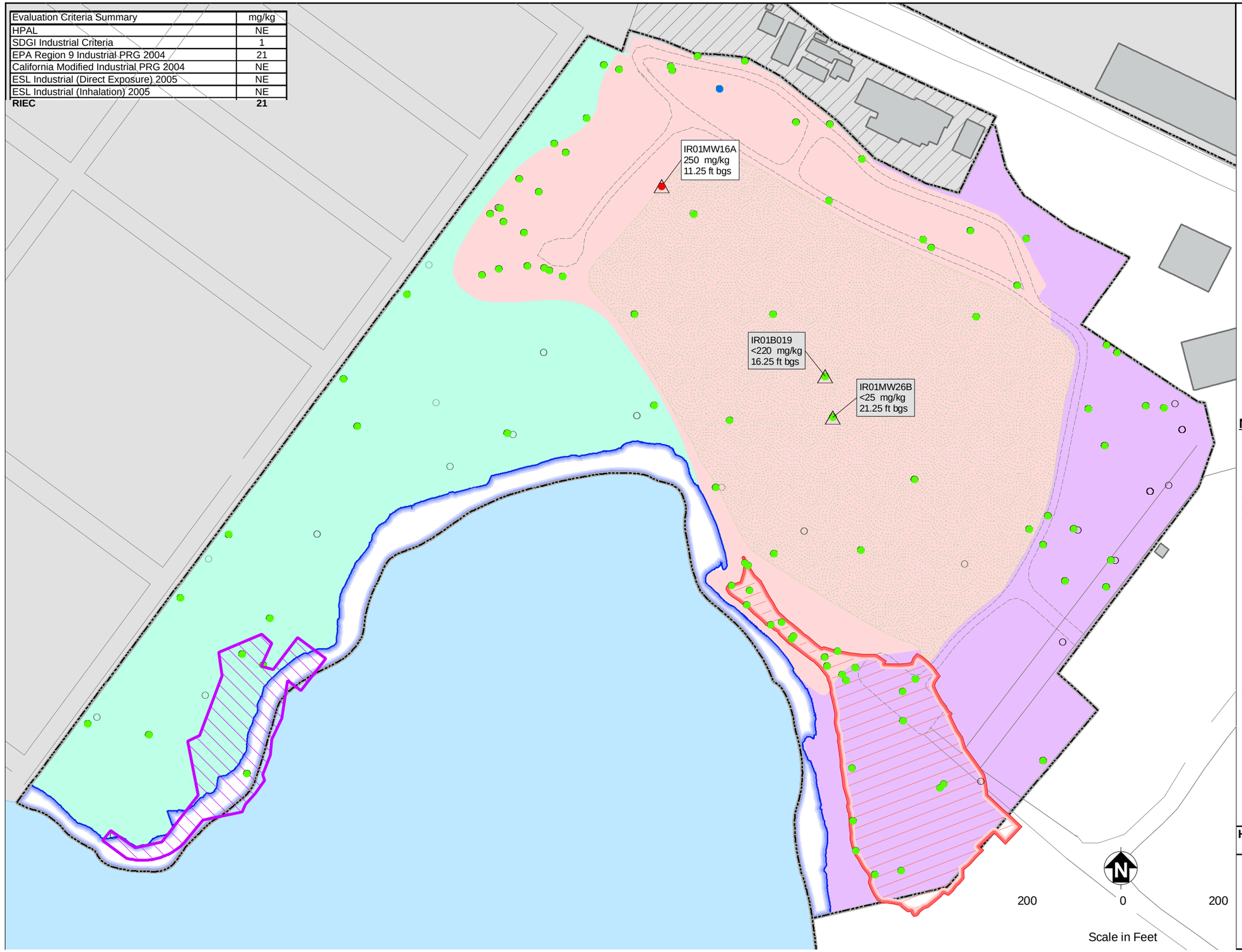
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-44

TOTAL PCBS (HIGH RISK) IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1
EPA Region 9 Industrial PRG 2004	21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**21**



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-45

TOTAL PCBS (LOW RISK) IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	4.5
EPA Region 9 Industrial PRG 2004	7.9
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exp) 2005	190
ESL Industrial (Inhalation) 2005	0.13
RIEC	**0.13**

IR01B004
0.94 J mg/kg
16.91 ft bgs

IR01B004
<0.4 mg/kg
31.91 ft bgs

IR01B006
6.45 mg/kg
18.77 ft bgs

IR01B006
<0.5 mg/kg
28.77 ft bgs

IR01B011
0.58 J mg/kg
21.25 ft bgs

IR01B011
<4.1 mg/kg
11.25 ft bgs

IR01B021
1 J mg/kg
21.25 ft bgs

IR01B021
<0.51 mg/kg
31.25 ft bgs

IR01B275
<0.54 mg/kg
27.75 ft bgs

IR01B275
0.79 J mg/kg
11.25 ft bgs

IR01B024
3 J mg/kg
16.25 ft bgs

IR01B024
<18 mg/kg
11.25 ft bgs

IR01SH030
<3.5 mg/kg
14 ft bgs

IR01SH030
0.012 mg/kg
14 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-46

1,4 - DICHLOROBENZENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	15
ESL Industrial (Inhalation) 2005	NE
RIEC	**2.1**

WE21B <3.8 mg/kg 11.48 ft bgs
WE21A <4.5 J0 mg/kg 11.34 ft bgs
WE03B <3.8 mg/kg 11.57 ft bgs
IR01B004 <2.9 mg/kg 16.91 ft bgs
TPBWE20B <4.1 J0 mg/kg 16 ft bgs
WE20A <3.8 mg/kg 11 ft bgs
IR01B006 <1.5 mg/kg 13.27 ft bgs
WE19B <4 mg/kg 11 ft bgs
WE19A <4 J0 mg/kg 16 ft bgs
IR01MW17B <3 mg/kg 11.25 ft bgs
IR01B013 <3.9 mg/kg 10.24 ft bgs
TPBWE08B <3.7 mg/kg 18.68 ft bgs
WE18B <3.9 mg/kg 13 ft bgs
IR01B012 <5.2 mg/kg 21.97 ft bgs
WE18A <3.9 mg/kg 12 ft bgs
IR01B030 <7.1 mg/kg 21.25 ft bgs
WE10 <3.9 mg/kg 10.76 ft bgs
WE08 <4.1 mg/kg 10.77 ft bgs
WE17E <4 mg/kg 11 ft bgs
WE17A <3.8 mg/kg 15.5 ft bgs
IR01B011 3.8 J mg/kg 11.25 ft bgs
IR01B019 <6.1 mg/kg 11.25 ft bgs
WE17D <4.1 mg/kg 13 ft bgs
WE17C <3.8 mg/kg 16 ft bgs
IR01MW38A <3.6 mg/kg 19 ft bgs
IR01MW26B 0.086 J mg/kg 26.25 ft bgs
IR01MW26B <21 mg/kg 21.25 ft bgs
IR01MW367A <7.6 mg/kg 13.27 ft bgs
TPBWE14 <6.4 mg/kg 15.5 ft bgs
IR01B024 2 J mg/kg 16.25 ft bgs
IR01B024 <18 mg/kg 11.25 ft bgs
IR01MW58A 3.3 J mg/kg 16.25 ft bgs
IR01MW58A <26 mg/kg 11.25 ft bgs
IR01MW63A 0.21 J mg/kg 16.25 ft bgs
IR01MW63A <9.5 mg/kg 11.25 ft bgs
IR01MW44A <26 mg/kg 12.11 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-47

BENZO (A) ANTHRACENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.33
EPA Region 9 Industrial PRG 2004	0.21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.5
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.33**

IR01MW02B
<0.44 mg/kg
25.68 ft bgs

IR01MW02B
0.39 J mg/kg
23.14 ft bgs

WE05
0.55 mg/kg
13.07 ft bgs

IR01MW16A
0.85 J mg/kg
11.25 ft bgs

IR01B030
0.49 J mg/kg
11.25 ft bgs

IR01B030
<0.85 mg/kg
16.25 ft bgs

IR01MW26B
<21 mg/kg
21.25 ft bgs

IR01MW26B
0.19 J mg/kg
26.25 ft bgs

IR01MW09B
<0.81 mg/kg
11.25 ft bgs

IR01MW09B
0.26 J mg/kg
26.25 ft bgs

IR01MW53B
0.22 J mg/kg
13.75 ft bgs

IR01MW53B
<1.1 mg/kg
31.25 ft bgs

IR01MW58A
<26 mg/kg
11.25 ft bgs

IR01MW58A
1.4 J mg/kg
16.25 ft bgs

IR01SH030
1.8 J0 mg/kg
14 ft bgs

MS-12A
0.13 J mg/kg
15 ft bgs

MS-12A
<0.53 mg/kg
19 ft bgs

IR01MW44A
<26 mg/kg
12.11 ft bgs

IR01MW44A
0.15 J mg/kg
17.11 ft/bgs

IR01MW63A
0.21 J mg/kg
16.25 ft bgs

IR01MW63A
<0.95 mg/kg
11.25 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

200 0 200
Scale in Feet

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-48

BENZO (A) PYRENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	15
ESL Industrial (Inhalation) 2005	NE
RIEC	**2.1**

WE21B <3.8 mg/kg 11.48 ft bgs
WE21A <4.5 mg/kg 11.34 ft bgs
WE03B <3.8 mg/kg 11.57 ft bgs
WE05 <3.5 mg/kg 13.07 ft bgs
TPBWE20B <4.1 mg/kg 16 ft bgs
IR01B004 <2.9 mg/kg 16.91 ft bgs
IR01B006 <1.5 mg/kg 13.27 ft bgs
IR01B012 <5.2 mg/kg 21.97 ft bgs
WE19B <4 mg/kg 11 ft bgs
WE20A <3.8 mg/kg 11 ft bgs
IR01MW16A 0.027 J mg/kg 26.75 ft bgs
IR01MW16A <5 mg/kg 11.25 ft bgs
TPBWE08B <3.7 mg/kg 18.68 ft bgs
WE19A <4 mg/kg 16 ft bgs
WE18C <4 mg/kg 12 ft bgs
WE18B <3.9 mg/kg 13 ft bgs
WE18A <3.9 mg/kg 12 ft bgs
IR01B013 <3.9 mg/kg 10.24 ft bgs
WE10 <3.9 mg/kg 10.76 ft bgs
IR01MW17B <3 mg/kg 11.25 ft bgs
IR01B030 0.41 J mg/kg 11.25 ft bgs
IR01B030 <7.1 mg/kg 21.25 ft bgs
WE17E <4 mg/kg 11 ft bgs
WE08 <4.1 mg/kg 10.77 ft bgs
IR01B011 <4.1 mg/kg 11.25 ft bgs
WE17D <4.1 mg/kg 13 ft bgs
WE17A <3.8 mg/kg 15.5 ft bgs
IR01B019 <6.1 mg/kg 11.25 ft bgs
IR01MW367A <7.6 mg/kg 13.27 ft bgs
WE17C <3.8 mg/kg 16 ft bgs
IR01MW38A <3.6 mg/kg 19 ft bgs
IR01MW26B 0.22 J mg/kg 26.25 ft bgs
IR01MW26B <21 mg/kg 21.25 ft bgs
TPBWE14 <6.4 mg/kg 15.5 ft bgs
IR01B024 1.7 J mg/kg 16.25 ft bgs
IR01B024 <18 mg/kg 11.25 ft bgs
IR04B025 <1.9 mg/kg 11.25 ft bgs
IR01MW58A 3.6 J mg/kg 16.25 ft bgs
IR01MW58A <26 mg/kg 11.25 ft bgs
IR01SH030 2.7 J0 mg/kg 14 ft bgs
IR01MW63A 0.15 J mg/kg 16.25 ft bgs
IR01MW63A <9.5 mg/kg 11.25 ft bgs
IR01MW44A <26 mg/kg 12.11 ft bgs
IR01MW44A 0.15 J mg/kg 17.11 ft/bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-49

BENZO (B) FLUORANTHENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	190
EPA Region 9 Industrial PRG 2004	190
California Modified Industrial PRG 2004	4.2
ESL Industrial (Direct Exposure) 2005	3.8
ESL Industrial (Inhalation) 2005	1.5
RIEC	**1.5**

WE21B <3.8 mg/kg 11.48 ft bgs
WE21A <4.5 mg/kg 11.34 ft bgs
WE03B <3.8 mg/kg 11.57 ft bgs
WE05 <3.5 mg/kg 13.07 ft bgs
TPBWE20B <4.1 mg/kg 16 ft bgs
WE20A <3.8 mg/kg 11 ft bgs
IR01B004 2.9 mg/kg 16.91 ft bgs
IR01B006 11 mg/kg 18.77 ft bgs
WE08 <4.1 mg/kg 10.77 ft bgs
WE19B <4 mg/kg 11 ft bgs
IR01MW16A 2.2 J mg/kg 11.25 ft/bgs
WE19A <4 mg/kg 16 ft bgs
IR01B013 <3.9 mg/kg 10.24 ft bgs
TPBWE08B <3.7 mg/kg 18.68 ft bgs
WE18C <4 mg/kg 12 ft bgs
IR01MW17B <3 mg/kg 11.25 ft bgs
WE18B <3.9 mg/kg 13 ft bgs
WE18A <3.9 mg/kg 12 ft bgs
IR01B012 <5.2 mg/kg 21.97 ft bgs
WE10 <3.9 mg/kg 10.76 ft bgs
IR01MW18A 3.6 mg/kg 11.25 ft bgs
WE17E <4 mg/kg 11 ft bgs
IR01B019 <6.1 mg/kg 11.25 ft bgs
IR01B011 31 mg/kg 11.25 ft bgs
WE17D <4.1 mg/kg 13 ft bgs
IR01B030 <7.1 mg/kg 21.25 ft bgs
WE17C 3.7 J mg/kg 16 ft bgs
IR01MW38A <3.6 mg/kg 19 ft bgs
IR01MW26B 4.9 J mg/kg 21.25 ft bgs
IR01MW367A <7.6 mg/kg 13.27 ft bgs
WE17A <3.8 mg/kg 15.5 ft bgs
IR01B021 5.6 mg/kg 21.25 ft bgs
IR04B025 <1.9 mg/kg 11.25 ft bgs
IR01B024 6.1 J mg/kg 16.25 ft bgs
TPBWE14 <6.4 mg/kg 15.5 ft bgs
IR01MW58A 23 J mg/kg 11.25 ft bgs
IR01SH030 6.3 mg/kg 18 ft bgs
IR01MW63A 110 mg/kg 11.25 ft bgs
IR01MW44A <26 mg/kg 12.11 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-50

NAPHTHALENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.35
EPA Region 9 Industrial PRG 2004	0.25
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.25**

IR01B275
0.43 J mg/kg
27.75 ft bgs

IR01B275
<1.5 mg/kg
11.25 ft bgs

200 0 200

Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-51

N-NITROSO-DI-N-PROPYLAMINE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.19
EPA Region 9 Industrial PRG 2004	0.55
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	8.2
ESL Industrial (Inhalation) 2005	0.034
RIEC	**0.034**

IR01MW02B
<0.035 mg/kg
23.14 ft bgs

IR01MW16A
<7.2 mg/kg
11.25 ft bgs

IR01B006
<0.044 mg/kg
11.27 ft bgs

IR01B013
<0.73 mg/kg
10.24 ft bgs

IR01MW18A
<0.69 mg/kg
11.25 ft bgs

IR01B011
<15 mg/kg
11.25 ft bgs

IR01B019
<0.046 mg/kg
11.25 ft bgs

IR01MW26B
<0.04 mg/kg
21.25 ft bgs

IR01B024
0.37 J mg/kg
16.25 ft bgs

IR01MW58A
<1.6 mg/kg
11.25 ft bgs

IR01MW63A
<0.72 mg/kg
11.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-52

CARBON TETRACHLORIDE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	210
EPA Region 9 Industrial PRG 2004	420
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	420
ESL Industrial (Inhalation) 2005	420
EPA Region 9 Industrial RSL 2008	29
ESL Industrial (Direct Exposure) 2008	5
RIEC	**5**

IR01MW16A
5.4 J mg/kg
11.25 ft bgs

IR01B011
55.73 J3 mg/kg
11.25 ft bgs

IR01B024
5.8 mg/kg
16.25 ft bgs

IR04B017
<13.47 mg/kg
36.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-53

ETHYLBENZENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	21
EPA Region 9 Industrial PRG 2004	1.3
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	25
ESL Industrial (Inhalation) 2005	0.24
RIEC	**0.24**

IR01MW16A
<7.2 mg/kg
11.25 ft bgs

IR01B013
<0.73 mg/kg
10.24 ft bgs

IR01MW18A
0.29 J mg/kg
11.25 ft bgs

IR01B011
<15 mg/kg
11.25 ft bgs

IR01B019
<0.84 mg/kg
16.25 ft bgs

IR01B024
<0.8 mg/kg
16.25 ft bgs

IR01MW58A
<1.6 mg/kg
11.25 ft bgs

IR01MW63A
<0.72 mg/kg
11.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-54

TETRACHLOROETHENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	210
EPA Region 9 Industrial PRG 2004	420
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	420
ESL Industrial (Inhalation) 2005	420
RIEC	**420**

IR01B011
520 J3 mg/kg
11.25 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-55

XYLENE (TOTAL) IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	NE
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**3,500**

IR01MW16A
4,000 mg/kg
11 ft bgs

IR01MW17B
3,925 mg/kg
11 ft bgs

IR01B019
9,740 mg/kg
11 ft bgs

IR01B011
9,360 mg/kg
11 ft bgs

GRID 177 BOTTOM
4,200 mg/kg
11 ft bgs

GRID 84 BOTTOM
4,411 mg/kg
11 ft bgs

IR01SH030
7,800 mg/kg
11 ft bgs

IR01MW63A
6,700 mg/kg
11 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-56

TOTAL TPH IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	9.05
SDGI Industrial Criteria	820
EPA Region 9 Industrial PRG 2004	410
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	380
ESL Industrial (Inhalation) 2005	NE
RIEC	**380**

IR01B368
530 J3 mg/kg
1 ft bgs

IR04B030
409 J3 mg/kg
1 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs

Location ID
Concentration and Qualifier
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-57

ANTIMONY IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	11.1
SDGI Industrial Criteria	22
EPA Region 9 Industrial PRG 2004	1.6
California Modified Industrial PRG 2004	0.25
ESL Industrial (Direct Exposure) 2005	0.24
ESL Industrial (Inhalation) 2005	NE
RIEC	**11.1**

IR01B390
5.5 J mg/kg
1 ft bgs

IR01B390
<28 mg/kg
2 ft bgs

IR01B374
13 mg/kg
1 ft bgs

IR01B399
<13 mg/kg
1 ft bgs

IR01B368
49 J9 mg/kg
2 ft bgs

IR01MW58A
215 J3 mg/kg
1.25 ft bgs

IR01B369
45 mg/kg
2 ft bgs

IR01B369
<13 mg/kg
1 ft bgs

IR01B367
21 mg/kg
2 ft bgs

IR01B366
28 mg/kg
2 ft bgs

GRID 86 SIDEWALL
23 mg/kg
1 ft bgs

GRID 71
16 mg/kg
0 ft bgs

GRID 87
14 mg/kg
2 ft bgs

GRID 68/69 SIDEWALL
12 mg/kg
0.5 ft bgs

GRID 94
18 mg/kg
0.5 ft bgs

IR01MW09B
11.14 mg/kg
0.75 ft bgs

IR04B030
12.6 mg/kg
1 ft bgs

GRID 127-1 SIDEWALL
17 mg/kg
1.8 ft bgs

GRID 128 SIDEWALL
21 mg/kg
2 ft bgs

IR02B452
24 mg/kg
0.8 ft bgs

IR02B452
22 mg/kg
1.77 ft bgs

N

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-58

ARSENIC IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	3.14
SDGI Industrial Criteria	15
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	7.4
ESL Industrial (Inhalation) 2005	NE
RIEC	**7.4**

IR04B030
10.2 mg/kg
1.25 ft bgs

IR04B015
11.8 mg/kg
1.25 ft bgs

IR01B368
8.9 mg/kg
2 ft bgs

GRID 86 SIDEWALL
37 mg/kg
1 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-59

CADMIUM IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	100,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**100,000**

IR01B368
190,000 mg/kg
1 ft bgs

IR01B369
120,000 mg/kg
2 ft bgs

IR04B030
139925 mg/kg
1 ft bgs

IR02B452
120,000 mg/kg
1.77 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-60

IRON
IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	2.28
SDGI Industrial Criteria	610
EPA Region 9 Industrial PRG 2004	310
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	180
ESL Industrial (Inhalation) 2005	NE
RIEC	**180**

GRID 71
190 mg/kg
0 ft bgs

200 0 200
Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-61

MERCURY IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	117.2
SDGI Industrial Criteria	14,000
EPA Region 9 Industrial PRG 2004	1,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6,700
ESL Industrial (Inhalation) 2005	NE
RIEC	**1,000**

IR01B373
2,100 mg/kg
2 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

200 0 200

Scale in Feet

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-62

VANADIUM IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	12
EPA Region 9 Industrial PRG 2004	7
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**6.3**

IR01B394
7.7 mg/kg
1 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

N

200 0 200

Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-63

4,4' -DDE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.15
EPA Region 9 Industrial PRG 2004	0.11
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.13
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.11**

IR01MW02B
<0.17 mg/kg
1.14 ft bgs

IR01B394
6.4 J9 mg/kg
1 ft bgs

IR01B394
<0.18 mg/kg
2 ft bgs

IR01B390
<4.2 mg/kg
1 ft bgs

IR01B390
3.2 J9 mg/kg
2 ft bgs

IR01B371
<0.37 mg/kg
2 ft bgs

IR01MW38A
<0.18 mg/kg
1 ft bgs

IR01B375
<0.17 mg/kg
2 ft bgs

IR01TA06B
<1.7 mg/kg
1 ft bgs

IR01SS350
<0.42 mg/kg
0.5 ft bgs

IR04B015
<0.17 mg/kg
1.25 ft bgs

IR04MW13A
<0.17 mg/kg
1.75 ft bgs

GRID 37 SIDEWALL
0.25 mg/kg
1.1 ft bgs

IR12B041
0.25 J9 mg/kg
0 ft bgs

GRID 56 SIDEWALL
0.13 mg/kg
1.3 ft bgs

GRID 86 SIDEWALL
<0.17 mg/kg
1 ft bgs

GRID 110 SIDEWALL
<0.35 mg/kg
1.8 ft bgs

IR12SS19
<0.16 mg/kg
0 ft bgs

IR02TA11A
<0.23 mg/kg
1.56 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-64

DIELDRIN IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	1.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**1.3**

IR01B383
2.1 J0 mg/kg
1 ft bgs

IR01B385
4 mg/kg
1 ft bgs

IR01B386
4.5 mg/kg
1 ft bgs

IR01B378
4.3 mg/kg
1 ft bgs

IR01B394
3.9 mg/kg
1 ft bgs

IR01B390
53 mg/kg
2 ft bgs

IR01B368
1.6 mg/kg
2 ft bgs

IR01B369
0.15 mg/kg
1 ft bgs

IR01B369
<1.5 mg/kg
2 ft bgs

IR01B366
1.7 mg/kg
2 ft bgs

IR72B025
<7 mg/kg
1 ft bgs

IR72B034
<1.8 mg/kg
0.47 ft bgs

IR01MW07A
<1.7 mg/kg
-0.07 ft bgs

IR72B038
<3.5 mg/kg
1.33 ft bgs

IR04B030
<3.6 mg/kg
1.25 ft bgs

IR04B047
<1.8 mg/kg
1.25 ft bgs

IR01TA06B
2.1 J mg/kg
1 ft bgs

IR04B017
<1.7 mg/kg
1.75 ft bgs

IR04B028
<1.7 mg/kg
1.25 ft bgs

IR04MW13A
<3.5 mg/kg
1.75 ft bgs

GRID 165 SIDEWALL
<4.1 mg/kg
1.3 ft bgs

GRID 110 SIDEWALL
<3.6 mg/kg
1.8 ft bgs

GRID 139 SIDEWALL
2 J mg/kg
1 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

200 0 200
Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-65

BENZO (K) FLUORANTHENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	180
EPA Region 9 Industrial PRG 2004	120
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	570
ESL Industrial (Inhalation) 2005	NE
RIEC	**120**

IR01B390
740 mg/kg
2 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

200 0 200
Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-66

BIS (2-ETHYLHEXYL) PHTHALATE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	18
EPA Region 9 Industrial PRG 2004	210
California Modified Industrial PRG 2004	13
ESL Industrial (Direct Exposure) 2005	13
ESL Industrial (Inhalation) 2005	NE
RIEC	**13**

IR01B390
57 mg/kg
2 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

200 0 200
Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-67

CHRYSENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.33
EPA Region 9 Industrial PRG 2004	0.21
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	0.38
ESL Industrial (Inhalation) 2005	NE
RIEC	**0.33**

IR01B390
5.3 J mg/kg
2 ft bgs

IR01B390
<0.83 mg/kg
1 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-68

DIBENZ (A,H) ANTHRACENE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	NE
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**3,500**

IR72SS24
5,130 mg/kg
0 ft bgs

IR72SS22
83,500 mg/kg
0 ft bgs

IR72B037
6,900 mg/kg
1.04 ft bgs

IR01B368
7,000 mg/kg
2 ft bgs

IR01B366
5,600 mg/kg
2 ft bgs

IR01B369
3,900 mg/kg
2 ft bgs

GRID 57-1 SIDEWALL
4,000 mg/kg
0.8 ft bgs

IR12B042
23,000 mg/kg
0.77 ft bgs

GRID 37 SIDEWALL
3,600 mg/kg
1.1 ft bgs

GRID 139 SIDEWALL
4,584 mg/kg
1 ft bgs

200 0 200
Scale in Feet

N

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-69

TOTAL TPH IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	109.9
SDGI Industrial Criteria	100,000
EPA Region 9 Industrial PRG 2004	100,000
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	290,000
ESL Industrial (Inhalation) 2005	NE
RIEC	**100,000**

IR01MW58A
116,000 mg/kg
6.25 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

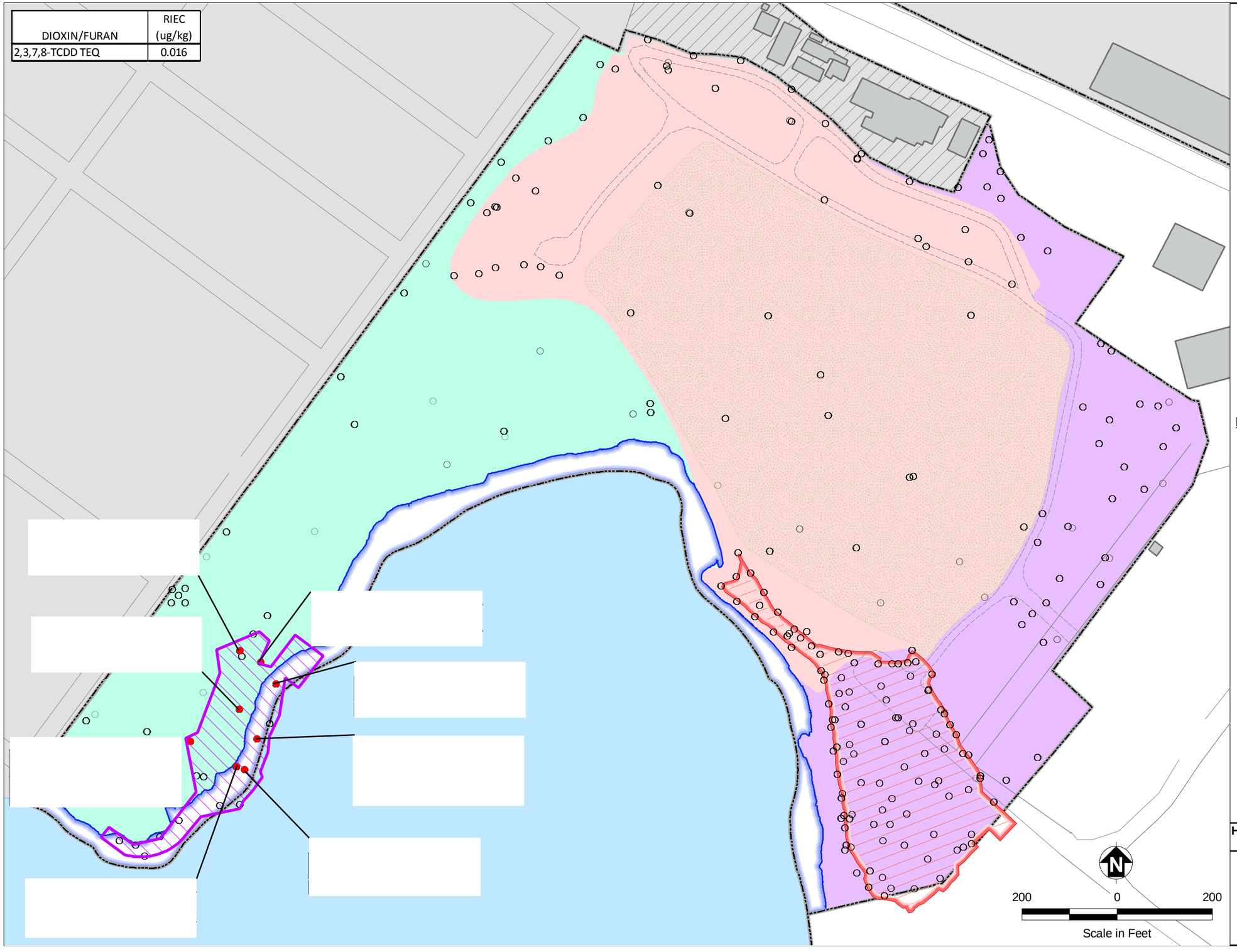
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-70

ZINC
IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

DIOXIN/FURAN	RIEC (ug/kg)
2,3,7,8-TCDD TEQ	0.016



Reporting Limit Exceeds the RIEC (for at least one sample)
Not Analyzed for Analyte
Analyte Not Detected
Analyte Exceeds Reporting Limit
Analyte Exceeds RIEC
Road
Gravel Road
Metal Slag Area (2007 excavation limit)[a]
PCB Hot Spot Area (2007 excavation limit)[a]
Limit of Landfill Cap
Parcel Boundary
Building
UCSF Compound
Landfill Area
East Adjacent Area
Panhandle Area
Shoreline Area
San Francisco Bay
Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

Conc. = concentration
ft bgs = feet below ground surface
PCB = polychlorinated biphenyl
RIEC = Remedial Investigation Evaluation Criterion
TEQ = toxicity equivalency quotient
UCSF = University of California, San Francisco
ug/kg = microgram per kilogram

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

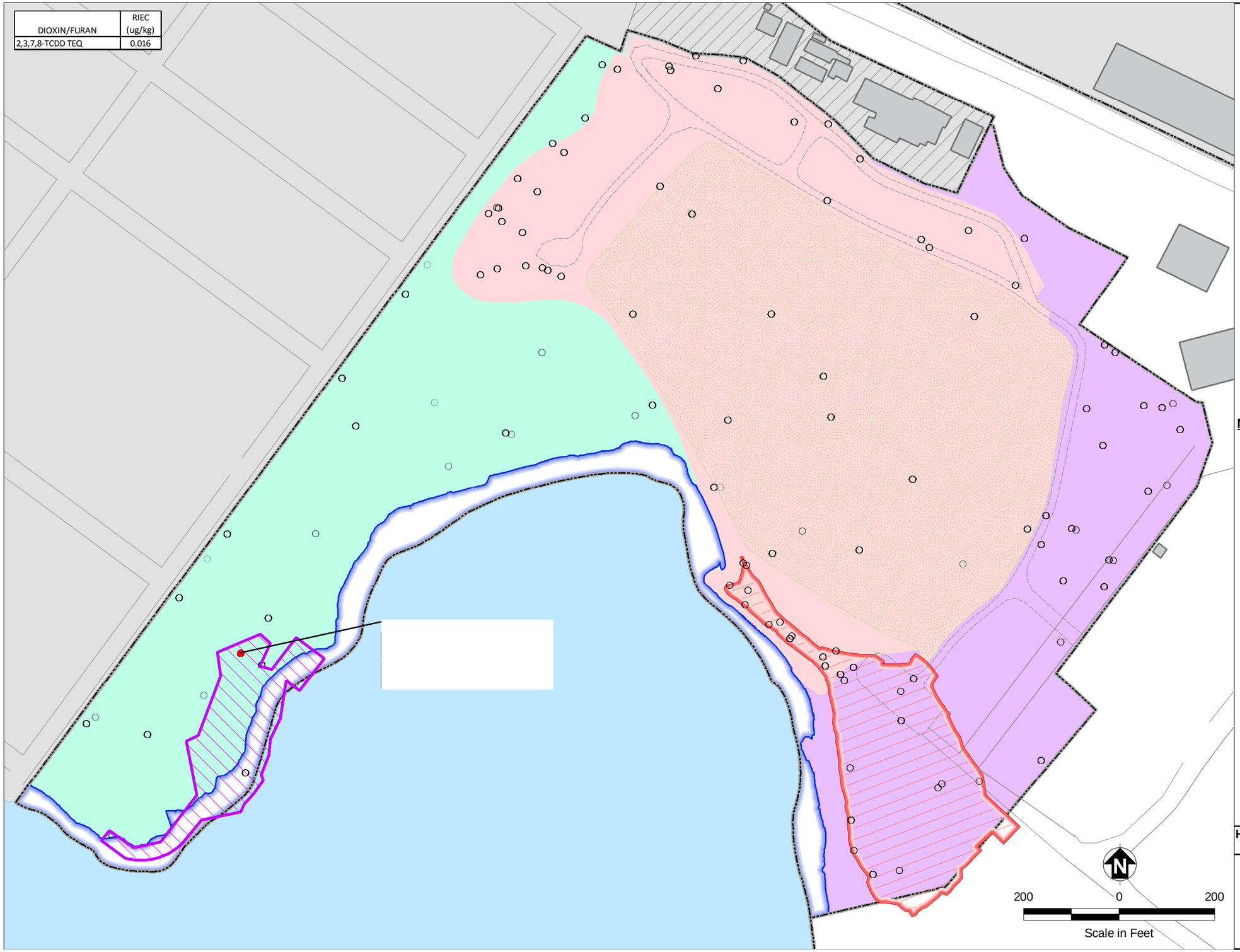
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-71

DIOXINS AND FURANS IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

DIOXIN/FURAN	RIEC (ug/kg)
2,3,7,8-TCDD TEQ	0.016



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

Conc. = concentration
ft bgs = feet below ground surface
PCB = polychlorinated biphenyl
RIEC = Remedial Investigation Evaluation Criterion
TEQ = toxicity equivalency quotient
UCSF = University of California, San Francisco
ug/kg = microgram per kilogram

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-72

DIOXINS AND FURANS IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1.8
EPA Region 9 Industrial PRG 2004	2.1
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exp) 2005	15
ESL Industrial (Inhalation) 2005	NE
RIEC	**2.1**

WE21A <4.5 mg/kg 11.34 ft bgs
IR01B004 <2.9 mg/kg 16.91 ft bgs
WE03B <3.8 mg/kg 11.57 ft bgs
WE21B <3.8 mg/kg 11.48 ft bgs
WE05 <3.5 mg/kg 13.07 ft bgs
TPBWE20B <4.1 mg/kg 16 ft bgs
WE20A <3.8 mg/kg 11 ft bgs
IR01B006 <1.5 mg/kg 13.27 ft bgs
IR01B012 <5.2 mg/kg 21.97 ft bgs
WE19B <4 mg/kg 11 ft bgs
IR01MW16A 0.027 J mg/kg 26.75 ft bgs
IR01MW16A <5 mg/kg 11.25 ft bgs
TPBWE08B <3.7 mg/kg 18.68 ft bgs
WE19A <4 mg/kg 16 ft bgs
WE18B <3.9 mg/kg 13 ft bgs
IR01MW17B <3 mg/kg 11.25 ft bgs
WE17B 2 J mg/kg 18 ft bgs
WE18A <3.9 mg/kg 12 ft bgs
IR01B013 <3.9 mg/kg 10.24 ft bgs
WE10 <3.9 mg/kg 10.76 ft bgs
WE08 <4.1 mg/kg 10.77 ft bgs
WE17E <4 mg/kg 11 ft bgs
IR01B011 <4.1 mg/kg 11.25 ft bgs
IR01B030 <7.1 mg/kg 21.25 ft bgs
IR01B019 <6.1 mg/kg 11.25 ft bgs
WE17D <4.1 mg/kg 13 ft bgs
IR01MW367A <7.6 mg/kg 13.27 ft bgs
WE17C <3.8 mg/kg 16 ft bgs
WE17A <3.8 mg/kg 15.5 ft bgs
IR01MW26B 0.14 J mg/kg 26.25 ft bgs
IR01B019 <6.1 mg/kg 11.25 ft bgs
IR01MW38A <3.6 mg/kg 19 ft bgs
IR01B021 <2.4 mg/kg 21.25 ft bgs
TPBWE14 <6.4 mg/kg 15.5 ft bgs
IR01B024 <18 mg/kg 11.25 ft bgs
IR01MW58A <26 mg/kg 11.25 ft bgs
IR01MW58A 2.7 J mg/kg 16.25 ft bgs
IR01MW63A <9.5 mg/kg 11.25 ft bgs
IR01MW44A <26 mg/kg 12.11 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

200 0 200
Scale in Feet

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-73

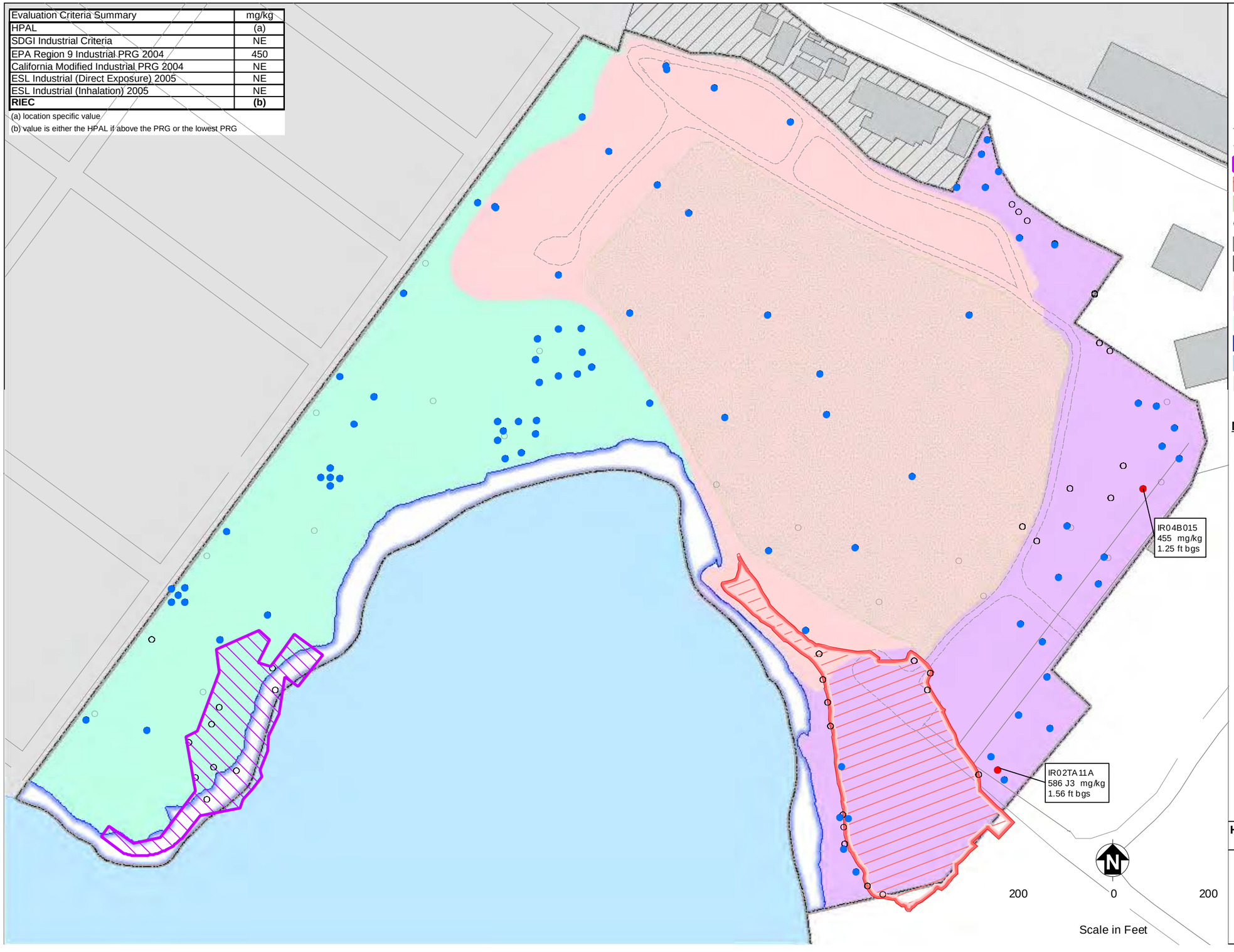
INDENO (1,2,3-CD) PYRENE IN >10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	(a)
SDGI Industrial Criteria	NE
EPA Region 9 Industrial PRG 2004	450
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	NE
ESL Industrial (Inhalation) 2005	NE
RIEC	**(b)**

(a) location specific value

(b) value is either the HPAL if above the PRG or the lowest PRG



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

Numbers associated with qualifiers are further defined in Appendix J.

IR01B275
150 J mg/kg
3.93 ft bgs
- Location ID
- Concentration and Qualifier
- Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California

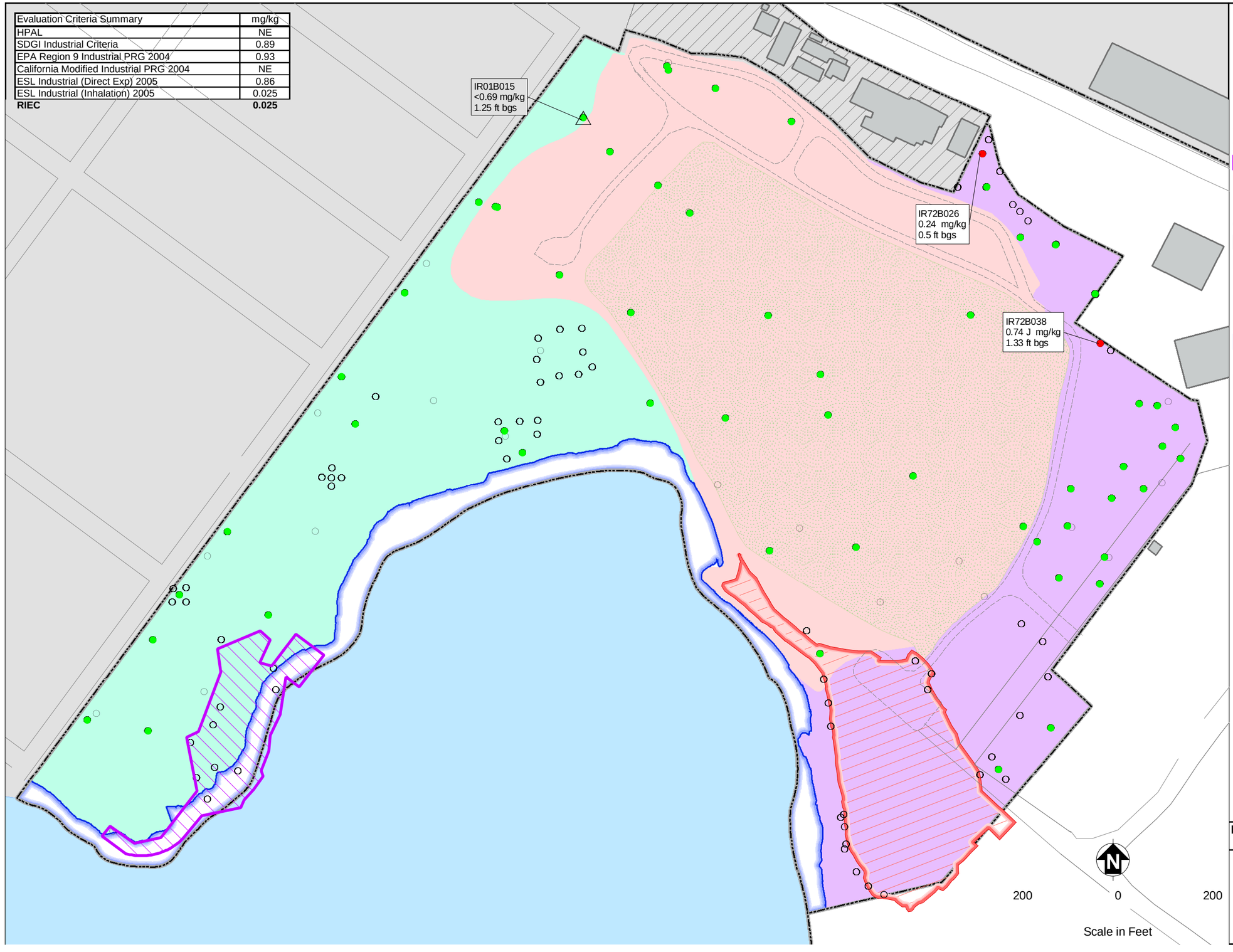
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-74

CHROMIUM (TOTAL) IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.89
EPA Region 9 Industrial PRG 2004	0.93
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exp) 2005	0.86
ESL Industrial (Inhalation) 2005	0.025
RIEC	**0.025**



- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-75

1,1,2,2-TETRACHLOROETHANE IN 0 - 2' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	12
EPA Region 9 Industrial PRG 2004	7
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**6.3**

IR01MW16A
<92 mg/kg
8.75 ft bgs

IR01MW05A
<84 mg/kg
8.31 ft bgs

IR01TA07B
<17 mg/kg
3.93 ft bgs

GRID 159 SIDEWALL
24 J mg/kg
6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-76

4, 4' - DDE
IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	12
EPA Region 9 Industrial PRG 2004	7
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exposure) 2005	6.3
ESL Industrial (Inhalation) 2005	NE
RIEC	**6.3**

IR01MW05A
<84 mg/kg
8.31 ft bgs

IR01MW16A
<92 mg/kg
8.75 ft bgs

IR01TA07B
<17 mg/kg
3.93 ft bgs

GRID 86 SIDEWALL
11 J mg/kg
7 ft bgs

GRID 159 SIDEWALL
110 J mg/kg
6 ft bgs

GRID 111 SIDEWALL
8.9 J mg/kg
6 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275 — Location ID
150 J mg/kg — Concentration and Qualifier
3.93 ft bgs — Depth

IR04B025 — Location ID
<37 mg/kg — Reporting Limit
2.0 ft bgs — Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-77

4,4' - DDT
IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	1600
EPA Region 9 Industrial PRG 2004	220
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exp) 2005	210
ESL Industrial (Inhalation) 2005	5
RIEC	**5**

IR01MW02B
<52 mg/kg
8.64 ft bgs

IR01B018G
<7.6 mg/kg
6.25 ft bgs

IR01B011
<7.47 mg/kg
8.75 ft bgs

IR72B038
<6.4 mg/kg
3.33 ft bgs

IR01MW53B
<22 mg/kg
6.25 ft bgs

IR01MW26B
<5.6 mg/kg
8.75 ft bgs

IR01B021A
<33 mg/kg
5.75 ft bgs

IR01B024
<12 mg/kg
8.75 ft bgs

IR01TA07A
<44 mg/kg
4.19 ft bgs

IR01TA08B
<22 mg/kg
2.03 ft bgs

IR04B019
<37 mg/kg
7.75 ft bgs

IR01B368
<50 mg/kg
7 ft bgs

IR01B367
<11 mg/kg
8 ft bgs

IR01MW58A
<28 mg/kg
6.25 ft bgs

IR01B369
<19 mg/kg
9 ft bgs

IR01B366
<23 mg/kg
9 ft bgs

IR01SH036
280 mg/kg
10 ft bgs

200 0 200

Scale in Feet

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
Location ID
Concentration and Qualifier
Depth

IR04B025
<37 mg/kg
2.0 ft bgs
Location ID
Reporting Limit
Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-78

1,2,4-TRICHLOROBENZENE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	mg/kg
HPAL	NE
SDGI Industrial Criteria	0.89
EPA Region 9 Industrial PRG 2004	0.93
California Modified Industrial PRG 2004	NE
ESL Industrial (Direct Exp) 2005	0.86
ESL Industrial (Inhalation) 2005	0.025
RIEC	**0.025**

IR01MW02B
<6.5 mg/kg
8.64 ft bgs

IR01MW03A
<0.74 mg/kg
5.68 ft bgs

WE20B
<0.026 mg/kg
10 ft bgs

IR01B004
<0.031 mg/kg
9.41 ft bgs

IR01MW16A
<7.2 mg/kg
8.75 ft bgs

IR72B025
0.24 mg/kg
2.5 ft bgs

IR72B026
0.19 mg/kg
2.5 ft bgs

IR72B027
0.76 mg/kg
3 ft bgs

IR72B039
0.091 J mg/kg
9 ft bgs

IR01B018G
<7.2 mg/kg
6.25 ft bgs

IR01B011
<0.7 mg/kg
8.75 ft bgs

IR01MW26B
<0.84 mg/kg
8.75 ft bgs

IR01MW367A
1.2 mg/kg
2.77 ft bgs

IR01B024
<7.5 mg/kg
8.75 ft bgs

IR01TA07A
<1.1 mg/kg
4.19 ft bgs

IR01TA07B
<0.027 mg/kg
3.93 ft bgs

IR01B368
<50 mg/kg
7 ft bgs

IR01B367
<11 mg/kg
8 ft bgs

IR01B369
<19 mg/kg
9 ft bgs

IR01B366
<23 mg/kg
9 ft bgs

IR01MW58A
<3.5 mg/kg
6.25 ft bgs

IR01B045
<0.74 mg/kg
6.25 ft bgs

- Reporting Limit Exceeds the RIEC (for at least one sample)
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds RIEC
- Road
- Gravel Road
- Metal Slag Area (2007 excavation limit)[a]
- PCB Hot Spot Area (2007 excavation limit)[a]
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- East Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:

[a] Post- excavation boundaries in PCB Hot Spot Area and Metal Slag Area are consistent with information presented in final removal action completion reports (Tetra Tech EC Inc., 2007a and 2007b).

Results are shown for locations where data have exceeded the RIEC.
Where results are shown as non-detect (<), the reporting limit follows.

EPA = Environmental Protection Agency
ESL = environmental screening level
ft bgs = feet below ground surface
HPAL = Hunters Point ambient level
J = estimated value
mg/kg = milligram per kilogram
NE = not established
PCB = polychlorinated biphenyl
PRG = preliminary remediation goal
RIEC = Remedial Investigation Evaluation Criterion
SDGI = Standard Data Gaps Investigation
UCSF = University of California, San Francisco

IR01B275
150 J mg/kg
3.93 ft bgs
— Location ID
— Concentration and Qualifier
— Depth

IR04B025
<37 mg/kg
2.0 ft bgs
— Location ID
— Reporting Limit
— Depth

ERRG ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

200 0 200
Scale in Feet

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4-79

1,1,2,2-TETRACHLOROETHANE IN 2 - 10' SOIL

Remedial Investigation/Feasibility Study for Parcel E-2

Tables

Table 4-1. Summary of Human Health Evaluation Criteria for Soil

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a] Conc. (mg/kg)	HPAL [a] Comments	SDGI Industrial Screening Criteria [b] Conc. (mg/kg)	SDGI Industrial Screening Criteria [b] Comments	EPA PRG Industrial 2004 [c] Conc. (mg/kg)	EPA PRG Industrial 2004 [c] Comments	ESL Industrial 2005 (direct exp) [d,e,g] Conc. (mg/kg)	ESL Industrial 2005 (direct exp) [d,e,g] Comments	ESL Industrial 2005 (inhalation) [e,f,g] Conc. (mg/kg)	ESL Industrial 2005 (inhalation) [e,f,g] Comments	RIEC Conc. (mg/kg)
Metals											
Aluminum	NA		100,000		100,000		-		--		100,000
Antimony	9.05		820		410		380	noncancer (HQ=1.0)	--		380
Arsenic	11.1		22		1.6		0.24	cancer PRG	--		11.1
Barium	314.4		100,000		67,000		63,000	noncancer (HQ=1.0)	--		63,000
Beryllium	0.71		2,200		1,900		36	noncancer (HQ=1.0)	--		36
Cadmium	3.14		15		450		7.4	cancer PRG	--		7.4
Calcium	NA		--		--		-		--		--
Chromium (total)	a		--	assume CrVI:CrIII at 1:6	450		-		--		a
Chromium VI	NA		17		64		37	noncancer (HQ=1.0)	--		37
Cobalt	a		100,000		1,900		3,200	noncancer (HQ=1.0)	--		a
Copper	124.3		--		41,000		38,000	noncancer (HQ=1.0)	--		38,000
Cyanide (free)	NA		--		12,000		12,000	noncancer (HQ=1.0)	--		12,000
Iron	NA		--		100,000		-		--		100,000
Lead	8.99		750		800		-		--		800
Magnesium	NA		--		-		-		--		--
Manganese	1,431.2		32,000		19,000		-		--		19,000
Mercury	2.28		610		310		180	noncancer (HQ=1.0)	--		180
Molybdenum	2.68		10,000		5,100		4,800	noncancer (HQ=1.0)	--		4,800
Nickel	a		--		20,000		20,000	noncancer (HQ=1.0)	--		a
Potassium	NA		--				-		--		--
Selenium	1.95		10,000		5,100		4,800	noncancer (HQ=1.0)	--		4,800
Silver	1.43		10,000		5,100		4,800	noncancer (HQ=1.0)	--		4,800
Sodium	-		--		--		-		--		--
Thallium	0.81		130		67		63	noncancer (HQ=1.0)	--		63
Tin	NA		--		100,000		-		--		100,000
Vanadium	117.2		14,000		1,000		6,700	noncancer (HQ=1.0)	--		1,000
Zinc	109.9		100,000		100,000		290,000	noncancer (HQ=1.0)	--		100,000
Pesticides											
2,4'-DDD			17	4,4'-DDD criteria	10.0	Total DDD criteria	9	cancer PRG (Total DDD)	--		9
2,4'-DDE			12	4,4'-DDE criteria	7.0	Total DDE criteria	6.3	cancer PRG (Total DDE)	--		6.3
2,4'-DDT			12	4,4'-DDT criteria	7.0	Total DDT criteria	6.3	cancer PRG (Total DDT)	--		6.3
4,4'-DDD			17		10.0	Total DDD criteria	9	cancer PRG (Total DDD)	--		9
4,4'-DDE			12		7.0	Total DDE criteria	6.3	cancer PRG (Total DDE)	--		6.3
4,4'-DDT			12		7.0	Total DDT criteria	6.3	cancer PRG (Total DDT)	--		6.3
Aldrin			0.15		0.10		0.13	cancer PRG	--		0.1
alpha-BHC			0.59		0.36		--		--		0.36
Alpha-chlordane			2.9		--		--		--		2.9
beta-BHC			2.1		1.3		--		--		1.3
Chlordane			--		6.5		1.7	cancer PRG	--		1.7
cis-Nonachlor			--		--		--		--		--
delta-BHC			0.59		--		--		--		0.59
Dieldrin			0.15		0.11		0.13	cancer PRG	--		0.11
Endosulfan I			5,300		3,700		3,700	noncancer (HQ=1.0)	--		3,700

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a] Conc. (mg/kg)	HPAL [a] Comments	SDGI Industrial Screening Criteria [b] Conc. (mg/kg)	SDGI Industrial Screening Criteria [b] Comments	EPA PRG Industrial 2004 [c] Conc. (mg/kg)	EPA PRG Industrial 2004 [c] Comments	ESL Industrial 2005 (direct exp) [d,e,g] Conc. (mg/kg)	ESL Industrial 2005 (direct exp) [d,e,g] Comments	ESL Industrial 2005 (inhalation) [e,f,g] Conc. (mg/kg)	ESL Industrial 2005 (inhalation) [e,f,g] Comments	RIEC Conc. (mg/kg)
Pesticides *(continued)*											
Endosulfan II			5,300		3,700		3,700	noncancer (HQ=1.0)	--		3,700
Endosulfan sulfate			5,300		--		--		--		5300
Endrin			260		180		230	noncancer (HQ=1.0)	--		180
Endrin aldehyde			260		--		--		--		260
Endrin ketone			260		--		--		--		260
Gamma-BHC (lindane)			2.9		1.7		2	cancer PRG	--		1.7
Gamma-chlordane			2.9		--		--		--		2.9
Heptachlor			0.55		0.38		0.52	cancer PRG	--		0.38
Heptachlor epoxide			0.27		0.19		0.31	cancer PRG	--		0.19
Methoxychlor			4,400		3,100		3,800	noncancer (HQ=1.0)	--		3,100
Mirex			--		--		--		--		--
Oxychlordane			--		--		--		--		--
Toxaphene			--		1.6		1.8	cancer PRG	--		1.6
trans-Chlordane			--		--		--		--		--
trans-Nonachlor			--		21		--		--		21
Polychlorinated Biphenyls											
Aroclor-1016 (low risk PCB)			1	Total PCB criteria	21	Total PCB criteria	--		--		21
Aroclor-1221 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Aroclor-1232 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Aroclor-1242 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Aroclor-1248 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Aroclor-1254 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Aroclor-1260 (high risk PCB)			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Total (high risk) PCBs			1	Total PCB criteria	0.74	Total PCB criteria	--		--		0.74
Dioxins and Furans											
1,2,3,4,6,7,8,9-OCDD			0.027		--		--		--		0.027
1,2,3,4,6,7,8,9-OCDF			0.027		--		--		--		0.027
1,2,3,4,6,7,8-Heptachlorooxanthrene			--		--		--		--		-
1,2,3,4,6,7,8-HpCDD			0.0027		--		--		--		0.0027
1,2,3,4,6,7,8-HpCDF			0.0027		--		--		--		0.0027
1,2,3,4,7,8,9-HpCDF			0.0027		--		--		--		0.0027
1,2,3,4,7,8-HxCDD			0.00027		--		--		--		0.00027
1,2,3,4,7,8-HxCDF			0.00027		--		--		--		0.00027
1,2,3,6,7,8-HxCDD			0.00027		--		--		--		0.00027
1,2,3,6,7,8-HxCDF			0.00027		--		--		--		0.00027
1,2,3,7,8,9-HxCDD			0.00027		--		--		--		0.00027
1,2,3,7,8,9-HxCDF			0.00027		--		--		--		0.00027
1,2,3,7,8-PeCDD			0.000055		--		--		--		0.000055
1,2,3,7,8-PeCDF			0.00055		--		--		--		0.00055
2,3,4,6,7,8-HxCDF			0.00027		--		--		--		0.00027
2,3,4,7,8-PeCDF			0.000055		--		--		--		0.000055
2,3,7,8-TCDD			0.000027		0.000016		0.000019	cancer PRG	--		0.000016
2,3,7,8-TCDF			0.00027		--		--		--		0.00027

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a]		SDGI Industrial Screening Criteria [b]		EPA PRG Industrial 2004 [c]		ESL Industrial 2005 (direct exp) [d,e,g]		ESL Industrial 2005 (inhalation) [e,f,g]		RIEC
	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)
Semivolatile Organic Compounds											
1-(Ethenyloxy)-octadecane			--		--		--		--		--
1,2,3,4-Tetrahydronaphthalene			--		--		--		--		--
1,2,4,5-Tetramethylbenzene			--		--		--		--		--
1,2,4-Trichlorobenzene			1,600		220		210	noncancer (HQ=1.0)	5	noncancer (HQ=1.0)	5
1,2-Dichlorobenzene			370		600		600	saturation limit	21		21
1,3-Dichlorobenzene			52		600		600	saturation limit	--		600
1,4-Dichlorobenzene			4.5		7.9		4.5	cancer PRG	0.13		0.13
11H-Benzo(a)fluorene			--		--		--		--		--
17-Pentatriacontene			--		--		--		--		--
1-Docosene			--		--		--		--		--
1-Hexacosanol			--		--		--		--		--
1-Methylpyrene			--		--		--		--		--
1-Octadecanol			--		--		--		--		--
2-(2-Butoxyethoxy)-ethanol			--		--		--		--		--
2,2'-Oxybis(1-chloropropane)			--		7.4		--		--		7.4
2,3-Dimethylphenanthrene			--		--		--		--		--
2,4,5,7-Tetramethylphenanthrene			--		--		--		--		--
2,4,5-Trichlorophenol			--		62,000		11,000	noncancer (HQ=1.0)	305	noncancer (HQ=1.0)	61
2,4,6-Trichlorophenol			--		62		25	cancer PRG	--		25
2,4-Dichlorophenol			--		1,800		1,800	noncancer (HQ=1.0)	--		1,800
2,4-Dimethylphenol			18,000		12,000		3,600	noncancer (HQ=1.0)	1500	noncancer (HQ=1.0)	1,500
2,4-Dinitrophenol			--		1,200		1,200	noncancer (HQ=1.0)	--		1,200
2,4-Dinitrotoluene			--		1,200		5.6	cancer PRG	--		5.6
2,6,10,14-Tetramethylhexadecane			--		--		--		--		--
2,6,10,14-Tetramethylpentadecane			--		--		--		--		--
2,6,10-Trimethyl-dodecane			--		--		--		--		--
2,6,11,15-Tetramethylhexadecane			--		--		--		--		--
2,6,11-Trimethyl-dodecane			--		--		--		--		--
2,6-Dinitrotoluene			880		620		--		--		620
2-Chloronaphthalene			27,000		23,000		--		--		23,000
2-Chlorophenol			--		240		230	noncancer (HQ=1.0)	10	noncancer (HQ=1.0)	10
2-Methylnaphthalene			190		--		6,500	noncancer (HQ=1.0)	550	noncancer (HQ=1.0)	550
2-Methylphenol			44,000		31,000		--		--		31,000
2-Nitroaniline			50		1,800		--		--		1,800
2-Nitrophenol			--		--		--		--		--
3,3'-Dichlorobenzidine			2.1		3.8		1.4	cancer PRG	--		1.4
3,6-Dimethylphenanthrene			--		--		--		--		--
3-Heptanone,2,4-Dimethyl-C9H18O			--		--		--		--		--
3-Nitroaniline			--		82		--		--		82
4,4-Dimethylbiphenyl			--		--		--		--		--
4,6-Dinitro-2-methylphenol			--		--		--		--		--
4-Bromophenyl-phenylether			--		--		--		--		--
4-Chloro-3-methylphenol			--		--		--		--		--

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a] Conc. (mg/kg)	HPAL [a] Comments	SDGI Industrial Screening Criteria [b] Conc. (mg/kg)	SDGI Industrial Screening Criteria [b] Comments	EPA PRG Industrial 2004 [c] Conc. (mg/kg)	EPA PRG Industrial 2004 [c] Comments	ESL Industrial 2005 (direct exp) [d,e,g] Conc. (mg/kg)	ESL Industrial 2005 (direct exp) [d,e,g] Comments	ESL Industrial 2005 (inhalation) [e,f,g] Conc. (mg/kg)	ESL Industrial 2005 (inhalation) [e,f,g] Comments	RIEC Conc. (mg/kg)
Semivolatile Organic Compounds *(continued)*											
4-Chloroaniline			--		2,500		--		--		2,500
4-Chlorophenyl-phenylether			--		--		--		--		--
4H-Cyclopenta(def)phenanthrene			--		--		--		--		--
4-Methylphenol			4,400		3,100		--		--		3,100
4-Nitroaniline			--		82		--		--		82
4-Nitrophenol			7,000		--		--		--		7,000
5-Methylhex-5-en-2-one			--		--		--		--		--
7H-Benzo[c]fluorene			--		--		--		--		--
9,10-Anthracenedione			--		--		--		--		--
9-Methylanthracene			--		--		--		--		--
Acenaphthene			38,000		29,000		22,000	noncancer (HQ=1.0)	650	noncancer (HQ=1.0)	650
Acenaphthylene			--		--		18,000	noncancer (HQ=1.0)	--		18,000
Aniline			--		300		--		--		300
Anthracene			100,000		100,000		160,000	noncancer (HQ=1.0)	31	noncancer (HQ=1.0)	31
Azobenzene			--		16		--		--		16
Benzidine			--		--		--		--		--
Benzo(a)anthracene			1.8		2.1		1.3	cancer PRG	--		1.3
Benzo(a)pyrene			0.33	reporting limit	0.21		0.13	cancer PRG	--		0.33
Benzo(b)fluoranthene			1.8		2.1		1.3	cancer PRG	--		1.3
Benzo(e)pyrene			--		--		--		--		--
Benzo(g,h,i)perylene			54,000		--		22,000	noncancer (HQ=1.0)	--		22,000
Benzo(k)fluoranthene			1.8		21		1.3	cancer PRG	--		1.3
Benzoic acid			--		100,000		--		--		100,000
Benzyl alcohol			--		100,000		--		--		100,000
Biphenyl			--		23,000		18,000	noncancer (HQ=1.0)	--		18,000
Bis(2-chloroethoxy)methane			--		--		--		--		--
Bis(2-chloroethyl)ether			--		0.58		0.22	cancer PRG	0.012		0.012
Bis(2-chloroisopropyl)ether			--		7.4		--		--		7.4
Bis(2-ethylhexyl)adipate			--		--		--		--		--
Bis(2-ethylhexyl)phthalate			180		120		570	cancer PRG	--		120
Butylbenzylphthalate			100,000		100,000		--		--		100,000
Carbazole			120		86		--		--		86
Chrysene			18		210		13	cancer PRG	--		13
Cyclic octaatomic sulfur			--		--		--		--		--
Cyclopenta(cd)pyrene			--		--		--		--		--
Dibenz(a,h)anthracene			0.33	reporting limit	0.21		0.38	cancer PRG	--		0.33
Dibenzofuran			5,100		1,600		--		--		1,600
Diethylphthalate			100,000		100,000		490,000	noncancer (HQ=1.0)	--		100,000
Dimethylphthalate			--		100,000		6,200,000	noncancer (HQ=1.0)	--		100,000
Di-n-butylphthalate			88,000		62,000		--		--		62,000
Di-n-octylphthalate			10,000		25,000		--		--		25,000
Dioctadecyl phosphonic acid			--		--		--		--		--
Dioctyl ester hexanedioic acid			--		--		--		--		--

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a]		SDGI Industrial Screening Criteria [b]		EPA PRG Industrial 2004 [c]		ESL Industrial 2005 (direct exp) [d,e,g]		ESL Industrial 2005 (inhalation) [e,f,g]		RIEC
	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)
Semivolatile Organic Compounds *(continued)*											
Docosane			--		--		--		--		--
Dodecane			--		--		--		--		--
Dotriacontane			--		--		--		--		--
Eicosane			--		--		--		--		--
Fluoranthene			30,000		22,000		22,000	noncancer (HQ=1.0)	--		22,000
Fluorene			33,000		26,000		18,000	noncancer (HQ=1.0)	800	noncancer (HQ=1.0)	800
Heneicosane			--		--		--		--		--
Heptacosane			--		--		--		--		--
Heptadecane			--		--		--		--		--
Hexachlorobenzene			1.4		1.1		0.96	cancer PRG	--		0.96
Hexachlorobutadiene			--		22		22	cancer PRG	--		22
Hexachlorocyclopentadiene			--		3700		--		--		3,700
Hexachloroethane			--		120		44	cancer PRG	--		44
Hexacosane			--		--		--		--		--
Hexadecane			--		--		--		--		--
Hexadecanoic acid			--		--		--		--		--
Hexatriacontane			--		--		--		--		--
Indeno(1,2,3-cd)pyrene			1.8		2.1		1.3	cancer PRG	--		1.3
Isophorone			2,600		510		--		--		510
m-Terphenyl			--		--		--		--		--
Naphthalene			190		190		3.8	cancer PRG	1.5		1.5
Nitrobenzene			NA		100		--		--		100
n-Nitrosodimethylamine			NA		0.034		--		--		0.034
n-Nitroso-di-n-propylamine			0.35		0.25		--		--		0.25
n-Nitrosodiphenylamine			270		350		--		--		350
Nonacosane			--		--		--		--		--
Nonadecane			--		--		--		--		--
Octacosane			--		--		--		--		--
Octadecane			--		--		--		--		--
Octadecanoic acid			--		--		--		--		--
o-Terphenyl			--		--		--		--		--
Pentachlorophenol			11		9.0		13	cancer PRG	--		9
Pentacosane			--		--		--		--		--
Pentadecane			--		--		--		--		--
Pentatriacontane			--		--		--		--		--
Perylene			--		--		--		--		--
Phenacetin			--		--		--		--		--
Phenanthrene			100,000		--		18,000	noncancer (HQ=1.0)	--		18,000
Phenol			100,000		100,000		180,000	noncancer (HQ=1.0)	--		100,000
p-Terphenyl			--		--		--		--		--
Pyrene			54,000		29,000		18,000	noncancer (HQ=1.0)	425	noncancer (HQ=1.0)	425
Terphenyl			--		--		--		--		--
Tetracosane			--		--		--		--		--

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a] Conc. (mg/kg)	HPAL [a] Comments	SDGI Industrial Screening Criteria [b] Conc. (mg/kg)	SDGI Industrial Screening Criteria [b] Comments	EPA PRG Industrial 2004 [c] Conc. (mg/kg)	EPA PRG Industrial 2004 [c] Comments	ESL Industrial 2005 (direct exp) [d,e,g] Conc. (mg/kg)	ESL Industrial 2005 (direct exp) [d,e,g] Comments	ESL Industrial 2005 (inhalation) [e,f,g] Conc. (mg/kg)	ESL Industrial 2005 (inhalation) [e,f,g] Comments	RIEC Conc. (mg/kg)
Semivolatile Organic Compounds *(continued)*											
Tetradecane			--		--		--		--		--
Tetratetracontane			--		--		--		--		--
Triacontane			--		--		--		--		--
Tricosane			--		--		--		--		--
Tridecane			--		--		--		--		--
Tri-m-cresyl phosphate			--		--		--		--		--
Triphenylene			--		--		--		--		--
Tri-p-tolyl phosphate			--		--		--		--		--
Volatile Organic Compounds											
1,1,1,2-Tetrachloroethane			--		7.3		6.9	cancer PRG	--		6.9
1,1,1-Trichloroethane			1,400		1,200		1,200	saturation limit	230		230
1,1,2,2-Tetrachloroethane			0.89		0.93		0.86	cancer PRG	0.025		0.025
1,1,2-Trichloro-1,2,2-trifluoroethane			--		--		--		--		--
1,1,2-Trichloroethane			1.9		1.6		1.5	cancer PRG	0.089		0.089
1,1-Dichloroethane			7.1		1,700		5.9	cancer PRG	0.89		0.89
1,1-Dichloroethene			0.12		410		410	noncancer (HQ=1.0)	105	noncancer (HQ=1.0)	105
1,1-Dichloropropene			--		--		--		--		--
1,2,3,5-Tetramethylbenzene			--		--		--		--		--
1,2,3-Trichlorobenzene			--		--		--		--		--
1,2,3-Trichloropropane			--		--		--		--		--
1,2,3-Trimethylbenzene			--		--		--		--		--
1,2,4-Trimethylbenzene			--		170		--		--		170
1,2-Dibromo-3-chloropropane			--		2		0.067	cancer PRG	--		0.067
1,2-Dibromoethane			--		--		0.25	cancer PRG	0.02		0.02
1,2-Dichloroethane			0.76		0.60		0.74	cancer PRG	0.07		0.07
1,2-Dichloroethene (Total)			150		--		--		--		150
1,2-Dichloropropane			--		0.74		1.4	cancer PRG	0.14		0.14
1,3,5-Trimethylbenzene			--		70		--		--		70
1,3-Dichloropropane			--		--		--		--		--
1-Ethyl-2,3-dihydro-1H-indene			--		--		--		--		--
1-Ethyl-2,4-dimethyl benzene			--		--		--		--		--
1-Ethyl-2-methylbenzene			--		--		--		--		--
2,2-Dichloropropane			--		--		--		--		--
2-Butanone			28,000		110,000		26,000	noncancer (HQ=1.0)	6,500	noncancer (HQ=1.0)	6,500
2-Chloroethyl vinyl ether			--		--		--		--		--
2-Chlorotoluene			--		--		--		--		--
2-Hexanone			--		--		--		--		--
4-Chlorotoluene			--		-		-		-		-
4-Ethyl-1,2-dimethylbenzene			--		-		-		-		-
4-Isopropyltoluene			--		-		-		-		-
4-Methyl-2-pentanone			2,900		47,000		2,800	noncancer (HQ=1.0)	1,550	noncancer (HQ=1.0)	1,550
Acetone			6,200		54,000		52,000	noncancer (HQ=1.0)	16,500	noncancer (HQ=1.0)	16,500
Benzene			0.4		1.4		0.38	cancer PRG	0.51		0.38

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a]		SDGI Industrial Screening Criteria [b]		EPA PRG Industrial 2004 [c]		ESL Industrial 2005 (direct exp) [d,e,g]		ESL Industrial 2005 (inhalation) [e,f,g]		RIEC
	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)
Volatile Organic Compounds *(continued)*											
Bicyclo[3.3.1]nonane			--		-		-		-		-
Bromobenzene			--		-		-		-		-
Bromochloromethane			--		-		-		-		-
Bromodichloromethane			--		1.8		0.84	cancer PRG	0.039		0.039
Bromoform			310		220		220	cancer PRG	-		220
Bromomethane			13		13		13	noncancer (HQ=1.0)	2.6	noncancer (HQ=1.0)	2.6
Carbon disulfide			720		720		-		-		720
Carbon tetrachloride			0.19		0.55		0.19	cancer PRG	0.034		0.034
Chlorobenzene			540		530		520	noncancer (HQ=1.0)	31	noncancer (HQ=1.0)	31
Chloroethane			6.5		6.5		6.4	cancer PRG	1.8		1.8
Chloroform			0.52		0.47		1.9	cancer PRG	330		0.47
Chloromethane			2.7		160		0.63	cancer PRG	0.2		0.2
cis-1,2-Dichloroethene			--		150		140	noncancer (HQ=1.0)	18	noncancer (HQ=1.0)	18
cis-1,3-Dichloropropene			--		1.8		0.46	cancer PRG	0.093		0.093
cis-Bicyclo[4.3.0]nonane			--		--		--		--		--
Dibromochloromethane			--		2.6		2.2	cancer PRG	0.054		0.054
Dibromomethane			--		--		--		--		--
Dichlorodifluoromethane			--		310		--		--		310
Ethylbenzene			230		400		400	saturation limit	390		5 [h]
Isopropylbenzene			--		2,000		--		--		2,000
m.p-Xylenes			210		--		--		--		210
Methylcyclohexane			--		2,600		--		--		2,600
Methylene chloride			9.7		21		9.2	cancer PRG	1.5		1.5
n-Butylbenzene			--		240		--		--		240
o-Xylene			210		--		--		--		210
Propylbenzene			--		240		--		--		240
sec-Butylbenzene			--		220		--		--		220
Styrene			1,700		1,700		1,500	saturation limit	1,100		1,100
tert-Butyl methyl ether			--		70		68	cancer PRG	5.6		5.6
tert-Butylbenzene			--		390		--		--		390
Tetrachloroethene			2.1		1.3		1.1	cancer PRG	0.24		0.24
Toluene			520		520		650	saturation limit	1,550	noncancer (HQ=1.0)	520
trans-1,2-Dichloroethene			--		230		230	noncancer (HQ=1.0)	37	noncancer (HQ=1.0)	37
trans-1,3-Dichloropropene			--		1.8		0.46	cancer PRG	0.093		0.093
Trichloroethene			3.7		0.11		6.3	cancer PRG	0.73		0.11
Trichlorofluoromethane			--		2,000		--		--		2,000
Vinyl acetate			--		1,400		--		--		1,400
Vinyl chloride			0.054		0.75		0.054	cancer PRG	0.019		0.019
Xylene (Total)			210		420		420	saturation limit	420		420

Table 4-1. Summary of Human Health Evaluation Criteria for Soil *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	HPAL [a]		SDGI Industrial Screening Criteria [b]		EPA PRG Industrial 2004 [c]		ESL Industrial 2005 (direct exp) [d,e,g]		ESL Industrial 2005 (inhalation) [e,f,g]		RIEC
	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)	Comments	Conc. (mg/kg)
Petroleum Hydrocarbons											
Gasoline-range organics			--		--		750	noncancer (HQ=0.5)	--		750
Diesel-range organics			--		--		750	noncancer (HQ=0.5)	--		750
Motor oil-range organics			--		--		4,600	noncancer (HQ=0.5)	--		4,600
TPH-extractable unknown hydrocarbon			--		--		4,600	noncancer (HQ=0.5)	--		4,600
TPH-purgeable unknown hydrocarbon			--		--		750	noncancer (HQ=0.5)	--		750
Total TPH			--		--		--		--		3,500
Total oil and grease			--		--		--		--		3,500

Notes:

a PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

b Tetra Tech EM Inc. 2002d. "Revised Draft Final Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan) for Parcel E Standard Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." August 27.

c EPA. 2004. "Preliminary Remediation Goals, Region 9." December. Available Online at: <http://www.epa.gov/Region9/waste/sfund/prg/index.htm>.

d Table K-2 from Regional Water Quality Control Board, San Francisco Bay Region. 2005. "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater." Interim Final. February.

e Noncancer screening levels, except TPH compounds, adjusted by a factor of five to be comparable with EPA PRGs (i.e., equivalent to a HQ of 1.0)

f Table E-1b from Regional Water Quality Control Board, San Francisco Bay Region. 2005. "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater." Interim Final. February.

g For depths greater than 10 feet,Table D-2 from Regional Water Quality Control Board, San Francisco Bay Region. 2005. "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater." Interim Final. February.

h ESL for ethylbenzene was revised in 2008 to 5 mg/kg; the updated 2008 ESL for ethylbenzene was used as the RIEC (to ensure the nature and extent evaluation was adequately conservative)

-- No criteria available for this chemical

BHC benzene hexachloride
Conc. Concentration
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
EPA U.S. Environmental Protection Agency
ESL environmental screening level
HPAL Hunters Point ambient level
HpCDD heptachlorodibenzo-p-dioxin
HpCDF heptachlorodibenzofuran
HQ hazard quotient
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
mg/kg milligrams per kilogram
OCDD octachlorodibenzo-p-dioxin
OCDF octachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibeno-p-dioxin
PeCDF pentachlorodibenzofuran
PRG preliminary remediation goal
RI Remedial Investigation
SDGI standard data gaps investigation
TPH total petroleum hydrocarbons

Table 4-2. Landfill Gas Characterization Monitoring Probes Result Summary

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency	Range of Detection Limits	Range of Results
Gas		**%**	**%**
Carbon dioxide	55/55	0.1 - 0.29	0.12 - 30
Carbon monoxide	0/55	0.1 - 0.29	0
Methane	47/55	0.1 - 0.29	0.57 - 71
Nitrogen	55/55	0.1 - 0.29	5.8 - 94
Oxygen	53/55	0.1 - 0.29	0.3 - 20
Methane (ppmv)	15/23	0.13 - 0.22	424 - 733,813
Nonmethane organic carbon compounds (ppmv)	47/55	0.13 - 0.22	2.4 - 330
Volatile Organic Compounds		**ppmv**	**ppmv**
1,1,1-Trichloroethane	11/57	4.5346 - 77.42	13.272 - 51.982
1,1,2,2-Tetrachloroethane	1/57	5.7236 - 97.72	69.8 - 69.8
1,1,2-Trichloro-1,2,2-trifluoroethane	2/57	6.3714 - 108.78	29.526 - 31.857
1,1,2-Trichloroethane	1/57	4.5346 - 77.42	21.567 - 21.567
1,1-Dichloroethane	37/57	3.3784 - 57.68	6.592 - 412
1,1-Dichloroethene	11/57	3.3046 - 56.42	4.03 - 44.33
1,2,4-Trichlorobenzene	7/57	6.1664 - 105.28	7.144 - 48.5792
1,2,4-Trimethylbenzene	39/57	4.0918 - 69.86	3.8922 - 16,966
1,2-Dibromoethane	10/57	6.4124 - 109.48	13.294 - 50.83
1,2-Dichloro-1,1,2,2-tetrafluoroethane	49/57	5.8302 - 99.54	16.353 - 1673.267
1,2-Dichlorobenzene	21/57	5.0102 - 85.54	4.4603 - 59.878
1,2-Dichloroethane	15/57	3.3784 - 57.68	4.0376 - 61.8
1,2-Dichloropropane	2/57	3.854 - 65.8	11.75 - 18.8
1,3,5-Trimethylbenzene	36/57	4.0918 - 69.86	4.3413 - 8,982
1,3-Butadiene	1/57	1.8368 - 31.36	10.752 - 10.752
1,3-Dichlorobenzene	14/57	5.0102 - 85.54	7.943 - 53.768
1,4-Dichlorobenzene	29/57	5.0102 - 85.54	5.9878 - 916.5
1,4-Dioxane	1/57	3.0012 - 51.24	10.98 - 10.98
2-Butanone	5/57	2.4518 - 41.86	101.66 - 478.4
2-Hexanone	0/57	3.4112 - 58.24	ND
4-Ethyltoluene	28/57	3.6162 - 61.74	3.1752 - 2513.7
4-Methyl-2-pentanone	1/57	3.4112 - 58.24	220.48 - 220.48
Acetone	6/57	1.9762 - 33.74	11.086 - 5061
Benzene	50/57	2.665 - 45.5	2.8925 - 552.5
Benzyl chloride	0/57	4.3296 - 73.92	ND
Bromodichloromethane	4/57	5.5596 - 94.92	8.136 - 33.9
Bromoform	3/57	8.61 - 147	33.6 - 80.85
Bromomethane	10/57	3.239 - 55.3	6.715 - 43.45
Carbon disulfide	31/57	2.5912 - 44.24	6.8572 - 1042.8
Carbon tetrachloride	12/57	5.248 - 89.6	5.952 - 45.44
Chlorobenzene	23/57	3.854 - 65.8	122.2 - 2256
Chloroethane	45/57	2.1976 - 37.52	5.762 - 7236
Chloroform	14/57	4.059 - 69.3	5.445 - 54.45
Chloromethane	8/57	1.722 - 29.4	14.7 - 798
cis-1,2-Dichloroethene	38/57	3.2718 - 55.86	3.7506 - 67.83
cis-1,3-Dichloropropene	8/57	3.7802 - 64.54	12.447 - 27.66
Cyclohexane	48/57	2.8618 - 48.86	4.886 - 3839
Dibromochloromethane	8/57	7.093 - 121.1	11.245 - 53.63
Dichlorodifluoromethane	48/57	4.1246 - 70.42	4.7785 - 4174.9
Ethanol	7/57	1.5662 - 26.74	80.6402 - 9932
Ethylbenzene	39/57	3.608 - 61.6	4.4 - 880
Heptane	49/57	3.4112 - 58.24	8.736 - 3260.691
Hexachlorobutadiene	14/57	8.897 -151.9	20.615 - 97.65

Table 4-2. Landfill Gas Characterization Monitoring Probes Result Summary *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency	Range of Detection Limits	Range of Results
Volatile Organic Compounds *(continued)*		**ppmv**	**ppmv**
Hexane	49/57	2.9274 - 49.98	35.7 - 14,994
Isopropyl alcohol	12/57	2.0418 - 34.86	6.225 - 473.8221
Methylene chloride	8/57	2.8946 - 49.42	45.89 - 165.91
o-Xylene	44/57	3.608 - 61.6	6.6 - 756.028
Propylene	42/57	1.435 - 24.5	36.75 - 26,250
Styrene	6/57	3.5424 - 60.48	5.184 - 56.16
t-Butyl mercaptan	3/3	18.75 - 37.5	56.25 - 1500
tert-Butyl methyl ether	0/57	3.0012 - 51.24	ND
Tetrachloroethene	31/57	2.829 - 96.6	5.658 - 65.55
Tetrahydrofuran	5/57	2.4518 - 41.86	3.289 - 23.7705
Tetrahydrothiophene	0/3	18.35 - 36.7	ND
Toluene	12/57	3.1406 - 53.62	18.001 - 472.5837
trans-1,2-Dichloroethene	25/57	3.2718 - 55.86	6.384 - 79.8
trans-1,3-Dichloropropene	7/57	3.7802 - 64.54	10.142 - 23.511
Trichloroethene	35/57	4.5346 - 77.42	6.636 - 199.08
Trichlorofluoromethane	19/57	4.674 - 79.8	5.016 - 96.9
Vinyl acetate	0/57	2.9274 - 49.98	ND
Vinyl chloride	42/57	2.132 - 36.4	3.9 - 218.842

Notes:

ND Nondetected

ppmv parts per million by volume

Table 4-3. Summary of Analyses and Detections in the Landfill Area (0-2 feet bgs)

Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	20 / 20	1.4 - 13	968J - 18,000J	NA	--
Antimony	5 / 14	1.6 - 6.3	0.53J - 42	9.05	1
Arsenic	20 / 22	0.1 - 3	1.5J - 7.58J	11.1	0
Barium	22 / 22	0.03 - 0.89	11.3 - 601	314.4	3
Beryllium	19 / 22	0.022 - 0.2	0.2J - 1.4	0.71	7
Cadmium	2 / 22	0.26 - 0.63	0.36 - 0.84	3.14	0
Calcium	20 / 20	2.7 - 13	570 - 20,000	NA	--
Chromium	22 / 22	0.13 - 0.87	6.8J - 340	(a)	0
Chromium VI	0 / 23	0.05 - 0.07	--	NA	--
Cobalt	21 / 22	0.19 - 1.8	3.5J - 79.7	(a)	2
Copper	22 / 22	0.23 - 13	24.7J - 1,100	124.3	3
Cyanide	6 / 17	0.1 - 2	0.28 - 6.6	NA	--
Iron	20 / 20	0.39 - 11	3,840 - 45,400	NA	--
Lead	22 / 22	0.16 - 7.8	4.3 - 9,700J	8.99	19
Magnesium	20 / 20	2.8 - 13	473 - 106,000	NA	--
Manganese	20 / 20	0.08 - 0.16	35.6 - 1,550	1,431.2	2
Mercury	16 / 22	0.00093 - 0.47	0.095 - 2.7	2.28	1
Molybdenum	3 / 21	0.62 - 1.1	0.8 - 2	2.68	0
Nickel	22 / 22	1 - 6.3	4J - 982	(a)	0
Potassium	20 / 20	39 - 193	227 - 3,000	NA	--
Selenium	2 / 20	0.1 - 2.5	0.63 - 1.3	1.95	0
Silver	10 / 22	0.11 - 0.54	0.32 - 0.94	1.43	0
Sodium	20 / 20	2.2 - 14.06	32.2 - 1,340	NA	--
Thallium	3 / 22	0.19 - 0.58	0.25 - 0.6	0.81	0
Tin	3 / 7	2.9 - 3	3.8 - 8.2	NA	--
Vanadium	22 / 22	0.21 - 0.85	3.5 - 116	117.2	0
Zinc	22 / 22	0.29 - 52	45 - 800	109.9	4
Pesticides					
4,4'-DDD	1 / 23	0.0037 - 0.18	0.02J	NA	--
4,4'-DDE	1 / 22	0.0037 - 0.18	0.38J	NA	--
4,4'-DDT	2 / 23	0.0037 - 0.18	0.0086J - 0.51J	NA	--
Aldrin	0 / 22	0.0019 - 0.088	--	NA	--
Alpha-BHC	0 / 22	0.0019 - 0.088	--	NA	--
Alpha-chlordane	1 / 21	0.0019 - 0.88	0.014J	NA	--
Beta-BHC	0 / 22	0.0019 - 0.088	--	NA	--
Chlordane	0 / 0	--	--	NA	--
Delta-BHC	0 / 22	0.0019 - 0.088	--	NA	--
Dieldrin	0 / 22	0.0037 - 0.18	--	NA	--
Endosulfan I	0 / 22	0.0019 - 0.088	--	NA	--
Endosulfan II	0 / 22	0.0037 - 0.18	--	NA	--
Endosulfan sulfate	2 / 22	0.0037 - 0.18	0.032J - 1.8	NA	--
Endrin	0 / 22	0.0019 - 0.18	--	NA	--
Endrin aldehyde	0 / 4	0.0037 - 0.068	--	NA	--
Endrin ketone	0 / 22	0.0037 - 0.18	--	NA	--
Gamma-BHC (lindane)	0 / 22	0.0019 - 0.088	--	NA	--
Gamma-chlordane	0 / 2	0.32 - 0.62	--	NA	--
Heptachlor	0 / 22	0.0019 - 0.088	--	NA	--
Heptachlor epoxide	2 / 22	0.0019 - 0.088	0.0086 - 0.39	NA	--
Methoxychlor	1 / 22	0.0075 - 0.88	0.0036J	NA	--
Mirex	0 / 0	--	--	NA	--
Toxaphene	0 / 21	0.16 - 1.8	--	NA	--
trans-Chlordane	1 / 21	0.0019 - 0.88	0.013J	NA	--

Table 4-3. Summary of Analyses and Detections in the Landfill Area (0-2 feet bgs) *(continued)*

Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	0 / 23	0.037 - 0.99	--	NA	--
Aroclor-1221 (high risk PCB)	0 / 23	0.037 - 2	--	NA	--
Aroclor-1232 (high risk PCB)	0 / 23	0.037 - 0.99	--	NA	--
Aroclor-1242 (high risk PCB)	1 / 23	0.037 - 0.99	0.024J	NA	--
Aroclor-1248 (high risk PCB)	0 / 23	0.037 - 0.99	--	NA	--
Aroclor-1254 (high risk PCB)	0 / 23	0.037 - 1.8	--	NA	--
Aroclor-1260 (high risk PCB)	4 / 23	0.037 - 1.8	0.1 - 48	NA	--
Total (high risk) PCBs	5 / 23	0.037 - 1.8	0.1 - 48	NA	--
Semivolatile Organic Compounds					
1-(Ethenyloxy)-octadecane	1 / 1	0.16 - 0.16	0.16	NA	--
1,2,4,5-Tetramethylbenzene	0 / 0	--	--	NA	--
1,2,4-Trichlorobenzene	0 / 23	0.18 - 3.6	--	NA	--
1,2-Dichlorobenzene	0 / 23	0.18 - 3.6	--	NA	--
1,3-Dichlorobenzene	0 / 23	0.18 - 3.6	--	NA	--
1,4-Dichlorobenzene	0 / 23	0.18 - 3.6	--	NA	--
1-Hexacosanol	0 / 0	--	--	NA	--
1-Octadecanol	0 / 0	--	--	NA	--
2,2'-Oxybis(1-chloropropane)	0 / 0	0.7 - 1.4	--	NA	--
2,4,5-Trichlorophenol	0 / 22	0.37 - 7	--	NA	--
2,4,6-Trichlorophenol	0 / 22	0.18 - 3.6	--	NA	--
2,4-Dichlorophenol	0 / 22	0.18 - 3.6	--	NA	--
2,4-Dimethylphenol	0 / 23	0.18 - 3.6	--	NA	--
2,4-Dinitrophenol	0 / 22	0.87 - 7.2	--	NA	--
2,4-Dinitrotoluene	0 / 23	0.18 - 3.6	--	NA	--
2,6-Dinitrotoluene	0 / 23	0.18 - 3.6	--	NA	--
2-Chloronaphthalene	0 / 23	0.18 - 3.6	--	NA	--
2-Chlorophenol	0 / 23	0.18 - 3.6	--	NA	--
2-Methylnaphthalene	3 / 22	0.073 - 1.5	0.056J - 0.076J	NA	--
2-Methylphenol	0 / 23	0.18 - 3.6	--	NA	--
2-Nitroaniline	0 / 23	0.73 - 7.2	--	NA	--
2-Nitrophenol	0 / 22	0.18 - 7.2	--	NA	--
3,3'-Dichlorobenzidine	0 / 23	0.36 - 7.2	--	NA	--
3-Nitroaniline	0 / 22	0.73 - 7.2	--	NA	--
4,6-Dinitro-2-methylphenol	0 / 22	0.87 - 7.2	--	NA	--
4-Bromophenyl-phenylether	0 / 22	0.18 - 3.6	--	NA	--
4-Chloro-3-methylphenol	0 / 23	0.18 - 3.6	--	NA	--
4-Chloroaniline	0 / 22	0.18 - 3.6	--	NA	--
4-Chlorophenyl-phenylether	0 / 22	0.18 - 3.6	--	NA	--
4-Methylphenol	0 / 23	0.18 - 3.6	--	NA	--
4-Nitroaniline	0 / 22	0.73 - 7.2	--	NA	--
4-Nitrophenol	0 / 23	0.73 - 7.2	--	NA	--
Acenaphthene	2 / 24	0.073 - 4.1	0.13 - 0.32J	NA	--
Acenaphthylene	8 / 24	0.073 - 4.1	0.04J - 1.1	NA	--
Anthracene	9 / 24	0.073 - 4.1	0.044J - 0.66	NA	--
Azobenzene	0 / 1	0.37 - 1.4	--	NA	--
Benzo(a)anthracene	11 / 24	0.073 - 4.1	0.089J - 2.3	NA	--
Benzo(a)pyrene	11 / 24	0.073 - 4.1	0.26J - 3.1	NA	--
Benzo(b)fluoranthene	13 / 24	0.073 - 4.1	0.043J - 4.1	NA	--
Benzo(e)pyrene	0 / 0	--	--	NA	--
Benzo(g,h,i)perylene	10 / 24	0.073 - 4.1	0.031J - 3.4	NA	--
Benzo(k)fluoranthene	12 / 24	0.073 - 4.1	0.0097J - 1.1	NA	--
Benzoic acid	1 / 20	0.87 - 7	0.31J	NA	--
Benzyl alcohol	0 / 20	0.18 - 1.5	--	NA	--

Table 4-3. Summary of Analyses and Detections in the Landfill Area (0-2 feet bgs) *(continued)*

Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Biphenyl	0 / 0	--	--	NA	--
Bis(2-chloroethoxy)methane	0 / 22	0.18 - 3.6	--	NA	--
Bis(2-chloroethyl)ether	0 / 22	0.18 - 3.6	--	NA	--
Bis(2-chloroisopropyl)ether	0 / 22	0.18 - 3.6	--	NA	--
Bis(2-ethylhexyl)adipate	0 / 23	--	--	NA	--
Bis(2-ethylhexyl)phthalate	0 / 0	0.18 - 3.6	--	NA	--
Butylbenzylphthalate	0 / 23	0.18 - 3.6	--	NA	--
Carbazole	0 / 2	0.37 - 1.4	--	NA	--
Chrysene	13 / 24	0.073 - 4.1	0.023J - 2.3	NA	--
Cyclic Octaatomic sulfur	0 / 0	--	--	NA	--
Dibenz(a,h)anthracene	6 / 24	0.073 - 4.1	0.043J - 0.25J	NA	--
Dibenzofuran	1 / 23	0.18 - 3.6	0.043J	NA	--
Diethylphthalate	0 / 23	0.18 - 3.6	--	NA	--
Dimethylphthalate	0 / 22	0.18 - 3.6	--	NA	--
Di-n-butylphthalate	0 / 23	0.18 - 3.6	--	NA	--
Di-n-octylphthalate	0 / 23	0.18 - 3.6	--	NA	--
Dioctadecyl phosphonic acid	1 / 1	0.35 - 0.35	0.35	NA	--
Docosane	0 / 0	--	--	NA	--
Eicosane	1 / 1	0.12 - 0.12	0.12	NA	--
Fluoranthene	15 / 24	0.073 - 4.1	0.022J - 6	NA	--
Fluorene	8 / 24	0.073 - 4.1	0.04J - 0.54	NA	--
Hexachlorobenzene	0 / 23	0.18 - 3.6	--	NA	--
Hexachlorobutadiene	0 / 22	0.18 - 3.6	--	NA	--
Hexachlorocyclopentadiene	0 / 22	0.18 - 7.2	--	NA	--
Hexachloroethane	0 / 22	0.18 - 3.6	--	NA	--
Hexadecanoic acid	1 / 1	0.26 - 0.26	0.26	NA	--
Hexatriacontane	1 / 1	0.19 - 0.19	0.19	NA	--
Indeno(1,2,3-cd)pyrene	10 / 24	0.073 - 4.1	0.15J - 3.1	NA	--
Isophorone	0 / 22	0.18 - 1.5	--	NA	--
m-Terphenyl	0 / 0	--	--	NA	--
Naphthalene	8 / 24	0.073 - 4.1	0.13J - 2.13	NA	--
Nitrobenzene	0 / 22	0.18 - 3.6	--	NA	--
n-Nitrosodimethylamine	0 / 1	0.37 - 1.4	--	NA	--
n-Nitroso-di-n-propylamine	0 / 23	0.18 - 3.6	--	NA	--
n-Nitrosodiphenylamine	0 / 23	0.18 - 3.6	--	NA	--
o-Terphenyl	0 / 0	--	--	NA	--
Octadecanoic acid	1 / 1	0.37 - 0.37	0.37	NA	--
p-Terphenyl	0 / 0	--	--	NA	--
Pentachlorophenol	1 / 23	0.73 - 7.2	0.059J	NA	--
Phenacetin	0 / 0	--	--	NA	--
Phenanthrene	13 / 24	0.073 - 4.1	0.044J - 5	NA	--
Phenol	1 / 23	0.18 - 3.6	0.036J	NA	--
Pyrene	15 / 24	0.073 - 4.1	0.023J - 7.1	NA	--
Terphenyl	0 / 0	--	--	NA	--
Tricosane	0 / 0	--	--	NA	--
Tridecane	1 / 1	0.09 - 0.09	0.09	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0 / 0	--	--	--	--
1,1,1-Trichloroethane	1 / 21	0.005 - 0.011	0.0016J	NA	--
1,1,2,2-Tetrachloroethane	0 / 21	0.005 - 0.011	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0 / 0	--	--	NA	--
1,1,2-Trichloroethane	0 / 21	0.005 - 0.011	--	NA	--
1,1-Dichloroethane	0 / 21	0.005 - 0.011	-	NA	-

Table 4-3. Summary of Analyses and Detections in the Landfill Area (0-2 feet bgs) *(continued)*

Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
1,1-Dichloroethene	0 / 21	0.005 - 0.011	--	NA	--
1,1-Dichloropropene	0 / 0	--	--	NA	--
1,2,3-Trichlorobenzene	0 / 0	--	--	NA	--
1,2,3-Trichloropropane	0 / 0	--	--	NA	--
1,2,4-Trimethylbenzene	0 / 0	--	--	NA	--
1,2-Dibromo-3-chloropropane	0 / 0	--	--	NA	--
1,2-Dibromoethane	0 / 0	--	--	NA	--
1,2-Dichloroethane	0 / 21	0.005 - 0.011	--	NA	--
1,2-Dichloroethene (Total)	0 / 20	0.005 - 0.011	--	NA	--
1,2-Dichloropropane	0 / 21	0.005 - 0.011	--	NA	--
1,3,5-Trimethylbenzene	0 / 0	--	--	NA	--
1,3-Dichloropropane	0 / 0	--	--	NA	--
2,2-Dichloropropane	0 / 0	--	--	NA	--
2-Butanone	0 / 21	0.01 - 0.012	--	NA	--
2-Chlorotoluene	0 / 0	--	--	NA	--
2-Hexanone	0 / 21	0.01 - 0.012	--	NA	--
4-Chlorotoluene	0 / 0	--	--	NA	--
4-Isopropyltoluene	0 / 0	--	--	NA	--
4-Methyl-2-pentanone	0 / 21	0.01 - 0.012	--	NA	--
Acetone	0 / 21	0.01 - 0.02	--	NA	--
Benzene	0 / 21	0.005 - 0.011	--	NA	--
Bromobenzene	0 / 0	--	--	NA	--
Bromochloromethane	0 / 0	--	--	NA	--
Bromodichloromethane	0 / 21	0.005 - 0.011	--	NA	--
Bromoform	0 / 21	0.005 - 0.011	--	NA	--
Bromomethane	0 / 21	0.01 - 0.012	--	NA	--
Carbon disulfide	1 / 21	0.005 - 0.011	0.001J	NA	--
Carbon tetrachloride	0 / 21	0.005 - 0.011	--	NA	--
Chlorobenzene	0 / 21	0.005 - 0.011	--	NA	--
Chloroethane	0 / 21	0.01 - 0.012	--	NA	--
Chloroform	0 / 21	0.005 - 0.011	--	NA	--
Chloromethane	0 / 21	0.01 - 0.012	--	NA	--
cis-1,2-Dichloroethene	0 / 1	0.005 - 0.005	--	NA	--
cis-1,3-Dichloropropene	0 / 21	0.005 - 0.011	--	NA	--
Dibromochloromethane	0 / 21	0.005 - 0.011	--	NA	--
Dibromomethane	0 / 0	--	--	NA	--
Dichlorodifluoromethane	0 / 0	--	--	NA	--
Ethylbenzene	0 / 21	0.005 - 0.011	--	NA	--
Isopropylbenzene	0 / 0	--	--	NA	--
Methylene chloride	0 / 21	0.005 - 0.011	--	NA	--
n-Butylbenzene	0 / 0	--	--	NA	--
o-Xylene	0 / 0	--	--	NA	--
Propylbenzene	0 / 0	--	--	NA	--
sec-Butylbenzene	0 / 0	--	--	NA	--
Styrene	0 / 21	0.005 - 0.011	--	NA	--
tert-Butylbenzene	0 / 0	--	--	NA	--
tert-Butyl methyl ether	0 / 1	0.005 - 0.005	--	NA	--
Tetrachloroethene	0 / 21	0.005 - 0.011	--	NA	--
Toluene	3 / 21	0.005 - 0.011	0.002J - 0.019	NA	--
trans-1,2-Dichloroethene	0 / 1	0.005 - 0.005	--	NA	--
trans-1,3-Dichloropropene	0 / 21	0.005 - 0.011	--	NA	--
Trichloroethene	0 / 21	0.005 - 0.011	--	NA	--
Trichlorofluoromethane	0 / 0	--	--	NA	--
Vinyl acetate	1 / 20	0.01 - 0.05	0.001J	NA	-
Vinyl chloride	0 / 21	0.01 - 0.012	-	NA	-
Xylene (Total)	0 / 21	0.005 - 0.011	--	NA	--

Table 4-3. Summary of Analyses and Detections in the Landfill Area (0-2 feet bgs) *(continued)*

Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Petroleum Hydrocarbons					
Gasoline-range organics	1 / 23	0.2 - 5.8	0.11	NA	--
Diesel-range organics	6 / 23	2.2 - 12	7.7J - 240	NA	--
Motor oil-range organics	4 / 4	11 - 26	55J - 770	NA	--
TPH-extractable unknown hydrocarbon	4 / 8	10 - 11	18 - 170	NA	--
TPH-purgeable unknown hydrocarbon	0 / 7	0.18 - 1.1	--	NA	--
Total TPH	10 / 23	--	18 - 1,010.11	NA	--
Total oil and grease	14 / 18	0 - 58	57 - 5,000J	NA	--

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical

bgs below ground surface

BHC benzene hexachloride

DDD dichlorodiphenyldichloroethane

DDE dichlorodiphenyldichloroethene

DDT dichlorodiphenyltrichloroethane

HPAL Hunters Point ambient level

mg/kg milligrams per kilogram

NA not available

J estimated value

TPH total petroleum hydrocarbons

Table 4-4. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (0-2 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	0	0
Arsenic	11.1	HPAL	0	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	0	0
Calcium	--		--	--
Chromium (total)	a	See note	0	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	0	0
Lead	800	2004 PRG Industrial	1	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	0	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5,300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	1	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-4. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	2	1
Total (high risk) PCBs	0.74	2004 PRG Industrial	2	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	2	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	9	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	2	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	0	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0

Table 4-4. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	2	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	1	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	-		0	0
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0

Table 4-4. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	0	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbon	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbon	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	0	0
Total oil and grease	3,500	HPS TPH source criterion	1	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
Conc. concentration
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HPAL Hunters Point ambient level
HPS Hunters Point Shipyard
mg/kg milligrams per kilogram
ESL environmental screening level
NE not established
PCB polychlorinated biphenyl
PRG preliminary remediation goal
RIEC remedial investigation evaluation criteria
SDGI standard data gaps investigation
TPH total petroleum hydrocarbons

Table 4-5. Summary of Analyses and Detections in the Landfill Area (2-10 feet bgs)

Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	87 / 87	0.18 - 12	1,617.1 - 28,700	NA	--
Antimony	78 / 113	0.01 - 8.6	0.069J - 1,930J	9.05	33
Arsenic	108 / 113	0.05 - 2.7	0.68J - 66.6J	11.1	5
Barium	113 / 113	0.02 - 4.3	9.4J - 1,400	314.4	11
Beryllium	100 / 113	0.01 - 0.29	0.03J - 12.1	0.71	12
Cadmium	80 / 113	0.01 - 0.91	0.06J - 330	3.14	15
Calcium	87 / 87	0.91 - 660	1,310J - 54,000	NA	--
Chromium	113 / 113	0.05 - 5.8	37.3 - 6,940J	(a)	16
Chromium VI	12 / 103	0.05 - 0.062	0.01J - 1.2	NA	--
Cobalt	113 / 113	0.01 - 2.6	2.3 - 170	(a)	1
Copper	113 / 113	0.01 - 5.8	5.8 - 175,000	124.3	54
Cyanide	22 / 73	0.11 - 1.2	0.09J - 11	NA	--
Iron	87 / 87	0.42 - 130	11,700 - 201,000	NA	--
Lead	112 / 113	0.01 - 99.2	4.1 - 3,840	8.99	106
Magnesium	87 / 87	0.12 - 29	2,400J - 220,000	NA	--
Manganese	87 / 87	0.01 - 0.57	170 - 2,080	1,431.20	4
Mercury	103 / 113	0.0056 - 2.2	0.01J - 38	2.28	25
Molybdenum	64 / 112	0.01 - 1.4	0.15 - 306J	2.68	23
Nickel	113 / 113	0.01 - 9.4	18J - 8,440	(a)	7
Potassium	85 / 87	0.54 - 288	157 - 3,030	NA	--
Selenium	46 / 113	0.02 - 4.45	0.06J - 3.4	1.95	1
Silver	62 / 113	0.01 - 0.62	0.04J - 245	1.43	11
Sodium	87 / 87	0.74 - 140	44 - 2,950	NA	--
Thallium	15 / 113	0.039 - 5.9	0.04J - 0.24J	0.81	0
Tin	17 / 21	2.9 - 4.5	3.4 - 31,600	NA	0
Vanadium	113 / 113	0.18 - 4.8	6J - 24,900	117.2	10
Zinc	113 / 113	0.11 - 23	20.95 - 15,800	109.9	64
Pesticides					
4,4'-DDD	12 / 112	0.0034 - 92	0.0064J - 0.76	NA	--
4,4'-DDE	23 / 112	0.0034 - 92	0.0007J - 0.72J	NA	--
4,4'-DDT	31 / 112	0.0034 - 92	0.0083J - 1.2J	NA	--
Aldrin	8 / 112	0.0018 - 46	0.0032J - 0.014J	NA	--
Alpha-BHC	2 / 112	0.0018 - 46	0.0039J - 0.056	NA	--
Alpha-chlordane	0 / 86	0.0019 - 460	--	NA	--
Beta-BHC	4 / 112	0.0018 - 46	0.0044J - 0.017J	NA	--
Chlordane	0 / 10	0.02 - 3.8	--	NA	--
Delta-BHC	2 / 112	0.0018 - 46	0.0029 - 0.0039J	NA	--
Dieldrin	19 / 112	0.0034 - 92	0.0022J - 0.71	NA	--
Endosulfan I	2 / 112	0.0018 - 46	0.017J - 0.078J	NA	--
Endosulfan II	12 / 112	0.0034 - 92	0.0052J - 2.3	NA	--
Endosulfan sulfate	15 / 112	0.0034 - 92	0.0076J - 6.2	NA	--
Endrin	17 / 112	0.0019 - 92	0.0028J - 0.25J	NA	--
Endrin aldehyde	6 / 58	0.0034 - 1.5	0.012J - 0.61	NA	--
Endrin ketone	3 / 108	0.0034 - 92	0.0043J - 0.053J	NA	--
Gamma-BHC (lindane)	11 / 112	0.0018 - 46	--	NA	--
Gamma-chlordane	0 / 40	0.002 - 2	0.00046J - 0.27J	NA	--
Heptachlor	6 / 112	0.0018 - 46	0.0014J - 0.0075J	NA	--
Heptachlor epoxide	19 / 112	0.0018 - 46	0.00089J - 1J	NA	--
Methoxychlor	7 / 112	0.0073 - 460	0.07J - 1.2J	NA	--
Mirex	0 / 26	0.0019 - 0.38	--	NA	--
Toxaphene	0 / 111	0.062 - 920	--	NA	--
trans-Chlordane	0 / 72	0.0019 - 460	--	NA	--
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	4 / 122	0.003 - 460	0.22 - 740	NA	--
Aroclor-1221 (high risk PCB)	0 / 122	0.017 - 460	--	NA	--
Aroclor-1232 (high risk PCB)	0 / 122	0.01 - 460	--	NA	--
Aroclor-1242 (high risk PCB)	9 / 122	0.01 - 460	0.039J - 15	NA	--
Aroclor-1248 (high risk PCB)	5 / 122	0.01 - 460	0.075 - 1	NA	--
Aroclor-1254 (high risk PCB)	15 / 122	0.01 - 920	0.038 - 7.1J	NA	--
Aroclor-1260 (high risk PCB)	77 / 122	0.006 - 920	0.0032J - 380	NA	--
Total (high risk) PCBs	82 / 122	0.006 - 920	0.0032J - 380	NA	--

Table 4-5. Summary of Analyses and Detections in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds					
1-(Ethenyloxy)-octadecane	0 / 0	--	--	NA	--
1,2,4,5-Tetramethylbenzene	0 / 1	--	--	NA	--
1,2,4-Trichlorobenzene	3 / 62	0.018 - 52	0.049J - 4.8	NA	--
1,2-Dichlorobenzene	2 / 61	0.018 - 52	0.19J - 4J	NA	--
1,3-Dichlorobenzene	1 / 61	0.018 - 52	0.73J	NA	--
1,4-Dichlorobenzene	8 / 62	0.018 - 52	0.26J - 59	NA	--
1-Hexacosanol	0 / 0	--	--	NA	--
1-Octadecanol	1 / 1	0.32 - 0.32	0.32	NA	--
2,2'-Oxybis(1-chloropropane)	0 / 4	0.69 - 3	--	NA	--
2,4,5-Trichlorophenol	0 / 61	0.69 - 260	--	NA	--
2,4,6-Trichlorophenol	0 / 61	0.18 - 52	--	NA	--
2,4-Dichlorophenol	0 / 61	0.18 - 52	--	NA	--
2,4-Dimethylphenol	6 / 61	0.18 - 52	0.15J - 30J	NA	--
2,4-Dinitrophenol	0 / 61	0.87 - 260	--	NA	--
2,4-Dinitrotoluene	0 / 61	0.18 - 52	--	NA	--
2,6-Dinitrotoluene	0 / 61	0.18 - 52	--	NA	--
2-Chloronaphthalene	0 / 61	0.18 - 52	--	NA	--
2-Chlorophenol	0 / 61	0.18 - 52	--	NA	--
2-Methylnaphthalene	26 / 61	0.14 - 52	0.019J - 650	NA	--
2-Methylphenol	4 / 61	0.18 - 52	0.12J - 6.8J	NA	--
2-Nitroaniline	0 / 61	0.87 - 260	--	NA	--
2-Nitrophenol	0 / 61	0.18 - 52	--	NA	--
3,3'-Dichlorobenzidine	0 / 61	0.36 - 100	--	NA	--
3-Nitroaniline	0 / 61	0.87 - 260	--	NA	--
4,6-Dinitro-2-methylphenol	0 / 61	0.87 - 260	--	NA	--
4-Bromophenyl-phenylether	0 / 61	0.18 - 52	--	NA	--
4-Chloro-3-methylphenol	0 / 61	0.18 - 52	--	NA	--
4-Chloroaniline	0 / 61	0.18 - 52	--	NA	--
4-Chlorophenyl-phenylether	0 / 61	0.18 - 52	--	NA	--
4-Methylphenol	8 / 61	0.18 - 52	0.31J - 30	NA	--
4-Nitroaniline	0 / 61	0.87 - 260	--	NA	--
4-Nitrophenol	0 / 61	0.87 - 260	--	NA	--
Acenaphthene	16 / 87	0.068 - 52	0.032J - 530	NA	--
Acenaphthylene	9 / 113	0.068 - 52	0.027J - 14J	NA	--
Anthracene	23 / 113	0.068 - 52	0.016J - 210	NA	--
Azobenzene	0 / 4	0.69 - 3	--	NA	--
Benzo(a)anthracene	37 / 113	0.068 - 52	0.0075J - 80	NA	--
Benzo(a)pyrene	41 / 113	0.068 - 52	0.0088J - 16J	NA	--
Benzo(b)fluoranthene	47 / 113	0.068 - 52	0.013J - 43	NA	--
Benzo(e)pyrene	1 / 26	0.38 - 4.1	2.8J	NA	--
Benzo(g,h,i)perylene	31 / 113	0.068 - 52	0.025J - 5.6	NA	--
Benzo(k)fluoranthene	33 / 113	0.068 - 52	0.014J - 13J	NA	--
Benzoic acid	0 / 60	0.87 - 260	--	NA	--
Benzyl alcohol	0 / 60	0.18 - 52	--	NA	--
Biphenyl	0 / 26	0.34 - 3.7	--	NA	--
Bis(2-chloroethoxy)methane	0 / 61	0.18 - 52	--	NA	--
Bis(2-chloroethyl)ether	0 / 61	0.18 - 52	--	NA	--
Bis(2-chloroisopropyl)ether	0 / 57	0.18 - 52	--	NA	--
Bis(2-ethylhexyl)adipate	0 / 87	--	--	NA	--
Bis(2-ethylhexyl)phthalate	0 / 0	0.15 - 52	--	NA	--
Butylbenzylphthalate	0 / 61	0.18 - 52	--	NA	--
Carbazole	0 / 31	0.38 - 4.1	--	NA	--
Chrysene	51 / 113	0.068 - 52	0.0093J - 77	NA	--
Cyclic Octaatomic sulfur	2 / 2	--	0.16J - 0.23J	NA	--
Dibenz(a,h)anthracene	7 / 113	0.068 - 52	0.027J - 1.5J	NA	--
Dibenzofuran	7 / 113	0.18 - 52	0.039J - 390	NA	--
Diethylphthalate	0 / 87	0.18 - 52	--	NA	--
Dimethylphthalate	0 / 61	0.18 - 52	--	NA	--
Di-n-butylphthalate	0 / 61	0.18 - 52	--	NA	--
Di-n-octylphthalate	0 / 61	0.18 - 52	--	NA	--
Dioctadecyl phosphonic acid	0 / 0	--	--	NA	--
Docosane	1 / 1	--	21J	NA	--

Table 4-5. Summary of Analyses and Detections in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Eicosane	0 / 0	--	--	NA	--
Fluoranthene	48 / 113	0.068 - 52	0.012J - 570	NA	--
Fluorene	23 / 113	0.068 - 52	0.012J - 550	NA	--
Hexachlorobenzene	0 / 61	0.18 - 52	--	NA	--
Hexachlorobutadiene	0 / 61	0.18 - 52	--	NA	--
Hexachlorocyclopentadiene	0 / 61	0.18 - 52	--	NA	--
Hexachloroethane	0 / 61	0.18 - 52	--	NA	--
Hexadecanoic acid	1 / 1	0.16 - 0.16	0.16	NA	--
Hexatriacontane	0 / 0	--	--	NA	--
Indeno(1,2,3-cd)pyrene	27 / 113	0.068 - 52	0.022J - 5.6J	NA	--
Isophorone	0 / 61	0.18 - 52	--	NA	--
m-Terphenyl	1 / 1	--	5.1J	NA	--
Naphthalene	32 / 113	0.068 - 52	0.012J - 1400	NA	--
Nitrobenzene	0 / 61	0.18 - 52	--	NA	--
n-Nitrosodimethylamine	0 / 4	0.69 - 3	--	NA	--
n-Nitroso-di-n-propylamine	0 / 87	0.18 - 52	--	NA	--
n-Nitrosodiphenylamine	2 / 87	0.18 - 52	0.099J - 0.65J	NA	--
o-Terphenyl	2 / 2	--	1.6J - 1.9J	NA	--
Octadecanoic acid	0 / 0	--	--	NA	--
p-Terphenyl	2 / 2	--	5.5J - 12J	NA	--
Pentachlorophenol	1 / 87	0.87 - 260	7.7J	NA	--
Phenacetin	0 / 26	0.76 - 8.2	--	NA	--
Phenanthrene	50 / 113	0.068 - 52	0.0071J - 1200	NA	--
Phenol	8 / 87	0.18 - 52	0.074J - 9.1J	NA	--
Pyrene	52 / 113	0.068 - 52	0.021J - 340	NA	--
Terphenyl	1 / 1	--	14J	NA	--
Tricosane	1 / 1	0.082 - 0.082	0.082	NA	--
Tridecane	0 / 0	--	--	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0 / 0	--	--	NA	--
1,1,2-Trichloroethane	0 / 56	0.005 - 7.5	--	NA	--
1,1,2,2-Tetrachloroethane	0 / 56	0.005 - 7.5	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0 / 1	0.037 - 0.037	--	NA	--
1,1,2-Trichloroethane	1 / 56	0.005 - 7.5	0.001J	NA	--
1,1-Dichloroethane	0 / 56	0.005 - 7.5	--	NA	--
1,1-Dichloroethene	0 / 56	0.005 - 7.5	--	NA	--
1,1-Dichloropropene	0 / 0	--	--	NA	--
1,2,3-Trichlorobenzene	0 / 1	0.018 - 0.018	--	NA	--
1,2,3-Trichloropropane	0 / 0	--	--	NA	--
1,2,4-Trimethylbenzene	0 / 1	--	--	NA	--
1,2-Dibromo-3-chloropropane	0 / 1	0.037 - 0.037	--	NA	--
1,2-Dibromoethane	0 / 1	0.018 - 0.018	--	NA	--
1,2-Dichloroethane	0 / 56	0.005 - 7.5	--	NA	--
1,2-Dichloroethene (Total)	0 / 56	0.005 - 7.5	--	NA	--
1,2-Dichloropropane	0 / 56	0.005 - 7.5	--	NA	--
1,3,5-Trimethylbenzene	0 / 0	--	--	NA	--
1,3-Dichloropropane	0 / 0	--	--	NA	--
2,2-Dichloropropane	0 / 0	--	--	NA	--
2-Butanone	1 / 56	0.011 - 15	0.047	NA	--
2-Chlorotoluene	0 / 0	--	--	NA	--
2-Hexanone	0 / 56	0.011 - 15	--	NA	--
4-Chlorotoluene	0 / 0	--	--	NA	--
4-Isopropyltoluene	0 / 0	--	--	NA	--
4-Methyl-2-pentanone	1 / 56	0.011 - 15	10J	NA	--
Acetone	1 / 56	0.005 - 15	0.135	NA	--
Benzene	6 / 56	0.005 - 7.5	0.001J - 0.02J	NA	--
Bromobenzene	0 / 0	--	--	NA	--
Bromochloromethane	0 / 1	0.018 - 0.018	--	NA	--
Bromodichloromethane	0 / 56	0.005 - 7.5	--	NA	--
Bromoform	0 / 56	0.005 - 7.5	--	NA	--
Bromomethane	0 / 56	0.011 - 15	--	NA	--
Carbon disulfide	6 / 56	0.005 - 7.5	0.002J - 0.017	NA	--

Table 4-5. Summary of Analyses and Detections in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
Carbon tetrachloride	0 / 56	0.005 - 7.5	--	NA	--
Chlorobenzene	8 / 56	0.005 - 7.5	0.002J - 1.7J	NA	--
Chloroethane	0 / 56	0.011 - 15	--	NA	--
Chloroform	0 / 56	0.005 - 7.5	--	NA	--
Chloromethane	0 / 56	0.011 - 15	--	NA	--
cis-1,2-Dichloroethene	0 / 1	0.018 - 0.018	--	NA	--
cis-1,3-Dichloropropene	0 / 56	0.005 - 7.5	--	NA	--
Dibromochloromethane	0 / 56	0.005 - 7.5	--	NA	--
Dibromomethane	0 / 0	--	--	NA	--
Dichlorodifluoromethane	0 / 1	0.018 - 0.018	--	NA	--
Ethylbenzene	18 / 56	0.005 - 7.5	0.001J - 40J	NA	--
Isopropylbenzene	0 / 1	0.018 - 0.018	--	NA	--
Methylene chloride	0 / 56	0.005 - 7.5	--	NA	--
n-Butylbenzene	0 / 0	--	--	NA	--
o-Xylene	0 / 0	--	--	NA	--
Propylbenzene	0 / 0	--	--	NA	--
sec-Butylbenzene	0 / 0	--	--	NA	--
Styrene	1 / 56	0.005 - 7.5	0.00486J	NA	--
tert-Butylbenzene	0 / 0	--	--	NA	--
tert-Butyl methyl ether	0 / 1	0.037 - 0.037	--	NA	--
Tetrachloroethene	0 / 56	0.005 - 7.5	--	NA	--
Toluene	16 / 56	0.005 - 7.5	0.001J - 10	NA	--
trans-1,2-Dichloroethene	0 / 1	0.018 - 0.018	--	NA	--
trans-1,3-Dichloropropene	0 / 56	0.005 - 7.5	--	NA	--
Trichloroethene	0 / 56	0.005 - 7.5	--	NA	--
Trichlorofluoromethane	0 / 1	0.018 - 0.018	--	NA	--
Vinyl acetate	0 / 54	0.011 - 15	--	NA	--
Vinyl chloride	0 / 56	0.011 - 15	--	NA	--
Xylene (Total)	24 / 56	0.005 - 7.5	0.001J - 320	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	31 / 92	0.17 - 650	0.03J - 380J	NA	--
Diesel-range organics	66 / 107	1 - 1800	5.3 - 11,000	NA	--
Motor oil-range organics	51 / 52	5.1 - 560	11J - 12,000	NA	--
TPH-extractable unknown hydrocarbon	18 / 23	11 - 790	21 - 2,800	NA	--
TPH-purgeable unknown hydrocarbon	13 / 23	0.2 - 59	0.4 - 3,000	NA	--
Total TPH	92 / 107	0.19 - 1,800	6.8 - 22,080	NA	--
Total oil and grease	49 / 54	27 - 84	99J - 300,000	NA	--

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical

bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HPAL Hunters Point ambient level
J estimated value
mg/kg milligrams per kilogram
NA not available
PCB polychlorinated biphenyl
TPH total petroleum hydrocarbons

Table 4-6. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (2-10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	4	0
Arsenic	11.1	HPAL	5	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	8	0
Calcium	--		--	--
Chromium (total)	a	See note	8	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	3	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	4	0
Lead	800	2004 PRG Industrial	16	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	-		0	0
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	1	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	7	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	5	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-6. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	2	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	7	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	1	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	9	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	40	4
Total (high risk) PCBs	0.74	2004 PRG Industrial	45	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	8	1
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	1	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	1	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	5	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	10	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	7	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	6	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0

Table 4-6. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Chrysene	13	2005 ESL Industrial (direct exp)	2	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	2	0
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	4	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	11	1
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	-		-	-
2-Chlorotoluene	-		-	-
2-Hexanone	-		-	-
4-Chlorotoluene	-		-	-
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0

Table 4-6. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	4	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	16	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	3	0
TPH-extractable unknown hydrocarbon	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbon	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	13	0
Total oil and grease	3,500	HPS TPH source criterion	13	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical

bgs	below ground surface	HPS	Hunters Point Shipyard
BHC	benzene hexachloride	mg/kg	milligrams per kilogram
Conc.	concentration	NE	not established
DDD	dichlorodiphenyldichloroethane	PCB	polychlorinated biphenyl
DDE	dichlorodiphenyldichloroethene	PRG	preliminary remediation goal
DDT	dichlorodiphenyltrichloroethane	RIEC	remedial investigation evaluation criteria
ESL	environmental screening level	SDGI	standard data gaps investigation
HPAL	Hunters Point ambient level	TPH	total petroleum hydrocarbon

Table 4-7. Summary of Analyses and Detections in the Landfill Area (greater than 10 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency [1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	96/96	0.18 - 7.5	921.32 - 41,000	NA	--
Antimony	49/97	0.01 - 9.4	0.05J - 278J	9.05	22
Arsenic	86/97	0.05 - 2.1	0.64J - 49J	11.1	21
Barium	97/97	0.04 - 1.83	6.2 - 588.08	314.4	7
Beryllium	71/97	0.01 - 0.32	0.03J - 1.77	0.71	14
Cadmium	51/97	0.01 - 1.2	0.067J - 112.79	3.14	17
Calcium	96/96	0.89 - 1,900	1,018.03 - 200,000J	NA	--
Chromium	96/97	0.05 - 1.4	22.96 - 3,589.21	a	23
Chromium VI	8/108	0.05 - 0.48	0.01J - 0.15	NA	--
Cobalt	97/97	0.01 - 2.8	1.8 - 106	a	3
Copper	97/97	0.01 - 0.75	4.4 - 13,371	124.3	35
Cyanide	30/83	0.1 - 1.9	0.07J - 1.6	NA	--
Iron	96/96	0.47 - 48	6,810 - 163,000	NA	--
Lead	96/97	0.01 - 45.2	1.5 - 15,700	8.99	74
Magnesium	96/96	0.12 - 38	2,410 - 209,000	NA	--
Manganese	96/96	0.01 - 0.75	69.87 - 2,120.88	1,431.20	3
Mercury	61/97	0.0057 - 1.6	0.02J - 22.4	2.28	18
Molybdenum	49/95	0.01 - 1.88	0.17 - 641	2.68	22
Nickel	97/97	0.01 - 10.3	13J - 1,524.62	a	0
Potassium	91/96	0.53 - 315	197 - 6,150	NA	--
Selenium	22/97	0.02 - 6.71	0.19J - 1.8J	1.95	0
Silver	50/97	0.01 - 1.1	0.05J - 13.71	1.43	14
Sodium	96/96	0.72 - 38	40.5 - 10,300J	NA	--
Thallium	10/97	0.038 - 2.92	0.04J - 0.29	0.81	0
Tin	10/17	3 - 5	5.2 - 591	NA	--
Vanadium	96/97	0.3 - 1.74	5.9 - 220.52	117.2	2
Zinc	97/97	0.11 - 3.5	10.9J - 14,800	109.9	40
Pesticides					
4,4'-DDD	1/93	0.0037 - 43	0.16586	NA	--
4,4'-DDE	1/93	0.0037 - 43	0.15059	NA	--
4,4'-DDT	1/93	0.0037 - 43	0.43J	NA	--
Aldrin	0/93	0.0018 - 21.55	--	NA	--
Alpha-BHC	0/93	0.0018 - 21.55	--	NA	--
Alpha-chlordane	0/92	0.0018 - 220	--	NA	--
beta-BHC	0/93	0.0018 - 21.55	--	NA	--
Chlordane	0/3	0.019 - 0.36	--	NA	--
delta-BHC	0/93	0.0018 - 21.55	--	NA	--
Dieldrin	0/93	0.0037 - 43	--	NA	--
Endosulfan I	0/93	0.0018 - 21.55	--	NA	--
Endosulfan II	0/93	0.0037 - 43	--	NA	--
Endosulfan sulfate	1/93	0.0037 - 43	0.15	NA	--
Endrin	0/93	0.0037 - 43	--	NA	--
Endrin aldehyde	0/25	0.0037 - 0.99	--	NA	--
Endrin ketone	0/91	0.0037 - 43	--	NA	--
Gamma-BHC (lindane)	0/93	0.0018 - 21.55	--	NA	--
Gamma-chlordane	0/6	0.002 - 0.31	--	NA	--
Heptachlor	0/93	0.0018 - 21.55	--	NA	--
Heptachlor epoxide	1/93	0.0018 - 21.55	0.035	NA	--
Methoxychlor	0/93	0.018 - 220	--	NA	--
Mirex	0/20	0.0019 - 0.1	--	NA	--
Toxaphene	0/93	0.076 - 430	--	NA	--
trans-Chlordane	0/87	0.0018 - 220	--	NA	--
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	2/103	0.01 - 220	0.21 - 250	NA	--
Aroclor-1221 (high risk PCB)	0/103	0.017 - 220	--	NA	--
Aroclor-1232 (high risk PCB)	0/103	0.01 - 220	--	NA	--
Aroclor-1242 (high risk PCB)	14/103	0.01 - 220	0.036J - 32,000	NA	--
Aroclor-1248 (high risk PCB)	7/103	0.01 - 220	0.089J - 6	NA	--
Aroclor-1254 (high risk PCB)	9/103	0.01 - 430	0.034J - 6.4	NA	--
Aroclor-1260 (high risk PCB)	48/103	0.006 - 430	0.0052J - 25.977	NA	--
Total (high risk) PCBs	55/103	0.006 - 430	0.0052 - 32,000	NA	--

Table 4-7. Summary of Analyses and Detections in the Landfill Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency [1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds					
1-(Ethenyloxy)-octadecane	0/0	--	--	NA	--
1,2,4,5-Tetramethylbenzene	1/1	--	0.28J	NA	--
1,2,4-Trichlorobenzene	1/81	0.0051 - 21	0.0093J	NA	--
1,2-Dichlorobenzene	5/81	0.0051 - 21	0.002J - 1.8J	NA	--
1,3-Dichlorobenzene	3/81	0.0051 - 21	0.003J - 0.03	NA	--
1,4-Dichlorobenzene	13/81	0.0051 - 21	0.0048J - 6.46	NA	--
1-Hexacosanol	1/1	0.13 - 0.13	0.13	NA	--
1-Octadecanol	0/0	--	--	NA	--
2,2'-Oxybis(1-chloropropane)	0/2	2.3 - 3.5	--	NA	--
2,4,5-Trichlorophenol	0/77	0.97 - 100	--	NA	--
2,4,6-Trichlorophenol	0/77	0.2 - 21	--	NA	--
2,4-Dichlorophenol	0/77	0.2 - 21	--	NA	--
2,4-Dimethylphenol	4/77	0.2 - 21	0.69273 - 11.0323	NA	--
2,4-Dinitrophenol	0/77	0.97 - 100	--	NA	--
2,4-Dinitrotoluene	0/77	0.2 - 21	--	NA	--
2,6-Dinitrotoluene	0/77	0.2 - 21	--	NA	--
2-Chloronaphthalene	0/77	0.2 - 21	--	NA	--
2-Chlorophenol	0/77	0.2 - 21	--	NA	--
2-Methylnaphthalene	18/76	0.2 - 21	0.066J - 21.1491	NA	--
2-Methylphenol	0/77	0.2 - 21	--	NA	--
2-Nitroaniline	0/77	0.97 - 100	--	NA	--
2-Nitrophenol	0/77	0.2 - 21	--	NA	--
3,3'-Dichlorobenzidine	0/77	0.4 - 42	--	NA	--
3-Nitroaniline	0/77	0.97 - 100	--	NA	--
4,6-Dinitro-2-methylphenol	0/77	0.97 - 100	--	NA	--
4-Bromophenyl-phenylether	0/77	0.2 - 21	--	NA	--
4-Chloro-3-methylphenol	0/77	0.2 - 21	--	NA	--
4-Chloroaniline	0/77	0.2 - 21	--	NA	--
4-Chlorophenyl-phenylether	0/77	0.2 - 21	--	NA	--
4-Methylphenol	5/77	0.2 - 21	0.19J - 8.9J	NA	--
4-Nitroaniline	0/77	0.97 - 100	--	NA	--
4-Nitrophenol	0/77	0.97 - 100	--	NA	--
Acenaphthene	11/77	0.2 - 21	0.14J - 6.98355	NA	--
Acenaphthylene	0/97	0.2 - 21	--	NA	--
Anthracene	9/97	0.2 - 21	0.083J - 2.3J	NA	--
Azobenzene	0/2	2.3 - 3.5	--	NA	--
Benzo(a)anthracene	15/97	0.2 - 21	0.086J - 3.78333J	NA	--
Benzo(a)pyrene	10/97	0.2 - 21	0.028J - 1.8J	NA	--
Benzo(b)fluoranthene	12/97	0.2 - 21	0.027J - 2.7J	NA	--
Benzo(e)pyrene	0/20	0.4 - 6.4	-	NA	--
Benzo(g,h,i)perylene	9/97	0.2 - 21	0.026J - 2.8J	NA	--
Benzo(k)fluoranthene	7/97	0.2 - 21	0.088J - 2.7J	NA	--
Benzoic acid	0/75	0.97 - 100	--	NA	--
Benzyl alcohol	1/75	0.2 - 21	0.038J	NA	--
Biphenyl	0/20	0.36 - 5.8	--	NA	--
Bis(2-chloroethoxy)methane	0/77	0.2 - 21	--	NA	--
Bis(2-chloroethyl)ether	0/77	0.2 - 21	--	NA	--
Bis(2-chloroisopropyl)ether	0/75	0.2 - 21	--	NA	--
Bis(2-ethylhexyl)adipate	1/1	0.44 - 0.44	0.44	NA	--
Bis(2-ethylhexyl)phthalate	3/97	0.16 - 21	13.1184 - 67.5371	NA	--
Butylbenzylphthalate	0/77	0.2 - 21	--	NA	--
Carbazole	0/23	0.4 - 6.4	--	NA	--
Chrysene	18/97	0.2 - 21	0.041J - 5	NA	--
Cyclic Octaatomic sulfur	2/2	--	0.32J - 6.5J	NA	--
Dibenz(a,h)anthracene	1/97	0.2 - 21	0.099J	NA	--
Dibenzofuran	10/97	0.2 - 21	0.08J - 5.04079	NA	--
Diethylphthalate	0/97	0.2 - 21	--	NA	--
Dimethylphthalate	0/77	0.2 - 21	--	NA	--
Di-n-butylphthalate	0/77	0.2 - 21	--	NA	--
Di-n-octylphthalate	1/77	0.2 - 21	97.8349	NA	--
Dioctadecyl phosphonic acid	0/0	--	--	NA	--
Docosane	0/0	--	--	NA	--

Table 4-7. Summary of Analyses and Detections in the Landfill Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency [1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Eicosane	0/0	--	--	NA	--
Fluoranthene	24/97	0.2 - 21	0.031J - 11.7333	NA	--
Fluorene	14/97	0.2 - 21	0.048J - 7.41534	NA	--
Hexachlorobenzene	0/77	0.2 - 21	--	NA	--
Hexachlorobutadiene	0/78	0.0051 - 21	--	NA	--
Hexachlorocyclopentadiene	0/77	0.2 - 21	--	NA	--
Hexachloroethane	0/77	0.2 - 21	--	NA	--
Hexadecanoic acid	0/0	--	--	NA	--
Hexatriacontane	0/0	--	--	NA	--
Indeno(1,2,3-cd)pyrene	8/97	0.2 - 21	0.027J - 2J	NA	--
Isophorone	0/76	0.2 - 21	--	NA	--
m-Terphenyl	0/0	--	--	NA	--
Naphthalene	23/98	0.0051 - 21	0.074J - 31.1198	NA	--
Nitrobenzene	0/77	0.2 - 21	--	NA	--
n-Nitrosodimethylamine	0/2	2.3 - 3.5	--	NA	--
n-Nitroso-di-n-propylamine	1/97	0.2 - 21	0.43J	NA	--
n-Nitrosodiphenylamine	2/97	0.2 - 21	0.2J - 1.53104	NA	--
o-Terphenyl	1/1	--	22J	NA	--
Octadecanoic acid	0/0	--	--	NA	--
p-Terphenyl	0/0	--	--	NA	--
Pentachlorophenol	0/97	0.97 - 100	--	NA	--
Phenacetin	0/20	0.79 - 13	--	NA	--
Phenanthrene	26/97	0.2 - 21	0.066J - 20.9162	NA	--
Phenol	3/97	0.2 - 21	0.2J - 3.6J	NA	--
Pyrene	25/97	0.2 - 21	0.036J - 10.3746	NA	--
Terphenyl	1/1	--	84J	NA	--
Tricosane	0/0	--	--	NA	--
Tridecane	0/0	--	--	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0/1	0.0051 - 0.0051	--	NA	--
1,1,1-Trichloroethane	0/78	0.005 - 15.451	--	NA	--
1,1,2,2-Tetrachloroethane	0/78	0.005 - 15.451	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0/4	0.0051 - 0.039	--	NA	--
1,1,2-Trichloroethane	1/78	0.005 - 15.451	0.002J	NA	--
1,1-Dichloroethane	0/78	0.005 - 15.451	--	NA	--
1,1-Dichloroethene	0/78	0.005 - 15.451	--	NA	--
1,1-Dichloropropene	0/1	0.0051 - 0.0051	--	NA	--
1,2,3-Trichlorobenzene	1/4	0.0051 - 0.02	0.0028J	NA	--
1,2,3-Trichloropropane	0/1	0.0051 - 0.0051	--	NA	--
1,2,4-Trimethylbenzene	0/1	0.0051 - 0.0051	--	NA	--
1,2-Dibromo-3-chloropropane	0/4	0.0051 - 0.039	--	NA	--
1,2-Dibromoethane	0/4	0.0051 - 0.02	--	NA	--
1,2-Dichloroethane	0/78	0.005 - 15.451	--	NA	--
1,2-Dichloroethene (Total)	0/76	0.005 - 15.451	--	NA	--
1,2-Dichloropropane	0/78	0.005 - 15.451	--	NA	--
1,3,5-Trimethylbenzene	0/1	0.0051 - 0.0051	--	NA	--
1,3-Dichloropropane	0/1	0.0051 - 0.0051	--	NA	--
2,2-Dichloropropane	0/1	0.0051 - 0.0051	--	NA	--
2-Butanone	3/78	0.006 - 30.902	0.02594 - 0.04549	NA	--
2-Chlorotoluene	0/1	0.0051 - 0.0051	--	NA	--
2-Hexanone	0/78	0.01 - 30.902	--	NA	--
4-Chlorotoluene	0/1	0.0051 - 0.0051	--	NA	--
4-Isopropyltoluene	0/1	0.0051 - 0.0051	--	NA	--
4-Methyl-2-pentanone	4/78	0.01 - 30.902	0.083 - 1.7	NA	--
Acetone	4/78	0.01 - 30.902	0.1557J - 0.29683	NA	--
Benzene	12/78	0.005 - 15.451	0.00077J - 0.05063J	NA	--
Bromobenzene	0/1	0.0051 - 0.0051	--	NA	--
Bromochloromethane	0/4	0.0051 - 0.02	--	NA	--
Bromodichloromethane	0/78	0.005 - 15.451	--	NA	--
Bromoform	0/78	0.005 - 15.451	--	NA	--
Bromomethane	0/78	0.0097 - 30.902	--	NA	--
Carbon disulfide	20/77	0.005 - 15.451	0.002J - 0.021	NA	--

Table 4-7. Summary of Analyses and Detections in the Landfill Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency [1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
Carbon tetrachloride	1/78	0.005 - 15.451	0.37J	NA	--
Chlorobenzene	18/78	0.005 - 15.451	0.002J - 6.25516	NA	--
Chloroethane	1/78	0.0097 - 30.902	0.0065J	NA	--
Chloroform	2/78	0.005 - 15.451	0.0021J - 0.0026J	NA	--
Chloromethane	0/78	0.0097 - 30.902	--	NA	--
cis-1,2-Dichloroethene	0/5	0.0051 - 0.02	--	NA	--
cis-1,3-Dichloropropene	0/78	0.005 - 15.451	--	NA	--
Dibromochloromethane	0/78	0.005 - 15.451	--	NA	--
Dibromomethane	0/1	0.0051 - 0.0051	--	NA	--
Dichlorodifluoromethane	1/4	0.0097 - 0.02	0.092	NA	--
Ethylbenzene	26/78	0.005 - 15.451	0.0016J - 55.7J	NA	--
Isopropylbenzene	1/4	0.0051 - 0.02	0.0058J	NA	--
Methylene chloride	1/78	0.005 - 15.451	0.4673	NA	--
n-Butylbenzene	1/1	0.0051 - 0.0051	0.018J	NA	--
o-Xylene	0/1	0.0051 - 0.0051	--	NA	--
Propylbenzene	0/1	0.0051 - 0.0051	--	NA	--
sec-Butylbenzene	1/1	0.0051 - 0.0051	0.02	NA	--
Styrene	0/78	0.005 - 15.451	--	NA	--
tert-Butyl methyl ether	0/5	0.0051 - 0.039	--	NA	--
tert-Butylbenzene	1/1	0.0051 - 0.0051	0.0043J	NA	--
Tetrachloroethene	1/78	0.005 - 15.451	0.29J	NA	--
Toluene	19/78	0.005 - 15.451	0.0005J - 2.2	NA	--
trans-1,2-Dichloroethene	0/5	0.0051 - 0.02	--	NA	--
trans-1,3-Dichloropropene	0/78	0.005 - 15.451	--	NA	--
Trichloroethene	0/78	0.005 - 15.451	--	NA	--
Trichlorofluoromethane	0/4	0.0051 - 0.02	--	NA	--
Vinyl acetate	0/74	0.011 - 30.902	--	NA	--
Vinyl chloride	0/78	0.0097 - 30.902	--	NA	--
Xylene (Total)	32/77	0.005 - 15.451	0.0023J - 519.451J	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	31/80	0.18 - 620	0.14J - 9,200	NA	--
Diesel-range organics	48/89	1.2 - 1,100	7.4 - 9,600H	NA	--
Motor oil-range organics	18/20	6.1 - 1,100	33 - 3,400LM	NA	--
TPH-extractable unknown hydrocarbon	8/18	12 - 540	45 - 2,300	NA	--
TPH-purgeable unknown hydrocarbon	6/16	1.1 - 340	1.8 - 10,000J	NA	--
Total TPH	59/89	0.18 - 1,100	15 - 22,900	NA	--
Total oil and grease	52/67	26 - 110	32 - 100,000J	NA	--

Notes

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
H Pattern is heavier hydrocarbon end of the analyte's range in the standard
HPAL Hunters Point ambient level
J estimated value
L pattern is lighter hydrocarbon end of the analyte's range in the standard
M pattern resembles motor oil
mg/kg milligrams per kilogram
NA not available
PCB polychlorinated biphenyl
TPH total petroleum hydrocarbons

Table 4-8. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (greater than 10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	0	0
Arsenic	11.1	HPAL	21	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	38	2005 ESL Industrial (direct exp)	2	0
Calcium	--		--	--
Chromium (total)	a	See note	17	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	2	0
Lead	800	2004 PRG Industrial	7	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	0	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	0	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-8. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	1	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	10	3
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	4	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	5	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	25	0
Total (high risk) PCBs	0.74	2004 PRG Industrial	31	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	9	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	2.1	2005 ESL Industrial (direct exp)	1	0
Benzo(a)pyrene	0.33	2004 PRG Industrial	6	0
Benzo(b)fluoranthene	2.1	2005 ESL Industrial (direct exp)	1	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	15	2005 ESL Industrial (direct exp)	0	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0

Table 4-8. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	2.1	2005 ESL Industrial (direct exp)	0	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	13	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	1	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	9	0
2,2-Dichloropropane	--		--	0
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	1	0

Table 4-8. Summary of Detected Exceedances of Evaluation Criteria in the Landfill Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	3	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	1	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	1	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	2	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbon	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbon	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	9	0
Total oil and grease	3,500	HPS TPH source criterion	18	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
Conc. concentration
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
ESL environmental screening level
HPAL Hunters Point ambient level
HPS Hunters Point Shipyard
mg/kg milligrams per kilogram
NE not established
PCB polychlorinated biphenyl
PRG preliminary remediation goal
RIEC remedial investigation evaluation criteria
SDGI standard data gaps investigation
TPH total petroleum hydrocarbon

Table 4-9. Summary of Analyses and Detections in the Panhandle Area (0-2 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	67/68	1.3 - 260	1,800 - 30,000	NA	--
Antimony	27/77	0.77 - 8.1	2.1 - 530J	9.05	14
Arsenic	65/77	0.08 - 28	1.8 - 215J	11.1	12
Barium	69/77	0.03 - 29	26.4 - 2,400	314.4	15
Beryllium	48/77	0.01 - 1	0.05 - 1.18	0.71	3
Cadmium	31/77	0.05 - 2.9	0.22 - 37	3.14	14
Calcium	67/68	0.89 - 270	2,114.56 - 81,000	NA	--
Chromium	76/77	0.1 - 13	24 - 1,800	a	5
Chromium VI	6/73	0.05 - 0.71	0.06 - 10J	NA	--
Cobalt	71/77	0.16 - 9	4.1 - 100	a	4
Copper	75/77	0.23 - 120	11.2 - 27,000	124.3	34
Cyanide	5/13	0.07 - 0.6	0.06J - 0.51	NA	--
Iron	67/68	0.37 - 230	6,500 - 190,000	NA	--
Lead	75/77	0.17 - 33	2.4 - 9,300J	8.99	72
Magnesium	67/68	2.6 - 250	1,400 - 180,000	NA	--
Manganese	77/77	0.06 - 29	0.15 - 12,000	1,431.20	7
Mercury	67/77	0.01 - 5.3	0.03J - 190	2.28	4
Molybdenum	37/75	0.16 - 6.5	0.21J - 70	2.68	16
Nickel	76/77	0.26 - 22	21 - 1,600	a	0
Potassium	66/68	16.7 - 848	190J - 2,160	NA	--
Selenium	15/77	0.08 - 25	0.28 - 6.4	1.95	3
Silver	12/77	0.08 - 37.3	0.22 - 5.5	1.43	5
Sodium	49/68	2.1 - 180	11.9 - 1,600J	NA	--
Thallium	10/77	0.14 - 0.68	0.2 - 7.2	0.81	3
Tin	0/1	3	--	NA	--
Vanadium	76/77	0.14 - 8	3.8 - 2,100	117.2	9
Zinc	76/77	0.28 - 58	36 - 6,900J	109.9	45
Pesticides					
2,4'-DDD	1/7	0.0001 - 0.011	0.0001J	NA	--
2,4'-DDE	0/7	0.0001 - 0.011	--	NA	--
2,4'-DDT	1/7	0.0001 - 0.011	0.0002J - 0.056	NA	--
4,4'-DDD	14/77	0.0001 - 4.2	0.0004J - 0.24J	NA	--
4,4'-DDE	20/77	0.0001 - 4.2	0.0004J - 7.7	NA	--
4,4'-DDT	22/77	0.0002 - 4.2	0.001J - 0.09	NA	--
Aldrin	9/77	0.0001 - 2.1	0.002 - 0.046	NA	--
alpha-BHC	11/77	0.0001 - 2.1	0.002 - 0.083	NA	--
alpha-Chlordane	6/68	0.0001 - 2.1	0.0003 - 0.34J	NA	--
beta-BHC	15/77	0.0001 - 2.1	0.0001J - 0.41	NA	--
Chlordane	0/0	--	--	NA	--
cis-Nonachlor	2/7	0.0001 - 0.011	0.0001J - 0.0005J	NA	--
delta-BHC	9/77	0.0001 - 2.1	0.002 - 0.046	NA	--
Dieldrin	15/77	0.0001 - 4.2	0.0022 - 6.4J	NA	--
Endosulfan I	10/77	0.0001 - 2.1	0.0004J - 0.046	NA	--
Endosulfan II	9/77	0.0001 - 4.2	0.0039 - 0.09	NA	--
Endosulfan sulfate	11/77	0.0001 - 4.2	0.0029J - 0.09	NA	--
Endrin	10/77	0.0001 - 4.2	0.0039 - 0.09	NA	--
Endrin aldehyde	15/75	0.0001 - 4.2	0.0039 - 0.09	NA	--
Endrin ketone	9/31	0.0001 - 0.09	0.001 - 0.09	NA	--
gamma-BHC (lindane)	9/77	0.0001 - 2.1	0.002 - 0.046	NA	--
gamma-Chlordane	9/9	0.035 - 0.81	0.015 - 0.81	NA	--
Heptachlor	10/77	0.0001 - 2.1	0.002 - 0.046	NA	--
Heptachlor epoxide	9/77	0.0001 - 2.1	0.0011 - 0.046	NA	--
Methoxychlor	10/77	0.0003 - 21	0.0068 - 4.2	NA	--
Mirex	0/7	0.0001 - 0.011	--	NA	--
Oxychlordane	0/7	0.0001 - 0.011	--	NA	--
Toxaphene	9/75	0.05 - 75	0.071 - 1.6	NA	--
trans-Chlordane	3/68	0.0001 - 2.1	0.0002 - 0.0026J	NA	--
trans-Nonachlor	5/7	0.0001 - 0.011	0.0003J - 0.0008J	NA	--
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	9/70	0.011 - 0.45	0.011 - 0.026	NA	--
Aroclor-1221 (high risk PCB)	9/70	0.022 - 0.45	0.022 - 0.52	NA	--
Aroclor-1232 (high risk PCB)	9/70	0.011 - 0.45	0.011 - 0.026	NA	--
Aroclor-1242 (high risk PCB)	9/70	0.011 - 0.45	0.011 - 0.026	NA	--
Aroclor-1248 (high risk PCB)	14/70	0.011 - 0.72	0.011 - 12	NA	--
Aroclor-1254 (high risk PCB)	19/70	0.011 - 0.9	0.011 - 17	NA	--
Aroclor-1260 (high risk PCB)	34/70	0.011 - 1.7	0.0099 - 20	NA	--
Total (high risk) PCBs	41/70	0.011 - 0.72	0.018 - 20	NA	--

Table 4-9. Summary of Analyses and Detections in the Panhandle Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Dioxins and Furans					
1,2,3,4,6,7,8,9-OCDD	0/0	--	--	NA	--
1,2,3,4,6,7,8,9-OCDF	0/0	--	--	NA	--
1,2,3,4,6,7,8-Heptachlorooxanthrene	0/0	--	--	NA	--
1,2,3,4,6,7,8-HpCDD	0/0	--	--	NA	--
1,2,3,4,6,7,8-HpCDF	0/0	--	--	NA	--
1,2,3,4,7,8,9-HpCDF	0/0	--	--	NA	--
1,2,3,4,7,8-HxCDD	0/0	--	--	NA	--
1,2,3,4,7,8-HxCDF	0/0	--	--	NA	--
1,2,3,6,7,8-HxCDD	0/0	--	--	NA	--
1,2,3,6,7,8-HxCDF	0/0	--	--	NA	--
1,2,3,7,8,9-HxCDD	0/0	--	--	NA	--
1,2,3,7,8,9-HxCDF	0/0	--	--	NA	--
1,2,3,7,8-PeCDD	0/0	--	--	NA	--
1,2,3,7,8-PeCDF	0/0	--	--	NA	--
2,3,4,6,7,8-HxCDF	0/0	--	--	NA	--
2,3,4,7,8-PeCDF	0/0	--	--	NA	--
2,3,7,8-TCDD	0/0	--	--	NA	--
2,3,7,8-TCDF	0/0	--	--	NA	--
Semivolatile Organic Compounds					
1,2,3,4-Tetrahydronaphthalene	0/0	--	--	--	--
1,2,4-Trichlorobenzene	0/62	0.0046 - 52	--	NA	--
1,2-Dichlorobenzene	0/62	0.0046 - 52	--	NA	--
1,3-Dichlorobenzene	0/62	0.0046 - 52	--	NA	--
1,4-Dichlorobenzene	0/62	0.0046 - 52	--	NA	--
2,2'-Oxybis(1-chloropropane)	0/0	--	--	NA	--
2,4,5-Trichlorophenol	0/59	0.34 - 52	--	NA	--
2,4,6-Trichlorophenol	0/59	0.34 - 52	--	NA	--
2,4-Dichlorophenol	0/59	0.34 - 52	--	NA	--
2,4-Dimethylphenol	0/61	0.34 - 52	--	NA	--
2,4-Dinitrophenol	0/59	1.6 - 260	--	NA	--
2,4-Dinitrotoluene	0/61	0.34 - 52	--	NA	--
2,6,10,14-Tetramethylpentadecane	0/0	--	--	NA	--
2,6-Dinitrotoluene	0/61	0.34 - 52	--	NA	--
2-Chloronaphthalene	0/61	0.34 - 52	--	NA	--
2-Chlorophenol	0/61	0.34 - 52	--	NA	--
2-Methylnaphthalene	8/61	0.067 - 10	0.038J - 3.1	NA	--
2-Methylphenol	0/61	0.34 - 52	--	NA	--
2-Nitroaniline	0/61	0.68 - 100	--	NA	--
2-Nitrophenol	0/59	0.34 - 100	--	NA	--
3,3'-Dichlorobenzidine	0/61	0.39 - 100	--	NA	--
3-Heptanone,2,4-Dimethyl-C9H18O	0/0	--	--	NA	--
3-Nitroaniline	0/59	0.68 - 100	--	NA	--
4,6-Dinitro-2-methylphenol	0/59	1.6 - 260	--	NA	--
4-Bromophenyl-phenylether	0/59	0.34 - 52	--	NA	--
4-Chloro-3-methylphenol	0/61	0.34 - 52	--	NA	--
4-Chloroaniline	0/59	0.34 - 52	--	NA	--
4-Chlorophenyl-phenylether	0/59	0.34 - 52	--	NA	--
4-Methylphenol	0/61	0.34 - 52	--	NA	--
4-Nitroaniline	0/59	0.68 - 100	--	NA	--
4-Nitrophenol	0/61	0.68 - 100	--	NA	--
5-Methylhex-5-en-2-one	0/0	--	--	NA	--
Acenaphthene	4/61	0.067 - 10	0.048J - 1.2	NA	--
Acenaphthylene	2/61	0.067 - 10	0.052J - 0.88	NA	--
Anthracene	16/61	0.067 - 10	0.038J - 7.6J	NA	--
Azobenzene	0/46	0.34 - 52	--	NA	--
Benzo(a)anthracene	24/61	0.067 - 10	0.045J - 51	NA	--
Benzo(a)pyrene	25/61	0.067 - 10	0.038J - 16	NA	--
Benzo(b)fluoranthene	39/61	0.067 - 10	0.045J - 64	NA	--
Benzo(e)pyrene	0/0	--	--	NA	--
Benzo(g,h,i)perylene	4/61	0.067 - 10	0.036J - 0.37	NA	--
Benzo(k)fluoranthene	30/61	0.067 - 10	0.058J - 53	NA	--
Benzoic acid	1/59	1.6 - 260	1.5J	NA	--
Benzyl alcohol	0/59	0.34 - 52	--	NA	--
Biphenyl	0/0	--	--	NA	--
Bis(2-chloroethoxy)methane	0/59	0.34 - 52	--	NA	--
Bis(2-chloroethyl)ether	0/59	0.34 - 52	--	NA	--

Table 4-9. Summary of Analyses and Detections in the Panhandle Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Bis(2-chloroisopropyl)ether	0/59	0.34 - 52	--	NA	--
Bis(2-ethylhexyl)phthalate	7/61	0.34 - 52	2.6 - 740	NA	--
Butylbenzylphthalate	0/61	0.34 - 52	--	NA	--
Carbazole	0/2	0.39 - 0.7	--	NA	--
Chrysene	33/61	0.067 - 10	0.039J - 57	NA	--
Cyclic Octaatomic sulfur	0/0	--	--	NA	--
Dibenz(a,h)anthracene	5/61	0.067 - 10	0.073J - 5.3J	NA	--
Dibenzofuran	1/61	0.34 - 52	0.88J	NA	--
Diethylphthalate	0/61	0.34 - 52	--	NA	--
Dimethylphthalate	0/59	0.34 - 52	--	NA	--
Di-n-butylphthalate	0/61	0.34 - 52	--	NA	--
Di-n-octylphthalate	0/61	0.34 - 52	--	NA	--
Dioctyl ester hexanedioic acid	1/1	--	--	NA	--
Fluoranthene	35/61	0.067 - 10	0.039J - 84	NA	--
Fluorene	4/61	0.067 - 10	0.044J - 1.7	NA	--
Heptadecane	0/0	--	--	NA	--
Hexachlorobenzene	2/68	0.0002 - 52	--	NA	--
Hexachlorobutadiene	0/60	0.0046 - 52	--	NA	--
Hexachlorocyclopentadiene	0/59	0.34 - 260	--	NA	--
Hexachloroethane	0/59	0.34 - 52	--	NA	--
Hexadecane	0/0	--	--	NA	--
Hexadecanoic acid	0/0	--	--	NA	--
Indeno(1,2,3-cd)pyrene	20/61	0.067 - 10	0.037J - 17	NA	--
Isophorone	0/61	0.34 - 52	--	NA	--
Naphthalene	10/62	0.0046 - 10	0.055J - 47	NA	--
Nitrobenzene	0/59	0.34 - 52	--	NA	--
n-Nitrosodimethylamine	0/46	0.34 - 52	--	NA	--
n-Nitroso-di-n-propylamine	0/61	0.34 - 52	--	NA	--
n-Nitrosodiphenylamine	0/61	0.34 - 52	--	NA	--
Octacosane	1/1	--	--	NA	--
Pentachlorophenol	0/61	0.68 - 100	--	NA	--
Phenacetin	0/0	--	--	NA	--
Phenanthrene	28/61	0.067 - 10	0.039J - 43	NA	--
Phenol	0/61	0.34 - 52	--	NA	--
Pyrene	35/61	0.067 - 10	0.04J - 35	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0/1	0.0046	--	NA	--
1,1,1-Trichloroethane	0/14	0.0046 - 0.692	--	NA	--
1,1,2,2-Tetrachloroethane	0/14	0.0046 - 0.692	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0/1	0.0046	--	NA	--
1,1,2-Trichloroethane	0/14	0.0046 - 0.692	--	NA	--
1,1-Dichloroethane	0/14	0.0046 - 0.692	--	NA	--
1,1-Dichloroethene	0/14	0.0046 - 0.692	--	NA	--
1,1-Dichloropropene	0/1	0.0046	--	NA	--
1,2,3-Trichlorobenzene	0/1	0.0046	--	NA	--
1,2,3-Trichloropropane	0/1	0.0046	--	NA	--
1,2,4-Trichlorobenzene	0/0	--	--	NA	--
1,2,4-Trimethylbenzene	0/1	0.0046	--	NA	--
1,2-Dibromo-3-chloropropane	0/1	0.0046	--	NA	--
1,2-Dibromoethane	0/1	0.0046	--	NA	--
1,2-Dichloroethane	0/14	0.0046 - 0.692	--	NA	--
1,2-Dichloroethene (Total)	0/13	0.005 - 0.692	--	NA	--
1,2-Dichloropropane	0/14	0.0046 - 0.692	--	NA	--
1,3,5-Trimethylbenzene	0/1	0.0046	--	NA	--
1,3-Dichloropropane	0/1	0.0046	--	NA	--
2,2-Dichloropropane	0/1	0.0046	--	NA	--
2-Butanone	2/14	0.0093 - 1.384	0.001J - 0.01716	NA	--
2-Chloroethyl vinyl ether	0/1	0.0046	--	NA	--
2-Chlorotoluene	0/1	0.0046	--	NA	--
2-Hexanone	0/14	0.0093 - 1.384	--	NA	--
4-Chlorotoluene	0/1	0.0046	--	NA	--
4-Isopropyltoluene	1/1	0.0046	0.0068	NA	--
4-Methyl-2-pentanone	0/13	0.0093 - 1.384	--	NA	--
Acetone	0/13	0.0093 - 1.384	--	NA	--
Benzene	0/14	0.0046 - 0.692	--	NA	--
Bromobenzene	0/1	0.0046	--	NA	--

Table 4-9. Summary of Analyses and Detections in the Panhandle Area (0-2 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
Bromochloromethane	0/1	0.0046	--	NA	--
Bromodichloromethane	0/14	0.0046 - 0.692	--	NA	--
Bromoform	0/14	0.0046 - 0.692	--	NA	--
Bromomethane	0/14	0.0046 - 1.384	--	NA	--
Carbon disulfide	0/14	0.005 - 0.692	--	NA	--
Carbon tetrachloride	0/14	0.0046 - 0.692	--	NA	--
Chlorobenzene	0/14	0.0046 - 0.692	--	NA	--
Chloroethane	0/14	0.0046 - 1.384	--	NA	--
Chloroform	0/14	0.0046 - 0.692	--	NA	--
Chloromethane	0/14	0.0046 - 1.384	--	NA	--
cis-1,2-Dichloroethene	0/1	0.0046	--	NA	--
cis-1,3-Dichloropropene	0/14	0.0046 - 0.692	--	NA	--
Dibromochloromethane	0/14	0.0046 - 0.692	--	NA	--
Dibromomethane	0/1	0.0046	--	NA	--
Dichlorodifluoromethane	0/1	0.0046	--	NA	--
Ethylbenzene	0/14	0.0046 - 0.692	--	NA	--
Isopropylbenzene	0/1	0.0046 - 0.0046	--	NA	--
Methylene chloride	0/14	0.0046 - 0.692	--	NA	--
n-Butylbenzene	0/1	0.0046	--	NA	--
o-Xylene	0/1	0.0046	--	NA	--
Propylbenzene	0/1	0.0046	--	NA	--
sec-Butylbenzene	0/1	0.0046	--	NA	--
Styrene	0/14	0.0046 - 0.692	--	NA	--
tert-Butyl methyl ether	0/1	0.0046	--	NA	--
tert-Butylbenzene	0/1	0.0046	--	NA	--
Tetrachloroethene	0/14	0.0046 - 0.692	--	NA	--
Toluene	1/14	0.0046 - 0.692	0.019	NA	--
trans-1,2-Dichloroethene	0/1	0.0046	--	NA	--
trans-1,3-Dichloropropene	0/14	0.0046 - 0.692	--	NA	--
Trichloroethene	0/14	0.0046 - 0.692	--	NA	--
Trichlorofluoromethane	0/1	0.0046	--	NA	--
Vinyl acetate	0/14	0.0093 - 1.384	--	NA	--
Vinyl chloride	0/14	0.0046 - 1.384	--	NA	--
Xylene (Total)	0/14	0.0046 - 0.692	--	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	1/13	1 - 5.9	0.98	NA	--
Diesel-range organics	4/16	10 - 160	17 - 3400J	NA	--
Motor oil-range organics	3/3	120 - 320	1,400J - 3,600J	NA	--
TPH-extractable unknown hydrocarbon	2/3	10 - 12	2J - 15	NA	--
TPH-purgeable unknown hydrocarbon	0/1	1.1	-	NA	--
Total TPH	6/16	10 - 12	2.98 - 7,000	NA	--
Total oil and grease	10/13	26 - 60	100 - 1,600	NA	--

Notes

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HpCDD heptachlorodibenzo-p-dioxin
HpCDF heptachlorodibenzofuran
HQ hazard quotient
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
J estimated value
mg/kg milligrams per kilogram
NA not available
OCDD octachlorodibenzo-p-dioxin
OCDF octachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibeno-p-dioxin
PeCDF pentachlorodibenzofuran
TPH total petroleum hydrocarbons

Table 4-10. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (0-2 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shiypard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	1	0
Arsenic	11.1	HPAL	12	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	3	0
Calcium	--		--	--
Chromium (total)	a	See note	0	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	3	0
Lead	800	2004 PRG Industrial	16	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	1	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	1	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4-DDE	6.3	2005 ESL Industrial (direct exp)	1	0
4,4-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	2	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	0	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-10. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shiypard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	1	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	3	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	4	0
Total (high risk) PCBs	0.74	2004 PRG Industrial	8	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	5	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	10	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	7	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	9	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	1	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0
Chrysene	13	2005 ESL Industrial (direct exp)	1	0

Table 4-10. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shiypard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	1	0
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	4	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	2	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0

Table 4-10. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shiypard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	3	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbon	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbon	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	3	0
Total oil and grease	3,500	HPS TPH source criterion	0	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

--	No criteria available for this chemical	HPS	Hunters Point Shipyard
bgs	below ground surface	mg/kg	milligrams per kilogram
BHC	benzene hexachloride	NE	not established
Conc.	concentration	PCB	polychlorinated biphenyl
DDD	dichlorodiphenyldichloroethane	PRG	preliminary remediation goal
DDE	dichlorodiphenyldichloroethene	RIEC	remedial investigation evaluation criteria
DDT	dichlorodiphenyltrichloroethane	SDGI	standard data gaps investigation
ESL	environmental screening level	TPH	total petroleum hydrocarbon
HPAL	Hunters Point ambient level		

Table 4-11. Summary of Analyses and Detections in the Panhandle Area (2-10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	38/38	0.18 - 14	1,990 - 22,776.6	NA	--
Antimony	40/64	0.01 - 9.4	0.21J - 59	9.05	14
Arsenic	62/64	0.05 - 8.1	0.17 - 315J	11.1	12
Barium	63/64	0.04 - 10	7.8J - 1,100	314.4	18
Beryllium	63/64	0.01 - 1	0.04J - 0.93	0.71	2
Cadmium	44/64	0.01 - 5	0.03 - 78.4	3.14	12
Calcium	37/38	0.95 - 30	805 - 53,300	NA	--
Chromium	64/64	0.05 - 9	26.26J - 607	a	3
Chromium VI	4/56	0.05 - 0.125	0.03J - 0.59J	NA	--
Cobalt	64/64	0.01 - 9	4.9J - 96.27	a	4
Copper	61/64	0.01 - 4	3.94 - 1,500	124.3	28
Cyanide	10/34	0.07 - 1.3	0.07J - 0.69J	NA	--
Iron	38/38	0.38 - 14.6	8,207 - 471,000	NA	--
Lead	64/64	0.01 - 33	1.7 - 5,600	8.99	62
Magnesium	38/38	0.12 - 29	2,078.76 - 157,000	NA	--
Manganese	64/64	0.01 - 10	125 - 2,700	1431.2	4
Mercury	54/64	0.01 - 1	0.09 - 13	2.28	6
Molybdenum	36/59	0.01 - 1.8	0.34 - 32	2.68	14
Nickel	64/64	0.01 - 16	19.88 - 1,451.92	a	0
Potassium	64/38	0.56 - 848	133J - 2,250	NA	--
Selenium	32/64	0.02 - 1	0.14J - 6.3	1.95	13
Silver	36/64	0.01 - 0.89	0.11J - 11	1.43	5
Sodium	37/38	0.77 - 23	87.6 - 2,200	NA	--
Thallium	10/64	0.04 - 3.5	0.04J - 0.25	0.81	0
Tin	2/3	3.2 - 3.3	11.4 - 39.8	NA	--
Vanadium	64/64	0.33 - 8	15.1 - 508	117.2	10
Zinc	64/64	0.11 - 20	15.51 - 116,000	109.9	43
Pesticides					
2,4'-DDD	0/0	--	--	NA	--
2,4'-DDE	0/0	--	--	NA	--
2,4'-DDT	0/0	--	--	NA	--
4,4'-DDD	20/64	0.0038 - 0.16	0.0016J - 0.51	NA	--
4,4'-DDE	22/64	0.0038 - 0.16	0.004J - 0.28	NA	--
4,4'-DDT	16/64	0.0038 - 0.45	0.0037J - 0.12	NA	--
Aldrin	7/64	0.002 - 0.082	0.0094 - 0.033	NA	--
alpha-BHC	8/64	0.002 - 0.082	0.0014 - 0.033	NA	--
alpha-Chlordane	0/38	0.0099 - 0.82	--	NA	--
beta-BHC	11/64	0.002 - 0.082	0.0009 - 0.033	NA	--
Chlordane	0/5	0.041 - 0.35	--	NA	--
cis-Nonachlor	0/0	--	--	NA	--
delta-BHC	8/64	0.002 - 0.082	0.00051 - 0.028	NA	--
Dieldrin	19/64	0.0038 - 0.16	0.0013J - 0.11	NA	--
Endosulfan I	7/64	0.002 - 0.082	0.0094 - 0.033	NA	--
Endosulfan II	7/64	0.0038 - 0.16	0.018 - 0.065	NA	--
Endosulfan sulfate	9/64	0.0038 - 0.16	0.0013 - 0.065	NA	--
Endrin	9/64	0.0038 - 0.45	0.0014 - 0.065	NA	--
Endrin aldehyde	8/35	0.0038 - 0.21	0.007 - 0.065	NA	--
Endrin ketone	8/64	0.0038 - 0.16	0.0012 - 0.065	NA	--
gamma-BHC (lindane)	7/64	0.002 - 0.082	0.0094 - 0.033	NA	--
gamma-Chlordane	7/12	0.37	0.17 - 0.59	NA	--
Heptachlor	8/64	0.002 - 0.082	0.0094 - 0.033	NA	--
Heptachlor epoxide	17/64	0.002 - 0.082	0.0014 - 0.053	NA	--
Methoxychlor	17/64	0.0035 - 0.82	0.0035 - 0.33	NA	--
Mirex	0/9	0.0099 - 0.048	--	NA	--
Oxychlordane	0/0	--	--	NA	--
Toxaphene	7/64	0.07 - 1.9	0.33 - 1.2	NA	--
trans-Chlordane	0/38	0.084 - 1.1	--	NA	--
trans-Nonachlor	0/0	--	--	NA	--

Table 4-11. Summary of Analyses and Detections in the Panhandle Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[(1)]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	7/64	0.015 - 0.82	0.011 - 0.094	NA	--
Aroclor-1221 (high risk PCB)	7/64	0.018 - 0.82	0.021 - 0.19	NA	--
Aroclor-1232 (high risk PCB)	7/64	0.015 - 0.82	0.011 - 0.094	NA	--
Aroclor-1242 (high risk PCB)	7/64	0.015 - 0.82	0.011 - 0.094	NA	--
Aroclor-1248 (high risk PCB)	7/64	0.015 - 0.82	0.011 - 0.094	NA	--
Aroclor-1254 (high risk PCB)	16/64	0.015 - 1.6	0.011 - 2.6	NA	--
Aroclor-1260 (high risk PCB)	38/64	0.015 - 1.6	0.018 - 1.8	NA	--
Total (high risk) PCBs	38/64	0.015 - 1.6	0.018 - 3.9	NA	--
Dioxins and Furans					
1,2,3,4,6,7,8,9-OCDD	10/10	--	0.000581 - 0.0152	NA	--
1,2,3,4,6,7,8,9-OCDF	7/7	--	0.0000839 - 0.000879	NA	--
1,2,3,4,6,7,8-Heptachlorooxanthrene	3/3	--	0.000177 - 0.000981	NA	--
1,2,3,4,6,7,8-HpCDD	7/7	--	0.00041 - 0.00198	NA	--
1,2,3,4,6,7,8-HpCDF	10/10	--	0.000183 - 0.00319	NA	--
1,2,3,4,7,8,9-HpCDF	10/10	--	0.00000904 - 0.000377	NA	--
1,2,3,4,7,8-HxCDD	10/10	--	0.00000659 - 0.0000603	NA	--
1,2,3,4,7,8-HxCDF	10/10	--	0.00000973 - 0.000788	NA	--
1,2,3,6,7,8-HxCDD	10/10	--	0.000025 - 0.00012	NA	--
1,2,3,6,7,8-HxCDF	10/10	--	0.00000957 - 0.0006	NA	--
1,2,3,7,8,9-HxCDD	10/10	--	0.0000181 - 0.0000995	NA	--
1,2,3,7,8,9-HxCDF	10/10	--	0.000002 - 0.000157	NA	--
1,2,3,7,8-PeCDD	10/10	--	0.00000666 - 0.0000625	NA	--
1,2,3,7,8-PeCDF	10/10	--	0.00000501 - 0.000365	NA	--
2,3,4,6,7,8-HxCDF	10/10	--	0.0000153 - 0.000525	NA	--
2,3,4,7,8-PeCDF	10/10	--	0.0000111 - 0.000452	NA	--
2,3,7,8-TCDD	10/10	--	0.00000151 - 0.0000161	NA	--
2,3,7,8-TCDF	10/10	--	0.00000426 - 0.000154	NA	--
Semivolatile Organic Compounds					
1,2,3,4-Tetrahydronaphthalene	1/1	0.98 - 0.98	0.39216	--	--
1,2,4-Trichlorobenzene	1/43	0.017 - 50	0.063J	NA	--
1,2-Dichlorobenzene	0/43	0.017 - 50	--	NA	--
1,3-Dichlorobenzene	0/43	0.017 - 50	--	NA	--
1,4-Dichlorobenzene	2/50	0.006 - 50	0.21J	NA	--
2,2'-Oxybis(1-chloropropane)	0/9	0.38 - 0.88	--	NA	--
2,4,5-Trichlorophenol	1/43	0.38 - 140	0.076J	NA	--
2,4,6-Trichlorophenol	0/43	0.35 - 28	--	NA	--
2,4-Dichlorophenol	0/43	0.35 - 28	--	NA	--
2,4-Dimethylphenol	0/43	0.35 - 28	--	NA	--
2,4-Dinitrophenol	0/43	1.7 - 140	--	NA	--
2,4-Dinitrotoluene	0/43	0.35 - 28	--	NA	--
2,6,10,14-Tetramethylpentadecane	1/1	0.5 - 0.5	0.67829	NA	--
2,6-Dinitrotoluene	0/43	0.35 - 28	--	NA	--
2-Chloronaphthalene	0/43	0.35 - 28	--	NA	--
2-Chlorophenol	0/43	0.35 - 28	--	NA	--
2-Methylnaphthalene	1/29	0.35 - 28	9J	NA	--
2-Methylphenol	0/43	0.35 - 28	--	NA	--
2-Nitroaniline	0/43	0.76 - 140	--	NA	--
2-Nitrophenol	1/43	0.35 - 28	0.3	NA	--
3,3'-Dichlorobenzidine	0/43	0.69 - 55	--	NA	--
3-Heptanone,2,4-Dimethyl-C9H18O	0/0	--	--	NA	--
3-Nitroaniline	0/43	0.76 - 140	--	NA	--
4,6-Dinitro-2-methylphenol	0/43	1.7 - 140	--	NA	--
4-Bromophenyl-phenylether	0/43	0.35 - 28	--	NA	--
4-Chloro-3-methylphenol	0/43	0.35 - 28	--	NA	--
4-Chloroaniline	0/43	0.35 - 28	--	NA	--
4-Chlorophenyl-phenylether	0/43	0.35 - 28	--	NA	--
4-Methylphenol	0/43	0.35 - 28	--	NA	--
4-Nitroaniline	0/43	0.76 - 140	--	NA	--
4-Nitrophenol	0/43	0.76 - 140	--	NA	--
5-Methylhex-5-en-2-one	0/0	--	--	NA	--

Table 4-11. Summary of Analyses and Detections in the Panhandle Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Acenaphthene	6/43	0.35 - 28	0.041J - 2.3J	NA	--
Acenaphthylene	6/52	0.35 - 28	0.014J - 0.054J	NA	--
Anthracene	7/52	0.35 - 28	0.037J - 0.081J	NA	--
Azobenzene	0/0	--	--	NA	--
Benzo(a)anthracene	13/52	0.35 - 28	0.02J - 0.5J	NA	--
Benzo(a)pyrene	15/52	0.35 - 28	0.02J - 0.65J	NA	--
Benzo(b)fluoranthene	15/52	0.35 - 28	0.039J - 0.88	NA	--
Benzo(e)pyrene	0/9	3.7 - 4.4	--	NA	--
Benzo(g,h,i)perylene	10/52	0.35 - 28	0.031J - 0.45J	NA	--
Benzo(k)fluoranthene	11/52	0.35 - 28	0.019J - 0.33J	NA	--
Benzoic acid	0/29	1.7 - 140	--	NA	--
Benzyl alcohol	0/29	0.35 - 28	--	NA	--
Biphenyl	0/9	3.4 - 4	--	NA	--
Bis(2-chloroethoxy)methane	0/43	0.35 - 28	--	NA	--
Bis(2-chloroethyl)ether	0/43	0.35 - 28	--	NA	--
Bis(2-chloroisopropyl)ether	0/34	0.35 - 28	--	NA	--
Bis(2-ethylhexyl)phthalate	10/52	0.33 - 28	0.12J - 1.1	NA	--
Butylbenzylphthalate	0/43	0.35 - 28	--	NA	--
Carbazole	0/9	3.7 - 4.4	--	NA	--
Chrysene	18/52	0.35 - 28	0.018J - 0.47J	NA	--
Cyclic Octaatomic sulfur	2/2	--	1.25969 - 4.16667	NA	--
Dibenz(a,h)anthracene	0/52	0.35 - 28	--	NA	--
Dibenzofuran	1/52	0.35 - 28	0.17J	NA	--
Diethylphthalate	0/52	0.35 - 28	--	NA	--
Dimethylphthalate	1/43	0.35 - 28	2	NA	--
Di-n-butylphthalate	3/43	0.35 - 28	0.075J - 3.7	NA	--
Di-n-octylphthalate	0/43	0.35 - 28	--	NA	--
Dioctyl ester hexanedioic acid	1/1	--	11.7708	NA	--
Fluoranthene	18/52	0.35 - 28	0.02J - 0.99J	NA	--
Fluorene	4/52	0.35 - 28	0.037J - 0.1J	NA	--
Heptadecane	1/1	0.25	0.5814	NA	--
Hexachlorobenzene	0/43	0.35 - 28	--	NA	--
Hexachlorobutadiene	0/43	0.35 - 50	--	NA	--
Hexachlorocyclopentadiene	0/43	0.35 - 28	--	NA	--
Hexachloroethane	0/43	0.35 - 28	--	NA	--
Hexadecane	1/1	0.25	0.3876	NA	--
Hexadecanoic acid	0/0	--	--	NA	--
Indeno(1,2,3-cd)pyrene	8/52	0.35 - 28	0.02J - 0.32J	NA	--
Isophorone	0/29	0.35 - 28	--	NA	--
Naphthalene	14/56	0.35 - 50	0.039J - 120	NA	--
Nitrobenzene	0/43	0.35 - 28	--	NA	--
n-Nitrosodimethylamine	0/0	--	--	NA	--
n-Nitroso-di-n-propylamine	0/52	0.35 - 28	--	NA	--
n-Nitrosodiphenylamine	0/52	0.35 - 28	--	NA	--
Octacosane	0/0	--	--	NA	--
Pentachlorophenol	1/52	0.76 - 140	0.11J	NA	--
Phenacetin	0/9	7.4 - 8.7	--	NA	--
Phenanthrene	18/52	0.11 - 28	0.019J - 2.3J	NA	--
Phenol	2/52	0.35 - 28	0.043J - 0.048J	NA	--
Pyrene	20/52	0.35 - 28	0.023J - 1.3	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0/4	11 - 50	--	NA	--
1,1,1-Trichloroethane	0/35	0.005 - 50	--	NA	--
1,1,2,2-Tetrachloroethane	0/35	0.005 - 50	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0/6	0.034 - 50	--	NA	--
1,1,2-Trichloroethane	0/35	0.005 - 50	--	NA	--
1,1-Dichloroethane	0/35	0.005 - 50	--	NA	--
1,1-Dichloroethene	0/35	0.005 - 50	--	NA	--

Table 4-11. Summary of Analyses and Detections in the Panhandle Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
1,1-Dichloropropene	0/4	11 - 50	--	NA	--
1,2,3-Trichlorobenzene	0/6	0.017 - 50	--	NA	--
1,2,3-Trichloropropane	0/4	11 - 50	--	NA	--
1,2,3-Trimethylbenzene	1/1	0.006 - 0.006	0.01646	NA	--
1,2,4-Trimethylbenzene	2/5	11 - 330	1.56863 - 48	NA	--
1,2-Dibromo-3-chloropropane	0/6	0.034 - 50	--	NA	--
1,2-Dibromoethane	0/6	0.017 - 50	--	NA	--
1,2-Dichloroethane	0/35	0.005 - 50	--	NA	--
1,2-Dichloroethene (Total)	0/31	0.005 - 3.5	--	NA	--
1,2-Dichloropropane	0/35	0.005 - 50	--	NA	--
1,3,5-Trimethylbenzene	3/6	0.006 - 50	0.02289 - 12J	NA	--
1,3-Dichloropropane	0/4	11 - 50	--	NA	--
2,2-Dichloropropane	0/4	11 - 50	--	NA	--
2-Butanone	6/35	0.01 - 100	0.001J - 0.02553	NA	--
2-Chloroethyl vinyl ether	0/3	11 - 50	--	NA	--
2-Chlorotoluene	0/4	11 - 50	--	NA	--
2-Hexanone	1/35	0.01 - 100	0.01085J	NA	--
4-Chlorotoluene	0/4	11 - 50	--	NA	--
4-Isopropyl toluene	0/4	11 - 50	--	NA	--
4-Methyl-2-pentanone	0/35	0.01 - 100	--	NA	--
Acetone	0/33	0.01 - 100	--	NA	--
Benzene	0/35	0.005 - 50	--	NA	--
Bromobenzene	0/4	11 - 50	--	NA	--
Bromochloromethane	0/6	0.017 - 50	--	NA	--
Bromodichloromethane	0/35	0.005 - 50	--	NA	--
Bromoform	0/35	0.005 - 50	--	NA	--
Bromomethane	0/35	0.01 - 50	--	NA	--
Carbon disulfide	3/35	0.005 - 100	0.002J - 0.01001	NA	--
Carbon tetrachloride	0/35	0.005 - 50	--	NA	--
Chlorobenzene	0/35	0.005 - 50	--	NA	--
Chloroethane	0/35	0.01 - 50	--	NA	--
Chloroform	1/35	0.005 - 50	0.0015J	NA	--
Chloromethane	0/35	0.01 - 50	--	NA	--
cis-1,2-Dichloroethene	0/6	0.017 - 50	--	NA	--
cis-1,3-Dichloropropene	0/35	0.005 - 50	--	NA	--
Dibromochloromethane	0/35	0.005 - 50	--	NA	--
Dibromomethane	0/4	11 - 50	--	NA	--
Dichlorodifluoromethane	0/6	0.017 - 50	--	NA	--
Ethylbenzene	3/35	0.005 - 50	0.01152 - 6.7J	NA	--
Isopropylbenzene	4/6	0.017 - 50	--	NA	--
Methylene chloride	0/35	0.005 - 50	--	NA	--
n-Butylbenzene	2/4	11 - 50	3.8J - 27J	NA	--
o-Xylene	1/4	11 - 50	4.9J	NA	--
Propylbenzene	3/4	11 - 50	4.3J - 37J	NA	--
sec-Butylbenzene	3/4	11 - 50	11J - 33J	NA	--
Styrene	0/35	0.005 - 50	--	NA	--
tert-Butyl methyl ether	0/6	0.034 - 50	--	NA	--
tert-Butylbenzene	1/4	11 - 50	1.8J	NA	--
Tetrachloroethene	0/35	0.005 - 50	--	NA	--
Toluene	6/35	0.005 - 50	0.001J - 2.1J	NA	--
trans-1,2-Dichloroethene	0/6	0.017 - 50	--	NA	--
trans-1,3-Dichloropropene	0/35	0.005 - 50	--	NA	--
Trichloroethene	0/35	0.005 - 50	--	NA	--
Trichlorofluoromethane	0/6	0.017 - 50	--	NA	--
Vinyl acetate	0/33	0.01 - 100	--	NA	--
Vinyl chloride	0/35	0.01 - 50	--	NA	--
Xylene (Total)	3/35	0.005 - 50	0.00656 - 15J	NA	--

Table 4-11. Summary of Analyses and Detections in the Panhandle Area (2-10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency(1)	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Petroleum Hydrocarbons					
Gasoline-range organics	5/28	1 - 69	0.15J - 79	NA	--
Diesel-range organics	16/29	11 - 380	3.8J - 830	NA	--
Motor oil-range organics	0/0	--	--	NA	--
TPH-extractable unknown hydrocarbo	4/8	11 - 88	9J - 220	NA	--
TPH-purgeable unknown hydrocarbon	0/3	1.2	--	NA	--
Total TPH	20/29	1 - 380	3.95 - 887	NA	--
Total oil and grease	26/29	27 - 120	56 - 5,800	NA	--

Notes

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HpCDD heptachlorodibenzo-p-dioxin
HpCDF heptachlorodibenzofuran
HQ hazard quotient
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
J estimated value
mg/kg milligrams per kilogram
NA not available
OCDD octachlorodibenzo-p-dioxin
OCDF octachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibeno-p-dioxin
PeCDF pentachlorodibenzofuran
TPH total petroleum hydrocarbons

Table 4-12. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (2-10 feet bgs)
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	0	0
Arsenic	11.1	HPAL	12	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	4	0
Calcium	--		--	--
Chromium (total)	a	See note	0	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	2	0
Lead	800	2004 PRG Industrial	13	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	1	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	0	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5,300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	0	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-12. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	3	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	4	0
Total (high risk) PCBs	0.74	2004 PRG Industrial	7	0
Dioxins and Furans				
1,2,3,4,6,7,8,9-OCDD	0.027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8,9-OCDF	0.027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8-HpCDD	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8-HpCDF	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8,9-HpCDF	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
1,2,3,6,7,8-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,6,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
1,2,3,7,8,9-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,7,8,9-HxCDF	0.00027	SDGI Industrial Criteria	0	0
1,2,3,7,8-PeCDD	0.000055	SDGI Industrial Criteria	1	0
1,2,3,7,8-PeCDF	0.00055	SDGI Industrial Criteria	0	0
2,3,4,6,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
2,3,4,7,8-PeCDF	0.000055	SDGI Industrial Criteria	8	0
2,3,7,8-TCDD	0.000016	2004 PRG Industrial	1	0
2,3,7,8-TCDF	0.00027	SDGI Industrial Criteria	1	0
TEQ (for 2,3,7,8-TCDD)	0.000016	2004 PRG Industrial	8	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	1	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0

Table 4-12. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	0	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	6	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	0	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	0	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0
Dibenzofuran	1600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	0	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	7	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0

Table 4-12. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	1	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	0
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	1	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	1	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbons	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbons	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	0	0
Total oil and grease	3,500	HPS TPH source criterion	2	0

Table 4-12. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

--	No criteria available for this chemical
bgs	below ground surface
BHC	benzene hexachloride
Conc.	concentration
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
ESL	environmental screening level
HPAL	Hunters Point ambient level
HPS	Hunters Point Shipyard
mg/kg	milligrams per kilogram
NE	not established
PCB	polychlorinated biphenyl
PRG	preliminary remediation goal
RIEC	remedial investigation evaluation criteria
SDGI	standard data gaps investigation
TEQ	toxicity equivalent quotient
TPH	total petroleum hydrocarbon

Table 4-13. Summary of Analyses and Detections in the Panhandle Area (greater than 10 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	36/36	0.2 - 15	2,090 - 25,300	NA	--
Antimony	11/40	0.01 - 8.8	0.22J - 27	9.05	5
Arsenic	36/40	0.05 - 8	1.3J - 20	11.1	6
Barium	38/40	0.04 - 435	11.69 - 1,300	314.4	5
Beryllium	25/40	0.01 - 1.5	0.12 - 0.91	0.71	4
Cadmium	13/40	0.01 - 1.5	0.35 - 6.3	3.14	1
Calcium	36/36	0.93 - 59	1,315.87 - 73,800	NA	--
Chromium	40/40	0.05 - 43	16.8 - 699.74	a	2
Chromium VI	1/62	0.05 - 0.12	0.58J	NA	--
Cobalt	39/40	0.01 - 108	3.65 - 115.03	a	1
Copper	36/40	0.01 - 54	1.65 - 4190	124.3	9
Cyanide	16/31	0.07 - 1.2	0.08J - 2.61J	NA	--
Iron	36/36	0.4 - 13.7	7,141.99 - 55,860.8	NA	--
Lead	39/40	0.01 - 33	1.2 - 3,200	8.99	28
Magnesium	36/36	0.14 - 59	1,340J - 136,981	NA	--
Manganese	40/40	0.01 - 108	46.81 - 2,370	1431.2	2
Mercury	17/40	0.07 - 1.3	0.09J - 0.86	2.28	0
Molybdenum	11/34	0.01 - 2.9	0.68 - 12.7	2.68	6
Nickel	40/40	0.01 - 108	15.8 - 2,557.66	a	0
Potassium	32/36	0.58 - 848	428 - 4,390	NA	--
Selenium	8/40	0.02 - 1.4	0.25 - 3.9	1.95	4
Silver	10/40	0.01 - 4	0.13 - 2.7	1.43	1
Sodium	36/36	0.78 - 59	147 - 6,793.88	NA	--
Thallium	1/40	0.04 - 3.8	0.09J	0.81	0
Tin	0/3	3.2 - 3.6	--	NA	--
Vanadium	40/40	0.32 - 108	5.4 - 200	117.2	1
Zinc	40/40	0.12 - 108	12.82 - 3,600	109.9	13
Pesticides					
2,4'-DDD	0/0	--	--	NA	--
2,4'-DDE	0/0	--	--	NA	--
2,4'-DDT	0/0	--	--	NA	--
4,4'-DDD	1/38	0.0042 - 0.093	0.0044J	NA	--
4,4'-DDE	3/38	0.003 - 0.093	0.003J - 0.0046	NA	--
4,4'-DDT	2/38	0.0042 - 0.093	0.0024J - 0.082	NA	--
Aldrin	0/38	0.0021 - 0.17	--	NA	--
alpha-BHC	0/38	0.0021 - 0.17	--	NA	--
alpha-Chlordane	0/34	0.0021 - 0.46	--	NA	--
beta-BHC	1/38	0.0021 - 0.17	0.0032J	NA	--
Chlordane	0/3	0.048 - 0.16	--	NA	--
cis-Nonachlor	0/0	--	--	NA	--
delta-BHC	0/38	0.0021 - 0.17	--	NA	--
Dieldrin	4/38	0.0042 - 0.093	0.0011J - 0.024	NA	--
Endosulfan I	0/38	0.0021 - 0.046	--	NA	--
Endosulfan II	0/38	0.0042 - 0.093	--	NA	--
Endosulfan sulfate	0/38	0.0042 - 0.093	--	NA	--
Endrin	0/38	0.0042 - 0.093	--	NA	--
Endrin aldehyde	0/6	0.0042 - 0.02	--	NA	--
Endrin ketone	1/38	0.0042 - 0.093	0.0069J	NA	--
gamma-BHC (lindane)	0/38	0.0021 - 0.17	--	NA	--
gamma-Chlordane	0/0	--	--	NA	--
Heptachlor	0/38	0.0021 - 0.17	--	NA	--
Heptachlor epoxide	2/38	0.0021 - 0.046	0.00096J - 0.0021J	NA	--
Methoxychlor	2/38	0.021 - 0.46	0.01J - 0.013J	NA	--
Mirex	0/2	0.0021 - 0.0098	--	NA	--
Oxychlordane	0/0	--	--	NA	--
Toxaphene	0/38	0.076 - 0.93	--	NA	--
trans-Chlordane	0/34	0.021 - 0.46	--	NA	--
trans-Nonachlor	0/0	--	--	NA	--

Table 4-13. Summary of Analyses and Detections in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	0/38	0.018 - 1	--	NA	--
Aroclor-1221 (high risk PCB)	0/38	0.018 - 1	--	NA	--
Aroclor-1232 (high risk PCB)	0/38	0.018 - 1	--	NA	--
Aroclor-1242 (high risk PCB)	0/38	0.018 - 1	--	NA	--
Aroclor-1248 (high risk PCB)	0/38	0.018 - 0.46	--	NA	--
Aroclor-1254 (high risk PCB)	2/38	0.018 - 0.93	0.052J - 0.19	NA	--
Aroclor-1260 (high risk PCB)	5/38	0.018 - 0.93	0.0041 - 0.22	NA	--
Total (high risk) PCBs	5/38	0.018 - 1	0.0041 - 0.41	NA	--
Dioxins and Furans					
1,2,3,4,6,7,8,9-OCDD	2/2	--	0.000173 - 0.00584	NA	--
1,2,3,4,6,7,8,9-OCDF	0/0	--	--	NA	--
1,2,3,4,6,7,8-Heptachlorooxanthrene	2/2	--	0.0000711 - 0.0016	NA	--
1,2,3,4,6,7,8-HpCDD	2/2	--	0.0000234 - 0.00042	NA	--
1,2,3,4,6,7,8-HpCDF	0/0	--	0.000196 - 0.00495	NA	--
1,2,3,4,7,8,9-HpCDF	0/0	--	0.0000234 - 0.00042	NA	--
1,2,3,4,7,8-HxCDD	2/2	--	0.00000695 - 0.000104	NA	--
1,2,3,4,7,8-HxCDF	2/2	--	0.0000763 - 0.00127	NA	--
1,2,3,6,7,8-HxCDD	2/2	--	0.0000124 - 0.00021	NA	--
1,2,3,6,7,8-HxCDF	2/2	--	0.0000631 - 0.00107	NA	--
1,2,3,7,8,9-HxCDD	2/2	--	0.00000965 - 0.000153	NA	--
1,2,3,7,8,9-HxCDF	2/2	--	0.0000187 - 0.000276	NA	--
1,2,3,7,8-PeCDD	2/2	--	0.0000092 - 0.0000953	NA	--
1,2,3,7,8-PeCDF	2/2	--	0.0000447 - 0.000507	NA	--
2,3,4,6,7,8-HxCDF	2/2	--	0.0000747 - 0.0012	NA	--
2,3,4,7,8-PeCDF	2/2	--	0.0000808 - 0.000986	NA	--
2,3,7,8-TCDD	2/2	--	0.00000237 - 0.0000207	NA	--
2,3,7,8-TCDF	2/2	--	0.0000352 - 0.000323	NA	--
Semivolatile Organic Compounds					
1,2,3,4-Tetrahydronaphthalene	0/0	--	--	NA	--
1,2,4-Trichlorobenzene	0/38	0.36 - 26	--	NA	--
1,2-Dichlorobenzene	0/38	0.36 - 26	--	NA	--
1,3-Dichlorobenzene	0/38	0.36 - 26	--	NA	--
1,4-Dichlorobenzene	0/38	0.36 - 26	--	NA	--
2,2'-Oxybis(1-chloropropane)	0/1	0.42 - 0.42	--	NA	--
2,4,5-Trichlorophenol	0/38	0.42 - 130	--	NA	--
2,4,6-Trichlorophenol	0/38	0.36 - 26	--	NA	--
2,4-Dichlorophenol	0/38	0.36 - 26	--	NA	--
2,4-Dimethylphenol	0/38	0.36 - 26	--	NA	--
2,4-Dinitrophenol	0/38	1.7 - 130	--	NA	--
2,4-Dinitrotoluene	0/38	0.36 - 26	--	NA	--
2,6,10,14-Tetramethylpentadecane	0/0	--	--	NA	--
2,6-Dinitrotoluene	0/38	0.36 - 26	--	NA	--
2-Chloronaphthalene	0/38	0.36 - 26	--	NA	--
2-Chlorophenol	0/38	0.36 - 26	--	NA	--
2-Methylnaphthalene	3/34	0.015 - 26	0.041J - 7.4	NA	--
2-Methylphenol	0/38	0.36 - 26	--	NA	--
2-Nitroaniline	0/38	0.84 - 130	--	NA	--
2-Nitrophenol	0/38	0.36 - 26	--	NA	--
3,3'-Dichlorobenzidine	0/38	0.72 - 52	--	NA	--
2,4-Dimethylheptan-3-one	2/2	--	1.21951 - 1.74863	NA	--
3-Nitroaniline	0/38	0.84 - 130	--	NA	--
4,6-Dinitro-2-methylphenol	0/38	1.7 - 130	--	NA	--
4-Bromophenyl-phenylether	0/38	0.36 - 26	--	NA	--
4-Chloro-3-methylphenol	0/38	0.36 - 26	--	NA	--
4-Chloroaniline	0/38	0.36 - 26	--	NA	--
4-Chlorophenyl-phenylether	0/38	0.36 - 26	--	NA	--
4-Methylphenol	0/38	0.36 - 26	--	NA	--
4-Nitroaniline	0/38	0.84 - 130	--	NA	--
4-Nitrophenol	1/38	0.84 - 130	0.091J	NA	--
5-Methylhex-5-en-2-one	1/1	--	2.51366	NA	--

Table 4-13. Summary of Analyses and Detections in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Acenaphthene	1/38	0.36 - 26	0.078J	NA	--
Acenaphthylene	0/40	0.36 - 26	--	NA	--
Anthracene	3/40	0.36 - 26	0.07J - 1.6J	NA	--
Azobenzene	0/0	--	--	NA	--
Benzo(a)anthracene	4/40	0.36 - 26	0.096J - 3.3J	NA	--
Benzo(a)pyrene	5/40	0.36 - 26	0.13J - 1.4J	NA	--
Benzo(b)fluoranthene	4/40	0.36 - 26	0.15J - 3.6J	NA	--
Benzo(e)pyrene	0/2	3.8 - 4.1	--	NA	--
Benzo(g,h,i)perylene	3/40	0.36 - 26	0.052J - 1.9J	NA	--
Benzo(k)fluoranthene	3/40	0.36 - 26	0.076J - 0.22J	NA	--
Benzoic acid	2/34	1.7 - 130	0.15J - 0.34J	NA	--
Benzyl alcohol	0/34	0.36 - 26	--	NA	--
Biphenyl	0/2	3.5 - 3.7	--	NA	--
Bis(2-chloroethoxy)methane	0/38	0.36 - 26	--	NA	--
Bis(2-chloroethyl)ether	0/38	0.36 - 26	--	NA	--
Bis(2-chloroisopropyl)ether	0/37	0.36 - 26	--	NA	--
Bis(2-ethylhexyl)phthalate	2/40	0.36 - 26	0.23J - 0.24J	NA	--
Butylbenzylphthalate	0/38	0.36 - 26	--	NA	--
Carbazole	0/2	3.8 - 4.1	--	NA	--
Chrysene	4/40	0.36 - 26	0.12J - 3.7J	NA	--
Cyclic Octaatomic sulfur	2/2	--	0.87432 - 2.76423	NA	--
Dibenz(a,h)anthracene	1/40	0.36 - 26	0.11J	NA	--
Dibenzofuran	0/40	0.36 - 26	--	NA	--
Diethylphthalate	0/40	0.36 - 26	--	NA	--
Dimethylphthalate	0/38	0.36 - 26	--	NA	--
Di-n-butylphthalate	0/38	0.36 - 26	--	NA	--
Di-n-octylphthalate	0/38	0.36 - 26	--	NA	--
Dioctyl ester hexanedioic acid	0/0	--	--	NA	--
Fluoranthene	4/40	0.36 - 26	0.13J - 5.3J	NA	--
Fluorene	2/40	0.36 - 26	0.067J - 0.086J	NA	--
Heptadecane	0/0	--	--	NA	--
Hexachlorobenzene	0/38	0.36 - 26	--	NA	--
Hexachlorobutadiene	0/38	0.36 - 26	--	NA	--
Hexachlorocyclopentadiene	0/38	0.36 - 26	--	NA	--
Hexachloroethane	0/38	0.36 - 26	--	NA	--
Hexadecane	0/0	--	--	NA	--
Hexadecanoic acid	1/1	--	1.95122 - 1.95122	NA	--
Indeno(1,2,3-cd)pyrene	1/40	0.36 - 26	2.7J	NA	--
Isophorone	0/34	0.36 - 26	--	NA	--
Naphthalene	7/40	0.015 - 26	0.073J - 110	NA	--
Nitrobenzene	0/38	0.36 - 26	--	NA	--
n-Nitrosodimethylamine	0/0	--	--	NA	--
n-Nitroso-di-n-propylamine	0/40	0.36 - 26	--	NA	--
n-Nitrosodiphenylamine	0/40	0.36 - 26	--	NA	--
Octacosane	1/1	--	0.56911	NA	--
Pentachlorophenol	0/40	0.84 - 130	--	NA	--
Phenacetin	4/2	7.6 - 8.2	0.08J - 6.3J	NA	--
Phenanthrene	0/40	0.36 - 26	--	NA	--
Phenol	0/40	0.36 - 26	--	NA	--
Pyrene	6/40	0.36 - 26	0.036J - 5J	NA	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0/0	--	--	NA	--
1,1,1-Trichloroethane	0/34	0.005 - 1.6	--	NA	--
1,1,2,2-Tetrachloroethane	0/34	0.005 - 1.6	--	NA	--
1,1,2-Trichloro-1,2,2-trifluoroethane	0/0	--	--	NA	--
1,1,2-Trichloroethane	0/34	0.005 - 1.6	--	NA	--
1,1-Dichloroethane	0/34	0.005 - 1.6	--	NA	--
1,1-Dichloroethene	0/34	0.005 - 1.6	--	NA	--
1,1-Dichloropropene	0/0	--	--	NA	--
1,2,3-Trichlorobenzene	0/0	--	--	NA	--
1,2,3-Trichloropropane	0/0	--	--	NA	--

Table 4-13. Summary of Analyses and Detections in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Volatile Organic Compounds *(continued)*					
1,2,3-Trimethylbenzene	0/0	--	--	NA	--
1,2,4-Trimethylbenzene	0/0	--	--	NA	--
1,2-Dibromo-3-chloropropane	0/0	--	--	NA	--
1,2-Dibromoethane	0/0	--	--	NA	--
1,2-Dichloroethane	0/34	0.005 - 1.6	--	NA	--
1,2-Dichloroethene (Total)	0/34	0.005 - 1.6	--	NA	--
1,2-Dichloropropane	0/34	0.005 - 1.6	--	NA	--
1,3,5-Trimethylbenzene	0/0	--	--	NA	--
1,3-Dichloropropane	0/0	--	--	NA	--
2,2-Dichloropropane	0/0	--	--	NA	--
2-Butanone	3/34	0.011 - 3.2	0.002J - 0.01444	NA	--
2-Chloroethyl vinyl ether	0/0	--	--	NA	--
2-Chlorotoluene	0/0	--	--	NA	--
2-Hexanone	0/34	0.011 - 3.2	--	NA	--
4-Chlorotoluene	0/0	--	--	NA	--
4-Isopropyl toluene	0/0	--	--	NA	--
4-Methyl-2-pentanone	0/34	0.011 - 3.2	--	NA	--
Acetone	0/34	0.011 - 3.2	--	NA	--
Benzene	0/34	0.005 - 1.6	--	NA	--
Bromobenzene	0/0	--	--	NA	--
Bromochloromethane	0/0	--	--	NA	--
Bromodichloromethane	0/34	0.005 - 1.6	--	NA	--
Bromoform	0/34	0.005 - 1.6	--	NA	--
Bromomethane	0/34	0.011 - 3.2	--	NA	--
Carbon disulfide	8/34	0.005 - 1.6	0.0022J - 0.05238	NA	--
Carbon tetrachloride	0/34	0.005 - 1.6	--	NA	--
Chlorobenzene	0/34	0.005 - 1.6	--	NA	--
Chloroethane	0/34	0.011 - 3.2	--	NA	--
Chloroform	0/34	0.005 - 1.6	--	NA	--
Chloromethane	0/34	0.011 - 3.2	--	NA	--
cis-1,2-Dichloroethene	0/0	--	--	NA	--
cis-1,3-Dichloropropene	0/34	0.005 - 1.6	--	NA	--
Dibromochloromethane	0/34	0.005 - 1.6	--	NA	--
Dibromomethane	0/0	--	--	NA	--
Dichlorodifluoromethane	0/0	--	--	NA	--
Ethylbenzene	0/34	0.005 - 1.6	--	NA	--
Isopropylbenzene	0/0	-	--	NA	--
Methylene chloride	0/34	0.005 - 1.6	--	NA	--
n-Butylbenzene	0/0	--	--	NA	--
o-Xylene	0/0	--	--	NA	--
Propylbenzene	0/0	--	--	NA	--
sec-Butylbenzene	0/0	--	--	NA	--
Styrene	0/34	0.005 - 1.6	--	NA	--
tert-Butyl methyl ether	0/0	--	--	NA	--
tert-Butylbenzene	0/0	--	--	NA	--
Tetrachloroethene	0/34	0.005 - 1.6	--	NA	--
Toluene	6/34	0.005 - 1.6	0.0031J - 0.77J	NA	--
trans-1,2-Dichloroethene	0/0	--	--	NA	--
trans-1,3-Dichloropropene	0/34	0.005 - 1.6	--	NA	--
Trichloroethene	0/34	0.005 - 1.6	--	NA	--
Trichlorofluoromethane	0/0	--	--	NA	--
Vinyl acetate	0/34	0.011 - 3.2	--	NA	--
Vinyl chloride	0/34	0.011 - 3.2	--	NA	--
Xylene (Total)	1/34	0.005 - 1.6	0.001J	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	3/32	1 - 200	3J - 3,900	NA	--
Diesel-range organics	13/33	1 - 430	4.8 - 2,800	NA	--
Motor oil-range organics	1/1	62 - 62	190	NA	--
TPH-extractable unknown hydrocarbons	4/7	11 - 14	8J - 22	NA	--
TPH-purgeable unknown hydrocarbons	0/3	1.2 - 1.3	--	NA	--

Table 4-13. Summary of Analyses and Detections in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Petroleum Hydrocarbons *(continued)*					
Total TPH	17/33	1 - 430	6.5 - 6,700	NA	--
Total oil and grease	27/32	27 - 130	32J - 12,000	NA	--

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HpCDD heptachlorodibenzo-p-dioxin
HpCDF heptachlorodibenzofuran
HQ hazard quotient
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
J estimated value
mg/kg milligrams per kilogram
NA not available
OCDD octachlorodibenzo-p-dioxin
OCDF octachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibeno-p-dioxin
PeCDF pentachlorodibenzofuran
TPH total petroleum hydrocarbons

Table 4-14. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC		Detections Exceeding RIEC	Detections Exceeding 100x RIEC
	Conc. (mg/kg)	Comments		
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	0	0
Arsenic	11.1	HPAL	6	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	38	2005 ESL Industrial (direct exp)	0	0
Calcium	--		--	--
Chromium (total)	a	See note	1	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	0	0
Lead	800	2004 PRG Industrial	5	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	0	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	0	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Total (high risk) PCBs	0.74	2004 PRG Industrial	0	0

Table 4-14. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Dioxins and Furans				
1,2,3,4,6,7,8,9-OCDD	0.027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8,9-OCDF	0.027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8-HpCDD	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,6,7,8-HpCDF	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8,9-HpCDF	0.0027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,4,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
1,2,3,6,7,8-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,6,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
1,2,3,7,8,9-HxCDD	0.00027	SDGI Industrial Criteria	0	0
1,2,3,7,8,9-HxCDF	0.00027	SDGI Industrial Criteria	1	0
1,2,3,7,8-PeCDD	0.000055	SDGI Industrial Criteria	1	0
1,2,3,7,8-PeCDF	0.00055	SDGI Industrial Criteria	0	0
2,3,4,6,7,8-HxCDF	0.00027	SDGI Industrial Criteria	1	0
2,3,4,7,8-PeCDF	0.000055	SDGI Industrial Criteria	2	0
2,3,7,8-TCDD	0.000016	2004 PRG Industrial	1	0
2,3,7,8-TCDF	0.00027	SDGI Industrial Criteria	1	0
TEQ (for 2,3,7,8-TCDD)	0.000016	2004 PRG Industrial	2	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	2.1	2005 ESL Industrial (direct exp)	1	0
Benzo(a)pyrene	0.33	2004 PRG Industrial	1	0
Benzo(b)fluoranthene	2.1	2005 ESL Industrial (direct exp)	1	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	15	2005 ESL Industrial (direct exp)	0	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0

Table 4-14. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	2.1	2005 ESL Industrial (direct exp)	1	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	3	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0

Table 4-14. Summary of Detected Exceedances of Evaluation Criteria in the Panhandle Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	0	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbons	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbons	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	1	0
Total oil and grease	3,500	HPS TPH source criterion	4	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
Conc. concentration
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
ESL environmental screening level
HPAL Hunters Point ambient level
HpCDD heptachlorodibenzo-p-dioxin
HpCDF heptachlorodibenzofuran
HPS Hunters Point Shipyard
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
mg/kg milligrams per kilogram
NE not established
OCDD octachlorodibenzo-p-dioxin
OCDF octachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibeno-p-dioxin
PeCDF pentachlorodibenzofuran
PRG preliminary remediation goal
RIEC remedial investigation evaluation criteria
SDGI standard data gaps investigation
TEQ toxicity equivalent quotient
TPH total petroleum hydrocarbon

Table 4-15. Summary of Analyses and Detections in the East Adjacent Area (0-2 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	42 / 42	1.4 - 240	1,200 - 32,900	NA	--
Antimony	41 / 55	0.34 - 6.6	0.21J - 409.44J	9.05	13
Arsenic	50 / 55	0.26 - 3	1.3 - 22	11.1	5
Barium	55 / 55	0.02 - 21.5	12 - 650	314.4	7
Beryllium	23 / 55	0.01 - 0.54	0.04J - 1.1	0.71	5
Cadmium	19 / 55	0.04 - 0.76	0.13 - 11.82	3.14	7
Calcium	42 / 42	1.4 - 220	950 - 120,000J	NA	--
Chromium	55 / 55	0.09 - 2.4	15.3 - 860J	a	3
Chromium VI	2 / 34	0.05 - 0.06	1.005 - 1.5	NA	--
Cobalt	55 / 55	0.09 - 5.4	2.9 - 102	a	4
Copper	55 / 55	0.11 - 23	5.1J - 5,500	124.3	28
Cyanide	0 / 5	0.51 - 0.55	--	NA	--
Iron	42 / 42	0.73 - 210	6,100 - 140,000	NA	--
Lead	55 / 55	0.15 - 28	2.6J - 11,215.9	8.99	52
Magnesium	42 / 42	0.78 - 14.47	630J - 175,000	NA	--
Manganese	42 / 42	0.01 - 2.2	78 - 2,400	1431.2	2
Mercury	42 / 55	0.01 - 0.5	0.05 - 46.67	2.28	10
Molybdenum	20 / 54	0.13 - 2.2	0.64 - 46.83	2.68	15
Nickel	53 / 55	0.15 - 4.3	16 - 1,500	a	--
Potassium	39 / 42	1.4 - 411	182J - 5,300J	NA	--
Selenium	11 / 55	0.26 - 2.3	0.14J - 3.9	1.95	1
Silver	14 / 55	0.07 - 2.56	0.11J - 1.51	1.43	1
Sodium	26 / 42	4.7 - 39	94 - 4,510	NA	--
Thallium	6 / 55	0.13 - 3.1	0.21J - 6.9	0.81	6
Tin	0 / 0	--	--	NA	--
Vanadium	54 / 55	0.09 - 5.4	4.1 - 209	117.2	1
Zinc	55 / 55	0.21 - 21	40J - 4,100	109.9	34
Pesticides					
4,4'-DDD	2/52	0.0034 - 1.7	0.3 - 1.2	NA	-
4,4'-DDE	8/52	0.0034 - 1.7	0.0064 - 0.99	NA	--
4,4'-DDT	15/52	0.0034 - 2.3	0.0071 - 5.8	NA	--
Aldrin	1/52	0.0018 - 0.21	0.0017	NA	--
Alpha-BHC	1/52	0.0018 - 0.21	0.0051	NA	--
Alpha-chlordane	1/39	0.0018 - 11	0.01	NA	--
Beta-BHC	0/52	0.0018 - 0.21	--	NA	--
Delta-BHC	0/52	0.0018 - 0.21	--	NA	--
Dieldrin	10/52	0.0034 - 1.7	0.0018 - 0.25J	NA	--
Endosulfan I	1/52	0.0018 - 0.85	0.0018	NA	--
Endosulfan II	5/52	0.0034 - 1.7	0.0037 - 4.8	NA	--
Endosulfan sulfate	10/52	0.0034 - 2.3	0.0081 - 13	NA	--
Endrin	6/52	0.0018 - 1.7	0.0064 - 0.14	NA	--
Endrin aldehyde	0/35	0.0034 - 0.35	--	NA	--
Endrin ketone	4/52	0.0034 - 2.3	0.45 - 0.99	NA	--
Gamma-BHC (lindane)	0/52	0.0018 - 0.21	--	NA	--
gamma-Chlordane	0/13	0.15 - 3.2	--	NA	--
Heptachlor	1/52	0.0018 - 0.21	0.0046	NA	--
Heptachlor epoxide	9/52	0.0018 - 0.21	0.0032 - 3.2	NA	--
Methoxychlor	9/52	0.0068 - 11	0.0088 - 3.3	NA	--
Toxaphene	0/48	0.167 - 23	--	NA	--
trans-Chlordane	1/38	0.0018 - 11	0.013	NA	--
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	0/55	0.01 - 10	0 - 0	NA	--
Aroclor-1221 (high risk PCB)	0/55	0.02 - 20	0 - 0	NA	--
Aroclor-1232 (high risk PCB)	0/55	0.01 - 10	0 - 0	NA	--
Aroclor-1242 (high risk PCB)	0/55	0.01 - 11	0 - 0	NA	--
Aroclor-1248 (high risk PCB)	1/55	0.01 - 11	3.8 - 3.8	NA	--
Aroclor-1254 (high risk PCB)	3/55	0.01 - 23	0.45 - 1.5	NA	--
Aroclor-1260 (high risk PCB)	39/55	0.01 - 23	0.035 - 450	NA	--
Total (high risk) PCBs	39/55	0.01 - 23	0.035 - 450	NA	--

Table 4-15. Summary of Analyses and Detections in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds					
1,2,4-Trichlorobenzene	1 / 39	0.14 - 21	0.12J	NA	--
1,2-Dichlorobenzene	0 / 39	0.14 - 21	--	NA	--
1,3-Dichlorobenzene	0 / 39	0.14 - 21	--	NA	--
1,4-Dichlorobenzene	0 / 39	0.14 - 21	--	NA	--
11H-Benzo(a)fluorene	1 / 1	0.13 - 0.13	0.13J	NA	--
17-Pentatriacontene	1 / 1	0.45 - 0.45	0.45J	NA	--
1-Docosene	0 / 0	--	--	NA	--
1-Methylpyrene	2 / 2	0.63 - 0.78	0.63 - 0.78J	NA	--
2-(2-Butoxyethoxy)-ethanol	1 / 1	0.11 - 0.11	0.11J	NA	--
2,2'-Oxybis(1-chloropropane)	0 / 0	0.68 - 14	--	NA	--
2,3-Dimethylphenanthrene	0 / 0	--	--	NA	--
2,4,5,7-Tetramethylphenanthrene	0 / 0	--	--	NA	--
2,4,5-Trichlorophenol	0 / 27	0.36 - 110	--	NA	--
2,4,6-Trichlorophenol	0 / 27	0.34 - 21	--	NA	--
2,4-Dichlorophenol	0 / 27	0.34 - 21	--	NA	--
2,4-Dimethylphenol	0 / 39	0.14 - 21	--	NA	--
2,4-Dinitrophenol	0 / 27	0.85 - 110	--	NA	--
2,4-Dinitrotoluene	0 / 30	0.34 - 21	--	NA	--
2,6,10,14-Tetramethylhexadecane	0 / 0	--	--	NA	--
2,6,10,14-Tetramethylpentadecane	1 / 1	0.27 - 0.27	0.27	NA	--
2,6,10-Trimethyl-dodecane	1 / 1	0.31 - 0.31	0.31	NA	--
2,6,11,15-Tetramethylhexadecane	2 / 2	0.14 - 0.36	0.14J - 0.36J	NA	--
2,6,11-Trimethyl-dodecane	0 / 0	--	--	NA	--
2,6-Dinitrotoluene	0 / 39	0.14 - 21	--	NA	--
2-Chloronaphthalene	0 / 39	0.14 - 21	--	NA	--
2-Chlorophenol	0 / 30	0.34 - 21	--	NA	--
2-Methylnaphthalene	3 / 39	0.072 - 21	0.075J - 3.5	NA	--
2-Methylphenol	0 / 39	0.14 - 21	--	NA	--
2-Nitroaniline	0 / 39	0.14 - 110	--	NA	--
2-Nitrophenol	0 / 27	0.34 - 21	--	NA	--
3,3'-Dichlorobenzidine	0 / 39	0.14 - 42	--	NA	--
3,6-Dimethylphenanthrene	1 / 1	0.5 - 0.5	0.5	NA	--
3-Nitroaniline	0 / 27	0.72 - 110	--	NA	--
4,4-Dimethylbiphenyl	1 / 1	0.24 - 0.24	0.24J	NA	--
4,6-Dinitro-2-methylphenol	0 / 27	0.85 - 110	--	NA	--
4-Bromophenyl-phenylether	0 / 27	0.34 - 21	--	NA	--
4-Chloro-3-methylphenol	0 / 30	0.34 - 21	--	NA	--
4-Chloroaniline	0 / 27	0.34 - 21	--	NA	--
4-Chlorophenyl-phenylether	0 / 27	0.34 - 21	--	NA	--
4H-Cyclopenta(def)phenanthrene	1 / 1	0.089 - 0.089	0.089J	NA	--
4-Methylphenol	1 / 39	0.14 - 21	0.1J	NA	--
4-Nitroaniline	0 / 27	0.72 - 110	--	NA	--
4-Nitrophenol	0 / 39	0.35 - 110	0.83J	NA	--
7H-Benzo[c]fluorene	0 / 0	--	--	NA	--
9,10-Anthracenedione	1 / 1	0.17 - 0.17	0.17J	NA	--
9-Methylanthracene	1 / 1	0.13 - 0.13	0.13	NA	--
Acenaphthene	6 / 52	0.07 - 21	0.067J - 0.44J	NA	--
Acenaphthylene	3 / 43	0.07 - 21	0.038J - 0.088J	NA	--
Aniline	0 / 3	0.351 - 3.546	--	NA	--
Anthracene	14 / 52	0.07 - 21	0.0043J - 0.39J	NA	--
Azobenzene	0 / 1	0.36 - 14	--	NA	--
Benzidine	0 / 3	0.351 - 3.546	--	NA	--
Benzo(a)anthracene	26 / 52	0.07 - 21	0.019J - 2.3J	NA	--
Benzo(a)pyrene	26 / 52	0.07 - 21	0.018J - 3.4J	NA	--
Benzo(b)fluoranthene	26 / 52	0.07 - 21	0.03J - 6.6J	NA	--
Benzo(e)pyrene	0 / 0	--	--	NA	--
Benzo(g,h,i)perylene	21 / 52	0.07 - 21	0.015J - 2.2J	NA	--
Benzo(k)fluoranthene	13 / 52	0.07 - 21	0.015J - 2.1	NA	--
Benzoic acid	0 / 18	1.6 - 110	--	NA	--
Benzyl alcohol	0 / 18	0.34 - 21	--	NA	--

Table 4-15. Summary of Analyses and Detections in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Bis(2-chloroethoxy)methane	0 / 27	0.34 - 21	--	NA	--
Bis(2-chloroethyl)ether	0 / 27	0.34 - 21	--	NA	--
Bis(2-chloroisopropyl)ether	0 / 27	0.34 - 21	--	NA	--
Bis(2-ethylhexyl)phthalate	3 / 39	0.14 - 21	0.16 - 4.1	NA	--
Butylbenzylphthalate	0 / 39	0.14 - 21	--	NA	--
Carbazole	0 / 21	0.14 - 10	--	NA	--
Chrysene	33 / 52	0.07 - 21	0.082J - 5.8	NA	--
Cyclopenta(cd)pyrene	0 / 0	--	--	NA	--
Dibenz(a,h)anthracene	6 / 52	0.07 - 21	0.071J - 0.23J	NA	--
Dibenzofuran	2 / 39	0.14 - 21	0.068J - 0.11J	NA	--
Diethylphthalate	0 / 39	0.14 - 21	--	NA	--
Dimethylphthalate	0 / 27	0.34 - 21	--	NA	--
Di-n-butylphthalate	1 / 39	0.14 - 21	0.63	NA	--
Di-n-octylphthalate	0 / 39	0.14 - 21	--	NA	--
Docosane	0 / 0	--	--	NA	--
Dodecane	0 / 0	--	--	NA	--
Dotriacontane	1 / 1	0.54 - 0.54	0.54J	NA	--
Eicosane	4 / 4	0.11 - 0.86	0.11 - 0.86	NA	--
Fluoranthene	31 / 39	0.14 - 21	0.051J - 5.5J	NA	--
Fluorene	7 / 52	0.07 - 21	0.063J - 0.86J	NA	--
Heneicosane	2 / 2	0.8 - 0.81	0.8 - 0.81	NA	--
Heptacosane	0 / 0	--	--	NA	--
Heptadecane	5 / 5	0.087 - 0.63	0.087J - 0.63	NA	--
Hexachlorobenzene	0 / 39	0.14 - 21	--	NA	--
Hexachlorobutadiene	0 / 27	0.34 - 21	--	NA	--
Hexachlorocyclopentadiene	0 / 27	0.34 - 70	--	NA	--
Hexachloroethane	0 / 27	0.34 - 21	--	NA	--
Hexacosane	0 / 0	--	--	NA	--
Hexadecane	4 / 4	0.36 - 8.2	0.36J - 8.2	NA	--
Hexadecanoic acid	1 / 1	0.28 - 0.28	0.28J	NA	--
Hexatriacontane	4 / 4	0.11 - 0.58	0.11 - 0.58J	NA	--
Indeno(1,2,3-cd)pyrene	17 / 52	0.07 - 21	0.012 - 0.81	NA	--
Isophorone	0 / 39	0.14 - 21	--	NA	--
m-Terphenyl	0 / 0	--	--	NA	--
Naphthalene	10 / 52	0.14 - 21	0.034J - 1.3	NA	--
Nitrobenzene	0 / 27	0.34 - 21	--	NA	--
n-Nitrosodimethylamine	0 / 4	0.351 - 14	--	NA	--
n-Nitroso-di-n-propylamine	0 / 39	0.14 - 21	--	NA	--
n-Nitrosodiphenylamine	0 / 39	0.14 - 21	--	NA	--
Nonacosane	0 / 0	--	--	NA	--
Nonadecane	3 / 3	0.25 - 0.6	0.25 - 0.6	NA	--
Octacosane	1 / 1	0.18 - 0.18	0.18J	NA	--
Octadecane	2 / 2	0.32 - 0.7	0.32 - 0.7	NA	--
o-Terphenyl	0 / 0	--	--	NA	--
PCB-153	0 / 0	--	--	NA	--
Pentachlorophenol	0 / 39	0.35 - 110	--	NA	--
Pentacosane	0 / 0	--	--	NA	--
Pentadecane	0 / 0	--	--	NA	--
Pentatriacontane	0 / 0	--	--	NA	--
Perylene	0 / 0	--	--	NA	--
Phenanthrene	26 / 52	0.07 - 21	0.038J - 2.1	NA	--
Phenol	4 / 39	0.14 - 21	0.074J - 1J	NA	--
p-Terphenyl	0 / 0	--	--	NA	--
Pyrene	37 / 52	0.07 - 21	0.059 - 6.9	NA	--
Tetracosane	2 / 2	0.16 - 0.61	0.16 - 0.61	NA	--
Tetradecane	1 / 1	0.81 - 0.81	0.81	NA	--
Tetratetracontane	0 / 0	--	--	NA	--
Triacontane	1 / 1	0.61 - 0.61	0.61	NA	--
Tricosane	0 / 0	--	--	NA	--
Tridecane	1 / 1	0.1 - 0.1	0.1J	NA	--

Table 4-15. Summary of Analyses and Detections in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Tri-m-cresyl phosphate	0 / 0	--	--	NA	--
Triphenylene	1 / 1	0.16 - 0.16	0.16J	NA	--
Tri-p-tolyl phosphate	0/0	--	--	NA	--
Volatile Organic Compounds					
1,1,1-Trichloroethane	0 / 20	0.005 - 0.011	--	NA	--
1,1,2,2-Tetrachloroethane	2 / 22	0.005 - 0.011	0.24 - 0.74J	NA	--
1,1,2-Trichloroethane	0 / 20	0.005 - 0.011	--	NA	--
1,1-Dichloroethane	1 / 20	0.005 - 0.011	0.00329J	NA	--
1,1-Dichloroethene	0 / 20	0.005 - 0.011	--	NA	--
1,2,3,5-Tetramethylbenzene	1 / 1	0.017 - 0.017	0.017	NA	--
1,2,4-Trimethylbenzene	1 / 1	0.005 - 0.005	0.005J	NA	--
1,2-Dichloroethane	0 / 20	0.005 - 0.011	--	NA	--
1,2-Dichloroethene (Total)	1 / 20	0.005 - 0.011	0.0064	NA	--
1,2-Dichloropropane	0 / 20	0.005 - 0.011	--	NA	--
1-Ethyl-2,3-dihydro-1H-indene	0 / 0	0.013 - 0.013	--	NA	--
1-Ethyl-2,4-dimethyl benzene	1 / 1	0.005 - 0.005	0.005	NA	--
1-Ethyl-2-methylbenzene	1 / 1	0.005 - 0.006	1.005	NA	--
2-Butanone	2 / 20	0.01 - 0.014	0.003J - 0.0083J	NA	--
2-Hexanone	0 / 20	0.01 - 0.014	--	NA	--
4-Ethyl-1,2-dimethylbenzene	1 / 1	0.008 - 0.008	0.008	NA	--
4-Methyl-2-pentanone	1 / 20	0.01 - 0.014	0.021	NA	--
Acetone	0 / 20	0.01 - 0.014	--	NA	--
Benzene	0 / 24	0.0048 - 0.011	--	NA	--
Bicyclo[3.3.1]nonane	0 / 0	--	--	NA	--
Bromodichloromethane	0 / 20	0.005 - 0.011	--	NA	--
Bromoform	0 / 20	0.005 - 0.011	--	NA	--
Bromomethane	0 / 20	0.01 - 0.014	--	NA	--
Carbon disulfide	0 / 20	0.005 - 0.011	--	NA	--
Carbon tetrachloride	0 / 20	0.005 - 0.011	--	NA	--
Chlorobenzene	0 / 20	0.005 - 0.011	--	NA	--
Chloroethane	0 / 20	0.01 - 0.014	--	NA	--
Chloroform	0 / 20	0.005 - 0.011	--	NA	--
Chloromethane	0 / 20	0.01 - 0.014	--	NA	--
cis-1,2-Dichloroethene	0 / 20	--	--	NA	--
cis-1,3-Dichloropropene	0 / 0	0.005 - 0.011	--	NA	--
cis-Bicyclo[4.3.0]nonane	0 / 0	--	--	NA	--
Dibromochloromethane	0 / 20	0.005 - 0.011	--	NA	--
Ethylbenzene	3 / 24	0.0048 - 0.011	0.0031J - 0.012	NA	--
Methylcyclohexane	0 / 0	--	--	NA	--
Methylene chloride	0 / 20	0.005 - 0.011	--	NA	--
o-Xylene	1 / 4	0.0048 - 0.0084	0.0072J	NA	--
Styrene	0 / 20	0.005 - 0.011	--	NA	--
Tert-butyl methyl ether	0 / 4	0.0048 - 0.0084	--	NA	--
Tetrachloroethene	2 / 20	0.005 - 0.011	0.001J - 0.0073	NA	--
Toluene	8 / 24	0.0048 - 0.011	0.00054J - 0.12	NA	--
trans-1,3-Dichloroethene	0 / 20	--	--	NA	--
trans-1,3-Dichloropropene	0 / 0	0.005 - 0.011	--	NA	--
Trichloroethene	3 / 20	0.005 - 0.011	0.001J - 0.013	NA	--
Vinyl acetate	0 / 17	0.01 - 0.014	--	NA	--
Vinyl chloride	0 / 20	0.01 - 0.014	--	NA	--
Xylene (Total)	4 / 24	0.0048 - 0.011	0.0039J - 0.056	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	12 / 52	0.18 - 11	0.02J - 84J	NA	--
Diesel-range organics	44 / 53	1 - 5,100	4.2 - 110,00D	NA	--
Motor oil-range organics	36 / 36	5.1 - 5,300	8.5J - 77,000Y	NA	--
TPH-extractable unknown hydrocarbon	1 / 4	10 - 11	46	NA	--
TPH-purgeable unknown hydrocarbon	0 / 3	0.2 - 5.2	--	NA	--
Total recoverable petroleum hydrocarbon	9 / 10	11 - 2,100	7.3J - 62,000	NA	--
Total TPH	46 / 51	--	14.6 - 83,500.64	NA	--
Total oil and grease	17 / 17	26 - 92	78J - 8,100J	NA	--

Table 4-15. Summary of Analyses and Detections in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC Benzene hexachloride
D pattern resembles diesel
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HPAL Hunters Point ambient level
J Estimated value
mg/kg milligrams per kilogram
NA not available
PCB polychlorinated biphenyl
R Rejected
TPH total petroleum hydrocarbons
Y Chromatogram indicates the presence of petroleum fuel

Table 4-16. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (0-2 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC		Detections Exceeding RIEC	Detections Exceeding 100x RIEC
	Conc. (mg/kg)	Comments		
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	1	0
Arsenic	11.1	HPAL	5	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	2	0
Calcium	--		--	--
Chromium (total)	a	See note	2	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	2	0
Lead	800	2004 PRG Industrial	9	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	4	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	2	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-16. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	1	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	1	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	30	2
Total (high risk) PCBs	0.74	2004 PRG Industrial	30	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	0
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	2	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	10	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	5	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	2	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0

Table 4-16. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	0	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	0	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	2	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0

Table 4-16. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (0-2 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	8	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	3	0
TPH-extractable unknown hydrocarbon	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbon	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	7	0
Total oil and grease	3,500	HPS TPH source criterion	6	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

--	No criteria available for this chemical	HPS	Hunters Point Shipyard
bgs	below ground surface	mg/kg	milligrams per kilogram
BHC	benzene hexachloride	NE	not established
Conc.	concentration	PCB	polychlorinated biphenyl
DDD	dichlorodiphenyldichloroethane	PRG	preliminary remediation goal
DDE	dichlorodiphenyldichloroethene	RIEC	remedial investigation evaluation criteria
DDT	dichlorodiphenyltrichloroethane	SDGI	standard data gaps investigation
ESL	environmental screening level	TPH	total petroleum hydrocarbons
HPAL	Hunters Point ambient level		

Table 4-17. Summary of Analyses and Detections in the East Adjacent Area (2-10 feet bgs)
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	72 / 72	1.4 - 250	871.46 - 42,652.9	NA	--
Antimony	87 / 126	0.36 - 6.9	0.26J - 976.27J	9.05	26
Arsenic	97 / 126	0.22 - 3.4	0.6 - 106	11.1	14
Barium	126 / 126	0.02 - 20.6	5.71 - 985	314.4	10
Beryllium	72 / 126	0.01 - 1.1	0.03J - 1.28	0.71	9
Cadmium	61 / 126	0.04 - 1.1	0.2J - 7.16	3.14	4
Calcium	72 / 72	1.31 - 330	278.04 - 131,000	NA	--
Chromium	126 / 126	0.09 - 2.5	33.16 - 924	a	4
Chromium VI	2 / 69	0.05 - 0.07	0.3 - 0.97	NA	--
Cobalt	126 / 126	0.09 - 5.2	1.8J - 225	a	2
Copper	125 / 126	0.11 - 23	2.7 - 7700	124.3	57
Cyanide	5 / 17	0.12 - 1	0.37 - 1.2	NA	--
Iron	72 / 72	0.72 - 210	4,011.52 - 100,000	NA	--
Lead	117 / 126	0.13 - 29	1.6 - 255,684	8.99	95
Magnesium	72 / 72	0.79 - 100	630J - 212,000	NA	--
Manganese	72 / 72	0.01 - 3.4	43.22 - 2,550	1431.2	3
Mercury	102 / 126	0.01 - 2.3	0.01J - 51	2.28	35
Molybdenum	45 / 123	0.14 - 2.3	0.56 - 14.61	2.68	15
Nickel	121 / 126	0.16 - 5.2	10J - 2,970	a	2
Potassium	55 / 72	1.4 - 413.09	107 - 5,640	NA	--
Selenium	39 / 126	0.22 - 5.2	0.09J - 6.2	1.95	4
Silver	26 / 126	0.09 - 10.4	0.14J - 17.8	1.43	4
Sodium	54 / 72	4.8 - 330	70 - 7,520	NA	--
Thallium	11 / 126	0.16 - 3.1	0.14J - 5.6	0.81	5
Tin	0 / 0	--	--	NA	--
Vanadium	125 / 126	0.09 - 5.2	3.7 - 520	117.2	2
Zinc	126 / 126	0.23 - 45	20.4 - 3,100	109.9	65
Pesticides					
4,4'-DDD	9 / 128	0.0034 - 27	0.0026J - 0.059J	NA	--
4,4'-DDE	37 / 128	0.0034 - 27	0.0016J - 24J	NA	--
4,4'-DDT	47 / 128	0.0034 - 27	0.0036J - 110J	NA	--
Aldrin	8 / 128	0.0017 - 14	0.0053J - 0.039J	NA	--
Alpha-BHC	2 / 128	0.0017 - 14	0.0029 - 0.0037J	NA	--
Alpha-chlordane	0 / 74	0.0017 - 87	--	NA	--
Beta-BHC	11 / 128	0.0017 - 14	0.0027J - 0.065	NA	--
Delta-BHC	2 / 128	0.0017 - 14	0.0027J - 0.0093J	NA	--
Dieldrin	25 / 128	0.0034 - 27	0.0047J - 7.9	NA	--
Endosulfan I	12 / 128	0.0017 - 14	0.0015J - 0.01J	NA	--
Endosulfan II	16 / 128	0.0034 - 27	0.0075J - 4.8	NA	--
Endosulfan sulfate	44 / 128	0.0034 - 27	0.0057J - 250	NA	--
Endrin	19 / 128	0.0017 - 27	0.0063J - 2.3J	NA	--
Endrin aldehyde	15 / 79	0.0034 - 27	0.0095J - 49J	NA	--
Endrin ketone	17 / 126	0.0034 - 27	0.011J - 3J	NA	--
Gamma-BHC (lindane)	0 / 128	0.0017 - 14	--	NA	--
Gamma-chlordane	9 / 56	0.024 - 240	0.001 - 0.0097	NA	--
Heptachlor	7 / 128	0.0017 - 14	0.0031J - 0.048J	NA	--
Heptachlor epoxide	35 / 128	0.0017 - 14	0.0038J - 86	NA	--
Methoxychlor	25 / 128	0.0068 - 140	0.012J - 85J	NA	--
Toxaphene	0 / 125	0.069 - 490	--	NA	--
Trans-chlordane	0 / 72	0.0017 - 87	--	NA	--
Polychlorinated Biphenyls					--
Aroclor-1016 (low risk PCB)	1 / 232	0.01 - 780	0.22	NA	--
Aroclor-1221 (high risk PCB)	0 / 232	0.021 - 1,600	--	NA	--
Aroclor-1232 (high risk PCB)	0 / 232	0.01 - 780	--	NA	--
Aroclor-1242 (high risk PCB)	3 / 232	0.01 - 780	0.016V - 1.2	NA	--
Aroclor-1248 (high risk PCB)	0 / 232	0.01 - 780	--	NA	--
Aroclor-1254 (high risk PCB)	8 / 232	0.01 - 780	0.62 - 5.9	NA	--
Aroclor-1260 (high risk PCB)	157 / 232	0.01 - 780	0.004J - 12,000	NA	--
Total (high risk) PCBs	157 / 232	0.01 - 780	0.008 - 12,000	NA	--

Table 4-17. Summary of Analyses and Detections in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds					
1,2,4-Trichlorobenzene	3 / 76	0.15 - 640	0.49J - 280	NA	--
1,2-Dichlorobenzene	1 / 76	0.15 - 640	2.7	NA	--
1,3-Dichlorobenzene	1 / 76	0.15 - 640	6.3	NA	--
1,4-Dichlorobenzene	1 / 76	0.15 - 640	5.8	NA	--
11H-Benzo(a)fluorene	0 / 0	--	--	NA	--
17-Pentatriacontene	0 / 0	--	--	NA	--
1-Docosene	1 / 1	0.24 - 0.24	0.24J	NA	--
1-Methylpyrene	0 / 0	--	--	NA	--
2-(2-Butoxyethoxy)-ethanol	0 / 0	--	--	NA	--
2,2'-Oxybis(1-chloropropane)	0 / 2	0.71 - 9.9	--	NA	--
2,3-Dimethylphenanthrene	0 / 0	--	--	NA	--
2,4,5,7-Tetramethylphenanthrene	1 / 1	0.098 - 0.098	0.098	NA	--
2,4,5-Trichlorophenol	0 / 71	0.48 - 1,600	--	NA	--
2,4,6-Trichlorophenol	0 / 71	0.34 - 640	--	NA	--
2,4-Dichlorophenol	0 / 71	0.34 - 640	--	NA	--
2,4-Dimethylphenol	0 / 76	0.15 - 640	--	NA	--
2,4-Dinitrophenol	0 / 71	0.86 - 1,600	--	NA	--
2,4-Dinitrotoluene	0 / 73	0.34 - 640	--	NA	--
2,6,10,14-Tetramethylhexadecane	0 / 0	--	--	NA	--
2,6,10,14-Tetramethylpentadecane	2 / 2	0.25 - 0.34	0.25 - 0.34J	NA	--
2,6,10-Trimethyl-dodecane	1 / 1	0.089 - 0.089	0.089	NA	--
2,6,11,15-Tetramethylhexadecane	1 / 1	0.084 - 0.084	0.084J	NA	--
2,6,11-Trimethyl-dodecane	1 / 1	0.12 - 0.12	0.12	NA	--
2,6-Dinitrotoluene	0 / 76	0.15 - 640	--	NA	--
2-Chloronaphthalene	0 / 76	0.15 - 640	--	NA	--
2-Chlorophenol	0 / 73	0.34 - 640	--	NA	--
2-Methylnaphthalene	7 / 73	0.14 - 640	0.046J - 25J	NA	--
2-Methylphenol	0 / 76	0.15 - 640	--	NA	--
2-Nitroaniline	0 / 76	0.15 - 1,600	--	NA	--
2-Nitrophenol	0 / 71	0.34 - 640	--	NA	--
3,3'-Dichlorobenzidine	0 / 76	0.15 - 640	--	NA	--
3,6-Dimethylphenanthrene	0 / 0	--	--	NA	--
3-Nitroaniline	0 / 71	0.86 - 1,600	--	NA	--
4,4-Dimethylbiphenyl	0 / 0	--	--	NA	--
4,6-Dinitro-2-methylphenol	0 / 71	0.86 - 1,600	--	NA	--
4-Bromophenyl-phenylether	0 / 71	0.34 - 640	--	NA	--
4-Chloro-3-methylphenol	0 / 73	0.34 - 640	--	NA	--
4-Chloroaniline	0 / 71	0.34 - 640	--	NA	--
4-Chlorophenyl-phenylether	0 / 71	0.34 - 640	--	NA	--
4H-Cyclopenta(def)phenanthrene	0 / 0	--	--	NA	--
4-Methylphenol	0 / 76	0.15 - 640	--	NA	--
4-Nitroaniline	0 / 71	0.86 - 1,600	--	NA	--
4-Nitrophenol	1 / 76	0.37 - 1,600	0.24J	NA	--
7H-Benzo[c]fluorene	1 / 1	0.19 - 190	0.19J	NA	--
9,10-Anthracenedione	0 / 0	--	--	NA	--
9-Methylanthracene	0 / 0	--	--	NA	--
Acenaphthene	4 / 127	0.073 - 44	0.26J - 2.3J	NA	--
Acenaphthylene	3 / 124	0.073 - 44	0.035J - 0.086J	NA	--
Aniline	0 / 9	0.351 - 3.623	--	NA	--
Anthracene	18 / 127	0.073 - 44	0.005J - 1.5	NA	--
Azobenzene	0 / 2	0.71 - 9.9	--	NA	--
Benzidine	0 / 9	0.351 - 3.623	--	NA	--
Benzo(a)anthracene	38 / 127	0.073 - 44	0.013J - 7.3	NA	--
Benzo(a)pyrene	37 / 127	0.073 - 44	0.016J - 13	NA	--
Benzo(b)fluoranthene	43 / 127	0.073 - 44	0.025J - 5.9	NA	--
Benzo(e)pyrene	1 / 1	9.1 - 640	9.1 - 9.1	NA	--
Benzo(g,h,i)perylene	19 / 127	0.073 - 44	0.017J - 4.3	NA	--
Benzo(k)fluoranthene	33 / 127	0.073 - 44	0.0092J - 6.6	NA	--
Benzoic acid	0 / 51	1.6 - 220	--	NA	--

Table 4-17. Summary of Analyses and Detections in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Benzyl alcohol	0 / 51	0.34 - 44	--	NA	--
Bis(2-chloroethoxy)methane	0 / 71	0.34 - 640	--	NA	--
Bis(2-chloroethyl)ether	0 / 71	0.34 - 640	--	NA	--
Bis(2-chloroisopropyl)ether	0 / 69	0.34 - 640	--	NA	--
Bis(2-ethylhexyl)phthalate	0 / 76	0.15 - 640	--	NA	--
Butylbenzylphthalate	0 / 76	0.15 - 640	--	NA	--
Carbazole	1 / 24	0.15 - 640	0.24J	NA	--
Chrysene	58 / 127	0.073 - 44	0.029J - 15	NA	--
Cyclopenta(cd)pyrene	1 / 1	0.14 - 140	0.14J	NA	--
Dibenz(a,h)anthracene	4 / 127	0.073 - 44	0.046J - 0.71	NA	--
Dibenzofuran	2 / 76	0.15 - 640	0.075J - 0.083J	NA	--
Diethylphthalate	0 / 76	0.15 - 640	--	NA	--
Dimethylphthalate	0 / 71	0.34 - 640	--	NA	--
Di-n-butylphthalate	0 / 76	0.15 - 640	--	NA	--
Di-n-octylphthalate	0 / 76	0.15 - 640	--	NA	--
Docosane	0 / 0	--	--	NA	--
Dodecane	2 / 2	0.1 - 0.12	0.1 - 0.12J	NA	--
Dotriacontane	6 / 6	0.11 - 1	0.11 - 1	NA	--
Eicosane	7 / 7	0.076 - 230	0.076 - 0.83	NA	--
Fluoranthene	49 / 127	0.073 - 44	0.026J - 11	NA	--
Fluorene	9 / 127	0.073 - 44	0.0067J - 3.2J	NA	--
Heneicosane	2 / 2	0.25 - 0.56	0.25J - 0.56	NA	--
Heptacosane	1 / 1	0.28 - 0.28	0.28J	NA	--
Heptadecane	4 / 4	0.088 - 0.26	0.088 - 0.26	NA	--
Hexachlorobenzene	0 / 76	0.15 - 640	--	NA	--
Hexachlorobutadiene	0 / 71	0.34 - 640	--	NA	--
Hexachlorocyclopentadiene	0 / 71	0.34 - 640	--	NA	--
Hexachloroethane	0 / 71	0.34 - 640	--	NA	--
Hexacosane	0 / 0	--	--	NA	--
Hexadecane	4 / 4	0.083 - 0.45	0.083 - 0.45J	NA	--
Hexadecanoic acid	0 / 0	--	--	NA	--
Hexatriacontane	5 / 5	0.098 - 0.57	0.098 - 0.57	NA	--
Indeno(1,2,3-cd)pyrene	16 / 127	0.073 - 44	0.014J - 5.1	NA	--
Isophorone	0 / 73	0.15 - 640	--	NA	--
m-Terphenyl	1 / 1	0.32 - 0.32	0.32	NA	--
Naphthalene	13 / 127	0.073 - 44	0.008J - 7.9	NA	--
Nitrobenzene	0 / 71	0.34 - 640	--	NA	--
n-Nitrosodimethylamine	0 / 11	0.351 - 9.9	--	NA	--
n-Nitroso-di-n-propylamine	0 / 76	0.15 - 640	--	NA	--
n-Nitrosodiphenylamine	0 / 76	0.15 - 640	--	NA	--
Nonacosane	1 / 1	0.15 - 0.15	0.15	NA	--
Nonadecane	1 / 1	0.09 - 0.09	0.09	NA	--
Octacosane	0 / 0	--	--	NA	--
Octadecane	1 / 1	2.5 - 2,500	2.5	NA	--
o-Terphenyl	0 / 0	--	--	NA	--
PCB-153	1 / 1	0.22 - 0.22	0.22	NA	--
Pentachlorophenol	0 / 76	0.37 - 1,600	--		--
Pentacosane	1 / 1	0.11 - 0.11	0.11J	NA	--
Pentadecane	2 / 2	0.11 - 0.12	0.11 - 0.12J	NA	--
Pentatriacontane	5 / 5	0.093 - 0.4	0.093J - 0.4J	NA	--
Perylene	1 / 1	7.8 - 7,800	7.8J	NA	--
Phenanthrene	54 / 127	0.073 - 44	0.025J - 10	NA	--
Phenol	3 / 76	0.15 - 640	0.56J - 3.2J	NA	--
p-Terphenyl	0 / 0	--	--	NA	--
Pyrene	63 / 127	0.073 - 44	0.036J - 14	NA	--
Tetracosane	1 / 1	0.59	0.59	NA	--
Tetradecane	1 / 1	0.21	0.21	NA	--
Tetratetracontane	1 / 1	0.085	0.085	NA	--
Triacontane	1 / 1	0.35	0.35J	NA	--

Table 4-17. Summary of Analyses and Detections in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Tricosane	1 / 1	0.54 - 0.54	0.54	NA	--
Tridecane	0 / 0	--	--	NA	--
Tri-m-cresyl phosphate	1 / 1	0.23 - 0.23	0.23J	NA	--
Triphenylene	0 / 0	--	--	NA	--
Tri-p-tolyl phosphate	1 / 1	0.21 - 0.21	0.21	NA	--
Volatile Organic Compounds					
1,1,1-Trichloroethane	5 / 69	0.005 - 1.1	0.004J - 0.03028	NA	--
1,1,2,2-Tetrachloroethane	7 / 76	0.005 - 1.2	0.19 - 1.2	NA	--
1,1,2-Trichloroethane	0 / 69	0.005 - 1.1	--	NA	--
1,1-Dichloroethane	2 / 69	0.005 - 1.1	0.05878 - 0.15047	NA	--
1,1-Dichloroethene	2 / 69	0.005 - 1.1	0.00582 - 0.01053	NA	--
1,2,3,5-Tetramethylbenzene	0 / 0	--	--	NA	--
1,2,4-Trimethylbenzene	0 / 0	0.12 - 0.12	--	NA	--
1,2-Dichloroethane	0 / 69	0.005 - 1.1	--	NA	--
1,2-Dichloroethene (Total)	0 / 66	0.005 - 1.1	--	NA	--
1,2-Dichloropropane	0 / 69	0.005 - 1.1	--	NA	--
1-Ethyl-2,3-dihydro-1H-indene	0 / 0	--	--	NA	--
1-Ethyl-2,4-dimethyl benzene	0 / 0	--	--	NA	--
1-Ethyl-2-methylbenzene	0 / 0	--	--	NA	--
2-Butanone	5 / 69	0.006 - 2.2	0.0031J - 0.01445	NA	--
2-Hexanone	0 / 69	0.01 - 2.2	--	NA	--
4-Ethyl-1,2-dimethylbenzene	0 / 0	--	--	NA	--
4-Methyl-2-pentanone	0 / 69	0.01 - 2.2	--	NA	--
Acetone	3 / 69	0.01 - 2.2	0.009J - 0.068J	NA	--
Benzene	1 / 69	0.005 - 1.1	0.0018J	NA	--
Bicyclo[3.3.1]nonane	0 / 0	--	--	NA	--
Bromodichloromethane	0 / 69	0.005 - 1.1	--	NA	--
Bromoform	0 / 69	0.005 - 1.1	--	NA	--
Bromomethane	0 / 69	0.01 - 2.2	--	NA	--
Carbon disulfide	3 / 66	0.005 - 1.1	0.006J - 0.04129J	NA	--
Carbon tetrachloride	0 / 69	0.005 - 1.1	--	NA	--
Chlorobenzene	1 / 69	0.005 - 1.1	0.094J	NA	--
Chloroethane	1 / 69	0.01 - 2.2	0.008J	NA	--
Chloroform	0 / 69	0.005 - 1.1	--	NA	--
Chloromethane	0 / 69	0.01 - 2.2	--	NA	--
cis-1,2-Dichloroethene	0 / 3	0.0067 - 0.0078	--	NA	--
cis-1,3-Dichloropropene	0 / 69	0.005 - 1.1	--	NA	--
cis-Bicyclo[4.3.0]nonane	0 / 0	--	--	NA	--
Dibromochloromethane	0 / 69	0.005 - 1.1	--	NA	--
Ethylbenzene	3 / 69	0.005 - 1.1	0.0017J - 1.11324	NA	--
Methylcyclohexane	0 / 0	--	--	NA	--
Methylene chloride	1 / 69	0.005 - 1.1	0.076	NA	--
o-Xylene	0 / 0	--	--	NA	--
Styrene	0 / 69	0.005 - 1.1	--	NA	--
Tert-butyl methyl ether	0 / 3	0.0067 - 0.0078	--	NA	--
Tetrachloroethene	3 / 69	0.005 - 1.1	0.02339 - 0.204	NA	--
Toluene	7 / 69	0.005 - 1.1	0.0011J - 0.064	NA	--
trans-1,3-Dichloroethene	0 / 3	0.0067 - 0.0078	--	NA	--
trans-1,3-Dichloropropene	0 / 69	0.005 - 1.1	--	NA	--
Trichloroethene	6 / 69	0.005 - 1.1	0.002J - 0.02414	NA	--
Vinyl acetate	0 / 52	0.01 - 2.2	--	NA	--
Vinyl chloride	0 / 69	0.01 - 2.2	--	NA	--
Xylene (Total)	9 / 69	0.005 - 1.1	0.0012J - 3.34324	NA	--
Petroleum Hydrocarbons					
Gasoline-range organics	88 / 228	0.16 - 590	0.02J - 4,800	NA	--
Diesel-range organics	193 / 229	1.1 - 990	2.8 - 15,000	NA	--
Motor oil-range organics	178 / 180	5.4 - 340	9.7J - 24,000	NA	--
TPH-extractable unknown hydrocarbon	1 / 6	10 - 12	110	NA	--
TPH-purgeable unknown hydrocarbon	1 / 8	0.19 - 150	0.35H - 290H	NA	--

Table 4-17. Summary of Analyses and Detections in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Petroleum Hydrocarbons *(continued)*					
Total recoverable petroleum hydrocarbon	11 / 14	10 - 26	31J - 720	NA	--
Total TPH	205 / 231	--	9.7 - 34,120	NA	--
Total oil and grease	43 / 49	26 - 94	29 - 9,700J	NA	--

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
H pattern is heavier hydrocarbon end of the chemical's range in the standard
HPAL Hunters Point ambient level
J estimated value
mg/kg milligrams per kilogram
NA not available
PCB polychlorinated biphenyl
R rejected
TPH total petroleum hydrocarbons

Table 4-18. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (2-10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	2	0
Arsenic	11.1	HPAL	14	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	7.4	2005 ESL Industrial (direct exp)	0	0
Calcium	--		--	--
Chromium (total)	a	See note	1	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	0	0
Lead	800	2004 PRG Industrial	11	2
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	1	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	3	0
Aldrin	0.1	2004 PRG Industrial	0	0
alpha-BHC	0.36	2004 PRG Industrial	0	0
Alpha-chlordane	2.9	SDGI Industrial Criteria	0	0
beta-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
cis-Nonachlor	--		--	--
delta-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	9	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5,300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamma-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamma-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	11	1
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
trans-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-18. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	1	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	5	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	79	18
Total (high risk) PCBs	0.74	2004 PRG Industrial	81	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	1	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	1	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	1.3	2005 ESL Industrial (direct exp)	7	0
Benzo(a)pyrene	0.33	SDGI Industrial Criteria	14	0
Benzo(b)fluoranthene	1.3	2005 ESL Industrial (direct exp)	13	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	1.3	2005 ESL Industrial (direct exp)	5	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0
Chrysene	13	2005 ESL Industrial (direct exp)	1	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	2	0

Table 4-18. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	1.3	2005 ESL Industrial (direct exp)	2	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	3	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	7	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0

Table 4-18. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (2-10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
cis-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
cis-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
para-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
trans-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
trans-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	36	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	18	0
TPH-extractable unknown hydrocarbons	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbons	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	27	0
Total oil and grease	3,500	HPS TPH source criterion	6	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
Conc. concentration
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
ESL environmental screening level
HPAL Hunters Point ambient level
HPS Hunters Point Shipyard
mg/kg milligrams per kilogram
NE not established
PCB polychlorinated biphenyl
PRG preliminary remediation goal
RIEC remedial investigation evaluation criteria
SDGI standard data gaps investigation
TPH total petroleum hydrocarbons

Table 4-19. Summary of Analyses and Detections in the East Adjacent Area (greater than 10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Metals					
Aluminum	59/59	1.6 - 11.4	2,682.99 - 5,9232.3	NA	--
Antimony	26/60	0.7 - 7.7	1.4J - 14.69J	9.05	5
Arsenic	46/60	0.32 - 4.3	0.68 - 25.98	11.1	12
Barium	60/60	0.07 - 2.1	11.3 - 512	314.4	1
Beryllium	19/60	0.02 - 1.1	0.19 - 1.25	0.71	6
Cadmium	8/60	0.05 - 1.5	0.5 - 2.6	3.14	0
Calcium	59/59	1.29 - 43	525J - 90,625.9	NA	--
Chromium	60/60	0.12 - 2.1	40.89 - 983.67	a	3
Chromium VI	0/85	0.05 - 0.05	-	NA	--
Cobalt	60/60	0.12 - 2.6	5.39 - 150.25	a	1
Copper	59/60	0.19 - 4.3	7.88 - 2,910J	124.3	8
Cyanide	4/19	0.12 - 1	0.14J - 1.1	NA	--
Iron	59/59	0.79 - 5.3	1,0815.2 - 65,095.9	NA	--
Lead	57/60	0.22 - 11.5	0.45 - 24,600	8.99	37
Magnesium	59/59	0.88 - 43	1,984.29 - 245,000	NA	--
Manganese	60/60	0.01 - 3.2	62.77 - 2,110.98	1,431.20	3
Mercury	18/60	0.03 - 0.5	0.11J - 8.8	2.28	4
Molybdenum	10/55	0.28 - 2.1	0.84 - 2.77	2.68	1
Nickel	60/60	0.3 - 6.8	22.74 - 2,250	a	0
Potassium	51/59	11.7 - 195	114 - 6,150	NA	--
Selenium	1/60	0.4 - 4.28	0.75J	1.95	0
Silver	9/60	0.16 - 2.1	0.42J - 1.1	1.43	0
Sodium	57/59	5.9 - 43	115 - 9,300	NA	--
Thallium	0/60	0.35 - 3.92	--	0.81	0
Tin	0/0	--	--	NA	--
Vanadium	60/60	0.19 - 2.8	18.39 - 116.65	117.2	0
Zinc	60/60	0.28 - 2.1	12.9 - 1,120	109.9	7
Pesticides					
4,4'-DDD	1/35	0.0039 - 0.21	0.0081J	NA	--
4,4'-DDE	1/35	0.0039 - 0.21	0.0075J	NA	--
4,4'-DDT	0/35	0.0039 - 0.21	--	NA	--
Aldrin	0/35	0.0019 - 0.11	--	NA	--
Alpha-BHC	0/35	0.0019 - 0.11	--	NA	--
Alpha-chlordane	0/34	0.0019 - 1.1	--	NA	--
Beta-BHC	1/35	0.0019 - 0.11	0.0018J	NA	--
Delta-BHC	0/35	0.0019 - 0.11	--	NA	--
Dieldrin	0/35	0.0039 - 0.21	--	NA	--
Endosulfan I	1/35	0.0019 - 0.11	0.0032J	NA	--
Endosulfan II	0/35	0.0039 - 0.21	--	NA	--
Endosulfan sulfate	1/35	0.0039 - 0.21	0.0043J	NA	--
Endrin	0/35	0.0039 - 0.21	--	NA	--
Endrin aldehyde	0/5	0.0039 - 0.019	--	NA	--
Endrin ketone	1/35	0.0039 - 0.21	0.0095J	NA	--
Gamma-BHC (lindane)	0/35	0.0019 - 0.11	--	NA	--
Gamma-chlordane	0/1	0.096 - 0.096	--	NA	--
Heptachlor	0/35	0.0019 - 0.11	--	NA	--
Heptachlor epoxide	1/35	0.0019 - 0.11	0.0015J	NA	--
Methoxychlor	0/35	0.019 - 1.1	--	NA	--
Toxaphene	0/35	0.051 - 2.1	--	NA	--
Trans-chlordane	0/34	0.0019 - 1.1	--	NA	--
Polychlorinated Biphenyls					
Aroclor-1016 (low risk PCB)	0/55	0.011 - 1.1	--	NA	--
Aroclor-1221 (high risk PCB)	0/55	0.022 - 1.1	--	NA	--
Aroclor-1232 (high risk PCB)	0/55	0.011 - 1.1	--	NA	--
Aroclor-1242 (high risk PCB)	0/55	0.011 - 1.1	--	NA	--
Aroclor-1248 (high risk PCB)	0/55	0.011 - 1.1	--	NA	--
Aroclor-1254 (high risk PCB)	0/55	0.011 - 2.1	--	NA	--
Aroclor-1260 (high risk PCB)	18/55	0.011 - 2.1	0.0042J - 8.6	NA	--
Total (high risk) PCBs	18/55	0.011 - 2.1	0.004 - 8.6	NA	--

Table 4-19. Summary of Analyses and Detections in the East Adjacent Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds					
1,2,4-Trichlorobenzene	1/62	0.35 - 26	0.044J	NA	--
1,2-Dichlorobenzene	0/62	0.35 - 26	--	NA	--
1,3-Dichlorobenzene	0/62	0.35 - 26	--	NA	--
1,4-Dichlorobenzene	0/62	0.35 - 26	--	NA	--
11H-Benzo(a)fluorene	0/0	--	--	NA	--
17-Pentatriacontene	0/0	--	--	NA	--
1-Docosene	0/0	--	--	NA	--
1-methylpyrene	0/0	--	--	NA	--
2-(2-Butoxyethoxy)-ethanol	0/0	--	--	NA	--
2,2'-Oxybis(1-chloropropane)	0/0	--	--	NA	--
2,3-Dimethylphenanthrene	1/1	3.9	3.9	NA	--
2,4,5,7-Tetramethylphenanthrene	0/0	--	--	NA	--
2,4,5-Trichlorophenol	0/62	0.93 - 130	--	NA	--
2,4,6-Trichlorophenol	0/62	0.35 - 26	--	NA	--
2,4-Dichlorophenol	0/62	0.35 - 26	--	NA	--
2,4-Dimethylphenol	0/62	0.35 - 26	--	NA	--
2,4-Dinitrophenol	0/62	0.93 - 130	--	NA	--
2,4-Dinitrotoluene	0/62	0.35 - 26	--	NA	--
2,6,10,14-Tetramethylhexadecane	1/1	0.19	0.19J	NA	--
2,6,10,14-Tetramethylpentadecane	1/1	3.2	3.2	NA	--
2,6,10-Trimethyl-dodecane	0/0	--	--	NA	--
2,6,11,15-Tetramethylhexadecane	1/1	0.4	0.4J	NA	--
2,6,11-Trimethyl-dodecane	1/1	0.15	0.15J	NA	--
2,6-Dinitrotoluene	0/62	0.35 - 26	--	NA	--
2-Chloronaphthalene	0/62	0.35 - 26	--	NA	--
2-Chlorophenol	0/62	0.35 - 26	--	NA	--
2-Methylnaphthalene	1/61	0.35 - 26	0.085J	NA	--
2-Methylphenol	0/62	0.35 - 26	--	NA	--
2-Nitroaniline	0/62	0.93 - 130	--	NA	--
2-Nitrophenol	0/62	0.35 - 27	--	NA	--
3,3'-Dichlorobenzidine	0/62	0.38 - 53	--	NA	--
3,6-Dimethylphenanthrene	0/0	--	--	NA	--
3-Nitroaniline	0/62	0.93 - 130	--	NA	--
4,4-Dimethylbiphenyl	0/0	--	--	NA	--
4,6-Dinitro-2-methylphenol	0/62	0.93 - 130	--	NA	--
4-Bromophenyl-phenylether	0/62	0.35 - 26	--	NA	--
4-Chloro-3-methylphenol	0/62	0.35 - 26	--	NA	--
4-Chloroaniline	0/62	0.35 - 26	--	NA	--
4-Chlorophenyl-phenylether	0/62	0.35 - 26	--	NA	--
4H-Cyclopenta(def)phenanthrene	0/0	--	--	NA	--
4-Methylphenol	0/62	0.35 - 26	--	NA	--
4-Nitroaniline	0/62	0.93 - 130	--	NA	--
4-Nitrophenol	0/62	0.93 - 130	--	NA	--
7H-Benzo[c]fluorene	0/0	--	--	NA	--
9,10-Anthracenedione	0/0	--	--	NA	--
9-Methylanthracene	0/0	--	--	NA	--
Acenaphthene	0/62	0.35 - 26	--	NA	--
Acenaphthylene	0/62	0.35 - 26	--	NA	--
Aniline	0/16	0.375 - 0.565	--	NA	--
Anthracene	0/62	0.35 - 26	--	NA	--
Azobenzene	0/0	--	--	NA	--
Benzidine	0/16	0.375 - 0.565	--	NA	--
Benzo(a)anthracene	1/62	0.35 - 26	0.33711J	NA	--
Benzo(a)pyrene	3/62	0.35 - 26	0.086J - 0.26206J	NA	--
Benzo(b)fluoranthene	2/62	0.35 - 26	0.15J - 0.3432J	NA	--
Benzo(e)pyrene	0/0	--	--	NA	--
Benzo(g,h,i)perylene	1/62	0.35 - 26	0.13J	NA	--
Benzo(k)fluoranthene	2/62	0.35 - 26	0.078J - 0.26289J	NA	--
Benzoic acid	0/57	1.7 - 130	--	NA	--

Table 4-19. Summary of Analyses and Detections in the East Adjacent Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Benzyl alcohol	0/57	0.35 - 26	--	NA	--
Bis(2-chloroethoxy)methane	0/62	0.35 - 26	--	NA	--
Bis(2-chloroethyl)ether	0/62	0.35 - 26	--	NA	--
Bis(2-chloroisopropyl)ether	0/62	0.35 - 26	--	NA	--
Bis(2-ethylhexyl)phthalate	0/62	0.35 - 26	--	NA	--
Butylbenzylphthalate	0/62	0.35 - 26	--	NA	--
Carbazole	0/4	0.38 - 7.6	--	NA	--
Chrysene	2/62	0.35 - 26	0.12J - 0.40961	NA	--
Cyclopenta(cd)pyrene	0/0	--	--	NA	--
Dibenz(a,h)anthracene	0/62	0.35 - 26	--	NA	--
Dibenzofuran	2/62	0.35 - 26	0.089J - 0.20677J	NA	--
Diethylphthalate	0/62	0.35 - 26	--	NA	--
Dimethylphthalate	0/62	0.35 - 26	--	NA	--
Di-n-butylphthalate	0/62	0.35 - 26	--	NA	--
Di-n-octylphthalate	0/62	0.35 - 26	--	NA	--
Docosane	1/1	6	6	NA	--
Dodecane	0/0	--	--	NA	--
Dotriacontane	1/1	1.9	1.9	NA	--
Eicosane	2/2	0.27 - 0.48	0.27 - 0.48	NA	--
Fluoranthene	2/62	0.35 - 26	0.25J - 0.83414	NA	--
Fluorene	2/62	0.35 - 26	0.16 - 0.74448	NA	--
Heneicosane	1/1	3.5	3.5J	NA	--
Heptacosane	0/0	--	--	NA	--
Heptadecane	1/1	0.16	0.16	NA	--
Hexachlorobenzene	0/62	0.35 - 26	--	NA	--
Hexachlorobutadiene	0/62	0.35 - 26	--	NA	--
Hexachlorocyclopentadiene	0/62	0.35 - 27	--	NA	--
Hexachloroethane	0/62	0.35 - 26	--	NA	--
Hexacosane	1/1	4.6	4.6J	NA	--
Hexadecane	0/0	--	--	NA	--
Hexadecanoic acid	0/0	--	--	NA	--
Hexatriacontane	1/1	7.2	7.2	NA	--
Indeno(1,2,3-cd)pyrene	0/62	0.35 - 26	--	NA	--
Isophorone	0/61	0.35 - 26	--	NA	--
m-Terphenyl	1/1	7.3	7.3	NA	--
Naphthalene	0/62	0.35 - 26	--	NA	--
Nitrobenzene	0/62	0.35 - 26	--	NA	--
n-Nitrosodimethylamine	0/16	0.375 - 0.565	--	NA	--
n-Nitroso-di-n-propylamine	0/62	0.35 - 26	--	NA	--
n-Nitrosodiphenylamine	0/62	0.35 - 26	--	NA	--
Nonacosane	0/0	--	--	NA	--
Nonadecane	1/1	0.49	0.49J	NA	--
o-Terphenyl	1/1	2.3	2.3	NA	--
Octacosane	1/1	1.3	1.3	NA	--
Octadecane	0/0	--	--	NA	--
p-Terphenyl	2/2	0.36 - 2.7	0.36J - 2.7	NA	--
PCB-153	0/0	--	--	NA	--
Pentachlorophenol	0/62	0.93 - 130	--	NA	--
Pentacosane	0/0	--	--	NA	--
Pentadecane	0/0	--	--	NA	--
Pentatriacontane	1/1	2.1	2.1J	NA	--
Perylene	0/0	--	--	NA	--
Phenanthrene	3/62	0.35 - 26	0.46 - 1.45217	NA	--
Phenol	0/62	0.35 - 26	--	NA	--
Pyrene	3/62	0.35 - 26	0.34J - 0.62724	NA	--
Tetracosane	1/1	6.3	6.3J	NA	--
Tetradecane	1/1	0.16	0.16J	NA	--
Tetratetracontane	1/1	2.7	2.7J	NA	--
Triacontane	0/0	--	--	NA	--

Table 4-19. Summary of Analyses and Detections in the East Adjacent Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Semivolatile Organic Compounds *(continued)*					
Tricosane	1/1	7.2	7.2J	NA	--
Tridecane	2/2	0.17 - 0.39	0.17J - 0.39	NA	--
Triphenylene	0/0	--	--	NA	--
Tri-m-cresyl phosphate	0/0	--	--	NA	--
Tri-p-tolyl phosphate	0/0	--	--	NA	--
Volatile Organic Compounds					
1,1,1-Trichloroethane	2/61	0.005 - 0.028	0.05042 - 0.35719	NA	--
1,1,2,2-Tetrachloroethane	0/61	0.005 - 0.028	--	NA	--
1,1,2-Trichloroethane	0/61	0.005 - 0.028	--	NA	--
1,1-Dichloroethane	1/61	0.005 - 0.028	0.39584	NA	--
1,1-Dichloroethene	2/61	0.005 - 0.028	0.00955 - 0.14717	NA	--
1,2,3,5-Tetramethylbenzene	0/0	--	--	NA	--
1,2,4-Trimethylbenzene	0/0	--	--	NA	--
1,2-Dichloroethane	0/61	0.005 - 0.028	--	NA	--
1,2-Dichloroethene (Total)	0/61	0.005 - 0.028	--	NA	--
1,2-Dichloropropane	0/61	0.005 - 0.028	--	NA	--
1-Ethyl-2,3-dihydro-1H-indene	1/1	0.015	0.015	NA	--
1-Ethyl-2,4-dimethyl benzene	0/0	--	--	NA	--
1-Ethyl-2-methylbenzene	1/1	0.008	0.008	NA	--
2-Butanone	3/61	0.006 - 0.056	0.0043J - 0.0072J	NA	--
2-Hexanone	0/61	0.011 - 0.056	--	NA	--
4-Ethyl-1,2-dimethylbenzene	0/0	--	--	NA	--
4-Methyl-2-pentanone	0/61	0.011 - 0.056	--	NA	--
Acetone	0/61	0.011 - 0.056	--	NA	--
Benzene	0/61	0.005 - 0.028	--	NA	--
Bicyclo[3.3.1]nonane	1/1	0.007	0.007	NA	--
Bromodichloromethane	0/61	0.005 - 0.028	--	NA	--
Bromoform	0/61	0.005 - 0.028	--	NA	--
Bromomethane	0/61	0.011 - 0.056	--	NA	--
Carbon disulfide	11/61	0.005 - 0.028	0.0016J - 0.04772	NA	--
Carbon tetrachloride	0/61	0.005 - 0.028	--	NA	--
Chlorobenzene	0/61	0.005 - 0.028	--	NA	--
Chloroethane	0/61	0.011 - 0.056	--	NA	--
Chloroform	0/61	0.005 - 0.028	--	NA	--
Chloromethane	0/61	0.011 - 0.056	--	NA	--
cis-1,2-Dichloroethene	0/61	0.005 - 0.028	--	NA	--
cis-1,3-Dichloropropene	0/0	--	--	NA	--
cis-Bicyclo[4.3.0]nonane	1/1	0.014	0.014	NA	--
Dibromochloromethane	0/61	0.005 - 0.028	--	NA	--
Ethylbenzene	0/61	0.005 - 0.028	--	NA	--
Methylcyclohexane	1/1	0.008	0.008	NA	--
Methylene chloride	0/61	0.005 - 0.028	--	NA	--
o-Xylene	0/0	--	--	NA	--
Styrene	0/61	0.005 - 0.028	--	NA	--
Tert-butyl methyl ether	0/0	--	--	NA	--
Tetrachloroethene	2/61	0.005 - 0.028	0.09973 - 0.1569	NA	--
Toluene	3/61	0.005 - 0.028	0.0014J - 0.028	NA	--
trans-1,3-Dichloroethene	0/0	--	--	NA	--
trans-1,3-Dichloropropene	0/61	0.005 - 0.028	--	NA	--
Trichloroethene	3/61	0.005 - 0.028	0.002J - 0.05328	NA	--
Vinyl acetate	0/57	0.011 - 0.056	--	NA	--
Vinyl chloride	0/61	0.011 - 0.056	--	NA	--
Xylene (Total)	3/61	0.005 - 0.028	0.01154 - 0.0587	NA	--
Petroleum Hydrocarbons					
Gasoline range organics	16/54	0.19 - 12	0.04J - 130J	NA	--
Diesel range organics	31/61	0.005 - 0.028	2 - 1,300	NA	--
Motor oil range organics	24/25	5.7 - 58	7.6 - 1,500	NA	--
TPH-extractable unknown hydrocarbon	0/2	11 - 12	--	NA	--

Table 4-19. Summary of Analyses and Detections in the East Adjacent Area (greater than 10 feet bgs) *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	Detection Frequency[1]	Range of Detection Limits (mg/kg)	Range of Results (mg/kg)	Ambient Level (mg/kg)	Detections Exceeding Ambient Level
Petroleum Hydrocarbons *(continued)*					
TPH-purgeable unknown hydrocarbon	0/2	1.1 - 1.2	--	NA	--
Total recoverable petroleum hydrocarbon	1/2	12 - 12	210	NA	--
Total TPH	32/55	0.005 - 58	9.6 - 2,480	NA	--
Total oil and grease	0/0	--	--	NA	--

Notes:

(1) rejected data are not included in detection frequency

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

-- No criteria available for this chemical
bgs below ground surface
BHC benzene hexachloride
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HPAL Hunters Point ambient level
J estimated value
mg/kg milligrams per kilogram
NA not available
PCB polychlorinated biphenyl
TPH total petroleum hydrocarbons

Table 4-20. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (greater than 10 feet bgs)

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Metals				
Aluminum	100,000	2004 PRG Industrial	0	0
Antimony	380	2005 ESL Industrial (direct exp)	0	0
Arsenic	11.1	HPAL	12	0
Barium	63,000	2005 ESL Industrial (direct exp)	0	0
Beryllium	36	2005 ESL Industrial (direct exp)	0	0
Cadmium	38	2005 ESL Industrial (direct exp)	0	0
Calcium	--		--	--
Chromium (total)	a	See note	1	0
Chromium VI	37	2005 ESL Industrial (direct exp)	0	0
Cobalt	a	See note	0	0
Copper	38,000	2005 ESL Industrial (direct exp)	0	0
Cyanide (free)	12,000	2004 PRG Industrial	0	0
Iron	100,000	2004 PRG Industrial	0	0
Lead	800	2004 PRG Industrial	1	0
Magnesium	--		--	--
Manganese	19,000	2004 PRG Industrial	0	0
Mercury	180	2005 ESL Industrial (direct exp)	0	0
Molybdenum	4,800	2005 ESL Industrial (direct exp)	0	0
Nickel	a	See note	0	0
Potassium	--		--	--
Selenium	4,800	2005 ESL Industrial (direct exp)	0	0
Silver	4,800	2005 ESL Industrial (direct exp)	0	0
Sodium	--		--	--
Thallium	63	2005 ESL Industrial (direct exp)	0	0
Tin	100,000	2004 PRG Industrial	0	0
Vanadium	1,000	2004 PRG Industrial	0	0
Zinc	100,000	2004 PRG Industrial	0	0
Pesticides				
2,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
2,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
2,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDD	9	2005 ESL Industrial (direct exp)	0	0
4,4'-DDE	6.3	2005 ESL Industrial (direct exp)	0	0
4,4'-DDT	6.3	2005 ESL Industrial (direct exp)	0	0
Aldrin	0.1	2004 PRG Industrial	0	0
alph-BHC	0.36	2004 PRG Industrial	0	0
Alph-chlordane	2.9	SDGI Industrial Criteria	0	0
bet-BHC	1.3	2004 PRG Industrial	0	0
Chlordane	1.7	2005 ESL Industrial (direct exp)	0	0
ci-Nonachlor	--		--	--
delt-BHC	0.59	SDGI Industrial Criteria	0	0
Dieldrin	0.11	2004 PRG Industrial	0	0
Endosulfan I	3,700	2004 PRG Industrial	0	0
Endosulfan II	3,700	2004 PRG Industrial	0	0
Endosulfan sulfate	5,300	SDGI Industrial Criteria	0	0
Endrin	180	2004 PRG Industrial	0	0
Endrin aldehyde	260	SDGI Industrial Criteria	0	0
Endrin ketone	260	SDGI Industrial Criteria	0	0
Gamm-BHC (lindane)	1.7	2004 PRG Industrial	0	0
Gamm-chlordane	2.9	SDGI Industrial Criteria	0	0
Heptachlor	0.38	2004 PRG Industrial	0	0
Heptachlor epoxide	0.19	2004 PRG Industrial	0	0
Heptachlor epoxide A	--		--	--
Heptachlor epoxide B	--		--	--
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Methoxychlor	3,100	2004 PRG Industrial	0	0
Mirex	--		--	--
Oxychlordane	--		--	--
Toxaphene	1.6	2004 PRG Industrial	0	0
tran-Nonachlor	21	2004 PRG Industrial	0	0

Table 4-20. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Polychlorinated Biphenyls				
Aroclor-1016 (low risk PCB)	21	2004 PRG Industrial	0	0
Aroclor-1221 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1232 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1242 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1248 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1254 (high risk PCB)	0.74	2004 PRG Industrial	0	0
Aroclor-1260 (high risk PCB)	0.74	2004 PRG Industrial	3	0
Total (high risk) PCBs	0.74	2004 PRG Industrial	3	0
Semivolatile Organic Compounds				
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2'-Oxybis(1-chloropropane)	7.4	2004 PRG Industrial	0	0
2,4,5-Trichlorophenol	61	2005 ESL Industrial (inhalation)	0	0
2,4,6-Trichlorophenol	25	2005 ESL Industrial (direct exp)	0	0
2,4-Dichlorophenol	1,800	2004 PRG Industrial	0	0
2,4-Dimethylphenol	1,500	2005 ESL Industrial (inhalation)	0	0
2,4-Dinitrophenol	1,200	2004 PRG Industrial	0	0
2,4-Dinitrotoluene	5.6	2005 ESL Industrial (direct exp)	0	0
2,6-Dinitrotoluene	620	2004 PRG Industrial	0	0
2-Chloronaphthalene	23,000	2004 PRG Industrial	0	0
2-Chlorophenol	10	2005 ESL Industrial (inhalation)	0	0
2-Methylnaphthalene	550	2005 ESL Industrial (inhalation)	0	0
2-Methylphenol	31,000	2004 PRG Industrial	0	0
2-Nitroaniline	1,800	2004 PRG Industrial	0	0
2-Nitrophenol	--		--	--
3,3'-Dichlorobenzidine	1.4	2005 ESL Industrial (direct exp)	0	0
3-Nitroaniline	82	2004 PRG Industrial	0	0
4,6-Dinitro-2-methylphenol	--		--	--
4-Bromophenyl-phenylether	--		--	--
4-Chloro-3-methylphenol	--		--	--
4-Chloroaniline	2,500	2004 PRG Industrial	0	0
4-Chlorophenyl-phenylether	--		--	--
4-Methylphenol	3,100	2004 PRG Industrial	0	0
4-Nitroaniline	82	2004 PRG Industrial	0	0
4-Nitrophenol	7,000	SDGI Industrial Criteria	0	0
Acenaphthene	650	2005 ESL Industrial (inhalation)	0	0
Acenaphthylene	18,000	2005 ESL Industrial (direct exp)	0	0
Aniline	300	2004 PRG Industrial	0	0
Anthracene	31	2005 ESL Industrial (inhalation)	0	0
Azobenzene	16	2004 PRG Industrial	0	0
Benzidine	--		--	--
Benzo(a)anthracene	2.1	2005 ESL Industrial (direct exp)	0	0
Benzo(a)pyrene	0.33	2004 PRG Industrial	0	0
Benzo(b)fluoranthene	2.1	2005 ESL Industrial (direct exp)	0	0
Benzo(e)pyrene	--		--	--
Benzo(g,h,i)perylene	22,000	2005 ESL Industrial (direct exp)	0	0
Benzo(k)fluoranthene	15	2005 ESL Industrial (direct exp)	0	0
Benzoic acid	100,000	2004 PRG Industrial	0	0
Benzyl alcohol	100,000	2004 PRG Industrial	0	0
Biphenyl	18,000	2005 ESL Industrial (direct exp)	0	0
Bis(2-chloroethoxy)methane	--		--	--
Bis(2-chloroethyl)ether	0.012	2005 ESL Industrial (inhalation)	0	0
Bis(2-ethylhexyl)phthalate	120	2004 PRG Industrial	0	0
Butylbenzylphthalate	100,000	2004 PRG Industrial	0	0
Carbazole	86	2004 PRG Industrial	0	0

Table 4-20. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Semivolatile Organic Compounds *(continued)*				
Chrysene	13	2005 ESL Industrial (direct exp)	0	0
Dibenz(a,h)anthracene	0.33	SDGI Industrial Criteria	0	0
Dibenzofuran	1,600	2004 PRG Industrial	0	0
Diethylphthalate	100,000	2004 PRG Industrial	0	0
Dimethylphthalate	100,000	2004 PRG Industrial	0	0
Di-n-butylphthalate	62,000	2004 PRG Industrial	0	0
Di-n-octylphthalate	25,000	2004 PRG Industrial	0	0
Fluoranthene	22,000	2004 PRG Industrial	0	0
Fluorene	800	2005 ESL Industrial (inhalation)	0	0
Hexachlorobenzene	0.96	2005 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Hexachlorocyclopentadiene	3,700	2004 PRG Industrial	0	0
Hexachloroethane	44	2005 ESL Industrial (direct exp)	0	0
Indeno(1,2,3-cd)pyrene	2.1	2005 ESL Industrial (direct exp)	0	0
Isophorone	510	2004 PRG Industrial	0	0
Naphthalene	1.5	2005 ESL Industrial (inhalation)	0	0
Nitrobenzene	100	2004 PRG Industrial	0	0
n-Nitrosodimethylamine	0.034	2004 PRG Industrial	0	0
n-Nitroso-di-n-propylamine	0.25	2004 PRG Industrial	0	0
n-Nitrosodiphenylamine	350	2004 PRG Industrial	0	0
Pentachlorophenol	9	2004 PRG Industrial	0	0
Phenacetin	--		--	--
Phenanthrene	18,000	2005 ESL Industrial (direct exp)	0	0
Phenol	100,000	2004 PRG Industrial	0	0
Pyrene	425	2005 ESL Industrial (inhalation)	0	0
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	6.9	2005 ESL Industrial (direct exp)	0	0
1,1,1-Trichloroethane	230	2005 ESL Industrial (inhalation)	0	0
1,1,2,2-Tetrachloroethane	0.025	2005 ESL Industrial (inhalation)	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	--		--	--
1,1,2-Trichloroethane	0.089	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethane	0.89	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloroethene	105	2005 ESL Industrial (inhalation)	0	0
1,1-Dichloropropene	--		--	--
1,2,3-Trichlorobenzene	--		--	--
1,2,3-Trichloropropane	--		--	--
1,2,4-Trichlorobenzene	5	2005 ESL Industrial (inhalation)	0	0
1,2,4-Trimethylbenzene	170	2004 PRG Industrial	0	0
1,2-Dibromo-3-chloropropane	0.067	2005 ESL Industrial (direct exp)	0	0
1,2-Dibromoethane	0.02	2005 ESL Industrial (inhalation)	0	0
1,2-Dichlorobenzene	21	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethane	0.07	2005 ESL Industrial (inhalation)	0	0
1,2-Dichloroethene (Total)	150	SDGI Industrial Criteria	0	0
1,2-Dichloropropane	0.14	2005 ESL Industrial (inhalation)	0	0
1,3,5-Trimethylbenzene	70	2004 PRG Industrial	0	0
1,3-Dichlorobenzene	600	2004 PRG Industrial	0	0
1,3-Dichloropropane	--		--	--
1,4-Dichlorobenzene	0.13	2005 ESL Industrial (inhalation)	0	0
2,2-Dichloropropane	--		--	--
2-Butanone	6,500	2005 ESL Industrial (inhalation)	0	0
2-Chloroethyl vinyl ether	--		--	--
2-Chlorotoluene	--		--	--
2-Hexanone	--		--	--
4-Chlorotoluene	--		--	--
4-Methyl-2-pentanone	1,550	2005 ESL Industrial (inhalation)	0	0
Acetone	16,500	2005 ESL Industrial (inhalation)	0	0
Benzene	0.38	2005 ESL Industrial (direct exp)	0	0
Bromobenzene	--		--	--
Bromochloromethane	--		--	--

Table 4-20. Summary of Detected Exceedances of Evaluation Criteria in the East Adjacent Area (greater than 10 feet bgs) *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Chemical	RIEC Conc. (mg/kg)	RIEC Comments	Detections Exceeding RIEC	Detections Exceeding 100x RIEC
Volatile Organic Compounds *(continued)*				
Bromodichloromethane	0.039	2005 ESL Industrial (inhalation)	0	0
Bromoform	220	2004 PRG Industrial	0	0
Bromomethane	2.6	2005 ESL Industrial (inhalation)	0	0
Carbon disulfide	720	2004 PRG Industrial	0	0
Carbon tetrachloride	0.034	2005 ESL Industrial (inhalation)	0	0
Chlorobenzene	31	2005 ESL Industrial (inhalation)	0	0
Chloroethane	1.8	2005 ESL Industrial (inhalation)	0	0
Chloroform	0.47	2004 PRG Industrial	0	0
Chloromethane	0.2	2005 ESL Industrial (inhalation)	0	0
ci-1,2-Dichloroethene	18	2005 ESL Industrial (inhalation)	0	0
ci-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Dibromochloromethane	0.054	2005 ESL Industrial (inhalation)	0	0
Dibromomethane	--		--	--
Dichlorodifluoromethane	310	2004 PRG Industrial	0	0
Ethylbenzene	5	2008 ESL Industrial (direct exp)	0	0
Hexachlorobutadiene	22	2004 PRG Industrial	0	0
Isopropylbenzene	2,000	2004 PRG Industrial	0	0
Methylcyclohexane	2,600	2004 PRG Industrial	0	0
Methylene chloride	1.5	2005 ESL Industrial (inhalation)	0	0
n-Butylbenzene	240	2004 PRG Industrial	0	0
o-Xylene	210	SDGI Industrial Criteria	0	0
par-Isopropyl toluene	--		--	--
Propylbenzene	240	2004 PRG Industrial	0	0
sec-Butylbenzene	220	2004 PRG Industrial	0	0
Styrene	1,100	2005 ESL Industrial (inhalation)	0	0
tert-Butyl methyl ether	5.6	2005 ESL Industrial (inhalation)	0	0
tert-Butylbenzene	390	2004 PRG Industrial	0	0
Tetrachloroethene	0.24	2005 ESL Industrial (inhalation)	0	0
Toluene	520	2004 PRG Industrial	0	0
tran-1,2-Dichloroethene	37	2005 ESL Industrial (inhalation)	0	0
tran-1,3-Dichloropropene	0.093	2005 ESL Industrial (inhalation)	0	0
Trichloroethene	0.11	2004 PRG Industrial	0	0
Trichlorofluoromethane	2,000	2004 PRG Industrial	0	0
Vinyl acetate	1,400	2004 PRG Industrial	0	0
Vinyl chloride	0.019	2005 ESL Industrial (inhalation)	0	0
Xylene (Total)	420	2004 PRG Industrial	0	0
Petroleum Hydrocarbons				
Gasoline-range organics	750	2005 ESL Industrial (direct exp)	0	0
Diesel-range organics	750	2005 ESL Industrial (direct exp)	0	0
Motor oil-range organics	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-extractable unknown hydrocarbons	4,600	2005 ESL Industrial (direct exp)	0	0
TPH-purgeable unknown hydrocarbons	750	2005 ESL Industrial (direct exp)	0	0
Total TPH	3,500	HPS TPH source criterion	0	0
Total oil and grease	3,500	HPS TPH source criterion	0	0

Notes:

(a) PRC Environmental Management, Inc. 1995a. "Draft Calculation of Hunters Point Ambient Levels, Hunters Point Shipyard, San Francisco, California." April 11. HPALs for chromium, cobalt, and nickel were determined on a location-specific basis.

--	No criteria available for this chemical	HPS	Hunters Point Shipyard
bgs	below ground surface	mg/kg	milligrams per kilogram
BHC	benzene hexachloride	NE	not established
Conc.	concentration	PCB	polychlorinated biphenyl
DDD	dichlorodiphenyldichloroethane	PRG	preliminary remediation goal
DDE	dichlorodiphenyldichloroethene	RIEC	remedial investigation evaluation criteria
DDT	dichlorodiphenyltrichloroethane	SDGI	standard data gaps investigation
ESL	environmental screening level	TPH	total petroleum hydrocarbons
HPAL	Hunters Point ambient level		

Table 4-21. Resolution of Data Quality Objectives, Lateral Extent of Landfill Waste
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Decision Questions	Decision Inputs	Resolution of Decision Questions
Investigation of Lateral Extent of Landfill Waste		
The following decision questions associated with the lateral extent of landfill waste were initially presented in the Parcel E NDGI FSP/QAPP: 1. Are there areas where the lateral extent of the Industrial Landfill located in IR Site 01/21 are not adequately delineated? 2. Are there areas along the northern border where waste thickness will be required for possible future remedial actions?	▪ Results from previous investigations at the Parcel E-2 Landfill. Data inputs are to include existing and available boring and test pit logs, geophysical surveys, scintillation surveys, and data from the soil gas survey. ▪ Maps that depict the spatial locations of previous soil borings, the known locations for the lateral extent of the landfill, and the limits of the multilayer cover. ▪ Results of test pits and borings.	Based on the results of previous investigations conducted at the Landfill, the answer to the decision questions are as follows: 1. The lateral extent of waste at the Landfill has been adequately defined and is shown on Figure 3-1. The presence of solid waste was defined as a 6-inch (minimum) thickness of solid waste in a test pit (TtEMI, 2004f). The first test pit where no waste was encountered was considered to be the limit of the solid waste. The Panhandle and East Adjacent Areas both contain isolated solid waste locations where a continuous 6-inch layer of waste was encountered. These isolated locations are outside the landfill footprint, are noncontiguous, and contain predominantly inert construction debris or sandblast waste. 2. The vertical extent of waste along the northern boundary has been adequately defined through test pits and borings drilled during the NDGI. The vertical extent of waste is shown on Figures 2-3 through 2-8. Data are adequate to answer the decision questions and to support the RI/FS.

Notes:

FS	Feasibility Study
FSP	Field Sampling Plan
IR	Installation Restoration
NDGI	nonstandard data gaps investigation
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
TtEMI	Tetra Tech EM Inc.

Reference:
TtEMI. 2002a. "Draft Final Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) for Parcel E Nonstandard Data Gaps Investigation (Industrial Landfill and Wetlands Delineation), Hunters Point Shipyard, San Francisco, California." January 8.
TtEMI. 2004f. "Final Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation, Hunters Point Shipyard, San Francisco, California." October 29.

Table 4-22. Resolution of Data Quality Objectives, Landfill Gas Characterization
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Decision Questions	Decision Inputs	Resolution of Decision Questions
Investigation of Nature and Extent of Landfill Gas		
The following decision questions associated with the nature and extent of landfill gas were initially presented in the NDGI FSP/QAPP for Parcel E (TtEMI, 2002a): 1. Is methane gas present outside the landfill boundary (the outer limit of the industrial landfill in IR Site 01/21) in ambient air of buildings or subterranean structures at concentrations greater than 1.25 percent by volume in air (25 percent of the LEL.)? 2. Are landfill gases other than methane present outside the landfill boundary (the outer limit of the industrial landfill in IR Site 01/21) in ambient air of buildings or subterranean structures at concentrations greater than 5 ppm above background? (Note: the basis of comparison for NMOC concentrations in buildings and subterranean structures was subsequently changed, in the Landfill Gas Characterization Study Report [TtEMI, 2003e], to the 2004 EPA Region 9 PRGs for ambient air.) 3. Are there locations on the periphery of the industrial landfill in IR Site 01/21 where concentrations of methane in soil gas are greater than the lower quantitation limit of the instrument (0.5 percent LEL)? 4. Are there areas of local topographic highs, cap penetrations, or visually stressed vegetation on the interim landfill cap where concentrations of methane and other landfill gas surface emissions in ambient air immediately above the interim landfill cap exceed 25 percent of the LEL and 5 ppm above background, respectively? 5. Is landfill gas present in areas located outside the defined lateral extent of landfill waste and farther from the landfill than the 300-foot zone of monitoring?	▪ Analytical results from previous investigations at Parcel E. ▪ Information on historical use from previous studies for Parcel E. ▪ Readings obtained from a methane monitor calibrated according to manufacturer's instructions taken during a soil gas survey performed around the periphery of the landfill in IR Site 01/21. ▪ Readings obtained from a CGI and a PID calibrated according to manufacturer's instructions taken during a building and subterranean ambient air survey conducted in the area within 300 feet of the limit of waste fill. ▪ Readings obtained from a CGI and a PID calibrated according to manufacturer's instructions taken during a surface ambient air survey conducted at areas of local topographic high points, cap penetrations, or areas of visually distressed vegetation on the interim landfill cap. ▪ Laboratory analytical results from the gaseous organic analysis (samples collected in Summa canisters) performed during soil gas sampling at five locations at the landfill in IR Site 01/21.	Based on the results of landfill gas investigation, the answers to the decision questions are as follows: 1. During the April 2002 survey, methane gas was not detected in ambient air of buildings or subterranean structures at concentrations greater than 1.25 percent. Methane gas was detected at concentrations greater than 1.25 percent at two outdoor locations (light pole and Location B) shown on Figure 4-2; however, methane was not detected at these locations during subsequent air monitoring in May 2002. As an additional precaution, surface monitoring was continued at these locations under the Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). The results of the ongoing monitoring are summarized in Table 4-23. 2. During the April 2002 survey, NMOCs were not detected in ambient air of buildings at concentrations greater than the EPA Region 9 PRGs. Several NMOCs were detected in the crawlspace of Building 830 at concentrations greater than the EPA Region 9 PRGs; however, no NMOCs were detected at concentrations greater than PRGs in samples collected at these locations in November 2002 (after active landfill gas extraction was initiated in the area). 3. The extent of methane in soil gas was delineated through a series of probes installed in April 2002. As shown on Figure 4-3, methane concentrations within (and due east of) the UCSF compound ranged from 25 percent of the LEL to greater than 100 percent of the LEL. As a result of this delineation, the Navy initiated a TCRA to (1) remove landfill gas and reduce subsurface methane concentrations at the UCSF compound to below the LEL (5 percent by volume in air); and (2) control future migration of landfill gas to off-site areas. The TCRA activities are described in the Landfill Gas TCRA Closeout Report (TtEMI, 2004a) (Appendix **F**). Performance of the gas control system is currently being monitored under the Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). The results of the ongoing monitoring are summarized in Table 4-23. 4. Outdoor air monitoring performed on the landfill surface (consisting of breathing zone measurements at cap penetrations and a surface transect over and around the cap surface) did not detect methane at concentrations exceeding 25 percent of the LEL. Methane was detected at the top of several well casings within the Landfill Area at concentrations exceeding 25 percent of LEL (Figure 4-2); however, these concentrations were not representative of outdoor air within the Landfill Area. As an additional precaution, surface monitoring was continued at several of these locations under the Landfill Gas Monitoring and Control Plan (TtEMI and ITSI, 2004c). The results of the ongoing monitoring are summarized in Table 4-23. 5. Subsurface landfill gas (specifically methane greater than the LEL) was detected within (and due east of) the UCSF compound. This finding prompted the Navy to initiate a TCRA (as described in item 3 above) that is effectively controlling landfill gas migration. The performance of the gas control system is summarized in Table 4-23. Methane was not detected at concentrations exceeding 25 percent of the LEL along the east, south, and west sides of the landfill (Figure 4-3). There are adequate data to answer the decision questions and to support the RI/FS.

Notes:

CGI	combustible gas indicator	LEL	lower explosive limit (for methane = 5 percent by volume)	QAPP	Quality Assurance Project Plan
EPA	U.S. Environmental Protection Agency	NDGI	nonstandard data gaps investigation	RI	Remedial Investigation
FS	Feasibility Study	NMOCs	nonmethane organic compounds	TCRA	time-critical removal action
FSP	Field Sampling Plan	PID	photoionization detector	TtEMI	Tetra Tech EM Inc.
IR	Installation Restoration	ppm	parts per million	UCSF	University of California, San Francisco
ITSI	Innovative Technical Solutions, Inc.	PRG	preliminary remediation goal		

Sources:
TtEMI. 2002a. "Draft Final Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) for Parcel E Nonstandard Data Gaps Investigation (Industrial Landfill And Wetlands Delineation), Hunters Point Shipyard, San Francisco, California. January 8.
TtEMI. 2003e. "Final Parcel E Nonstandard Data Gaps Investigation, Landfill Gas Characterization, Hunters Point Shipyard, San Francisco, California." December 23.
TtEMI and ITSI. 2004a. "Draft Removal Action Closeout Report, Parcel E Landfill Gas Time-Critical Removal Action, Hunters Point Shipyard, San Francisco, California." March 19.
TtEMI and ITSI. 2004c. "Final Interim Landfill Gas Monitoring and Control Plan, Parcel E Industrial Landfill, Hunters Point Shipyard, San Francisco, California." August 13.

Table 4-23. Resolution of Data Quality Objectives, Landfill Gas Monitoring and Control System Operation
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Decision Questions	Decision Inputs	Resolution of Decision Questions
Landfill Gas Monitoring of the Fence Line and UCSF Compound, Building 830 Crawlspace, UCSF Surface Locations, and On-Site Utilities		
To ensure consistency with Title 27 CCR and the adequacy of the gas control system, the Navy has developed the following decisions for the fence line GMPs, the UCSF GMPs, the Building 830 crawlspace, UCSF surface locations, and on-site utilities: 1. Is migration of methane from the landfill controlled below explosive levels (5 percent by volume) at the site boundary (northern fence line) and the UCSF compound? Is the migration of NMOCs from the landfill controlled below levels that pose a potential health threat (500 ppmv)? 2. Are concentrations of methane in the Building 830 crawlspace greater than 1.25 percent by volume? Are concentrations of NMOCs in the Building 830 crawlspace a potential health threat (5 ppmv above background)? 3. Are concentrations of methane at the UCSF surface locations greater than 1.25 percent by volume? Are concentrations of NMOCs in the breathing zone above the UCSF surface locations posing a potential health threat (5 ppmv above background)? Do the UCSF surface locations warrant continued monitoring? 4. Are concentrations of methane in on-site utilities greater than 1.25 percent by volume? Are concentrations of NMOCs in the breathing zone at on-site utilities posing a potential health threat (5 ppmv above background)? The Navy has established action levels shown in the Interim Monitoring and Control Plan (TtEMI and ITSI, 2004c) to inhibit exceedances of the regulatory limits.	▪ The landfill gas control system is operated passively and actively. ▪ Percent methane and NMOC readings collected at the GMPs along the fence line and on the UCSF compound using a methane monitor and PID calibrated according to manufacturer's instructions. ▪ Percent methane and NMOC readings collected from the Building 830 crawlspace using a methane monitor and PID calibrated according to manufacturer's instructions. ▪ Percent methane and NMOC readings collected from the UCSF surface locations and the breathing zone, respectively, using a methane monitor and PID calibrated according to manufacturer's instructions. ▪ Percent methane and NMOC readings collected within the on-site utilities and in the breathing zone of the on-site utilities, respectively, using a methane monitor and PID calibrated according to manufacturer's instructions.	Based on the data collected through June 2010, the answers to the decision questions are: 1. Yes. The migration of methane from the landfill is being controlled below explosive levels and the migration of NMOCs from the landfill is being controlled below levels that pose a potential health threat (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, 2008a through 2008c, 2008e, 2009a through 2009d, and 2010a through 2010c). 2. No. Concentrations of methane in the Building 830 crawlspace are not greater than 1.25 percent by volume and concentrations of NMOCs in the Building 830 crawlspace are not a potential health threat (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, 2008a through 2008c, 2008e, 2009a through 2009d, and 2010a through 2010c). 3. No. Concentrations of methane at the UCSF surface locations are not greater than 1.25 percent by volume and NMOCs have not been detected in the breathing zone; therefore, they do not pose a potential health threat. Methane has not been detected above 1 percent and NMOCs have not been detected above 5 ppmv for more than 18 consecutive months (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, and 2008a through 2008d); therefore, the UCSF surface locations can be removed from the monitoring program. 4. No. Concentrations of methane in the on-site utilities are not greater than 1.25 percent by volume and concentrations of NMOCs in the breathing zone at these locations do not pose a potential health threat (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, 2008a through 2008c, 2008e, 2009a through 2009d, and 2010a through 2010c). Data are adequate to answer the decision questions and to support the RI/FS.
Landfill Gas Monitoring at GMPs along Crisp Avenue		
To ensure that landfill gas is not migrating north from the landfill into Parcel A, the Navy has developed the following decisions for GMPs along Crisp Avenue: 1. Is methane migrating across Crisp Avenue toward Parcel A at concentrations greater than 5 percent by volume? 2. Are concentrations of NMOCs exceeding levels that would pose a potential health threat to future residents on the former Parcel A? The Navy has established action levels shown in the Interim Monitoring and Control Plan (TtEMI and ITSI, 2004c) to inhibit landfill gas from affecting the former Parcel A.	▪ The landfill gas control system operated passively and actively. ▪ Percent methane and NMOC readings collected at GMPs along Crisp Avenue using a methane monitor and PID calibrated according to manufacturer's instructions.	Based on the data collected through June 2010, the answers to the decision questions are: 1. No. Methane is not migrating across Crisp Avenue toward adjacent non-Navy property. Methane has not been detected in the Crisp Avenue GMPs. 2. No. NMOC concentrations do not pose a health threat to residents of the adjacent non-Navy property. Data are adequate to answer the decision questions and to support the RI/FS.

Table 4-23. Resolution of Data Quality Objectives, Landfill Gas Monitoring and Control System Operation *(continued)*
Remedial Investigation/Feasibility Study for Parcel E-2, Hunters Point Shipyard

Decision Questions	Decision Inputs	Resolution of Decision Questions
Landfill Gas Control System		
The following decisions were identified to determine when to initiate and terminate extraction: 1. Is extraction from the gas control system effectively controlling gas migration? 2. Do monitoring data indicate the potential for a landfill fire? 3. Is the HDPE barrier sufficiently submerged in groundwater to prevent migration of gas under the barrier? 4. Do monitoring data results indicate that extraction is no longer needed? 5. Is the system operating correctly? Is extraction occurring from the correct location? The Navy developed the following decision to ensure the gas control system is maintained appropriately: 6. Do data indicate that treatment units need to be replaced?	▪ The landfill gas control system operated passively and actively. ▪ Percent methane and NMOC readings collected from the sample ports located on the extraction unit using a methane monitor and PID calibrated according to manufacturer's instructions. ▪ Water levels recorded at monitoring wells and GMPs upgradient and downgradient of the gas control system using a water-level meter in accordance with manufacturer's instructions. ▪ Pressure readings collected at the vents while actively extracting gas from the gas control system to check for flow restrictions. Pressure readings will be taken at the outlet sample port of the last canister (three treatment canisters in series), while applying a vacuum at the first canister to check for flow restrictions within the NMOC treatment units. ▪ Temperature readings for landfill gas collected during monitoring before and after the NMOC treatment units vent locations. ▪ Treatment units installed at the vents of the interceptor trench visually inspected for moisture. ▪ Meteorological data collected from the monitoring station.	Based on the data collected through June 2010, the answers to the decision questions are: 1. Yes. Extraction from the gas control system is effectively controlling gas migration. Data indicate that landfill gas is currently being collected in the passive vents located along the barrier wall and is not migrating past the gas control system into the perimeter GMPs. Methane concentrations have been below explosive levels in all GMPs. 2. No. Monitoring data do not indicate the potential for a landfill fire. Temperatures above 55°C (131°F) within the gas collection trench indicate a potential fire risk (Appendix G). Temperature measurements from locations within the gas collection trench have been below 55°C (131°F) (ITSI, 2005j). 3. Yes. According to monthly water level measurements collected around the barrier wall, Yes. The HDPE barrier is sufficiently submerged in groundwater, thus preventing migration of gas under the barrier (ITSI, 2004a through 2004g, 2005a through 2005n, 2006a through 2006g, 2006i through 2006m, 2007a through 2007c, 2007e through 2007g, 2008a through 2008c, 2008e, 2009a through 2009d, and 2010a through 2010c). 4. No. Monitoring data indicate that gas extraction is needed to continue to prevent the migration of methane onto non-Navy property. When operated only passively, landfill gas will build up in the gas collection trench and will eventually migrate north across the barrier wall. Because of this, the control system is operated both passively and actively on an intermittent basis. 5. Yes. Passive extraction occurs throughout the perforated pipe along the barrier wall and is vented through treatment units at the five passive vent locations (Figure 3-6). Active extraction is performed at PV-02, which is located near the center of the barrier wall. Data have shown that active extraction from this location sufficiently controls migration of landfill gas. 6. No. Current data indicate the treatment units do not need to be replaced. However, constant operation of the gas control system can possibly cause NMOC concentrations to exceed 100 ppmv (project action level for treatment units) at the outlet of a treatment unit. When this occurs for 2 consecutive days, the treatment unit is replaced with a new unit (ITSI, 2005j). Data are adequate to answer the decision questions and to support the RI/FS.

Notes:

CCR	California Code of Regulations	NMOC	nonmethane organic compound
GMP	gas monitoring probe	PID	photoionization detector
FS	Feasibility Study	ppmv	parts per million by volume
HDPE	high-density polyethylene	RI	Remedial Investigation
ITSI	Innovative Technical Solutions, Inc.	TtEMI	Tetra Tech EM Inc.
Navy	Department of the Navy	UCSF	University of California, San Francisco

Sources:

ITSI. 2004 to 2010. Monthly and Quarterly Gas Monitoring Reports for Parcel E-2, Hunters Point Shipyard, San Francisco, California (various dates).
TtEMI and ITSI, 2004c. "Final Interim Landfill Gas Monitoring and Control Plan, Parcel E Industrial Landfill, Hunters Point Shipyard, San Francisco, California." August 13.

Table 4-24. Exceedance Frequency of Soil Evaluation Criteria

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

	Landfill Area			Panhandle Area			East Adjacent Area		
Chemical	0-2	2-10	10+	0-2	2-10	10+	0-2	2-10	10+
Maximum depth (feet bgs)	1.91	10	52.66	2	10	42.75	2	10	46.82
Metals									
Antimony		4 / 113		**1 / 77**			1 / 55	**2 / 126**	
Arsenic		5 / 113	21 / 97	**12 / 77**	**12 / 64**	**6 / 40**	**5 / 55**	**14 / 126**	**12 / 60**
Cadmium		8 / 113	2 / 97	**3 / 77**	**4 / 64**		2 / 55		
Chromium		8 / 113	17 / 97			**1 / 40**	2 / 55	**1 / 126**	**1 / 60**
Copper		3 / 113							
Iron		4 / 87	2 / 96	**3 / 68**	**2 / 38**		**2 / 42**		
Lead	1 / 22	16 / 113	7 / 97	**16 / 77**	**13 / 64**	**5 / 40**	**9 / 55**	**11 / 126**	1 / 60
Mercury				1 / 77					
Vanadium		1 / 113		1 / 77					
Zinc					**1 / 64**				
Pesticides									
4,4'-DDE				**1 / 77**				**1 / 128**	
4,4'-DDT								**3 / 128**	
Dieldrin		7 / 112		**2 / 77**			**4 / 52**	**9 / 128**	
Heptachlor epoxide	1 / 22	5 / 112					**2 / 52**	**11 / 128**	
Polychlorinated Biphenyls									
Total PCBs (high risk)	2 / 23	45 / 122	31 / 103	**8 / 70**	**7 / 64**		**30 / 55**	**81 / 232**	**3 / 55**
Total PCBs (low risk)		2 / 122	1 / 103						
Dioxins and Furans									
1,2,3,4,7,8-HxCDF					**1 / 10**	**1 / 2**			
1,2,3,7,8,9-HxCDF					**1 / 10**	**1 / 2**			
1,2,3,7,8-PeCDD					**1 / 10**	**1 / 2**			
2,3,4,6,7,8-HxCDF					**1 / 10**	**1 / 2**			
2,3,4,7,8-PeCDF					**8 / 10**	**2 / 2**			
2,3,7,8-TCDD					**1 / 10**	**1 / 2**			
2,3,7,8-TCDF						**1 / 2**			
Semivolatile Organic Compounds									
1,4-Dichlorobenzene		8 / 62	9 / 81		**1 / 50**			**1 / 76**	
1,2,4-Trichlorobenzene								**1 / 76**	
2-Methylnapthalene		1 / 61							
Anthracene		1 / 113							
Benzo(a)anthracene	2 / 24	5 / 113	1 / 97	**5 / 61**		**1 / 40**	**2 / 52**	**7 / 127**	
Benzo(a)pyrene	9 / 24	10 / 113	6 / 97	**10 / 61**	**6 / 52**	**1 / 40**	**10 / 52**	**14 / 127**	
Benzo(b)fluoranthene	2 / 24	7 / 113	1 / 97	**7 / 61**		**1 / 40**	**5 / 52**	**13 / 127**	
Benzo(k)fluoranthene		6 / 113		**9 / 61**			**2 / 52**	**5 / 127**	
Bis(2-ethylhexyl)phthalate				**1 / 61**					
Chrysene		2 / 113		**1 / 61**				1 / 127	
Dibenz(a,h)anthracene		2 / 113		**1 / 61**				**2 / 127**	
Indeno(1,2,3-cd)pyrene	2 / 24	4 / 113		**4 / 61**		**1 / 40**		**2 / 127**	
Naphthalene	1 / 24	11 / 113	13 / 98	**2 / 62**	**7 / 52**	**3 / 40**		**3 / 127**	
n-Nitroso-di-n-propylamine			1 / 97						
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane							**2 / 22**	**7 / 76**	
Carbon tetrachloride			1 / 78						
Tetrachloroethene			1 / 78						
Total xylenes			1 / 77						
Petroleum Hydrocarbons									
Total TPH		13 / 107	9 / 89	**3 / 16**		**1 / 33**	**7 / 51**	**27 / 231**	

Table 4-24. Exceedance Frequency of Soil Evaluation Criteria *(continued)*

Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Notes: Text denotes the number of samples above the RIEC over the total number of samples analyzed (e.g., 2 / 26 = 2 exceedances out of 26 analys
Bold text (in shaded cells) denotes chemicals that are not fully delineated.

bgs below ground surface
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HxCDD hexachlorodibenzo-p-dioxin
HxCDF hexachlorodibenzofuran
PCB polychlorinated biphenyl
PeCDD pentachlorodibenzo-p-dioxin
PeCDF pentachlorodibenzofuran
RIEC remedial investigation evaluation criteria
TPH total petroleum hydrocarbons
TCDD tetrachlorodibenzo-p-dioxin
TCDF tetrachlorodibenzofuran

Table 4-25. Resolution of Data Quality Objectives, Parcel E-2 Soil and Sediment
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Decision Questions	Decision Inputs	Resolution of Decision Questions
Nature and Extent of Contamination in Onshore Soil		
The primary decision questions associated with onshore soil within Parcel E-2 are: 1. Do potential source areas identified by additional review of site-related documents, aerial photographs, and other historical information have chemical concentrations that exceed criteria? 2. Have all identified source areas been sufficiently characterized to estimate the approximate spatial extent of contamination? 3. Does contamination extend beyond the boundaries of single-point sampling locations? 4. Do actual concentrations of PAHs or PCBs exceed screening criteria at locations where existing samples yielded nondetect results but where detection limits were above screening criteria? 5. Do potential source areas, known source areas, and single-point locations suspected of being within TPH plumes or locations where PCBs have been detected in groundwater have soil concentrations of TPH that exceed criteria (greater than 3,500 mg/kg of total TPH)?	▪ Historical use information from previous Parcels E and E-2 studies ▪ Aerial photographs of HPS ▪ GIS maps that depict the locations of previous sampling locations and their analytical results ▪ Existing data from the NDGI ▪ Validated analytical results for data collected during the SDGI ▪ SDGI screening criteria (updated with RIEC for RI/FS) ▪ HPALs for metals of potential concern	Based on the data presented in the Parcels E and E-2 SDGI Data Summary Report (Revision 01) (TtEMI, 2005c), the answer to the decision questions are: 1. Yes. Source areas have chemical concentrations that exceed criteria, such as PCBs within the southeast portion of Parcel E-2 (referred to as the PCB Hot Spot Area). 2. No. Some but not all identified source areas have been sufficiently characterized to estimate the spatial extent of contamination. This finding is attributed to the heterogeneous nature of the Parcel E-2 soil contamination. Additional delineation is not effective in defining the nature and extent of such heterogeneous soil contamination. Enough data are available to support the HHRA and SLERA and the focused set of remedial alternatives. 3. Yes. Some (but not all) single-point sampling locations, at which further delineation was attempted during the SDGI, were found to have contamination that extends beyond the boundaries of single-point locations. Similar to the resolution of question 2 above, this finding is attributed to the heterogeneous nature of Parcel E-2 soil contamination. Enough data are available to support the HHRA and SLERA and the focused set of remedial alternatives. 4. Yes. Concentrations of PAHs or PCBs detected during the SDGI exceed screening criteria at locations where previous samples yielded nondetect results (but where detection limits were above the screening criteria). Results with elevated detection limits are shown as triangles on the Section 4 figures. 5. Yes. Some (but not all) sampling locations within potential TPH plumes or areas with PCBs were detected in groundwater contain total TPH concentrations exceeding the soil source criteria (3,500 mg/kg). Adequate information has been collected to identify primary source areas, most notably the PCB hot spot in the East Adjacent Area; however, not all identified source areas have been sufficiently characterized to estimate the spatial extent of contamination. This finding is attributed to the heterogeneous nature of the Parcel E-2 soil contamination. Additional delineation is not effective in defining the nature and extent of such heterogeneous soil contamination. Enough data are available to support the HHRA and SLERA and the focused set of remedial alternatives. There are adequate data to answer the decision questions and to support the RI/FS.
Nature and Extent of Contamination in Parcel E-2 Shoreline Sediment		
The primary decision questions associated with shoreline sediment within Parcel E-2 are: 1. Are copper, lead, and PCBs present in shoreline sediment at concentrations sufficient to pose a threat to offshore areas and does the proposed offshore Parcel F FS footprint (identified in the Parcel F validation study [Battelle, Entrix, Inc., and Neptune and Company, 2002]) have corresponding source areas in the Parcel E-2 shoreline area? 2. Are metals, hexavalent chromium, pesticides, PCBs, and SVOCs present at identified or potential source areas along the Parcel E-2 shoreline at concentrations sufficient to pose a threat to wildlife?	▪ Historical use information from previous Parcels E and E-2 studies ▪ Aerial photographs of HPS ▪ Observations from the March 3, 2001, and April 9, 2002, site walkthroughs and reconnaissance studies ▪ GIS maps that depict the locations of previous sampling locations and their analytical results ▪ Validated analytical results for data collected during this SDGI ▪ Information on chemical concentrations that exceed screening criteria within the Parcel F validation study area ▪ Parcel E shoreline ecological screening criteria (SulTech, 2007)	Based on the data presented in the Shoreline Characterization Technical Memorandum (SulTech, 2007; Appendix G to this report), the answer to the decision questions are: 1. Concentrations of copper, lead, and PCBs in sediments along the Parcel E-2 shoreline exceed ambient concentrations for San Francisco Bay sediments, and are considered a potential source of contamination to Parcel F (SulTech, 2007; Appendix G to this report). 2. Benthic invertebrates, birds, and mammals are at risk from exposure to PCBs in surface and subsurface sediment along the Parcels E and E-2 shoreline. Benthic invertebrates in surface and subsurface sediment may be adversely affected by exposure to copper, lead, zinc, and DDTs. In subsurface sediment, mercury may pose an additional risk to benthic invertebrates. Ingestion of sediment and prey that contain cadmium, copper, molybdenum, zinc, and PCBs may pose a risk to the house mouse (SulTech, 2007; Appendix G to this Report). There are adequate data to answer the decision questions and to support the RI/FS.

Table 4-25. Resolution of Data Quality Objectives, Parcel E-2 Soil and Sediment *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

Notes:

DDT	dichlorodiphenyltrichloroethane
FS	Feasibility Study
GIS	Geographic Information System
HHRA	human health risk assessment
HPALs	Hunters Point ambient levels
HPS	Hunters Point Shipyard
IR	Installation Restoration
mg/kg	milligrams per kilogram
NDGI	Nonstandard Data Gaps Investigation
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
RI	Remedial Investigation
RIEC	Remedial Investigation Evaluation Criteria
SDGI	Standard Data Gaps Investigation
SLERA	screening-level ecological risk assessment
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
TtEMI	Tetra Tech EM Inc.

Sources:

Battelle, Entrix, Inc., and Neptune and Company. 2002. "Draft Parcel F Validation Study Report, Hunters Point Shipyard, San Francisco, California."

SulTech. 2007. "Draft Parcels E and E-2 Shoreline Characterization Technical Memorandum, Hunters Point Shipyard, San Francisco, California." June 29.

TtEMI. 2002d. "Revised Draft Final Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan) for Parcel E Standard Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." August 22.

TtEMI. 2005c. "Parcels E and E-2 Standard Data Gaps Investigation, Data Summary Report (Revision 01), Hunters Point Shipyard, San Francisco, California." March 24.

Table 4-26. Exceedances of Remedial Investigation Evaluation Criteria Adjacent to Parcel Boundary
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

	Panhandle Area			East Adjacent Area		
Chemical	0–2	2–10	10+	0–2	2–10	10+
Maximum depth (feet bgs):	*2*	*10*	*42.75*	*2*	*10*	*46.82*
Metals						
Antimony	IR01B038					
Arsenic	IR01B366, IR01B367, IR01B368, IR01B369, IR01MW58A	IR01MW58A	IR01B365	IR01MW09B, IR02B452, GRID 128 SIDEWALL	GRID 139 SIDEWALL, IR02B452, GRID 65 SIDEWALL, IR01MW09B, IR04B002, IR72B037	IR01MW07A, IR04B002, IR01MW09B, IR02B249
Cadmium	IR01B368	IR01MW58A				
Chromium			IR01B015		IR12B041	
Iron	IR01B368, IR01B369	IR01MW58A		IR02B452		
Lead	IR01B366, IR01B367, IR01B368, IR01B369	IR01MW58A	IR01MW58A, IR01MW62A	IR04B015, IR04B017, IR04B028, IR04B047, IR04MW13A, IR12B042	IR01TA07B, IR04B019, IR72B037	
Zinc		IR01MW58A				
Volatile Organic Compounds						
1,1,2,2-Tetrachloroethane				IR72B038, IR72B026	IR72B025, IR72B026, IR72B027, IR72B039, IR01MW367A	

Table 4-26. Exceedances of Soil Evaluation Criteria Adjacent to Parcel Boundary *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

	Panhandle Area			East Adjacent Area		
Chemical	0–2	2–10	10+	0–2	2–10	10+
Maximum depth (feet bgs):	*2*	*10*	*42.75*	*2*	*10*	*46.82*
Semivolatile Organic Compounds						
Benzo(a)anthracene			IR01MW58A	GRID 139 SIDEWALL	IR72B038, GRID 138 SIDEWALL	
Benzo(a)pyrene			IR01MW58A	IR12SS19, IR02TA11A, IR12B037, GRID 128 SIDEWALL, IR02B434, GRID 139 SIDEWALL, IR72B038	IR72B038, GRID 138 SIDEWALL	
Benzo(b)fluoranthene			IR01MW58A	IR02TA11A, IR12B037, GRID 139 SIDEWALL	IR72B038, GRID 138 SIDEWALL	
Benzo(k)fluoranthene	IR01B366, IR01B368			GRID 139 SIDEWALL	IR72B038, GRID 138 SIDEWALL	
Dibenz(a,h)anthracene					GRID 138 SIDEWALL	
Indeno(1,2,3-cd)pyrene			IR01MW58A		GRID 138 SIDEWALL	
Naphthalene	IR01B368, IR01B369	IR01B366, IR01B367, IR01B368, IR01B369, IR01MW58A, IR01MW63A	IR01MW58A, IR01MW63A			

Table 4-26. Exceedances of Soil Evaluation Criteria Adjacent to Parcel Boundary *(continued)*
Remedial Investigation/Feasibility Study Report for Parcel E-2, Hunters Point Shipyard

	Panhandle Area			East Adjacent Area		
Chemical	0–2	2–10	10+	0–2	2–10	10+
Maximum depth (feet bgs):	*2*	*10*	*42.75*	*2*	*10*	*46.82*
Pesticides						
Dieldrin				IR12B041		
Polychlorinated Biphenyls						
Total PCBs (high risk)	IR01B368, IR01B372	WE20B		IR01SS350, IR04B030, IR04B015, IR04B047, IR04B028, IR04MW13A, IR04B017, IR12B042, IR12B041, IR12SS19, IR12B038, IR02TA11A, IR12B037, GRID 66 SIDEWALL, GRID 138 SIDEWALL, GRID 139 SIDEWALL, IR02B434, GRID 128 SIDEWALL	IR01MW367A, IR04B019, IR01TA07B, GRID 65 SIDEWALL, GRID 65 BOTTOM, GRID 66 BOTTOM, GRID 74 BOTTOM, GRID 104 BOTTOM, GRID 116 BOTTOM, GRID 131 BOTTOM, GRID 130 BOTTOM, GRID 138 SIDEWALL, GRID 139 SIDEWALL, GRID 128 BOTTOM, IR02B434, IR02B452	
Petroleum Hydrocarbons						
Total TPH	IR01B366, IR01B368, IR01B369		IR01MW63A	GRID 139 SIDEWALL, IR12B042, IR72B037, IR72SS22, IR72SS24	GRID 128 BOTTOM	

Notes:
bgs below ground surface PCBs polychlorinated biphenyls TPH total petroleum hydrocarbons