ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability

660 Baker Street, Suite 253
Costa Mesa, California 92626
Main: (714) 662-2759 Fax: (714) 662-2758
www.ecostmanage.com

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10:47 am, Apr 21, 2010

Alameda County
Environmental Health

April 19, 2010

Jerry Wickham, PG
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Corrective Action Plan
Carnation Dairy, 1310 14th Street, Oakland, CA
Fuel Leak Case No. RO0000018 and Geotracker Global ID T0600100262

Dear Mr. Wickham:

On behalf of Nestlé USA, Inc. (Nestlé), Environmental Cost Management, Inc. (ECM) has prepared this *Corrective Action Plan* (CAP) for the site located at 1310 14th Street in Oakland, California.

This report responds to requests made in a letter from the Alameda County Health Care Services (ACHS), dated September 18, 2009. The September 18, 2009 letter acknowledged ECM's submittal of the May 2009 *Draft Corrective Action Plan* (CAP) Report, provides comments on this report, and requested additional sub-slab soil vapor sampling (see Appendix A1), and this CAP Report. This Corrective Action Plan Report responds to the ACHS comments on the draft report, and includes the results of recent sub-slab vapor sampling and the associated *Sub-slab Soil Gas Sampling and Analysis Report*.

Upon approval of this report by the ACHS, ECM is prepared to implement the corrective action proposals recommended herein. Should you have any questions regarding this Corrective Action Plan report, please call me at (415) 282-1979.

Perjury Statement

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Brent Searcy

Brent Searcy, P.E.
Senior Engineer

Environnemental Cost Management, Inc.

Enclosure: Corrective Action Report

Cc:
Mike Desso, Nestlé USA (CD copy)
Jennifer Costanza, Legal (CD copy)
Nestlé USA, File (CD copy)
Ken Cheitlin, Hall Equities Group (CD copy)
Rob Balas, Iris Environmental (CD copy)
ECM, File (CD copy)

Report to:

Nestlé USA, Inc.
800 North Brand Boulevard
Glendale, California 91203

Corrective Action Plan
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, CA

April 19, 2010

Prepared By:

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253
Costa Mesa, California 92626
Main: (714) 662-2759 Fax: (714) 662-2758
www.ecostmanage.com

Binayak Acharya

Binayak Acharya
Program Manager

Date: 04/19/10

Brent S

Brent Searcy, P.E.
Senior Engineer

Date: 04/19/10

BRENT A. SEARCY
No. C66647
Exp. 6/30/10

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1 INTRODUCTION

On behalf of Nestlé USA, Inc. (Nestlé), Environmental Cost Management, Inc. (ECM) prepared this *Corrective Action Plan* (CAP) for the former Nestlé facility (Site) once located at 1310 14th Street, Oakland, California (Figure 1). This report responds to requests made in a letter from the Alameda County Health Care Services (ACHS), dated September 18, 2009. The September 18, 2009 letter acknowledged ECM's submittal of the May 2009 *Draft Corrective Action Plan* (CAP) Report and provided comments on the report, requested additional sub-slab soil vapor sampling (see Appendix A1), and requested this revised CAP Report.

This CAP relies on the compilation and analysis of site investigation and remediation data as documented in the January 2001 *Comprehensive Site Characterization Report*[1], July 2008 *Supplemental Soil and Groundwater Investigation Report*, the November 4, 2008 *Revised SCM Report* (SCM) (ECM, 2008), the May 18, 2009 *Screening Health Risk Evaluation* (Appendix A2), and the February 2010 *Sub-slab Soil Gas Sampling and Analysis Report* (Appendix A1).

This report is intended to present the relevant background information and consideration given to the viable options that have been developed for corrective action at the Site. These options are assessed and their advantages and disadvantages considered in establishing a proposed CAP for the site. Upon approval of this CAP, Nestlé is prepared to proceed with the implementation of the recommended CAP alternative presented in this report.

2 SITE HISTORY

2.1 Operational History

This CAP report addresses the northwest corner of 1310 14th Street, Oakland, California, indicated as "NW Parcel" in Figure 1 (Site), consistent with directives from ACHS. The ACHS issued closure letters for other portions of the property. The terms "facility" or "property" are used to discuss the property as entirety with four parcels including the NW parcel (Site)

The former Nestlé facility, originally constructed by American Creamery in 1915, was used to manufacture ice cream and packaged milk. Carnation purchased the property in 1929 and made additions and improvements between 1946 and 1973 for dairy product processing and distribution. Nestlé USA, Inc. assumed operation of the property following its purchase of Carnation in 1985. Nestlé ceased operations at the property in 1991[2].

While it was operational, the facility was used for the distribution of ice cream and packaged fresh milk by trucks. The delivery trucks were fueled at dispensers near service bays located at the northwest corner and were repaired and maintained at the facility.

A chronological summary of historical operations at the facility and remedial actions and at the Site is provided below. In addition, Appendix B of the 2008 SCM[3] provides a series of historical aerial photos that illustrate changes in the development of the facility over time.

1915 - 1979

- Original facilities constructed by American Creamery in 1915.
- Facilities were further developed for ice cream manufacturing and distribution and milk packaging activities by Carnation between 1946 and 1973.

- Following development by Carnation, facilities included food processing equipment, large cooler/freezer rooms, and five (5) underground storage tanks (USTs; two (2) gasoline, two (2) diesel, one (1) waste oil) for delivery vehicles.

1980s

- Ice cream manufacturing and distribution activities declined in the late 1980s.
- In early 1988, ice cream and milk distribution ceased.
- In December 1988 and January 1989, five USTs were excavated and removed from the Site.
- Free product was observed in the tank excavation area during UST removal.
- Approximately 1,200 cubic yards of soil removed during UST excavation, treated on-site, and replaced in excavation.

1990s

- Additional remediation efforts were implemented in the early 1990s.
- A soil vapor extraction (SVE) system operated in the former UST area from January 1994 through 1995, removing approximately 34,000 pounds of hydrocarbons.
- A multi-phase extraction system operated from August 1997 through June 2000, removing 10,875 pounds of hydrocarbons.
- Active remediation terminated in November 1999, with the concurrence of ACHA and the Regional Water Quality Control Board, San Francisco (RWQCB-SF), in response to reductions in LPH measurements.
- Nestlé monitored a network of 11 monitoring wells for petroleum hydrocarbons and halogenated volatile organic compounds (HVOCs) in groundwater semi-annually for two years, under the direction of the ACHA and the RWQCB-SF.
- A Risk Based Corrective Action (RBCA) analysis addressed residual concentrations remaining on-site.

2000s

- Operation of the multi-phase extraction system terminated in June 2000.
- The ACHA accepted the RBCA, a *Soil Management Plan* (SMP), and a Deed Restriction by July 2000.
- The RBCA analysis concluded that no significant risk to human health exists as a result of residual chemicals in soil or groundwater for all applicable exposure pathways.
- The *Risk Management Plan* (RMP) and deed restriction were recorded to protect against any possible direct exposure routes to future construction workers.
- Nestlé sold the Site to Encinal 14th Street, LLC in July 2000, subject to the RBCA, the RMP and the legally binding Deed Restriction.
- Nestlé submitted a *Comprehensive Site Characterization Report* to ACHA in January 2001 in support of its request for Site closure.
- Nestlé submitted a Request for Case Closure to ACHA in February 2002.
- All unused wells were properly abandoned in December 2002, with approval from the ACHA.
- Nestlé requested Site closure with the submittal of the semiannual groundwater monitoring report dated February 23, 2005.
- Nestlé submitted Site closure request follow-up letters to the ACHA on June 12, 2006 and June 15, 2007.
- In response to ACHS's September 28, 2007 directive, Nestlé performed and submitted results of additional field sampling in March and July 2008.

- By letter dated August 8, 2008, ACHS established a separate case for the northwest portion of the property ("Parcel B"), thus separating regulatory oversight of the northwest portion, which is the subject of this report, from the other three subdivided parcels of the property.
- During the second half of 2008, the parcels to the south-southeast of the NW parcel were graded and redeveloped, with several commercial/industrial buildings constructed on these parcels. The northwest parcel (subject of this report) was not altered or redeveloped as part of these activities.
- Per ACHS request, additional site investigation and sampling was conducted for soil, groundwater, and soil vapor in May 2008. These data was incorporated in a *Revised Site Conceptual Model* for the Site submitted in November 2008.
- A *Revised Risk Assessment*, incorporating May 2008 soil vapor sampling data, was developed and submitted for the site in May 2009
- A Draft CAP was submitted for the northwest parcel of the property in May 2009
- Per ACHS request, additional soil vapor sampling (from sub-slab location) was conducted at the site in December 2009

2.2 On-Site Structures and Features

The USTs listed below stored fuel for the operations on-site:

- One used-oil tank (1,000-gallon capacity),
- Two gasoline tanks (10,000-gallon capacity each), and
- Two diesel fuel tanks (12,000-gallon capacity each).

The fuel system included underground piping that connected the USTs to the dispensers outside of the service bays. Figure 2 shows the locations of the former USTs and piping.

Figure 2 illustrates the primary features located within the northwestern portion of the facility. The locations of the previous USTs and associated subsurface piping are indicated in Figure 2, as well as the footprint of the existing L-shaped (formerly truck maintenance) building, which extends along the northern and western edges of the property. This building is an open structure approximately 29,000 square feet in size and contains multiple roll-up vehicle access doors opening to the interior of the property.

ECM has searched for, but was unable to locate, final construction drawings for the L-shaped truck maintenance building. Historic coring and drilling activities indicate that the concrete slab foundation varies in thickness from 4 to 8 inches. Building footings likely exist beneath the exterior and load bearing walls. The depth of these footings is unknown, although construction codes and practices at the approximate time of construction suggest a likely depth of 2 to 15 feet below grade, depending on the load distribution technique implemented. The presence of these load-bearing footings and/or consolidated soils beneath these footings may form a downgradient barrier to shallow groundwater flow in the subsurface along the northwestern edge of the Site boundary (see Section 6 for further discussion and implications).

To better understand the distribution and movement of chemicals of concern (COCs), Subdynamic Corporation conducted a comprehensive survey of subsurface utility corridors in November 2007. The findings of this in-field survey are presented within the *Revised SCM Report*[4]. The results of this subsurface conduit survey confirmed the existence of on- and off-site utility trenches. All on-site utilities were either abandoned, or the utility corridors are no longer active. Conduits identified during the survey were located to the north and east of the former UST area and do not extend into the area associated with the former USTs and the primary original source of hydrocarbons within the subsurface. Therefore, it can be concluded that subsurface utilities do not act as conduits for preferential migration of COCs in the subsurface.

The on-site utility survey also addresses concerns raised in the September 2007 ACHS directive regarding possible residual diary fat or detergent impacts in the subsurface. Information collected regarding the abandoned and non-operational sewer and/or storm drains on the site indicates there are no active sources of such substances within utility conduits beneath the Site.

3 GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

The Site is located in an area of the San Francisco Bay region generally underlain by bay mud, the Merrit Sand, and Younger and Older Alluvium[5]. The San Francisco Bay is located approximately 2 miles to the west of the Site. The San Andreas Fault is located approximately 9 miles west, and the Calaveras/Hayward fault zone lies approximately 8 miles east. Shallow soils in this area of the eastern shore of the San Francisco Bay generally consist of clayey or silty sands. Due to its limited extent and thickness, the saturated portion of the Merritt Sand in this immediate region is not considered a drinking water resource[6].

3.2 Site-Specific Geology and Hydrogeology

Soil borings extended and logged from 8 to 25 feet below ground surface (ft. bgs) provide geologic data for a thorough characterization of subsurface geology[7,8,9]. Soils are predominantly well-sorted sands (SP), with discontinuous areas of clayey or silty sands (SC, SM). Hydraulic conductivities of these soils have been estimated at approximately 30 ft/day[10]. Boring log information collected during historical soil boring investigations have been used in developing lithologic cross sections, as shown in Figures 3 through 5.

Groundwater has historically been encountered at depths ranging from approximately 5 to 12 ft. bgs. Most recently, static groundwater elevations encountered in borings extended during the May 2008 site investigation were in the 9 to 10 ft. bgs range. Groundwater generally flows to the north-northwest (toward 16th Street) at an average gradient of 0.0027ft/ft[11]. Figure 6 shows the variation of groundwater flow directions from December 1995 through April 2000, and confirms the observation that the groundwater flow direction has been generally consistent and does not change significantly throughout the annual hydraulic cycle.

4 SITE CHARACTERIZATION AND REMEDIATION ACTIVITIES

Following the discovery of hydrocarbons in the subsurface during the December 1988 and January 1989 excavation of USTs at the Site, multiple phases of site characterization and remediation have taken place. The following sections provide an overview of the delineation of COCs, as well as the various remediation activities undertaken to address impacts at the Site.

4.1 Soil Gas Characterization

Soil gas samples were collected across the Site during two separate studies (in August 1999 and May 2008) to evaluate the magnitude and extent of VOCs in shallow soil gas. Both soil gas investigations addressed soil vapor conditions following active remediation activities (see Section 4 for details of remedial activities). Table 1a and Table 1b detail the results of these soil gas sampling investigations. As directed by the ACHS, a focused sub-slab vapor sampling event was conducted in January 2010. Methods and findings of these three episodes of vapor sampling are described in Section 4.1.3 below.

4.1.1 August 1999 Investigation

Following operation of an SVE system from 1994 through 1995, and three years of multiphase extraction activities at the Site, soil gas sampling was conducted to support the proposed shut down of the multi-phase extraction system and planned regulatory closure discussions. Table 1a documents soil gas concentrations from 15 soil borings sampled at 3 ft. bgs using direct-push equipment and summa canisters for vapor collection. Protocols for the collection of soil gas samples are provided in Appendix E of the January 2001 *Comprehensive Site Characterization*[12]. Soil gas sampling locations represented areas thought to overlie the highest groundwater contaminant levels and the perimeter and downgradient edge of the soil and groundwater plume (see Appendix B, Figure 6). Active operation of the existing multi-phase extraction system ceased 24 hours prior to the soil gas sampling and remained off until the conclusion of soil gas sampling.

All soil gas samples were analyzed using USEPA Compendium Method TO-14/TO-14A for VOCs. Benzene and other fuel hydrocarbon compounds were measured in the soil vapor samples. Benzene concentrations ranged from 0.91 to 9,900 parts per billion by volume (ppbv) (Table 1a). Non-fuel hydrocarbon compounds detected in the soil vapor were acetone (10 to 260 ppbv), ethanol (23 to1,400 ppbv), Freon-12 (0.93 to 630 ppbv), and tetrachloroethene (1.2 to160 ppbv). Concentrations of 1,2-DCA were not detected in the soil vapor at or above the respective laboratory reporting limits. These sampling results are used in the assessment of potential exposure risks as documented in the *Screening Health Risk Evaluation* for the Site (Appendix A2).

4.1.2 May 2008 Investigation

The May 2008 investigation addressed the ACHS's directive dated September 28, 2007. Soil gas concentrations from this investigation are reported in Table 1b.

Soil gas sampling was performed as per the protocol recommended by the *Los Angeles Regional Water Quality Control Board (LARWQCB)/California Department of Toxic Substances Control (DTSC) Advisory for Active Soil Gas Investigations*[13]. A California certified on-site mobile lab (TEG, Inc) with full gas chromatography (GC) and mass spectrometry (MS) capabilities analyzed all soil gas samples immediately following sample collection[14].

Soil gas samples were collected from 12 sampling locations at a depth of 5 ft. bgs. Soil gas samples from each boring were analyzed according to the following methods:

- EPA 8015M for gasoline (TPH-g) and diesel (TPH-d) range organics, and
- EPA method 8260B for benzene, toluene, ethylbenzene, total xylenes (BTEX) and VOCs.

Five of the 12 sampling locations exhibited detectable concentrations of hydrocarbons or VOC constituents. TPH-g concentrations ranged from below the laboratory reporting limit of 50 µg/L to 2,600 µg/L at boring SB-22. TPH-d was not detected in any soil gas samples. Benzene was detected at two of the 12 sampling locations, with the highest concentration at 40 µg/L at boring SB-22. Ethylbenzene, toluene, and xylenes were detected at 3 of the 12 sampling locations. No detections of 1,2-DCA were reported in any of the soil gas samples. Detections of dichlorodifluoromethane (i.e., Freon-12) characterized soil gas samples from two soil borings (SB-22 and SB-26).

The soil gas sampling data collected during August 1999 and May 2008 were used in the preparation of a revised 2009 *Screening Health Risk Evaluation* for the site (Appendix A2). This report, prepared in May 2009 by Iris Environmental, describes the methodology and results of the screening level human health risk evaluation for the site.

Potentially exposed populations considered in this evaluation were onsite indoor commercial/industrial workers who are assumed to work full-time in the onsite commercial building for 25 years, onsite outdoor intrusive construction workers who are assumed to work onsite for 4 weeks, and offsite residents who are assumed to live near the site for 30 years.

The main conclusions of the screening health risk evaluation were:

- The estimated potential cancer risk for onsite indoor commercial/industrial workers is 8.0×10^{-6}. The estimated potential noncancer hazard index for onsite indoor commercial/industrial workers is 0.051. Both the estimated cancer risk and the noncancer hazard index are below the accepted exposure levels as defined, and endorsed by, relevant state and federal agencies[15] (see Appendix A2).
- The estimated potential cancer risk for onsite outdoor intrusive construction workers is 9.8×10^{-5}. The estimated potential noncancer hazard index for onsite outdoor intrusive construction workers is 21. Both the estimated cancer risk and the noncancer hazard index were above the accepted exposure levels as defined, and endorsed by, relevant state and federal agencies[16] (see Appendix A2). However, this cancer risk and noncancer hazard were attributable entirely to assumed dermal contact with COPCs in groundwater at the bottom of a construction trench, and do not account for personal protective equipment that intrusive construction workers would be required to use. Actual exposures under compliance with the site-specific RMP (Appendix D) were highly likely to be below levels of concern.
- The estimated potential cancer risk for offsite residents is 4.1×10^{-7}. The estimated noncancer hazard index for offsite residents is 0.0040. Both the estimated cancer risk and the noncancer hazard index are below the accepted exposure levels as defined, and endorsed by, relevant state and federal agencies[17] (see Appendix A2

4.1.3 January 2010 Sub-slab Soil Gas Sampling Investigation

Following the submittal of the May 2009 Draft CAP Report and Revised *Screening Health Risk Evaluation*, the ACHS provided technical comments which included a request for additional subslab sampling in order to verify the site-specific calculation of exposure risks to on-site commercial workers[18]. The ACHS noted that site-specific soils parameters (density, total porosity, water-filled porosity, etc.) could be exerting significant influence in the calculation of risks based on 1999 and 2008 soil vapor data. In order to address this concern and provide a more direct calculation of on-site commercial workers exposure risks, the ACHS requested that a workplan for sub-slab vapor sampling be submitted. A workplan for *Sub-slab Soil Gas Sampling and Analysis* was submitted to the ACHS in November 2009, and approved in December 2009[19].

The full sub-slab soil gas sampling and analysis report is enclosed in Appendix A1, and documents the methodology and results of the sub-slab soil gas investigation of the northwest portion of the site. Sub-slab soil gas sampling was performed on January 6, 2010 at six locations beneath the existing, unoccupied onsite commercial/industrial building. The sampling locations were selected in order to provide data for vapor exposure risk calculations across the footprint of the existing L-shaped building, and to address ACHS concerns regarding areas beneath the building reporting the highest historical COC groundwater concentrations (i.e., previous boring location SB-17).

The potential vapor intrusion inhalation cancer risk and noncancer hazard to on-site commercial workers building occupants, associated with measured concentrations of volatile chemicals in sub-slab soil gas, were estimated in accordance with United States Environmental Protection Agency (USEPA) inhalation risk assessment guidance[20], California Environmental Protection Agency (Cal/EPA) DTSC vapor intrusion guidance[21], and Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) and DTSC inhalation risk assessment methodology[22, 23]. Cancer- and noncancer-based screening levels were developed based on a target risk level of 1×10^{-6} and target noncancer quotient of 1.0, respectively. The findings of the sub-slab soil gas data evaluation are:

- No chemical was detected in any sample at a concentration exceeding its cancer-based or noncancer-based screening level.
- The estimated cumulative (multi-chemical) cancer risk ranges across the six primary subslab soil gas samples from a minimum of 2.1×10^{-7} at SSG-2 to a maximum of 9.0×10^{-7} at SSG-3. The estimated cumulative cancer risk at every sampling location is below the accepted exposure level of 1×10^{-6}, as defined, and endorsed by, relevant state and federal agencies[24] (see Appendix A2).
- The primary risk drivers at the site are benzene and naphthalene (note that naphthalene was detected in only one of six samples). Other chemicals which contribute significantly to cumulative risk in one or more samples are: 1,3-butadiene and tetrachloroethene.
- The estimated cumulative noncancer hazard index ranges from 0.0094 to 0.12 across the six primary sub-slab soil gas samples, and thus is below the threshold noncancer level of 1.0 at all locations.

The concentrations of volatile chemicals detected in sub-slab soil gas beneath the existing unoccupied commercial/industrial building during the January 2010 sub-slab site investigation were below levels of concern with respect to potential vapor intrusion into the building. These results are consistent with the previous screening-level vapor intrusion evaluation of the building (Appendix A2), and confirm the lack of exposure risks to on-site commercial workers posed by residual hydrocarbon impacts currently beneath the Site.

4.2 Soil Characterization

Three separate historical field investigations in 1991, 1999, and 2008 involved subsurface soil sampling and analysis. Results from these soil investigations are reported in Table 2. Soil data gathered after active remediation activities were integrated into the three dimensional model of hydrocarbon impacts presented in the Revised SCM Report (see Appendix B, Figures 16 through 27).

4.2.1 1991 Soil Sampling Investigation

An initial investigation conducted in 1991 yielded soil samples from 5, 10, 12.5, 15, and 20 ft. bgs as documented in Table 2. The highest TPH-g and TPH-d concentrations were measured in the area immediately to the north and northwest of the former UST area, generally at 10 ft. bgs[25].

The soil boring data indicated that TPH-g impacts were mainly limited to the 5 to 15 ft. bgs interval. The maximum TPH-g concentration at 5 ft. bgs was 2,500 millgrams per kilogram (mg/kg). At 10 ft. bgs, the maximum was 10,000 mg/kg. By 15 ft. bgs, the maximum concentration dropped to 1,900 mg/kg, and at 20 ft. bgs, the maximum TPH-g level decreased to 260 mg/kg.

The TPH-d distribution followed a pattern similar to that of TPH-g. The maximum TPH-d impact at 5 ft. bgs was 470 mg/kg. At 10 ft. bgs, the maximum increased to 940 mg/kg. By 20 ft. bgs, the maximum TPH-d level dropped to 23 mg/kg.

4.2.2 1999 Soil Sampling Investigation

Following soil over-excavation during tank removal and subsequent soil vapor extraction activities, an August 1999 investigation was performed to collect soil samples and characterize remaining hydrocarbon impacts primarily at the Site perimeter to the north and west of the former UST area. The August 1999 investigation collected soil samples from 13 soil borings (SB1 through SB15) (see Table 2 and Appendix B, Figure 9). The locations of the borings represented subsurface conditions in the area downgradient (NNW) of the UST source areas (see Figure 2) and assessed impacts beneath the footprint of the L-shaped building on the northwest edge of the property. Remediation equipment and aboveground piping restricted boring locations to the south side of the piping in the former repair garage bay (SB6) and to the end bay at the east side of the building (SB14). Results of soil samples collected in August 1999 are shown in Table 2.

Low levels (at or below 2.7 micrograms per kilogram [μg/kg]) of 1,2-DCA, toluene, ethylbenzene and total xylenes characterized the 3.5 to 4.0 ft. bgs interval. Maximum TPH-d was 1,200 mg/kg in this interval.

Sporadic concentrations of hydrocarbons and HVOCs characterized the soil at the water table (6.5 to 7.0 ft. bgs). Concentrations of 1,2-DCA ranged from below laboratory reporting limits at multiple locations to 430 μg/kg at SB6 within this vertical interval. Elevated concentrations of hydrocarbons were measured at sampling locations SB3, SB6, SB8, and SB12, and SB14, with TPH-g ranging from 2.25 to 10,100 mg/kg, TPH-d ranging from 60 to 2,900 mg/kg, and benzene ranging from 0.07 to 76 mg/kg.

4.2.3 2008 Soil Sampling Investigation

Following the completion of dual phase extraction, and two years of post-remediation sampling activities, Nestlé requested Site Closure in 2005. Upon review of the request, the ACHS directed additional delineation of potential residual hydrocarbons and polychlorinated biphenyls (PCBs) in the subsurface at the Site[26]. In May 2008, an additional soil boring investigation was performed. This investigation collected soil samples from 15 borings (SB16 through SB27 and PCB4 through PCB6) (see Appendix B, Figure 10). Soil borings were located in areas of suspected residual hydrocarbon impacts and at the perimeter of impacted area to improve delineation of current residual COCs present beneath the Site.

For the May 2008 soil sampling investigation, soil borings were advanced using a 2-inch diameter direct-push Geoprobe® coring method and logged[27]. At each boring, a soil sample was collected from immediately above the first-encountered saturated zone, typically between 6 and 10 ft. bgs, as documented in Table 2. Per prior agreement with the ACHS, soil boring SB17 was to be extended up to 30 ft. bgs, collecting soil samples every 5 feet. The Geoprobe® was unable to drive sampling rods through saturated and consolidated sands encountered in this boring at approximately 20 ft. bgs. Samples were, therefore, collected and analyzed from 5, 10, 15, and 20 ft. bgs at soil boring SB17.

Soil samples were analyzed for TPH-g, TPH-d, and TPH as motor oil (TPH-mo) via EPA Method 8015B modified and BTEX via EPA method 8260B. Soil samples were also analyzed for 1,2-DCA via EPA method 8260B and PCBs via EPA Method 8082 (see Table 2). Duplicate soil samples were collected at some locations to validate and verify soil sampling consistency and method.

TPH-g, TPH-d, and TPH-mo results were consistent with the impacts identified in previous soil and groundwater sampling efforts. Elevated levels of hydrocarbons were detected at borings located to the north and northwest of the former UST locations (see Figure 2). TPH-g ranged from ND up to 12,000 mg/kg. TPH-d ranged from ND up to 17,000 mg/kg. TPH-mo ranged from ND up to 13,000 mg/kg. All three maximum TPH fraction results were from soil samples collected from SB17 at 10 to 10.5 ft. bgs vertical interval, as did the highest benzene concentration of 140 mg/kg. TPH and benzene concentrations in soil samples collected above (8-8.5 ft. bgs) and below (15-15.5 ft. bgs) this interval were at least one order of magnitude lower than the preceding interval. The most elevated results were reported from borings north and northwest of the former UST locations (see Table 2 and Appendix B, Figures 16 through 27). This is consistent with the site conceptual model which indicates that the former UST tanks on the northwestern parcel are the source of historical hydrocarbon impacts at the Site. 1,2-DCA was not detected above detection limit at any of the soil boring sampling locations. Results from SB17 confirmed the absence of BTEX constituents below 10 ft. bgs and TPH-g, TPH-d, and TPH-mo below 15 ft. bgs (see Table 2 and Appendix B, Figures 16 through 27). The maximum TPH-g concentration detected was 12,000 mg/kg at 10 ft bgs (SB-17). The soil boring data from the May 2008 investigation indicated that TPH-g impacts in soils beneath the Site are mainly limited to the 5 to 15 feet bgs interval.

Per a request made by ACHS in the September 28, 2007 directive, soil samples were analyzed for PCBs at eight borings at depths ranging from 8.5 to 9.5 ft. bgs. No PCBs were detected above laboratory detection limits. These results are consistent with prior reports which stated that there were no sources of PCBs at the Site from dairy processing or distribution activities. Per an August 2008 letter from the ACHS, no further investigation of PCB impacts at the Site is warranted[28].

4.3 Groundwater Characterization

As many as 65 monitoring wells were sampled quarterly and semi-annually to characterize dissolved hydrocarbons and VOCs in groundwater between 1994 and 2004. The number of wells monitored was reduced in 2004, consistent with ACHS approval in November 2002. Between December 2002 and late 2004, 11 monitoring wells were sampled. Grab groundwater samples were collected during the May 2008 soil boring investigation, as requested by the ACHS in the September 28, 2007 directive. Cumulative groundwater monitoring results (1993 through 2008) are shown in Table 3.

Historical groundwater results show that positive TPH-g and benzene detections are generally limited to the area immediately downgradient (NNW) of the former USTs. Dissolved hydrocarbons have historically existed immediately downgradient of the former UST location at wells PR50, PR53, and PR64. Historical and recent (May 2008) concentrations of benzene and TPH-g, as illustrated in the *Revised SCM Report*, attenuate in the downgradient direction toward 16th Street. Monitoring wells farther downgradient from MW-26 (located at the southern edge of 16th Street) did not contain detectable TPH-g and benzene from 2002 through 2004, as shown in Table 3. Wells sampled to the west and east (cross-gradient) and south (upgradient) of the former UST area have not exhibited detectable TPH-g or BTEX, with the exception of 0.60 micrograms per liter (μg/L) benzene and 0.90 μg/L ethylbenzene in upgradient well MW-33.

Historical groundwater sampling results and estimated TPH-g, TPH-d, and benzene isoconcentration contours are presented for sampling events in 2000, 2004, and 2008 in the *Revised SCM Report*[29]. These plots indicate the stable condition of hydrocarbon constituents since the termination of active remedial activities (i.e., multi-phase extraction) in the second quarter of 2000.

HVOCs in groundwater have historically existed in the area immediately downgradient of the former UST locations and at lower levels further downgradient in the area of 16th Street. The predominant HVOC is 1,2-DCA, which has a historical maximum concentration of 2,200 µg/L found in a grab groundwater sample from boring SB18. Post-remediation monitoring revealed a maximum 1,2-DCA level of 83 µg/L in downgradient wells within 16th Street. Groundwater monitoring data do not indicate any predominant or persistent source of HVOCs.

Per regulatory requests made by ACHS in the September 28, 2007 directive, groundwater samples were analyzed for PCBs at eight borings during the May 2008 investigation. Laboratory reports show that no PCBs were detected[30]. The absence of PCB detections in groundwater confirms that PCBs are not present at the Site.

Liquid phase hydrocarbons (LPH) was first observed at the Site in the area of the USTs and maintenance bays during UST removal in 1988. More than 50 wells monitored LPH since 1989. As indicated in Table 4, LPH levels in wells that historically reported the most significant LPH levels showed the most significant reductions in LPH thickness as a result of product removal by various technologies implemented at the site between 1989 and 2001. Following the cessation of regular LPH monitoring in August 2001, semi-annual groundwater sampling was performed at 11 on- and off-site wells from November 2002 through November 2004. LPH was not observed in any of these 11 monitoring wells during these semi-annual sampling events.

Historical LPH gauging through August 2001 shows that LPH has not migrated following the termination of active remediation in the second quarter of 2000. This conclusion is based on the following facts:

- The number and location of wells containing LPH remained relatively constant prior to LPH recovery initiated in late 1997.
- The number of wells containing measurable LPH decreased after multi-phase extraction was initiated in late 1997.
- LPH has not been detected in any well outside the group of wells that have historically contained measurable LPH thickness, and
- LPH was never observed in any of the 11 post-remediation groundwater monitoring wells sampled from November 2002 through November 2004.

4.4 Remediation Activities

Four fuel USTs and associated dispensers and piping were excavated on December 19, 1988. One 1,000-gallon used-oil tank was removed on January 12, 1989. The former tank and fuel line excavation areas are shown in Figure 2. Each of the removal actions was documented in a 1989 report[31]. Removal of the tanks and piping stopped the primary source of COC release to the subsurface.

Between January and March 1989, approximately 1,200 cubic yards of soil were removed in the area of the former tanks and lines. This soil was treated onsite and placed back into the excavation. Following removal of the five USTs in December 1988 and January 1989, LPH skimming began in January 1989. LPH skimming removed approximately 1,800 gallons of LPH[32] .

A SVE system began treating residual hydrocarbons in 1994 in the vadose zone immediately to the north and northwest of the former UST area[33]. This system operated until December 1995 and removed approximately 5,200 pounds of hydrocarbons.

A multiphase extraction system addressed both LPH and dissolved-phase hydrocarbons in the subsurface, starting in August 1997[34]. This system extracted LPH entrained above the groundwater table, floating directly on the groundwater table, dissolved in groundwater and in subsurface as vapors in areas with high dissolved hydrocarbon concentrations. This system operated until June 2000 and removed approximately 10,875 pounds of hydrocarbons and reduced residual LPH levels at the Site significantly, as documented in the *Revised SCM Report*[35].

LPH thickness in monitoring wells declined until the cessation of dual phase extraction activities. At meetings held in May and November 1999, ACHS and RWQCB-SF agreed that the Site conditions satisfied the criteria for consideration of closure as a low risk site with respect to petroleum hydrocarbons and residual HVOCs. In November 2002, Nestlé received a letter from ACHS indicating that the Site did not warrant further active remediation and that two years of semi-annual post-remediation monitoring was required at the site (Appendix F). Multiphase extraction ceased in June 2000. Eleven groundwater monitoring wells were monitored on a semi-annual basis between 2002 and 2004, as directed by ACHS. These post-remediation monitoring events documented the plume stability due to lack of hydrocarbon plume movement and the low to non-detectable levels of hydrocarbons in groundwater at downgradient and off-site monitoring wells[36]. Post-remediation monitoring of LPH levels conducted through August 2001 documented that LPH is not migrating following the termination of active remediation at the site

Since the cessation of active remediation and the completion of the required semi-annual confirmation groundwater monitoring, Nestlé made several requests that the site be considered for a no further action or case closure designation. These requests were made pursuant to the November 14, 2002 letter from the ACHS stating that following the two years of semi-annual monitoring, case closure would be appropriate if no additional plume migration or off-site detections of COCs above MCLs were detected. On September 28, 2007, ACHS responded to these requests for closure and/or no further action and requested additional site characterization and incorporation of all historical site data in a *Revised Site Conceptual Model*[37]. Following the submittal and approval of the *Revised Site Conceptual Model*, ACHS requested additional in-field sampling to further demonstrate plume stability and re-assess any exposure risks related to residual hydrocarbons at the site. These investigations and assessments were submitted to ACHS[38], and have been summarized and included in support of the remedial alternatives considered in this CAP (Appendix B).

5 DEVELOPMENT OF CORRECTIVE ACTION PLAN ALTERNATIVES

Based on the understanding and conceptualization of the Site, this CAP has been developed for the site. This CAP relies on the compilation and analysis of site investigation and remediation data as documented in the January 2001 *Comprehensive Site Characterization Report*[39], July 2008 *Supplemental Soil and Groundwater Investigation Report*, the November 4, 2008 *Revised SCM Report*[40], the May 18, 2009 *Screening Health Risk Evaluation* (Appendix A2), and the February 2010 *Sub-slab Soil Gas Sampling and Analysis Report* (Appendix A1). The assessment of corrective action options and recommendations for a corrective action plan for the site are detailed in this and subsequent sections of this report

In this section, ECM assesses several corrective action plan (CAP) alternatives, which includes descriptions of the targeted cleanup areas and scope for each alternative. ECM considered the following alternatives:

1. Targeted Excavation of Impacted Soils
2. Excavation of all Soils Above TPH Tier I ESLs
3. Soil Vapor Extraction / Bioventing
4. In-situ Chemical Oxidation
5. Institutional Controls

Each of the above alternatives is evaluated in terms of advantages, disadvantages, estimated costs, and the likelihood of success in reaching cleanup objectives for the site. Cleanup objectives are discussed below. Table 5 summarizes each alternative and the primary factors considered in this evaluation.

The Sub-slab Soil Gas Sampling and Analysis Report (Appendix A1) and the May 2009 *Screening Health Risk Evaluation* (Appendix A2) were used to assess and provide quantification of risks associated with residual COCs at the site and to assist in establishing cleanup objectives. Table 6, developed in conjunction with the risk evaluation process, indicates the exposure pathways which are considered complete in terms of potential exposure risks associated with residual COCs remaining at the site. The evaluation of the corrective action plan alternatives assesses each alternative and its likely success in providing cleanup of the site to levels such that these exposure risks are below acceptable (per USEPA guidance[41]) levels.

Costs associated with each alternative have also been estimated through a thorough engineering cost assessment. An estimated cost range for each alternative is presented in Table 5, considering all likely activities and system operation and maintenance if required associated with each alternative. The details of these cost estimates are contained in Appendix E.

Specific considerations and assumptions made in the development of the various CAP alternatives are presented in Sections 5.1 through 5.5 below. Section 6 discusses the advantages and disadvantages for each CAP alternative and recommends a corrective action plan for the Site. A summary of the primary features, advantages, and disadvantages of each CAP alternative is provided in Table 5.

Where necessary, and to establish the extent of areas to be targeted for remedial actions, May 2008 Tier 1 Environmental Screening Levels (ESLs)[42] drive the scope of the various alternatives. RWQCB-SF guidance shows the following ESL criteria for shallow soil. ECM used these ESLs to target areas for the various remedial alternatives.

Environmental Screening Levels (ESLs) for Soil[43]

	Tier 1 ESLs	**Urban Area Eco-toxicity Criteria**	**Odor Index**	**Human Health Direct Exposure, Commercial/ Industrial Worker**	**Direct Exposure, Construction / Trench Worker**	**Vapor Intrusion into Buildings**	**Groundwater Protection, Soil Leaching Concerns**
	(Table B)	**(Table B-2)**	**(Table H-2)**	**(Table K-2)**	**(Table K-3)**	**(Table B-2)**	**(Table G)**

Chemical	Soil ESL (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)
TPHd (nc)	**180**	-	355	450	4,200	*	180
TPHg (nc)	**180**	-	13,600	450	4,200	*	180
Benzene (c)	**0.27**	25.00	63.3	0.27	12.0	*	2.0
Toluene (nc)	**9.3**	-	3.5	210	650	*	9.3
Ethyl-benzene (c)	**4.7**	-	22.2	5.0	210	*	4.7
Xylenes (Total)(nc)	**11.0**	-	6.0	100	420	*	11.0
MTBE (c)	**8.4**	-	1,880	65	2,800	*	8.4

NOTE:
Table adapted from *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Interim Final, November 2007[44].
Tables from ESLs where groundwater is not a current or potential source of drinking water and for commercial/industrial land use only.
(c) carcinogenic effects.
(nc) noncarcinogen
* use soil gas.
\- not available.

Site characterization data (see Table 2) indicates that other COC (TPH-d, benzene, etc.) impacts are coincident or smaller in their extent, compared to TPH-g impacts to soil. Thus, TPH-g impacts were used when developing the extent of targeted areas for each CAP alternative. In addition, the May 2009 *Screening Health Risk Evaluation* (see Appendix A2) and the *Sub-slab Soil Gas Sampling and Analysis Report* (Appendix A1) are used to assess and provide quantification of risks associated with residual hydrocarbons. The risk evaluation notes the following complete exposure routes and receptors (see Table 6):

- Vapor intrusion from soil gas to indoor air of the onsite commercial building;
- Volatilization from soil gas to onsite outdoor; and
- Advective transport from onsite outdoor air to the outdoor or indoor air of offsite residential land uses

These potential receptors are considered when assessing the CAP alternatives in Sections 6.1.1 through 6.1.5 below. As noted in the Risk Evaluations and the *Revised SCM Report*[45], there is no current use of groundwater from beneath the site as potable water supply. Well surveys conducted in 1997 and 2000 found no municipal or private groundwater supply wells located within a ¼-mile of the site[46]. The current Deed Restriction (Appendix C) recorded for the site also prohibits the installation of any wells on site for the purpose of extracting groundwater for any potable or non-potable use.

Nestlé understands that the ACHS may request, as part the implementation of any of the selected CAP alternative, that the existing Deed Restriction be amended to reflect the Alameda County Health Care Service as the beneficiary of the deed restriction. The following considerations are relevant to any possible amendment to the Deed Restriction:

- The deed restriction that is currently in place "runs with the land" and is therefore enforceable against any use of the property, no matter who owns the property.

- The deed restriction that is currently in place restricts development of the property to industrial, commercial, or office space use. It requires that all uses and development of the property must preserve the integrity of the cap. Therefore, the deed restriction protects the public and the environment.

- The deed restriction is for the benefit of the City of Oakland Fire Services, rather than the ACHS. In all other respects, it conforms to current ACHS guidance for deed restrictions.

- Nestlé no longer owns the property. Therefore has no legal right free to restrict the property. If the deed restriction is amended, it can only be amended by the current property owner.

- Nestlé does not have any objection to, and would encourage, the amendment of the deed restriction to reflect ACHS as the beneficiary agency.

In considering the following CAP alternatives, cleanup goals with respect to petroleum hydrocarbons were considered. Evaluation of potential exposure pathways such as groundwater ingestion, air inhalation, direct soil contact, etc. is the first step in determining if human exposure pathways are complete. The evaluation of exposure pathways, as illustrated in Table 6 and documented in the *Screening Health Risk Evaluation* (Appendix A2) and the *Sub-slab Soil Gas Sampling and Analysis Report* (Appendix A1), has resulted in risk evaluations for the following complete pathways:

- Exposure by on-site commercial workers to COCs in indoor and outdoor air, and

- Direct (dermal) exposure of on-site construction workers to impacted subsurface soil or groundwater

Cleanup Goals for COC Vapor Concentrations <u>(see Appendix A1 and A2)</u>

Chemical	**Vapor Phase Cleanup Goals** **(based on maximum concentrations in vapor at 5 ft. bgs protective of an indoor air cancer risk of 10^{-5} ; see Appendix A2, Table 16)** **(µg/m^3)**
Benzene	**1.0×10^5**
Toluene	**3.2×10^7**
Ethyl-benzene	**1.4×10^6**
Xylenes (Total)	**1.1×10^7**
1,3-Butadiene	**6.5×10^3**
MTBE	**9.1×10^6**

Cleanup levels for other media (soil, groundwater) are dependent on complete exposure pathways and, with the exception to direct exposure to subsurface soil or groundwater by on-site intrusive construction workers, direct exposure to groundwater or soil by on- and off-site commercial/ industrial workers is documented as incomplete (see Table 6; Appendix A2). The process to mitigate the potential in case of direct exposure to above cleanup-level concentrations in soil and groundwater are addressed in Deed Restriction (Appendix C) and RMP (Appendix D) for the Site.

5.1 Alternative 1: Targeted Excavation of Impacted Soils

Soil excavation is a rapid, conventional and reliable means of remediating areas of relatively high hydrocarbon impact. Previous soil excavation activities at the site have resulted in the removal and treatment of approximately 1,200 cubic yards of soil from the area of the former tanks and fuel delivery lines. Limited over-excavation in targeted zones impacted by TPH-g can be considered as a viable option for some specific areas. For consideration of this alternative, ECM selected soil excavation in areas where three-dimensional interpolation of historical soil sampling data indicates that TPH-g concentrations exceed 4,200 mg/kg. This contaminant level represents the ESL for direct exposure to a construction worker and is an approximate gauge of zones where an aggressive remedial action such as excavation may be most beneficial.

Soil excavation under this alternative involves removal and replacement of the surface cap which includes the existing building floor and foundation in the area where excavation is to occur, soil removal, potential dewatering, loading, transportation and disposal of excavated material to an offsite disposal facility, and import and placement of clean soil, and compaction. When excavations encounter shallow water tables, dewatering can be necessary to facilitate further excavation and fill placement. Persistent constituents may require more extensive dewatering to flush the excavation, requiring an on-site pump-and-treat system.

Groundwater has historically been encountered at depths ranging from approximately 5 to 12 ft. bgs. Static groundwater elevations encountered in borings extended during the May 2008 site investigation were in the 9 to 10 ft. bgs range. Groundwater generally flows to the north-northwest (toward 16th Street) at an average gradient of 0.0027ft/ft. The groundwater flow direction has been generally consistent and does not change significantly throughout the annual hydraulic cycle[47].

Excavation often extends one or two feet below the lowest observed water table elevation. Nearby stockpiles or roll-off containers can store the excavation spoils pending characterization and disposal arrangements. In the case of TPH constituents, local Class II landfills will normally accept impacted soil as non-hazardous, special waste. A mobile lab could help with spot excavations and stockpile characterization, if needed.

Soil sampling data is used to delineate the excavation area and to demonstrate successful removal. An understanding of likely source areas (near the former USTs and downgradient locations), repeated groundwater elevation measurements, and sample analyses provide additional basis upon which to determine potential excavation locations.

Estimated excavation volumes of soils above RWQCB-SF direct exposure limits[48] (see Section 5 above) were derived using Rockworks© Modeling Software and assume a universal depth of excavation of 15 ft. bgs in establishing the excavation boundaries. Soils were assumed to be predominately well-sorted sands for estimating purposes, with an estimated density of approximately 120 lbs/ft^3. Rockworks© modeling produced an estimated soil excavation volume of approximately 14,600 ft^3 (541.7 cubic yards) to excavate soil with TPH-g levels above 4,200mg/kg (see Figure 7).

5.2 Alternative 2: Excavation of all Soils above TPH Tier I ESLs

As discussed in Section 5.2, soil excavation is a rapid, conventional and reliable means of addressing areas of significant hydrocarbon impacts. For this alternative, ECM selected soil excavation in areas where modeling indicates that TPH-g concentrations exceed 180 mg/kg (the RWQCB-SF Tier 1 ESL, see Section 5 above).

Excavation to Tier I levels requires similar equipment and procedures as those discussed in Section 6.3, but results in a larger excavation volume. This alternative requires demolition of the existing L-shaped 29,000 square foot building (see Figure 2), engineered dismantling of all building related structures, excavation shoring to protect adjacent sidewalks and structures, soil removal, potential dewatering, loading soils for transport to an offsite disposal facility, and import and placement of clean soil for backfill and compaction. As this excavation alternative would necessitate the demolition of the existing building, costs for reconstruction of a building of similar size and dimension are noted in Table 5. These costs are noted in Table 5, as they are likely to be incurred by Nestlé under this alternative, since Nestlé is not the current owner of the building or parcel. As the future plans for the existing building, and any potential new buildings to be built on the northwest parcel are not known to Nestlé at this time, these costs are listed separately as a contingency in terms of assessing this alternative.

Estimated excavation volumes were derived using Rockworks© Modeling Software and assume a universal depth of excavation of 15 ft. bgs in establishing the excavation boundaries. Soils were assumed to be predominately well-sorted sands for estimating purposes, with an estimated density of approximately 120 lbs/ft^3. Rockworks© modeling produced an estimated total soil excavation volume of approximately 110,500 ft^3 (4,090 cubic yards) to excavate soil with TPH-g levels above

180mg/kg. The small volume of soils located near SB12 is approximately 1,300 ft^3 (48 cubic yards) and is included in the total estimated soil excavation volume (Figure 8).

5.3 Alternative 3: Soil Vapor Extraction / Bioventing

The SVE or Bioventing alternative target soils for remediation where TPH-g levels exceed the Tier I ESL. The following subsections discuss the specific options for SVE and Bioventing in more detail. Figure 9 shows the proposed SVE or Bioventing Layout.

5.3.1 Soil Vapor Extraction (SVE)

For SVE (including high-vacuum extraction (HVE)) a vacuum blower pumps air from the unsaturated part of the vadose zone, flushing out constituents in vapor form. SVE is the air-flow equivalent of groundwater pump and treat. Installation of an SVE system involves air permitting, extraction well installation, system construction, performance monitoring, and operations and maintenance.

The SVE process capitalizes on the volatility of constituents to partition from the aqueous and soil-adsorbed phases into the vapor phase. Thus, SVE may treat COCs in both soil and groundwater. These mechanisms work best on constituents with low water solubility, a high Henry's Law constant, and a high vapor pressure. Gasoline may be considered to have a relatively high vapor pressure with its flash point being below typical room temperature. Pavement or other semi-permeable ground cover is often necessary to reduce short circuiting through the vadose zone to the atmosphere when applying SVE.

Extracted vapor typically requires treatment prior to discharge to the atmosphere to meet any Bay Area Air Quality Management District's air permitting requirements. The methods of treatment depend upon the concentrations of the various vapor constituents and include granular activate carbon (GAC) adsorption, internal combustion engines, or thermal processes (catalytic and thermal oxidation).

SVE is often less effective for sites where shallow groundwater is present. The May 2008 soil sampling event indicated that the most elevated residual hydrocarbon (TPH-g and TPH-d) detections were found at a depth of 10 ft. bgs. Residual impacts detected during the May 2008 soil sampling investigation were focused in the 5 to 15 ft bgs interval. The most recent groundwater monitoring event (in May 2008) indicated that the vadose zone ranged from 9 to 10 feet in thickness, which is relatively shallow and may present challenges for removal of hydrocarbons entrained in soil below the groundwater surface.

Previous dual phase (high vacuum) extraction efforts implemented at the Site from August 1997 through June 2000 provide insight into the likely effectiveness of additional SVE for removal of hydrocarbons entrained in the vadose zone. This dual phase system extracted hydrocarbons in groundwater and vapor phases, over a three year period, until additional hydrocarbon mass removal was considered technically impracticable. Operation of the system was terminated, with regulatory approval, when ongoing groundwater and LPH monitoring (see Table 4) indicted that hydrocarbon levels in the areas of highest impact reached asymptotic levels and were no longer declining.

Areas of low permeability may also restrict flow and require a higher well density. A thin vadose zone may allow short circuiting to atmosphere; thus, testing and sealing the surface with an impermeable material and seal coat may be necessary with SVE. This can add complexity to the system design, and increase capital, and operation and maintenance costs.

5.3.2 Bioventing

Bioventing treats the vadose zone and may treat the uppermost 2 or 3 feet of the aquifer using an air injection system. Bioventing replenishes the fresh air supply in the subsurface formation around injection wells, enhancing remediation efforts in two ways:

- Exposing fuel impacts to fresh air, thereby promoting aerobic biodegradation and hence, in situ destruction of fuel hydrocarbons; and
- Smearing any remaining free product along the well borehole as the water level drops due to increased air pressure inside the injection well. The smear zone's higher exposure to air increases oxygen demand, thus accelerating the remediation of the smear zone and the free product within it.

As with SVE, the existence of relatively shallow groundwater (depth to groundwater most recently ranged from 9 to 10 ft. bgs) significantly limits the vertical extent across which bioventing would expect to be effective. The most elevated residual hydrocarbon (TPH-g and TPH-d) detections were found during recent (May 2008) sampling at a depth of 10 ft. bgs. Residual impacts detected during the May 2008 soil sampling investigation were focused in the 5 to 15 ft bgs interval. The dual phase extraction system previously operated at the site has effectively removed the residual hydrocarbons in the shallow vadose zone which would be most readily influenced by a bioventing system.

5.4 Alternative 4: In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) treatment injects oxidizers into the subsurface to oxidize organic constituents in place. Oxidizers can include hydrogen peroxide, ozone, Fenton's Reagent (iron-catalyzed hydrogen peroxide), potassium permanganate, sodium persulfate, and other chemicals. The technology is implemented by drilling wells so that the oxidizer can be injected into the contaminated zone. ISCO treatment may reduce organic pollutant concentrations, biological oxygen demand (BOD), chemical oxygen demand (COD), and/or improve odor and color.

Successful application of ISCO is sensitive to site conditions such as natural organic matter content and hydrogeology. ISCO using chemicals like potassium permanganate and sodium persulfate require a slurry or solution of the reagent in water and injection of the mix into the subsurface in batches.

Implementation of in-situ chemical oxidation also depends on adequate distribution of injected oxidizer throughout the hydrocarbon-impacted area. It may be difficult to achieve good mixing between the groundwater and injected oxidant solutions due to the presence of discontinuous silt and silty-sand zones beneath the Site (see Appendix B, Figures 5 and 6). The injected solution tends to displace the impacted groundwater and then react with natural organic matter before it reacts with impacted groundwater. Injection of a chemical oxidation solution is regulated and permits are required by the regulatory agencies which may delay the implementation of this alternative[49].

ISCO may require special planning and operational constraints, especially when using ozone as an oxidizer. These constraints include permitting and inspections, additional monitoring for ozone or degradation by-products, and unwanted or potentially hazardous treatment by-product build-up beneath the surface cap present across the Site.

5.5 Alternative 5: Institutional Controls

This CAP alternative involves documentation of the risks associated with residual hydrocarbons remaining at the site, and the implementation of institutional controls required to address any exposure risks documented in this evaluation. Documentation of existing residual hydrocarbon impacts at the Site is complete and documented in the Revised Site Conceptual Model (SCM) and the *February 18, 2009 Response Letter to SCM Comments*, which provide the basis for the assessment of exposure risks in the *Screening Health Risk Evaluation* and the *Sub-slab Soil Gas Sampling and Analysis Report* (see Appendix A1 and Appendix A2).

Institutional controls are currently in place to address direct exposure risks pursuant to the Covenant and Environmental Restriction (i.e., a Deed Restriction, Appendix C) recorded in June 2000. The Deed Restriction controls land use and on-site activities and is binding on the current and future property owner. Requirements of the Deed Restriction for the Site include, but are not limited to:

- Any future development of the site is limited to land use characterized as industrial, commercial, or office space
- No residence for human habitation, hospitals, schools for persons under 21 years of age, child day care, or Senior Citizens care facilities are permitted on the site
- The maintenance of a surface cap across the deed restricted portion of the property;
- Notification of regulatory agencies (City of Oakland Fire Services (COFS), ACHS, RWQCB) prior to disturbing subsurface soils or seeking changes to current land use restrictions at the Site.
- Any future development plans for the site are required to be conducted in accordance with the requirements of the RMP for the site (Appendix D)
- No installation of wells on the site for the purpose of extracting water for any use, unless permitted in writing by the RWQCB-SF

Section 3.1 of the Deed Restriction (Appendix C) details the implementation of a risk management plan for any future development and new construction. Therefore, the 2001 RMP (Appendix D) was developed and submitted in order to further define site activity requirements and procedures to be followed in order to prevent potential exposure of future site occupants to residual hydrocarbons under the Site for Alternative 5.

Amongst the key requirements of the RMP:

- Any site redevelopment must be performed in accordance with the site use limitations of the existing Deed Restriction for the Site (see above).

- For any future excavation or other construction activities at the Site, a hazardous operations site-specific health and safety plan (SHSP) must be developed and implemented in compliance with state and federal regulations listed in the RMP.

- Any potential construction worker exposure to subsurface soils must be addressed through personal protective equipment requirements listed within the SHSP and specified to mitigate contact with residual hydrocarbons in soil and groundwater remaining beneath the Site.

- Ongoing maintenance of a surface cap as currently exists for the northwestern parcel, and documentation of any alterations, or replacement, of this cap.

- An addendum to the RMP is required to be submitted, and approved by the ACHS and the RWQCB-SF, if any change is made in the thickness, or plan view extent, of the current surface cap.

These documents are legally binding on all future owners of the property. Nestlé understands that the ACHS may request, as part of this proposed CAP alternative, that the existing Deed Restriction be re-filed with the Alameda County Health Care Service office such that the document is recorded according to current protocols within the County. In addition, this alternative considers the need for regular inspection of Site conditions (primarily the surface CAP) on an annual basis, and submittal of a report to AHSC as to the status of the northwest parcel with respect to the requirements of the Deed Restriction and RMP.

6 EVALUATION OF CORRECTIVE ACTION ALTERNATIVE

This section provides a detailed evaluation of each CAP alternative. Each of the alternatives described above have been considered in terms of advantages, drawbacks, likelihood of success, technical challenges, and estimated cost of implementation. Table 5 presents a summary of these considerations and provides an overview of the critical considerations assessed for each alternative.

6.1 Alternative 1: Targeted Excavation of Impacted Soils

CAP Alternative 1, soil excavation of targeted areas (areas of soil with THP-g or TPH-d above RWQCB-SF direct exposure limits) provides the following advantages:

- Provides direct removal of COC mass from the Site,
- The excavation of soils is likely to reduce risks of direct exposure associated with residual COCs, and
- No on-going discharge of treated groundwater or vapor is necessary

Excavation of soils cannot guarantee complete removal of targeted residual hydrocarbons. The typical limitations of the environmental sampling performed to date are such that defining excavation limits must rely on the interpretation and interpolation of a reasonable population of soil sampling data. Thus, post-excavation levels of residual hydrocarbons in soil and groundwater can be anticipated to be significantly reduced through targeted excavation, but complete removal of all hydrocarbons above direct exposure limits is not certain.

Excavation of soils under this alternative will also require disruption and replacement of the concrete and asphalt surface cap currently present at the site. The presence of this surface cap is currently required by the existing Deed Restriction at the site, and its removal and appropriate replacement would need approval from the ACHS and/or RWQCB-SF, as required by the terms of the Deed Restriction.

Costs of excavation of areas above direct exposure limits are estimated from $478,600 to $574,000, and could exceed this range if future groundwater levels are above current elevations and additional dewatering volumes are required to reach the target depth of 15 ft. bgs across the soil excavation area.

6.2 Alternative 2: Excavation of all Soils above TPH Tier I ESLs

CAP Alternative 2, soil excavation of soils above Tier I ESLs (areas above RWQCB-SF commercial/industrial Tier I ESLs) provides similar advantages and drawbacks to Alternative 1, above. However, as illustrated in Figure 8 and detailed in Section 5.2, the total estimated soil volume required to remove the estimated area of soil impacts above Tier I ESLs (180 mg/L TPHg) is 110,500 ft^3 (4,090 yds^3). This is over seven times the volume of soil estimated for excavation under Alternative 1.

In addition, the excavation of soils within areas estimated to contain TPH-g levels above Tier I ESLs could require the demolition of the existing L-shaped building located on the northwestern portion of the Site (Figure 2), which is not the case in Alternative 1. Additional engineering controls and excavation shoring would likely be required to ensure stability of sidewalks and off-site structures along the northern edge of the property.

These engineering and structural considerations would result in significant additional costs for Alternative 2. Like Alternative 1, the complete removal of all soils above the targeted (Tier 1 ESLs) limits is not certain following excavation activities due to the necessary estimation and interpolation of impacted areas using all available soil sampling data from the Site (see Table 2 and Figure 8).

Costs of excavation of areas above direct exposure limits are estimated from $1,203,400 to $1,452,800, and could exceed this range depending on the groundwater levels and dewatering volumes required to reach the target depth of 15 ft. bgs across the soil excavation area. A significant increase in costs for Alternative 2 could result from the potential need to demolish and replace the existing building, if these activities are not part of the planned future use of the site. Additional potential costs for building demolition and replacement are estimated at $1,653,200 to $1,963,800.

6.3 Alternative 3: Soil Vapor Extraction / Bioventing

Alternative 3, as detailed in Section 5.3 above, involves extraction and treatment of soil vapor from the subsurface areas of highest residual hydrocarbon impacts to soil as outlined in Figure 9. Bioventing of soils (see Section 5.3 above) is a means of promoting vadose zone air flow and enhancing in-situ biodegradation of hydrocarbons.

Soil vapor and/or bioventing at the Site offer the following advantages:

- SVE and/or bioventing provide for direct removal of vapor phase COCs from the subsurface (primarily vadose zone).

- SVE and/or bioventing can target areas of highest hydrocarbon concentrations in soil.
- SVE and/or bioventing involves minimal disruption of existing concrete/asphalt cap and building.

Groundwater has been encountered at depths ranging from approximately 5 to 12 ft. bgs at the Site. Where shallow aquifers exist, SVE can lift the water table high enough to saturate the part of the vadose zone around the well where most of the airflow occurs, effectively cutting off airflow. SVE is generally less effective in extracting hydrocarbons from deeper soil layers for sites where shallow groundwater is present. The recent monitoring event (in May 2008) data indicated that the vadose zone ranged from 9 to 10 feet in thickness, which is relatively shallow and may present challenges for removal of hydrocarbons entrained in soil below the groundwater surface.

Previous dual phase (high vacuum) extraction efforts implemented at the Site from August 1997 through June 2000 provide insight into the likely effectiveness of SVE for removal of hydrocarbon mass via extracted vapors. This dual phase system extracted hydrocarbons in groundwater and vapor phases, over a three year period. Operation of the system was terminated, with regulatory approval, when ongoing groundwater and LPH monitoring (see Table 4) indicted that hydrocarbon levels in the areas of highest impact reached asymptotic levels and were no longer declining.

Given this experience, any newly installed extraction system likely result in a rapid return to this asymptotic condition. Outside of an initial and short-lived elevated rate of hydrocarbon mass removal during extraction system start-up, it is unlikely that operation of an SVE system would produce any significant and consistent reductions in hydrocarbon mass beneath the Site.

Estimated costs for the installation and operation (for one year) of a combined SVE and bioventing system are $593,700 to $711,600, depending on the number of extraction points and the mass of hydrocarbons requiring treatment in extracted vapors. Cost will increase if the operation of the SVE is continued beyond one year.

6.4 Alternative 4: In-situ Chemical Oxidation

Alternative 4, as detailed in Section 5.4 above, involves subsurface injection of chemical oxidants to effect the degradation of hydrocarbons to non-toxic (carbon dioxide and water) endpoints in groundwater and saturated soil beneath the Site. Typical oxidizers include hydrogen peroxide, ozone, Fenton's Reagent (iron-catalyzed hydrogen peroxide), potassium permanganate, sodium persulfate, and other chemicals.

Use of in-situ chemical oxidation offers the following advantages:

- It provides for conversion of residual hydrocarbon mass to non-toxic (carbon dioxide, water) by-products.
- It may accelerate reduction of residual hydrocarbon mass beneath Site.
- It creates minimal disruption of existing concrete/asphalt cap and existing building.

Successful implementation of in-situ chemical oxidation depends on adequate distribution of injected oxidizer throughout the hydrocarbon-impacted area. It may be difficult to achieve good mixing between the groundwater and injected oxidant solutions due to the presence of discontinuous silt and silty-sand zones beneath the Site. Injection of a chemical oxidation solution is regulated and permits are required by the regulatory agencies which may delay the implementation of this alternative[50].

ISCO may have disadvantages such as increasing the corrosion potential of pipeline infrastructure at the Site. The effectiveness of ISCO may be limited in areas of separate phase product or other more-impacted areas. ISCO may require special planning and operational constraints, especially when using ozone as an oxidizer. These constraints include permitting and inspections, additional monitoring for ozone or degradation by-products, and preparation of a hazardous materials business plan.

The effectiveness of ISCO remediation may be limited by the ability to directly apply oxidizer. Aqueous solutions or slurries of oxidizing chemicals are injected into wells and the effectiveness is limited by soil conditions and well spacing. Ozone-oxygen gas blends can be sparged into wells (ozone sparging). Ozone sparging may reach more target zones than other oxidizing schemes because ozone is very mobile. However, ozone sparging is subject to the same distribution limitations as the traditional air sparging oxidizers and delivers weaker reagent doses than permanganate or persulfate slurries. Liquid or slurried oxidizers can deliver more concentrated reagent doses and react with source areas more effectively. In either case, naturally occurring carbon (total organic carbon) from various sources will be oxidized, reducing the effect of the oxidizer and requiring a high volume of oxidizer.

Estimated costs for the installation and operation (for one year) of a ozone-based oxidation system are $917,600 to $1,101,500, depending on the number of required injection points and the number of injection cycles required to effect degradation of hydrocarbons across the areas of highest impact.

6.5 Alternative 5: Institutional Controls

Alternative 5, as discussed in Section 5.5 above, involves documenting risks associated with residual hydrocarbons, and implementing institutional controls to address any exposure risks documented in the *Revised Risk Assessment*.

The National Contingency Plan (NCP) is cited by USEPA[51] as the basis for defining acceptable incremental risk levels. According to the NCP, lifetime incremental cancer risk levels posed by a site should be within the risk range of one in a million (1×10^{-6}) to 100 in a million (1×10^{-4}). Thus, USEPA and Cal/EPA agencies typically consider the 1×10^{-6} risk level to be an insignificant risk, and consider a calculated excess cancer risk between 1×10^{-6} and 1×10^{-4} to be within the acceptable risk range. For commercial exposure scenarios, a typical point of departure is a risk level of 1×10^{-5}; i.e., if risks are at or below 1×10^{-5}, the agency of record will generally accept no further action[52].

The risk evaluations conducted for the Site (Appendix A1 and Appendix A2) conclude that indoor air exposure risks associated with the concentrations of COCs in sub-slab, shallow soil, and groundwater are within the risk management range for carcinogens as determined by the USEPA[53] and below the typical point of departure ($1x10^{-5}$) for commercial exposure scenarios. The risk evaluation documents the potential for exposure risks above Tier I screening levels in the case of on-site construction workers that may come into direct contact with impacted soils or groundwater during any future construction activities at the Site which involve trenching or excavation

Institutional controls currently in place address the actions to be taken to prevent direct exposure risks. These controls can be found in the Covenant and Environmental Restriction (i.e., a Deed Restriction, Appendix C) recorded in June 2000 and the 2001 RMP (Appendix D). These documents control land use and limit on-site activity to protect against risks posed by the presence of residual hydrocarbons beneath the Site. They are legally binding on all future owners of the property. The deed restriction requires a surface cap at the Site and notice to regulatory agencies if disturbance to subsurface soils or changes in land use are proposed for the Site. Section 3.1 of the Deed Restriction (see Appendix C) details the implementation of RMP for any future development and new construction.

Nestlé understands that the ACHS may request, as part of this proposed CAP alternative, that the existing Deed Restriction be amended to indicate the Alameda County Health Care Service as a beneficiary consistent with current protocols.

Estimated costs for Alternative 5, including the cost of risk evaluations and any modifications deemed necessary to the existing Deed Restriction and RMP for the Site, are estimated at $165,200 to $235,100.

7 CORRECTIVE ACTION PLAN RECOMMENDATION

After evaluation and comparison of the Corrective Action Plan options (see Table 5), Alternative 5 (Institutional Controls) is recommended as the Corrective Action Plan for implementation at the Site.

Data from previously implemented remediation efforts indicate that additional extraction or in-situ technologies are not likely to produce significant additional mass removal. This conclusion is supported by the asymptotic rates of mass removal observed prior to the termination of previous active remediation through dual phase extraction[54, 55]. As illustrated in Appendix B, Figure 24, wells that historically reported the most significant LPH levels showed significant reductions in LPH thickness as a result of the dual phase extraction system operated at the site. Following the removal of over 10,800 pounds of hydrocarbons via dual phase extraction from August 1997 through June 2000, asymptotic levels of groundwater concentrations and mass removal rates were achieved, resulting in the recommendation and approval by ACHS to terminate active remediation at the site in June 2000.

Any newly installed extraction system would likely result in a return to this asymptotic condition within a very short period of time. Outside of a short-lived initial rate of hydrocarbon mass removal during extraction system start-up, it is unlikely that further groundwater or soil vapor extraction would produce any significant and consistent reductions in hydrocarbon mass beneath the Site.

Local subsurface lithology, site hydrogeology, and compliance groundwater monitoring data indicate that hydrocarbons remaining at the site are stable and not migrating[56]. Two years of semi-annual compliance monitoring were then requested by the ACHS, and subsequently performed between January 2002 and December 2004. This compliance monitoring has confirmed the stability of dissolved hydrocarbons and the lack of off-site migration of dissolved hydrocarbons (see revised SCM Report[57]).

The assessment of potential excavation activities (see Sections 6.1.1 and 6.1.2 above) have resulted in the conclusion that direct removal of soils from large areas of the site is logistically and economically infeasible. These alternatives likely pose considerable engineering risk and financial cost due to the presence of the existing building and shoring requirements to protect adjacent and off-site sidewalk and street infrastructure.

The attached risk evaluations (Appendix A1 and Appendix A2) analyze the risks for existing exposure pathways, including indoor air and future onsite workers. Based on the thorough documentation of residual hydrocarbons and the assessment of potential exposure risks associated with the impacts remaining at the site (Appendix A1 and Appendix A2), the implementation of institutional controls to prevent exposure risks via the existing Deed Restriction (Appendix C) and RMP (Appendix D) is the most viable corrective action alternative evaluated for the site. Implementation of this alternative is proposed based on the thorough site conceptual model developed for the Site, in conjunction with the above assessment of effective activities and institutional controls necessary to meet ACHS requirements for site remediation and protection of human health and the environment.

8 PROPOSED SCHEDULE AND IMPLEMENTATION OF ALTERNATIVE 5

8.1 Implementation Process

As discussed in Section 5.5, implementation of Alternative 5 is contingent on adherence to the existing Deed Restriction (Appendix C) and RMP (Appendix D). The existing Deed Restriction, recorded in June 2000 with the Recorder for the County of Alameda, limits use of and activities on the Site. Complimenting this document as part of the recommended CAP alternative, the 2001 RMP, presents the required steps if future use of the site involves disruption of the building currently on-site or disruption of the existing surface cap. Proper implementation of the requirements of these site-specific land use and risk mitigation documents includes, but is not limited to, compliance with the following:

- Any future development of the site is limited to land use characterized as industrial, commercial, or office space
- No residence for human habitation, hospitals, schools for persons under 21 years of age, child day care, or Senior Citizens care facilities are permitted on the site
- The maintenance of a surface cap across the deed restricted portion of the property;
- Notification to regulatory agencies (COFS and the RWQCB-SF) prior to disturbing subsurface soils or seeking changes to current land use restrictions at the Site.
- No installation of wells on the site for the purpose of extracting water for any use, unless permitted in writing by the RWQCB-SF
- For any future excavation or other construction activities at the Site, a hazardous operations site-specific health and safety plan (SHSP) must be developed and implemented in compliance with state and federal regulations listed in the RMP.
- Any potential construction worker exposure to subsurface soils must be addressed through personal protective equipment requirements listed within the SHSP and specified to mitigate contact with residual hydrocarbons in soil and groundwater remaining beneath the Site.
- An addendum to the Deed Restriction or RMP is required to be submitted, and approved by the ACHS and the RWQCB-SF, if any change is made in the thickness, or plan view extent, of the current surface cap.

This alternative requires that, in implementing the necessary corrective actions under this alternative, an annual report of site conditions will be submitted to the ACHS to ensure compliance with the various institutional controls outlined in the Deed Restriction and the RMP (see Section 5.5 and Appendices C and D). Nestlé understands that ACHS may request, as part the implementation of this CAP alternative, that the existing Deed Restriction be amended to reflect Alameda County Health Care Service office as the beneficiary, consistent with current protocols.

8.2 Schedule

Any amendment to the Deed Restriction, if necessary, will also be addressed following agreement and acceptance of the recommended corrective action plan for the Site in consultation with the current property owner. Any required long-term institutional control monitoring and/or inspection schedules will also be proposed to the ACHS upon the acceptance of the final proposed corrective action plan. Required provisions for public review and comment on this CAP will be scheduled and accommodated in accordance with ACHS requirements for such a review process.

9 END NOTES

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[52] **(USEPA, 1989)**

[53] **(USEPA, 1989)**

[54] **(ETIC, 2001)**

[55] **(ECM, 2008a)**

[56] **(ECM, 2008a)**

[57] **(ECM, 2008a)**

Figures

Project: Nestle-Oakland

Proj. Manager B. Acharya

Date drafted: 3/22/10

Chkd by: B. Searcy

Drafter: JWP

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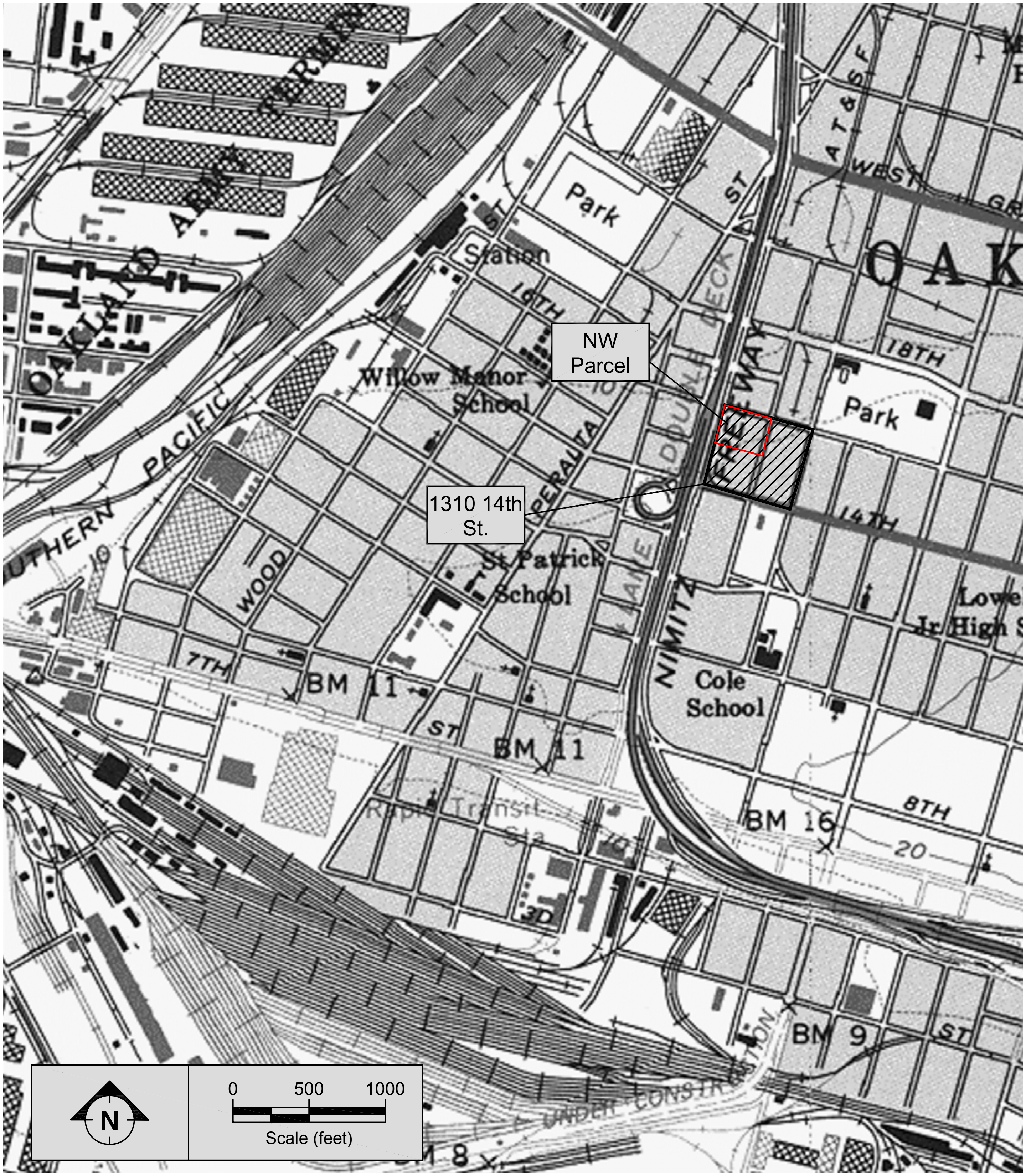

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Site Location

Former Nestle Oakland Facility

1310 14th Street, Oakland, CA-94607

Figure

1

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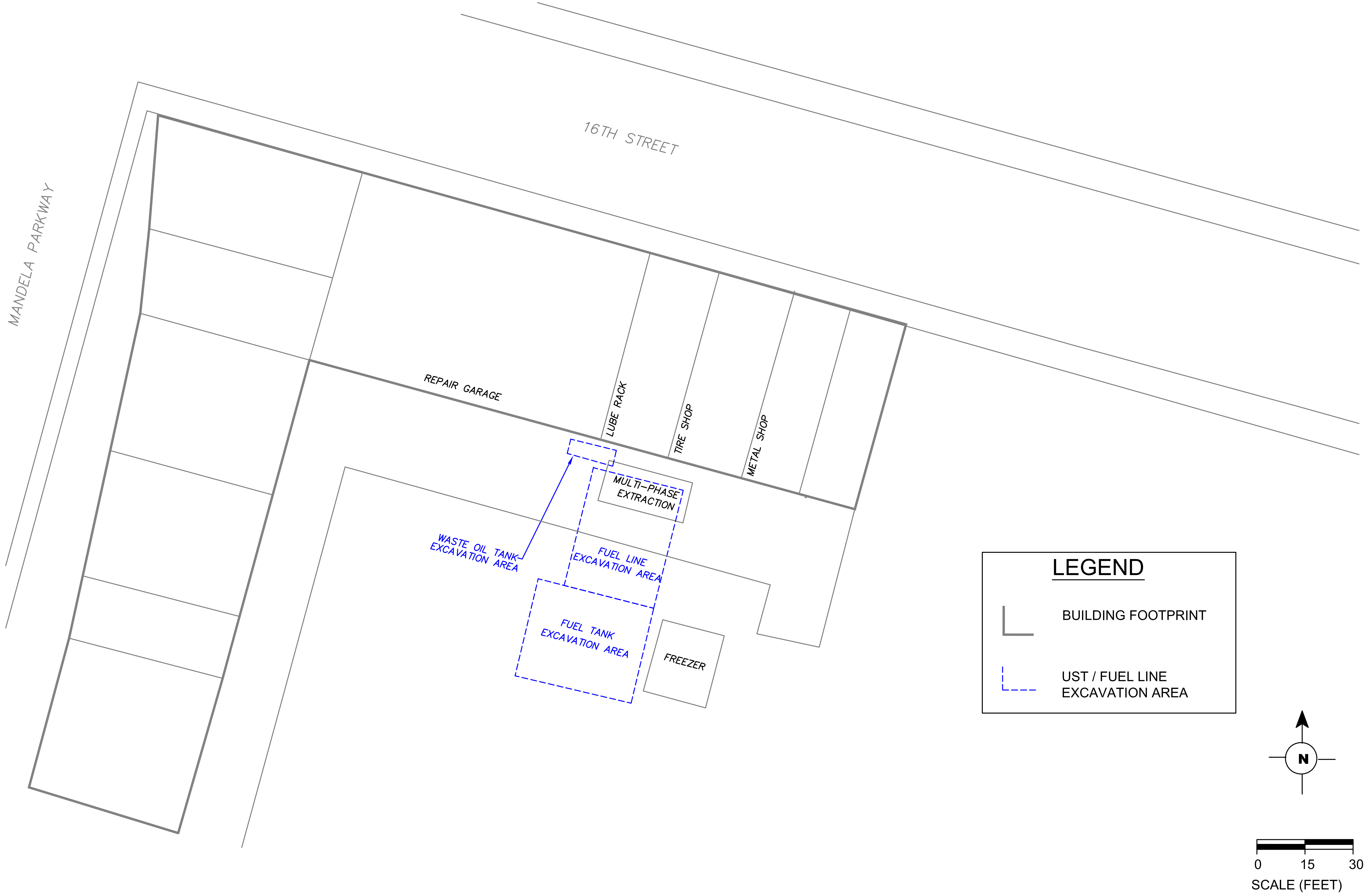

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Primary Site Features

CORRECTIVE ACTION PLAN
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Figure

2

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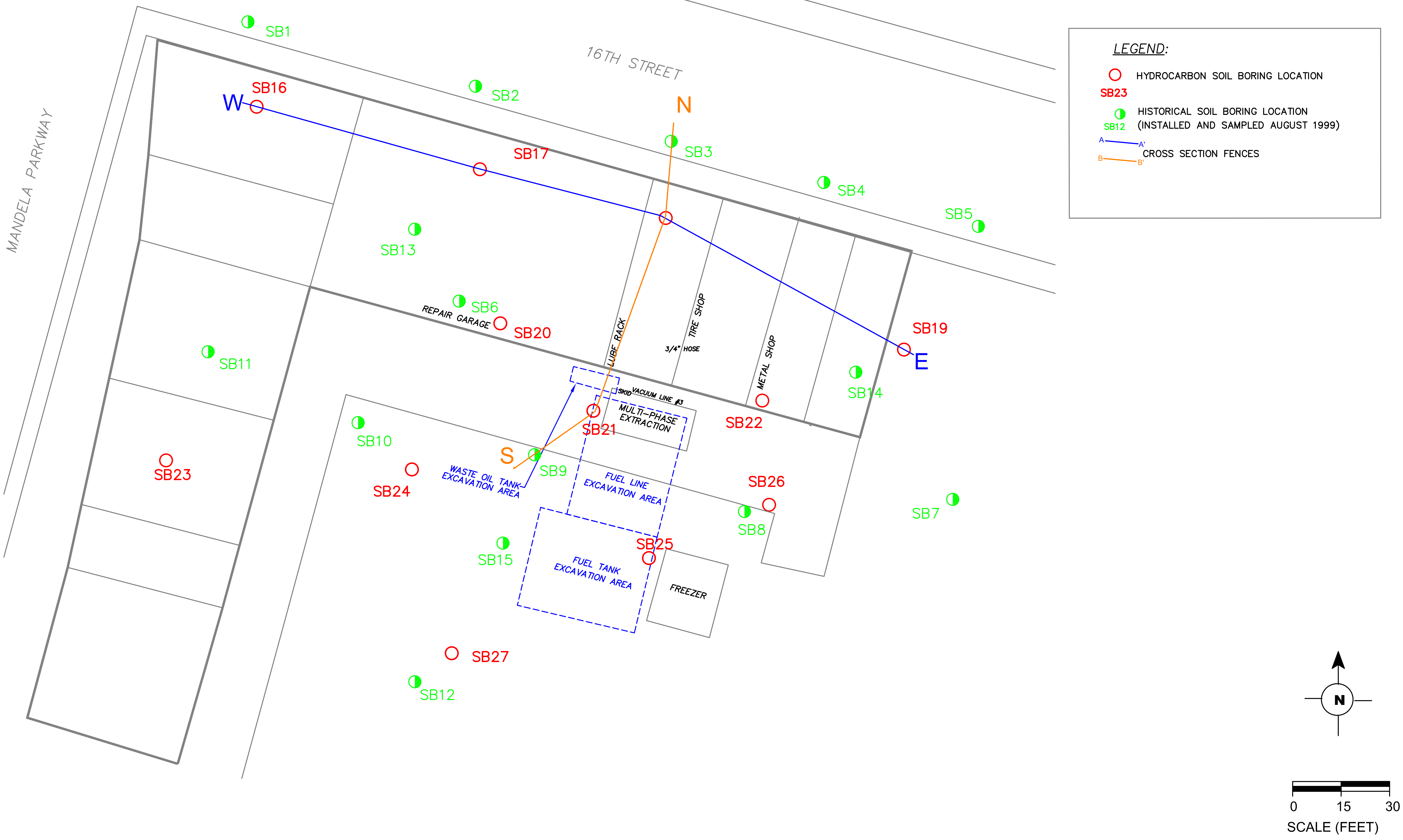

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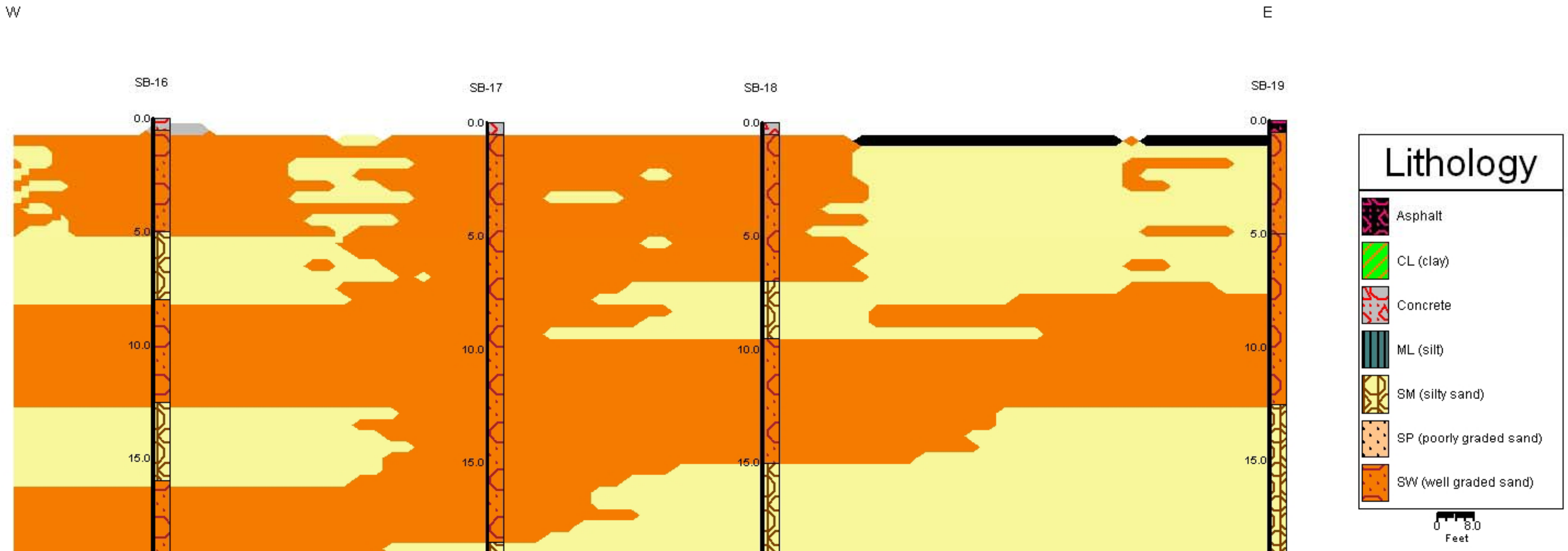
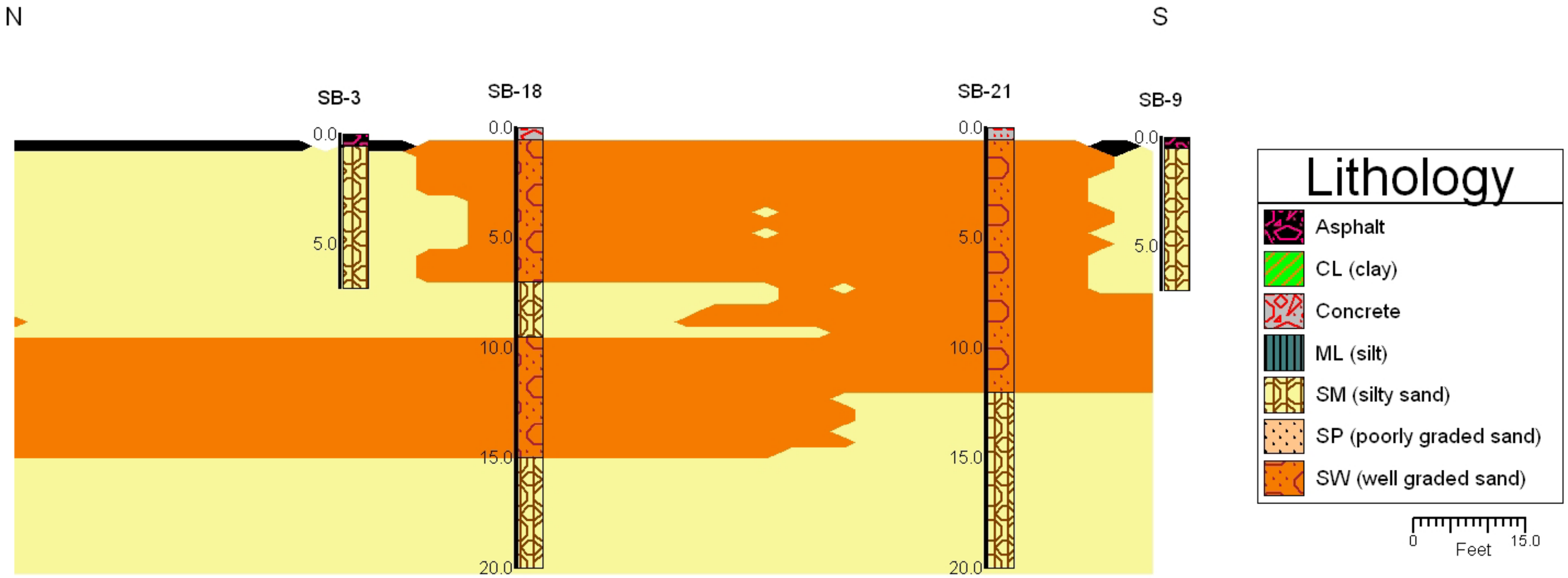
Cross Section Locations
CORRECTIVE ACTION PLAN
April 2010

Figure
3



Former Nestlé USA, Inc. Facility Northwest Parcel 1310 14th Street Oakland, California 94607	**ENVIRONMENTAL COST MANAGEMENT, INC.** *Managing Cost and Liability* 3525 Hyland Avenue, Suite 200 ● Costa Mesa, CA 92626 Tel: (714) 662-2759 ● Fax: (714) 662-2758	E-W Cross Section CORRECTIVE ACTION PLAN April 2010	Figure 4



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Northwest Parcel
1310 14th Street
Oakland, California 94607

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Managing Cost and Liability
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N-S Cross Section
CORRECTIVE ACTION PLAN
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Figure

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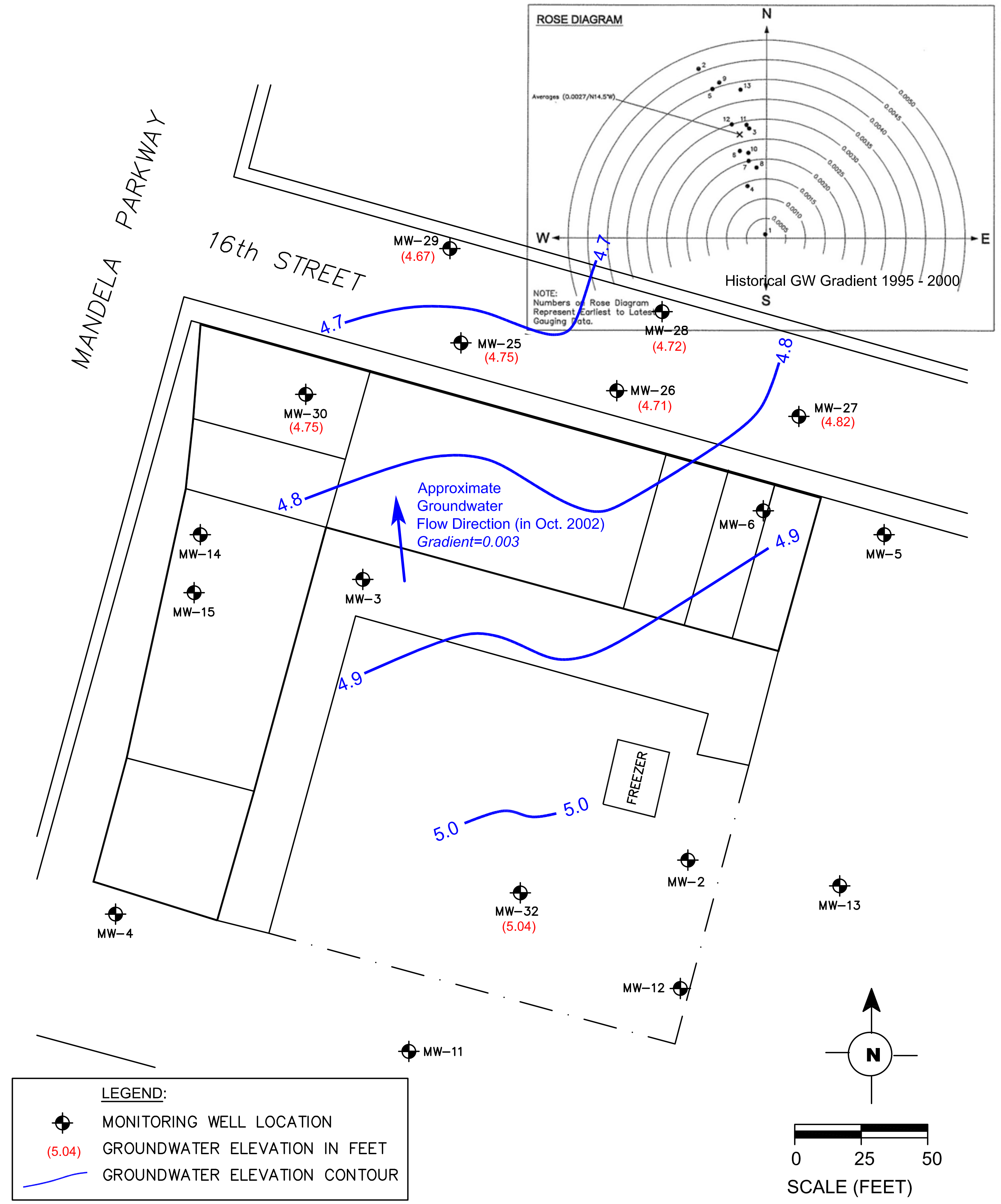

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Historical Groundwater Gradient
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Figure
6

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1310 14th Street
Oakland, California - 94607

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Managing Cost and Liability
3525 Hyland Avenue, Suite 200 ● Costa Mesa, CA 92626
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Proposed Extent of Targeted Excavation of Impacted Soil
Alternative 1
CORRECTIVE ACTION PLAN
April 2010

Figure
7

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Proposed Extent of Excavation of Soils
Above TPH Tier I ESLs - Alternative 2
CORRECTIVE ACTION PLAN
April 2010

Figure
8

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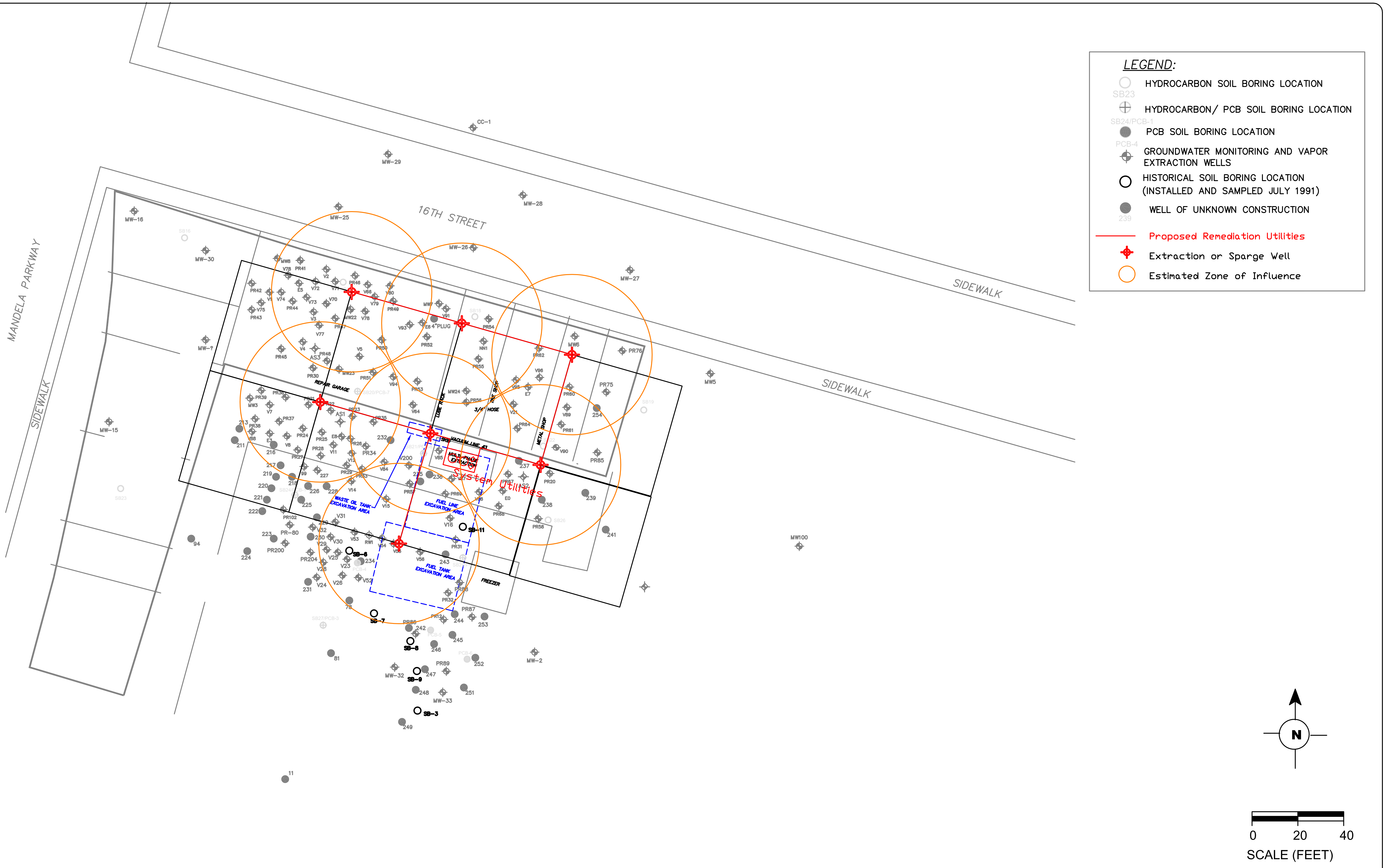

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Managing Cost and Liability
3525 Hyland Avenue, Suite 200 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Proposed Soil Vapor Extraction / Bioventing Layout

CORRECTIVE ACTION PLAN

April 2010

Figure

9

Tables

Table 1a: Soil Vapor Sampling Results, August 1999

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Concentration (ppbv)

Sample ID	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH-g	TPH-d	Acetone	1,3-Butadiene	2-Butanone	Carbon Disulfide	Chlorobenzene	Chloroform	Chloromethane	Cyclohexane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,4-Dioxane	Ethanol	4-Ethyltoluene
SB-1	**4.3**	**3.1**	<0.65	**2.74**	**800**	NA	**77 a**	**2.8**	**13**	**6.2**	<0.65	<0.65	<0.65	<2.6	<0.65	<0.65	**0.77**	<0.65	<0.65	<0.65	<0.65	<2.6	**63**	<2.6
SB-2	**7.5**	**12**	**3.6**	**17.6**	**1,100**	NA	**260 a**	<2.7	**24**	**9.0**	<0.67	**3.9**	<0.67	**12**	<0.67	<0.67	**1.8**	<0.67	<0.67	<0.67	<0.67	<2.7	**110**	<2.7
SB-3	**9,900**	**230**	**68**	**67**	**36,000**	NA	<190	<190	<190	<190	<48	<48	<48	<190	<48	<48	<48	<48	<48	<48	<48	<190	<190	<190
SB-3 (dup)	**9,500**	**240**	<140	<140	**40,000**	NA	<580	<580	<580	<580	<140	<140	<140	<580	<140	<140	<140	<140	<140	<140	<140	<580	<580	<580
SB-4	**1,200**	**76**	**8.1**	**18.7**	**4,600**	NA	**200 a**	**19**	<14	<14	<3.5	<3.5	<3.5	**32**	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<14	**1,400**	<14
SB-5	**7.6**	**5.6**	**0.80**	**1.9**	**1,900**	NA	**45 a**	**61**	**12**	**18**	<0.71	<0.71	**0.77**	**8.2**	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	**3.3**	**55**	<2.8
SB-6	**3.0**	**4.2**	<0.68	**2.52**	**560**	NA	**11 a**	<2.7	**4.0**	<2.7	<0.68	<0.68	<0.68	<2.7	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<2.7	**35**	<2.7
SB-7	**5.9**	**6.2**	**0.87**	**4.3**	**780**	NA	**43 a**	**3.4**	**7.9**	**3.3**	<0.73	<0.73	<0.73	**5.1**	<0.73	<0.73	**2.0**	<0.73	<0.73	<0.73	<0.73	**8.2**	**94**	<2.9
SB-8	**10**	**12**	**3.8**	**15.7**	**1,300**	NA	**42 a**	<11	<11	<11	<2.8	<2.8	<2.8	<11	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<11	**62**	<11
SB-9	**12**	**18**	**1.7**	**9.9**	**690**	NA	**19 a**	<2.7	**6.0**	<2.7	<0.68	**1.1**	<0.68	**4.9**	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<2.7	**47**	<2.7
SB-10	**3.5**	**2.8**	<0.80	**1.7**	**610**	NA	**39 a**	<3.2	**9.7**	<3.2	<0.80	**1.6**	<0.80	<3.2	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<3.2	**40**	<3.2
SB-11	**2.7**	**1.9**	<0.82	**0.91**	**520**	NA	**38 a**	<3.3	**9.9**	<3.3	<0.82	<0.82	**3.7**	<3.3	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	**22**	**23**	<3.3
SB-12	**250**	<70	<70	**610**	**750,000**	NA	<280	<280	<280	<280	<70	<70	<70	<280	**480**	<70	**76**	<70	<70	<70	<70	<280	<280	**760**
SB-13	**0.91**	**8.5**	<0.67	**1.3**	**550**	NA	**49 a**	<2.7	**5.5**	**6.4**	<0.67	<0.67	<0.67	<2.7	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	**4.3**	**410 b**	<2.7
SB-14	**2.7**	**5.3**	**0.87**	**4.7**	**620**	NA	**10 a**	<2.8	**3.5**	<2.8	<0.70	<0.70	<0.70	<2.8	<0.70	<0.70	**1.6**	<0.70	<0.70	<0.70	<0.70	<2.8	**67**	<2.8
SB-15	**42**	**12**	**1.6**	**6.7**	**2,100**	NA	**51 a**	**13**	**13**	<5.8	<1.4	<1.4	<1.4	<5.8	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<5.8	**190**	<5.8

Notes:

All soils vapor samples were collected at 3 feet bgs

ppbv	Parts per billion volumetric.
a	Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
b	Exceeds instrument calibration range.
NA	Not analyzed.
TPH-g	Total Petroleum Hydrocarbons as gasoline.
TPH-d	Total Petroleum Hydrocarbons as diesel.

Table 1a: Soil Vapor Sampling Results, August 1999

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Concentration (ppbv)

Sample ID	Freon 11	Freon 12	Freon 113	Hep-tane	Hex-ane	4-Methyl-2-penta-none	Methylene Chloride	Methyl t-butyl ether	2-Pro-panol	Sty-rene	Tetra-chloro-ethene	Tetra-hydro-furan	1,1,1-Tri-chloro-ethane	Tri-chloro-ethene	1,2,4-Tri-methyl-benzene	1,3,5-Tri-methyl-benzene
SB-1	**0.74**	**0.93**	**27**	<2.6	**4.4**	**3.8**	**3.7**	<2.6	**5.6**	<0.65	**1.2**	<2.6	<0.65	<0.65	**1.1**	<0.65
SB-2	**1.2**	**200**	<0.67	**3.3**	**5.3**	**8.1**	**2.2**	<2.7	<2.7	**3.0**	<0.67	<2.7	<0.67	<0.67	**2.0**	**0.77**
SB-3	<48	**180**	<48	<190	**590**	<190	<48	<190	<190	<48	<48	<190	<48	<48	<48	<48
SB-3 (dup)	<140	**160**	<140	<580	**580**	<580	<140	<580	<580	<140	<140	<580	<140	<140	<140	<140
SB-4	<3.5	**100**	<3.5	<14	**19**	**15**	**340**	<14	**22**	<3.5	**160**	<14	**21**	<3.5	<3.5	<3.5
SB-5	**4.4**	**1.2**	**3.4**	<2.8	<2.8	<2.8	<0.71	<2.8	<2.8	<0.71	<0.71	<2.8	<0.71	<0.71	<0.71	<0.71
SB-6	<0.68	<0.68	<0.68	<2.7	<2.7	<2.7	<0.68	<2.7	<2.7	<0.68	<0.68	<2.7	<0.68	<0.68	**1.1**	<0.68
SB-7	**0.74**	**1.1**	<0.73	<2.9	**6.8**	**4.4**	<0.73	<2.9	**3.8**	**1.0**	**2.0**	<2.9	<0.73	<0.73	**1.8**	<0.73
SB-8	**6.5**	**630**	<2.8	<11	<11	<11	<2.8	<11	<11	<2.8	<2.8	<11	<2.8	<2.8	**5.3**	<2.8
SB-9	**1.5**	**20**	<0.68	<2.7	**4.3**	<2.7	<0.68	<2.7	<2.7	<0.68	<0.68	<2.7	<0.68	<0.68	**2.3**	**0.77**
SB-10	<0.80	**1.4**	<0.80	<3.2	**3.9**	<3.2	<0.80	<3.2	<3.2	<0.80	<0.80	<3.2	<0.80	<0.80	**1.2**	<0.80
SB-11	**4.6**	<0.82	<0.82	<3.3	<3.3	<3.3	**1.2**	<3.3	<3.3	<0.82	<0.82	<3.3	<0.82	<0.82	**0.85**	<0.82
SB-12	<70	<70	<70	<280	**18,000**	<280	<70	<280	<280	<70	<70	<280	<70	<70	**580**	**740**
SB-13	<0.67	<0.67	<0.67	**3.4**	<2.7	<2.7	**5.6**	<2.7	**26**	<0.67	<0.67	**58**	<0.67	<0.67	**1.1**	<0.67
SB-14	<0.70	<0.70	<0.70	<2.8	<2.8	**2.8**	**1.3**	**2.9**	<2.8	**0.82**	<0.70	<2.8	<0.70	<0.70	**2.0**	**0.81**
SB-15	<1.4	**46**	<1.4	<5.8	**50**	<5.8	**4.8**	<5.8	<5.8	<1.4	**2.1**	<5.8	<1.4	<1.4	**1.8**	<1.4

Notes:

All soils vapor sample All soils vapor samples were collected at 3 feet bgs

ppbv	Parts per billion volumetric.
a	Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
b	Exceeds instrument calibration range.
NA	Not analyzed.
TPH-g	Total Petroleum Hydrocarbons as gasoline.
TPH-d	Total Petroleum Hydrocarbons as diesel.

Table 1b: Soil Vapor Sampling Results, May 2008

Corrective Action Plan, April 2010
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, CA

Boring Location	Sample Depth (feet bgs)	Date of Sample Collection	Analytical results of Vapor, µg/l							
			TPH g	TPH d	Benzene	Ethylbenzene	Toluene	Xylenes, Tot	1,2-DCA	Others
SB-16	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-17	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-18	5	19-May-08	630	<50	2.2	<0.10	0.44	<0.30	<0.10	
SB-19	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-20/ PCB-7	5	19-May-08	19	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-21/ PCB-8	5	19-May-08	25	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-22	5	19-May-08	2,600	<50	40	7.7	32	19.1	<0.10	Dichlorodifluoromethane: 0.39
SB-23	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-24/ PCB-1	5	19-May-08	<10	<50	<0.10	<0.10	0.22	<0.30	<0.10	
SB-25/ PCB-2	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-26	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	Dichlorodifluoromethane: 10
SB-27/ PCB-3	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-22 dup	5	19-May-08	2,600	<50	40	7.5	32	18.0	<0.10	Dichlorodifluoromethane: 0.38
Probe Blank	NA	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	

Notes:

EPA Method 8260B for VOC Analyses of soil vapor
EPA Mentod 8015m for TPH-g and TPH-d analyses of soil vapor

Table 2: Historical Soil Sample Results
(1999 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Boring Location	**Sample Depth (feet bgs)**	**Date of Sample Collectio**	**Analytical results (mg/kg)**								
			TPH g	TPH d	TPH mo	Benzene	Toluene	Ethylbenzene	Xylenes, Tot	1,2-DCA	Others
SB-1	3.5-4.0	08/12/99	<0.13	**1,200**	NA	<0.0013	<0.0013	<0.0013	<0.0013	<0.0011	
SB-1	6.5-7.0	08/12/99	<0.10	<5.9	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-2	3.5-4.0	08/12/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.001	
SB-2	6.5-7.0	08/12/99	<0.10	<5.9	NA	<0.001	<0.001	<0.001	<0.001	**0.001**	
SB-3	3.5-4.0	08/12/99	<0.10	<5.6	NA	<0.001	<0.001	<0.001	<0.001	**0.0007**	
SB-3	6.5-7.0	08/12/99	**6,160**	<5.7	NA	**11**	**190**	**100**	**460**	**0.0018**	MTBE: 0.073
SB-4	3.5-4.0	08/12/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0007	
SB-4	6.5-7.0	08/12/99	**1**	**94**	NA	**0.082**	**0.0085**	**0.0073**	**0.013**	**0.001**	
SB-5	3.5-4.0	08/12/99	<0.09	<5.5	NA	<0.0009	<0.0009	<0.0009	<0.0009	**0.0006**	
SB-5	6.5-7.0	08/12/99	<0.08	<5.9	NA	<0.0008	<0.0008	<0.0008	<0.0008	**0.0009**	
SB-6	3.5-4.0	08/13/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-6	6.5-7.0	08/13/99	10,100	**1,100**	NA	**76**	**490**	**170**	**990**	**0.43**	
SB-7	3.5-4.0	08/12/99	<0.10	<5.4	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-7	6.5-7.0	08/12/99	<0.11	<5.8	NA	<0.0011	<0.0011	<0.0011	<0.0011	<0.0009	
SB-8	3.5-4.0	08/12/99	<0.10	<5.6	NA	<0.001	<0.001	<0.001	<0.001	<0.0007	
SB-8	6.5-7.0	08/12/99	**13**	<5.8	NA	**0.43**	**0.36**	**0.12**	**0.83**	**0.0012**	MTBE: 0.022
SB-9	3.5-4.0	08/13/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.001	
SB-9	6.5-7.0	08/13/99	<0.61	<5.8	NA	**0.024**	<0.0061	<0.0061	<0.0061	<0.0011	
SB-10	3.5-4.0	08/13/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.0008	
SB-10	6.5-7.0	08/13/99	<0.13	<6.4	NA	<0.0013	<0.0013	<0.0013	<0.0013	<0.001	
SB-11	3.5-4.0	08/13/99	<0.20	<5.5	NA	<0.002	<0.002	<0.002	<0.002	<0.0011	
SB-11	6.5-7.0	08/13/99	<0.11	<5.7	NA	<0.0011	<0.0011	<0.0011	<0.0011	<0.001	
SB-12	3.5-4.0	08/12/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0006	
SB-12	4.5-5.0	08/12/99	**496**	**2,900**	NA	**0.07**	**0.032**	**4**	**6.7**	<0.0009	Chlorobenzene: 0.0017 1,2-DCB: 3.1 1,3-DCB: 0.038 1,4-DCB: 0.33 MTBE: 0.014
SB-12	6.5-7.0	08/12/99	**2**	**60**		<0.001	<0.001	**0.023**	**0.0098**	<0.0011	MTBE: 0.001
SB-13	3.5-4.0	08/13/99	**1**	**390**	NA	<0.0012	**0.002**	**0.0027**	**0.0027**	**0.0025**	
SB-13	6.5-7.0	08/13/99	**12**	**65**	NA	**0.25**	**0.048**	**0.15**	**0.49**	**0.0014**	
SB-14	3.5-4.0	08/12/99	<0.08	<5.5	NA	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	MTBE: 0.084
SB-14	6.5-7.0	08/12/99	**29**	**450**	NA	**0.56**	**0.29**	**0.33**	**1.7**	**0.0097**	
SB-15	3.5-4.0	08/12/99	<0.51	**140**	NA	<0.0054	<0.0054	<0.0054	<0.0054	<0.0091	
SB-15	6.5-7.0	08/12/99	<0.57	**81**	NA	<0.0061	**0.012**	<0.0061	**0.0085**	<0.0098	

Table 2: Historical Soil Sample Results
(1999 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Boring Location	Sample Depth (feet bgs)	Date of Sample Collectio	Analytical results (mg/kg)								
			TPH g	TPH d	TPH mo	Benzene	Toluene	Ethylbenzene	Xylenes, Tot	1,2-DCA	Others
SB-16	6-6.5	05/19/08	<0.22	**30**	<50	<0.0043	<0.0043	<0.0043	<0.0087	<0.0043	
SB-17	8-8.5	05/22/08	**2,500**	**3,600**	**2,900**	**30**	**130**	**27**	**120**	ND	
SB-17	10-10.5	05/22/08	12,000	17,000	13,000	**140**	**580**	**120**	**620**	<8.3	
SB-17	15-15.5	05/22/08	**64**	**1,400**	**1,300**	<0.89	<0.89	<0.89	<1.8	<0.89	
SB-17	20-20.5	05/22/08	<0.21	<0.99	<49	<0.0042	<0.0042	<0.0042	<0.0084	<0.0042	
SB-18	8-8.5	05/21/08	**1,900**	**67**	<49	**41**	**110**	**28**	**130**	<19	
SB-19	8-8.5	05/21/08	<0.25	<0.99	<49	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	
SB-20/ PCB-7	8-8.5	05/22/08	**5,600**	**390**	**51**	**86**	**280**	**54**	**280**	<8.3	
SB-21/ PCB-8	8-8.5	05/21/08	**3,800**	**2,500**	<49	**40**	**210**	**69**	**360**	<19	
SB-22	8-8.5	05/21/08	**3,200**	**1,100**	<500	<47	**140**	<47	**190**	<47	
SB-23	11.5-12	05/22/08	<0.21	**1.2**	<49	<0.0041	<0.0041	<0.0041	<0.0082	<0.0041	
SB-24/ PCB-1	9-9.5	05/20/08	<0.19	**1.6**	<50	<0.0039	<0.0039	<0.0039	<0.0078	<0.0039	
SB-25/ PCB-2	8-8.5	05/20/08	<0.19	**1.1**	<50	<0.0037	<0.0037	<0.0037	<0.0075	<0.0037	
SB-26	8.5-9	05/21/08	<0.23	**10**	<50	<0.0047	<0.0047	<0.0047	<0.0093	<0.0047	
SB-27/ PCB-3	8.5-9	05/20/08	<0.27	<0.99	<49	<0.0054	<0.0054	<0.0054	<0.011	<0.0054	
SB-20/ PCB-7 Dup	8-8.5	05/22/08	**4,900**	**610**	<250	**99**	**300**	**64**	**340**	<21	
SB-25/ PCB-2 Dup	8-8.5	05/20/08	NA	<1.0	<50	NA	NA	NA	NA	NA	

Notes:

NA = Not Analyzed
EPA Method 8260 for BTEX and 1,2-DCA analyses of soil
EPA Mentod 8015m for TPH-g, TPH-d, and TPM-mo analyses of soil

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-2	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	--	--	--	--	--	--	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	<0.5	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	<0.3	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.8	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	0.7	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	<0.5	<0.5	<0.5	<0.5	<50	<150	0.7	<0.5	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	01/27/98	<0.5	<0.5	<0.5	<0.5	100	<150	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-3	03/23/93	35	2.9	2	3.2	300	ND	--	--	--	--	--	
	07/27/93	97	1	4	1.1	220	ND	--	--	--	--	--	
	11/05/93	4.9	ND	ND	1.2	170	ND	--	--	--	--	--	
	02/25/94	42	<1	<1	<1	100	<1,000	--	--	--	--	--	
	06/03/94	120	8.2	8.4	4.5	320	<20,000	--	--	--	--	--	
	08/31/94	83	1.1	5.3	2.9	<500	<500	--	--	--	--	--	
	12/22/94	1,460	18	100	50	3,800	270	--	--	--	--	--	
	03/13/95	3,600	260	270	280	14,000	1,700	--	--	--	--	--	
	06/09/95	4,700	58	140	71	3,700	120	--	--	--	--	--	
	09/21/95	9,800	58	600	95	14,000	300	--	--	--	--	--	
	12/12/95	330	2.1	47	5.3	700	<50	--	--	--	--	--	
	03/12/96	350	4.6	23	8.7	600	<50	--	--	--	--	--	
	06/21/96	940	76	98	57	1,900	<50	--	--	--	--	--	
	08/29/96	420	29	44	28	900	<150	--	--	--	--	--	
	01/16/97	1,600	270	120	194	3,600	700	<0.5	9.2	<0.5	<0.5	--	
	04/15/97	1,300	300	180	160	4,300	800	<0.5	16	<0.5	1.1	6.9	
	07/07/97	100	84	100	67	1,900	350	--	--	--	--	3.8	
	10/27/97	1,030	60	54	40	2,200	--	<0.5	2.4	<0.5	<0.5	3.1	
	01/27/98	1,070	98	73	69	3,200	--	--	--	--	--	3.9	
	04/22/98	610	56	49	54	1,800	--	<0.5	3.0	<0.5	<0.5	1.1	
	07/22/98	1,800	230	160	180	3,600	370	--	--	--	--	5.0	
	10/21/98	78	1.0	3.8	0.6	110	<250	<0.5	0.6	<0.5	<0.5	<0.5	
	07/23/99	1,500	140	76.0	260	4,000	790	<0.5	1.0	<0.5	<0.5	5.60	
	10/28/99	1,100	43	58	102	3,000	600	<0.5	0.9	--	<0.5	--	
	02/10/00	690	22	36	49	1,400	520	<0.5	<0.5	<0.5	<0.5	2.20	
	04/27/00	1,100	140	73	163	2,400	250	<0.5	0.6	<0.5	<0.5	<0.5	
	08/03/00	520	7.7	21	27	1,100	750	<0.5	0.6	<0.5	<0.5	<0.5	
	10/23/00	2,000	16	22	46	3,800	760	<0.5	0.7	<0.5	<0.5	<0.5	
	01/31/01	360	8.6	14	28	860	300	<0.5	0.6	<0.5	<0.5	<0.5	
	04/26/01	808	60.6	46.8	115	1,530	280	<0.5	0.8	<0.5	<0.5	<0.5	
	07/30/01	788	23.3	44.6	80.7	1,400	350	<0.5	0.6	<0.5	<0.5	<0.5	
	10/29/01	852	14.3	24.5	38.6	1,730	500	<0.5	0.5	<0.5	<0.5	<0.5	
	01/29/02	1,250	85.3	64.7	95.7	4,240	490	<0.5	1.4	<0.5	<0.5	<0.5	
	04/29/02	1,120	51.5	84.4	117	5,710	700	<0.5	1.1	<0.5	<0.5	<0.5	
MW-5	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-6	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	3.5	<100	<1,000	--	--	--	--	--	
	06/03/94	2.7	<0.5	<0.5	<0.5	69	<20,000	--	--	--	--	--	
	08/31/94	<0.3	8.7	1.6	3.5	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	1.2	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	0.6	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	5.5	16	2.9	16	140	220	<0.5	6.3	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	10/24/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	7.7	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	6.9	<0.5	<0.5	<0.5	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-6 (cont.)	04/27/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	6.6	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	9.2	<0.5	<0.5	<0.5	
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	10	<0.5	<0.5	<0.5	
	01/29/02	0.54	<0.5	<0.5	<1.0	<200	<250	<0.5	10	<0.5	<0.5	<0.5	
	04/30/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	14	<0.5	<0.5	<0.5	
MW-11	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-12	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-13	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-15	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	430	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-25	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	4.2	4.4	2.5	20	170	ND	--	--	--	--	--	
	02/25/94	2.1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	2.4	14	<0.5	3.4	97	<20,000	--	--	--	--	--	
	08/31/94	0.5	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.58	<0.5	<0.5	<0.5	150	950	--	--	--	--	--	
	06/09/95	0.8	<0.5	<0.5	<0.5	<100	60	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	120	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	90	<150	--	--	--	--	--	
	01/16/97	0.6	<0.5	<0.5	<0.5	80	<150	25	41	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	140	<150	--	--	--	--	11	
	01/27/98	<0.5	<0.5	<0.5	<0.5	<100	--	--	--	--	--	10	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	24	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	340	28	59	<0.5	<0.5	28	1,1-DCE detected, 0.9 µg/L.
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	27	72	<0.5	<0.5	27	1,1-DCE detected, 1.6 µg/L.
	07/23/99	1.80	<0.5	<0.5	<0.5	<50	<200	30	58	<0.5	<0.5	23.0	
	10/27/99	<0.5	1.4	<0.5	1.0	<100	<200	35	47	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	100	<250	39	41	<0.5	<0.5	29.0	1,1-Dichloroethene detected at 3.1 µg/L.
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	51	38	<0.5	<0.5	18	1,1-Dichloroethene detected at 4.2 µg/L.
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	40	57	<0.5	<0.5	27	1,1-Dichloroethene detected at 2.6 µg/L.
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	54	68	<0.5	<0.5	38	1,1-Dichloroethene detected at 3.5 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	90	<250	52	46	<0.5	<0.5	22	1,1-Dichloroethene detected at 6.5 µg/L.
	04/26/01	<0.5	0.62	<0.5	<0.5	<200	<250	49	37	<0.5	<0.5	15.8	1,1-Dichloroethene detected at 6.0 µg/L.
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	33	36	<0.5	<0.5	10.9	Chloromethane detected at 0.8 µg/L; 1,1-Dichloroethene detected at 4.6 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	22	38	<0.5	<0.5	10.5	Chloromethane detected at 0.5 µg/L; 1,1-Dichloroethene detected at 1.8 µg/L.
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	25	56	<0.5	<0.5	8.90	1,1-Dichloroethene detected at 2.8 µg/L.
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	14	44	<0.5	<0.5	6.92	1,1-Dichloroethene detected at 1.7 µg/L; 1,1,2,2-Tetrachloroethane detected at 0.5 µg/L.
	10/22/02	7.64	248	133	843	4,790	1,240	9.6	34	<0.5	<0.5	1,410	1,1-Dichloroethene detected at 0.9 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	11	35	<0.5	<0.5	7.3	Chloroethane detected at 22 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	8.5	34	<0.5	<0.5	5.7	1,1-Dichloroethene detected at 0.8 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	7.6	27	<0.5	<0.5	6.3	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	5.1	18	<0.5	<0.5	5.2	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	190	6.7	25	<0.50	<0.50	6.1	1,1-Dichloroethene detected at 0.51 µg/L.
MW-26	03/23/93	180	190	55	330	7,000	1,300	ND	ND	ND	ND	--	
	07/27/93	470	96	30	80	1,800	ND	ND	140	ND	ND	--	
	11/05/93	4,700	1,300	9	1,400	19,000	ND	ND	120	ND	ND	--	
	02/25/94	4,800	570	200	860	14,000	<1,000	<1	28	<1	<1	--	
	06/03/94	4,100	300	120	230	12,000	<20,000	1.7	140	<0.5	<0.5	--	Bromodichloromethane detected, 0.84 µg/L.
	08/31/94	4,100	360	170	450	93,000	1,400	<4.0	<4.0	<4.0	<4.0	--	
	12/22/94	1,030	170	85	290	5,000	560	<2.0	<2.0	<2.0	<2.0	--	8 other volatiles detected by 8260.
	03/13/95	320	19	23	66	3,000	810	53	5.8	<0.5	<0.5	--	
	06/09/95	14,000	64	31	230	10,800	310	240	3.1	1	<0.5	--	
	09/21/95	1,900	160	160	330	8,000	200	1.3	120	<0.5	<0.5	--	
	12/12/95	13,000	38	36	120	25,000	0.6	1.4	180	<0.5	<0.5	--	No diesel pattern detected; result due to high gasoline concentration.
	03/12/96	9,000	33	30	65	4,400	<50	<0.5	180	<0.5	<0.5	--	
	06/21/96	14,000	27	16	66	5,400	<50	3.2	170	<0.5	<0.5	--	
	08/29/96	8,500	26	28	74	19,000	<150	<0.5	160	<0.5	<0.5	--	
	01/16/97	6,500	21	31	47	4,600	--	4.3	>50	<0.5	<0.5	26	
	04/15/97	16,000	33	40	160	26,000	2,200	3.5	97	<0.5	2.4	40	cis-1,2-DCE detected, 0.7 µg/L.
	07/07/97	22,000	44	170	200	28,000	1,100	<5.0	<5.0	<5.0	<5.0	95	
	10/27/97	16,000	26	100	37	30,000	--	3.6	92	<0.5	<0.5	38	
	01/27/98	23,600	<5.0	<5.0	<5.0	26,000	420	8.3	100	<0.5	<0.5	100	
	04/22/98	5,000	4.3	9.2	16	14,000	--	13	130	<0.5	<0.5	27	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-26 (cont.)	07/22/98	3,800	5.7	6.9	11	5,200	750	10	110	--	<1.0	33	
	10/21/98	420	<0.5	2.1	2.7	820	<250	24	82	<0.5	<0.5	31	
	02/05/99	20	<0.5	0.60	0.80	230	230	10	51	<0.5	<0.5	29	
	04/07/99	<0.5	<0.5	<0.5	<0.5	80	<250	15	54	<0.5	<0.5	25	
	07/23/99	7.10	<0.5	<0.5	0.80	180	<200	12	32	<0.5	<0.5	12.0	
	10/27/99	14	1.4	2.9	7.8	400	<200	13	30	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	80	<250	13	32	<0.5	<0.5	28.0	
	04/26/00	0.7	<0.5	0.6	<0.5	200	340	7.5	39	<0.5	<0.5	22	
	08/03/00	6.8	<0.5	0.6	1.4	<50	<250	7.4	19	<0.5	<0.5	19	
	10/23/00	10	0.8	1.7	1.7	80	<250	5.1	37	<0.5	<0.5	26	
	01/31/01	26	0.70	2.4	2.2	390	320	5.7	51	<0.5	<0.5	33	
	04/26/01	10.6	<0.5	0.70	1.04	400	350	16	39	<0.5	<0.5	28.5	
	07/30/01	107	<0.5	1.42	1.06	1,920	380	22	44	<0.5	<0.5	31.4	
	10/29/01	31.6	<0.5	<0.5	<1.0	2,020	500	26	25	<0.5	<0.5	27	
	01/28/02	30.0	<0.5	0.70	<1.0	450	380	43	<0.5	<0.5	<0.5	14.5	1,1-Dichloroethene detected at 1.8 µg/L.
	04/29/02	394	<0.5	<0.5	<1.0	1,870	550	50	23	<0.5	<0.5	8.62	1,1-Dichloroethene detected at 2.5 µg/L.
	10/22/02	1,440	25.7	6.60	20.4	4,440	890	53	26	<0.5	<0.5	168	1,1-Dichloroethene detected at 3.7 µg/L.
	11/15/02	1,630	0.56	3.22	3.86	5,590	780	18	33	<0.5	<0.5	49.2	1,1-dichloroethene detected at 1.0 µg/L.
	05/06/03	1,250	<0.5	2.42	<1.0	3,730	380	46	24	<0.5	<0.5	13.1	1,1-Dichloroethene detected at 3.1 µg/L.
	10/14/03	51	<0.5	1.38	<1.0	3,100	<250	83	28	<0.5	<0.5	23.8	1,1-Dichloroethene detected at 3.3 µg/L.
	04/27/04	467	<0.5	1.24	<1.0	1,380	<250	82	33	<0.5	<0.5	<0.5	1,1-Dichloroethene detected at 5.2 µg/L.
	11/17/04	120	<1.0	2.50	1.3	740	820	31	44	<0.50	<0.50	120	1,1-Dichloroethene detected at 1.1 µg/L.
MW-27	06/21/96	<0.5	<0.5	<0.5	<0.5	<50	<50	<0.5	6.8	<0.5	<0.5	--	
	08/29/96	--	--	--	--	--	--	--	--	--	--	--	
	01/16/97	12	5.0	<0.5	2.6	70	<150	<0.5	5.7	<0.5	<0.5	--	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	<1.0	1.4	--	<1.0	<0.5	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	0.7	<0.5	<0.5	<0.5	
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	0.7	<0.5	<0.5	<0.5	
	10/27/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/16/00	<0.5	<0.5	<0.5	<0.5	<50	--	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	8.56	56.2	9.37	59.3	650	600	<0.5	<0.5	<0.5	<0.5	331	
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	64	<0.50	<0.50	<0.50	<0.50	<5.0	
MW-28	03/23/93	ND	ND	ND	ND	110	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	2.1	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1	--	--	--	--	--	
	06/03/94	3.1	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	1.4	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.91	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	18	20	2.2	13	220	<150	5.1	85	<0.5	<0.5	8.2	
	04/15/97	<0.5	<0.5	<0.5	<0.5	120	<150	1.1	150	<0.5	<0.5	7.1	
	07/07/97	<0.5	<0.5	<0.5	<0.5	110	<150	<5.0	170	<5.0	<5.0	7.2	
	10/27/97	3.6	<0.5	<0.5	<0.5	300	--	6.2	120	<0.5	<0.5	36	
	01/27/98	7.6	<0.5	<0.5	<0.5	500	<150	--	--	--	--	56	
	04/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	1.0	89	<0.5	<0.5	8.6	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	<1.0	85	--	<1.0	18	
	10/21/98	<0.5	<0.5	<0.5	<0.5	<50	<250	0.5	80	<0.5	<0.5	12	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	32	29	<0.5	<0.5	5.0	1,1-DCE detected, 0.9 µg/L.
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	62	<0.5	<0.5	4.5	
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	50	<0.5	<0.5	1.80	
	10/27/99	--	--	--	--	--	<200	--	--	--	--	--	
	11/02/99	0.7	<0.5	<0.5	<0.5	<100	--	<0.5	32	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	39	<0.5	<0.5	4.30	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	50	<0.5	<0.5	1.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	47	<0.5	<0.5	3.7	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-28 (cont.)	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	57	<0.5	<0.5	4.7	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	46	<0.5	<0.5	4.4	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	26	<0.5	<0.5	1.98	
	07/30/01	0.5	<0.5	0.64	2.58	<200	<250	<0.5	38	<0.5	<0.5	3.0	Chloromethane detected at 3.3 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	29	<0.5	<0.5	3.74	
	01/28/02	6.20	<0.5	<0.5	<1.0	<200	<250	2.8	50	<0.5	<0.5	6.00	
	04/29/02	1.64	<0.5	<0.5	<1.0	<200	<250	3.7	44	<0.5	<0.5	4.81	
	10/22/02	25.0	<0.5	<0.5	<1.0	750	<250	2.0	59	<0.5	<0.5	<0.5	
	11/15/02	13.4	<0.5	1.29	<1.0	610	<250	1.3	54	<0.5	<0.5	<0.5	Chloromethane detected at 1.0 µg/L.
	05/06/03	3.1	<0.5	<0.5	<1.0	390	<250	0.8	70	<0.5	<0.5	9.29	Chloroethane detected at 0.8 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	38	<0.5	<0.5	6.44	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	9.29	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	4.7	<0.50	<0.50	<5.0	
MW-29	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	2.1	11	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	<0.5	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	<0.3	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.59	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	6.6	8.9	0.6	9.3	120	<150	47	24	<0.5	<0.5	1.8	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	52	21	<5.0	<5.0	1.2	
	01/27/98	<0.5	<0.5	<0.5	<0.5	100	<150	--	--	--	--	8.0	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	12	29	--	<1.0	7.8	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	68	<0.5	<0.5	8.5	
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	30	38	<0.5	<0.5	4.9	1,1-DCE detected, 1.4 µg/L.
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	44	33	<0.5	1.9	4.70	1,1-Dichloroethene detected at 2.3 µg/L; cis-1,2-Dichloroethene detected at 2.3 µg/L.
	10/27/99	<0.5	<0.5	<0.5	<0.5	<100	<200	36	23	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	87	25	<0.5	<0.5	18.0	1,1-Dichloroethene detected at 9.6 µg/L.
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	61	38	<0.5	<0.5	12	1,1-Dichloroethene detected at 5.2 µg/L.
	08/16/00	<0.5	<0.5	<0.5	<0.5	<50	--	49	21	<0.5	<0.5	17	1,1-Dichloroethene detected at 6.0 µg/L.
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	94	40	<0.5	<0.5	34	1,1-Dichloroethene detected at 14 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	60	<250	100	35	<0.5	<0.5	26	1,1-Dichloroethene detected at 13 µg/L.
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	270	87	38	<0.5	<0.5	39.1	1,1-Dichloroethene detected at 12 µg/L.
	07/30/01	1.25	1.28	1.1	5.99	220	<250	120	42	<0.5	<0.5	42.3	1,1-Dichloroethene detected at 13 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	120	34	<0.5	<0.5	28.0	1,1-Dichloroethene detected at 14 µg/L.
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	120	44	<0.5	<0.5	28.9	1,1-Dichloroethene detected at 26 µg/L.
	04/29/02	4.95	<0.5	<0.5	<1.0	<200	<250	130	29	<0.5	<0.5	20.9	1,1-Dichloroethene detected at 23 µg/L.
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	140	26	<0.5	<0.5	18.1	1,1-Dichloroethene detected at 19 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	120	26	<0.5	<0.5	13.9	1,1-dichloroethene detected at 15 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	140	31	<0.5	<0.5	13.1	1,1-Dichloroethene detected at 24 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	110	22	<0.5	<0.5	11.9	Chloromethane detected at 0.9 µg/L.
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	160	28	<0.5	<0.5	15.3	1,1-Dichloroethene detected at 31 µg/L.
	11/17/04	<1.0	<1.0	<1.0	<1.0	120	<50	33	6.5	<0.50	<0.50	120	1,1-Dichloroethene detected at 5.5 µg/L.
MW-30	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	2.8	ND	ND	--	--	--	--	--	
	02/25/94	1.3	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	1.1	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	0.8	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	0.6	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.98	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	<0.5	<0.5	<0.5	0.6	80	<150	<0.5	<0.5	<0.5	0.9	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	01/27/98	5.4	<0.5	<0.5	<0.5	100	--	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	--	--	--	--	<0.5	
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	--	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-30 (cont.)	08/04/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/24/00	5.4	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroethane detected at 1.3 µg/L.
	01/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/30/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	140	<0.50	<0.50	<0.50	<0.50	<5.0	
MW-32	03/23/93	391	6.2	3.1	9	440	ND	ND	60	ND	ND	--	
	07/27/93	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	--	
	11/05/93	20	ND	1.8	2.1	170	ND	ND	7.9	ND	ND	--	
	02/25/94	5.6	<1	<1	<1	<100	<1,000	<1	<1	<1	<1	--	
	06/03/94	120	1.3	<0.5	1.4	350	<20,000	<0.5	11	<0.5	<0.5	--	
	08/31/94	39	0.5	2.2	1.2	<500	<500	<4.0	10	<4.0	<4.0	--	
	12/22/94	4.8	<0.5	<0.5	<0.5	<50	<50	<2.0	4.6	<2.0	<2.0	--	Non-diesel peak reported.
	03/13/95	220	3.6	6.5	5.8	1,100	<400	<0.5	16	<0.5	<0.5	--	
	06/09/95	1,500	7.9	43	14	2,200	180	0.7	<0.5	0.5	<0.5	--	
	09/21/95	1,200	2.4	72	4.5	2,300	60	<0.5	6.7	<0.5	1.4	--	
	12/12/95	230	<0.5	8.9	<1.0	500	<50	<0.5	28	<0.5	<0.5	--	
	03/12/96	40	<0.5	1.7	<0.5	110	<50	<0.5	6.8	<0.5	<0.5	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	150	<0.5	49	<0.5	700	<150	<0.5	27	<0.5	<0.5	--	
	01/16/97	14	<0.5	1.9	<0.5	150	<150	<0.5	10	<0.5	0.7	--	cis-1,2-DCE detected, 0.8 µg/L.
	07/07/97	370	11	110	21	1,600	190	--	--	--	--	11	
	01/27/98	13	<0.5	1.0	<0.5	300	--	<0.5	7.5	<0.5	<0.5	2.5	
	07/22/98	700	55	88	66	2,300	--	--	--	--	--	14	
	07/22/99	59.0	0.80	1.80	<0.5	900	220	<0.5	5.9	<0.5	<0.5	8.70	
	10/28/99	95	2.5	2.1	1.6	500	<200	<0.5	12	--	<0.5	--	
	02/10/00	7.0	<0.5	<0.5	<0.5	120	<250	<0.5	4.3	<0.5	<0.5	1.10	
	04/27/00	240	7.0	12	18.8	800	250	<0.5	9.8	<0.5	<0.5	<0.5	
	08/03/00	620	3.0	14	4.1	1,300	<250	<0.5	3.0	<0.5	<0.5	<0.5	
	10/23/00	430	4.30	5.50	8.80	1,200	260	<0.5	7.8	<0.5	<0.5	<0.5	
	01/31/01	42	1.5	0.90	2.8	280	<250	<0.5	5.7	<0.5	<0.5	3.6	
	04/26/01	268	13.0	22.1	22.0	780	<250	<0.5	6.3	<0.5	<0.5	<0.5	
	07/30/01	29.4	<0.5	0.52	0.51	320	<250	<0.5	6.6	<0.5	<0.5	<0.5	
	10/29/01	16.1	2.01	1.14	3.96	<200	<500	<0.5	5.4	<0.5	<0.5	<0.5	
	01/29/02	12.0	<0.5	0.70	<1.0	<200	<250	<0.5	4.9	<0.5	2.0	<0.5	cis 1,2-Dichloroethene detected at 1.3 µg/L.
	04/29/02	188	5.52	9.70	13.0	680	<250	<0.5	6.0	<0.5	<0.5	<0.5	
	10/22/02	4.84	<0.5	<0.5	<1.0	<200	<250	<0.5	4.8	<0.5	<0.5	<0.5	
	05/06/03	20.72	0.76	0.86	2.08	<200	<250	<0.5	5.8	<0.5	<0.5	<0.5	
	10/14/03	6.02	<0.5	<0.5	<1.0	<200	<250	<0.5	3.2	<0.5	<0.5	<0.5	
	04/27/04	23.60	1.68	0.67	3.91	<200	<250	<0.5	3.0	<0.5	<0.5	<0.5	
	11/17/04	2.0	<0.50	<0.50	<0.50	<50	<50	<0.50	2.1	<0.50	<0.50	<5.0	
MW-33	04/07/99	0.60	<0.5	0.90	<0.5	<50	<250	--	--	--	--	<0.5	
	07/22/99	8.90	<0.5	1.00	<0.5	<50	<200	0.6	0.7	<0.5	<0.5	<0.5	
	10/28/99	40	0.9	21	3.8	200	<200	0.8	1.3	--	<0.5	--	
	02/10/00	20	0.7	12	10.0	380	<250	0.9	0.6	<0.5	<0.5	1.30	
	04/27/00	6.9	<0.5	6.4	<0.5	<100	250	4.3	0.9	<0.5	<0.5	<0.5	
	08/03/00	31	0.5	20	1.0	150	550	<0.5	0.6	<0.5	<0.5	<0.5	
	10/23/00	89	1.5	36	3.9	350	<250	<0.5	2.1	<0.5	<0.5	<0.5	
	01/31/01	6.8	<0.5	2.0	<0.5	<50	<250	1.9	0.6	<0.5	<0.5	0.7	
	04/26/01	6.61	0.56	1.63	0.61	<200	<250	2.6	<0.5	<0.5	<0.5	<0.5	
	07/30/01	4.43	2.61	1.34	6.6	<200	<250	2.2	0.5	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.6 µg/L.
	10/29/01	14.2	<0.5	0.63	<1.0	<200	<500	1.3	0.7	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	1.1	0.5	<0.5	3.8	<0.5	Dichlorodiflouromethane detected at 1.9 µg/L.; cis 1,2-Dichloroethene detected at 8.9 µg/L.
	04/29/02	14.6	<0.5	1.41	<1.0	<200	<250	0.8	0.9	<0.5	<0.5	<0.5	Dichlorodiflouromethane detected at 1.9 µg/L.
MW-100	07/06/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<0.50	<0.50	<0.50	<5.0	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-?	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	430	--	--	--	--	<0.5	
PR-26	07/26/99	20,000	15,000	1,100	7,250	82,500	11,000	--	--	--	--	33.0	
	10/26/99	28,000	25,000	2,300	8,400	110,000	60,000	<0.5	24	--	<0.5	--	
PR-45	07/26/99	13,200	8,200	2,600	15,600	82,500	39,000	--	--	--	--	35.0	
	10/28/99	12,000	8,200	1,700	8,500	45,000	25,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	24,000	25,000	10,000	53,000	360,000	82,000	<0.5	4.0	<0.5	<0.5	1,000	
	04/27/00	17,000	9,500	16,000	92,000	1,300,000	20,300	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/04/00	20,000	8,800	2,600	16,000	73,000	54,500	<0.5	1.0	<0.5	<0.5	<0.5	
	10/23/00	26,000	12,000	4,000	20,000	96,000	36,000	<0.5	1.2	<0.5	<0.5	<5.0	Chloroethane detected at 6.0 µg/L.
	04/27/01	16,200	8,600	3,220	19,000	178,000	22,700	<0.5	14	<0.5	<0.5	<25	Chloroethane detected at 4.6 µg/L.
	07/30/01	14,500	8,900	4,400	24,700	132,000	29,700	<0.5	11	<0.5	<0.5	<50	Chloromethane detected at 0.6 µg/L; Chloroethane detected at 11 µg/L; Methylene chloride detected at 0.5 µg/L.
	10/29/01	12,600	6,650	2,260	12,400	86,100	50,000	<0.5	7.8	<0.5	<0.5	<25	Chloroethane detected at 6.0 µg/L.
	01/29/02	8,930	4,860	2,640	12,700	114,000	19,400	<0.5	30	<0.5	<0.5	<0.5	Chloroethane detected at 7.5 µg/L.
	05/16/02	14,300	2,630	1,580	7,780	125,000	15,600	<0.5	1.0	<0.5	<0.5	<0.5	Chloroethane detected at 7.3 µg/L.
PR-52	07/26/99	12,000	1,720	750	12,400	172,000	40,000	<0.5	1.8	<0.5	<0.5	217	Methylene chloride detected at 7.9 µg/L.
	10/28/99	19,000	530	1,800	5,800	40,000	450,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	22,000	1,600	4,100	15,800	200,000	140,000	<0.5	1.3	<0.5	<0.5	430	
	04/28/00	20,000	2,200	4,700	18,600	270,000	88,000	<1.0	<1.0	<1.0	<1.0	<5.0	
	08/04/00	26,000	1,600	2,900	15,000	150,000	110,000	<0.5	2.3	<0.5	<0.5	<0.5	
	10/24/00	52,000	13,000	41,000	180,000	650,000	280,000	<5.0	<5.0	<5.0	<5.0	<5.0	
	01/31/01	81,000	840	57,000	210,000	5,300,000	276,000	<0.5	1.0	<0.5	<0.5	500	Chloroethane detected at 2.4 µg/L; Methylene chloride detected at 0.6 µg/L.
	04/27/01	25,000	16,300	14,700	55,000	886,000	134,000	<0.5	<0.5	<0.5	<0.5	1,040	Chloroethane detected at 1.5 µg/L.
	07/30/01	31,100	2,480	13,500	51,700	340,000	185,000	<0.5	1.3	<0.5	<0.5	2,510	Chloromethane detected at 13 µg/L; Chloroethane detected at 46 µg/L; Methylene chloride detected at 0.6 µg/L.
	10/29/01	22,700	1,630	3,070	11,500	126,000	140,000	<0.5	0.9	<0.5	<0.5	<50	Chloromethane detected at 0.6 µg/L; Chloroethane detected at 4.0 µg/L; Methylene chloride detected at 0.7 µg/L.
	01/29/02	21,500	1,840	4,540	16,800	517,000	272,000	<0.5	<0.5	<0.5	<0.5	44.1	Chloroethane detected at 1.5 µg/L.
	05/16/02	31,600	53,600	43,800	216,000	2,020,000	75,000	<5.0	<5.0	<5.0	<5.0	63.5	Chloroethane detected at 8.3 µg/L.
PR-53	07/26/99	31,000	12,000	1,900	8,800	110,000	98,000	<0.5	43	<0.5	<0.5	43.0	Methylene chloride detected at 6.2 µg/L.
	10/27/99	17,000	3,900	890	3,320	54,000	16,000	<0.5	18	--	<0.5	--	
	02/09/00	21,000	5,000	1,200	5,300	65,000	9,400	0.6	20	<0.5	<0.5	67.0	Methylene chloride detected at 0.8 µg/L.
	04/28/00	34,000	30,000	9,300	51,000	730,000	104,000	<1.0	<1.0	<1.0	<1.0	340	
	08/04/00	35,000	17,000	3,800	24,000	180,000	69,500	<0.5	1.7	<0.5	<0.5	110	
	10/24/00	99,000	110,000	80,000	640,000	580,000	380,000	<5.0	5.0	<5.0	<5.0	380	
	01/31/01	66,000	15,000	28,000	140,000	2,400,000	960,000	<0.5	1.5	<0.5	<0.5	660	Chloroethane detected at 1.7 µg/L; Methylene chloride detected at 0.9 µg/L.
	04/27/01	55,500	10,000	23,700	137,000	4,240,000	806,000	<0.5	<0.5	<0.5	<0.5	<5,000	Chloroethane detected at 1.7 µg/L; Methylene chloride detected at 1.1 µg/L.
	10/29/01	46,500	9,520	12,900	74,000	1,630,000	130,000	<0.5	0.8	<0.5	<0.5	<500	Chloroethane detected at 3.0 µg/L; Methylene chloride detected at 0.9 µg/L.
	01/29/02	33,000	7,340	10,300	41,800	495,000	462,000	<0.5	1.8	<0.5	<0.5	122	Chloroethane detected at 3.2 µg/L.
	05/16/02	35,800	10,500	18,700	130,000	3,280,000	113,000	<5.0	<5.0	<5.0	<5.0	242	
PR-54	07/26/99	32,000	22,000	1,500	21,800	170,000	28,000	<0.5	3.0	<0.5	<0.5	56.0	Methylene chloride detected at 2.5 µg/L.
	10/26/99	27,000	10,000	3,700	19,500	190,000	350,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	27,000	23,000	9,900	50,000	960,000	110,000	<0.5	3.9	<0.5	<0.5	1,000	
	04/28/00	24,000	14,000	1,200	9,000	76,000	80,000	<1.0	1.6	<1.0	<1.0	300	
	08/04/00	27,000	7,600	1,400	11,000	120,000	54,500	<0.5	2.0	<0.5	<0.5	200	
	10/24/00	23,000	4,400	2,000	13,000	140,000	96,000	<0.5	2.3	<0.5	<0.5	<100	Chloroethane detected at 5.3 µg/L; Methylene chloride detected at 2.3 µg/L.
	01/31/01	30,000	8,300	3,300	21,000	220,000	236,000	<0.5	2.6	<0.5	<0.5	480	Chloroethane detected at 2.8 µg/L; Methylene chloride detected at 1.7 µg/L.
	04/27/01	26,100	8,650	2,120	15,900	51,300	108,000	<0.5	<0.5	<0.5	<0.5	<500	Chloroethane detected at 3.0 µg/L.
	07/30/01	31,700	18,000	9,880	58,400	320,000	71,200	<0.5	3.9	<0.5	<0.5	2,750	Chloromethane detected at 2.2 µg/L; Chloroethane detected at 22 µg/L; Methylene chloride detected at 2.6 µg/L.
	10/30/01	25,400	11,300	3,500	18,800	222,000	530,000	<0.5	1.2	<0.5	<0.5	276	Chloroethane detected at 7.4 µg/L; Methylene chloride detected at 2.0 µg/L.
	01/29/02	13,300	9,850	4,240	33,100	108,000	48,000	<0.5	7.5	<0.5	<0.5	51.3	Chloroethane detected at 6.2 µg/L.
	05/16/02	27,900	34,500	5,630	36,400	324,000	172,000	<5.0	43	<5.0	<5.0	251	Chloroethane detected at 9.8 µg/L.
PR-64	07/26/99	22,000	18,000	1,700	10,300	110,000	--	<0.5	130	<0.5	<0.5	35.0	Methylene chloride detected at 1.4 µg/L.
	10/27/99	11,000	7,400	1,200	3,900	66,000	50,000	<0.5	110	--	<0.5	--	
	02/09/00	22,000	20,000	6,000	17,000	120,000	40,000	<0.5	>50	<0.5	<0.5	110	
	04/28/00	19,000	16,000	1,800	13,900	130,000	78,000	<1.0	67	<1.0	<1.0	300	
	05/16/02	18,300	40,100	10,400	104,000	30,600,000	419,000	<5.0	<5.0	<5.0	<5.0	<500	
PR-65	07/26/99	12,000	1,400	1,300	13,000	68,000	16,500	<0.5	2.6	<0.5	<0.5	20.0	
	10/26/99	14,000	2,300	1,800	11,000	65,000	50,000	<0.5	<0.5	--	<0.5	--	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
PR-68	07/26/99	1,900	24.0	27.0	62.0	4,900	11,000	<0.5	1.2	<0.5	<0.5	4.40	
	10/26/99	2,800	36	86	62	8,000	2,800	<0.5	<0.5	--	<0.5	--	
PR-76	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	85	<0.50	<0.50	<0.50	<0.50	<5.0	
V-24	04/07/99	<0.5	<0.5	<0.5	<0.5	120	<250	--	--	--	--	0.5	
V-31	07/26/99	7,000	600	550	1,370	17,500	5,350	--	--	--	--	19.0	
	10/26/99	7,000	120	850	950	18,000	3,000	<0.5	<0.5	--	<0.5	--	
V-46	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	270	<0.5	<0.5	<0.5	<0.5	<0.5	
V-55	07/22/99	8,000	480	740	2,880	30,000	2,100	<0.5	<0.5	<0.5	<0.5	13.0	
	10/28/99	11,000	59	1,200	317	28,000	38,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	2,200	59	760	350	7,900	10,000	<0.5	<0.5	<0.5	<0.5	9.70	
	04/28/00	2,900	510	440	2,340	14,000	26,500	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/03/00	9,400	380	720	2,200	28,000	70,000	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	11,000	140	900	1,300	30,000	51,000	<0.5	<0.5	<0.5	<0.5	<12	
	01/31/01	4,600	57	550	1,200	34,000	88,500	<0.5	<0.5	<0.5	<0.5	44	
	04/26/01	6,400	61.5	250	336	34,200	227,000	<0.5	<0.5	<0.5	<0.5	<25	
	10/30/01	5,360	70.0	1,090	1,450	32,700	78,000	<0.5	<0.5	<0.5	<0.5	<25	
	01/29/02	1,660	140	492	818	12,000	4,100	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	5,170	95.1	572	523	30,600	35,100	<0.5	<0.5	<0.5	<0.5	1.06	
V-72	07/26/99	13,500	6.80	1.10	3.90	3,900	12,900	<0.5	11	<0.5	<0.5	<0.5	
	10/28/99	2,900	58	21	47.7	6,000	48,000	<0.5	3.4	--	<0.5	--	
	02/09/00	670	8.2	<0.5	17.8	890	6,100	<0.5	3.0	<0.5	<0.5	<0.5	
	04/28/00	130	<0.5	<0.5	<0.5	200	5,950	<0.5	0.7	<0.5	<0.5	<0.5	
	08/04/00	460	0.8	<0.5	0.6	440	4,120	<0.5	2.8	<0.5	<0.5	<0.5	
	10/24/00	2,700	3.2	0.5	2.3	3,500	17,000	<0.5	4.0	<0.5	<0.5	<0.5	
	04/27/01	1,240	2.05	<0.5	2.78	1,310	6,290	<0.5	5.1	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.8 µg/L.
	07/30/01	1,790	69.8	1.22	2.50	1,490	4,290	<0.5	6.2	<0.5	<0.5	<0.5	Chloromethane detected at 1.5 µg/L.
	10/29/01	1,330	4.38	0.55	3.32	1,960	--	<0.5	5.6	<0.5	<0.5	<0.5	Chloromethane detected at 1.1 µg/L.
	01/29/02	655	6.40	<0.5	8.00	1,840	2,250	<0.5	3.9	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
	05/16/02	43.8	1.09	<0.5	4.36	230	5,120	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
V-84	07/26/99	2,400	440	80.0	340	8,700	2,350	<0.5	2.4	<0.5	<0.5	6.40	
	10/26/99	1,100	130	46	108	4,000	700	<0.5	<0.5	--	<0.5	--	
	02/09/00	300	30	8.9	53	2,300	1,100	<0.5	1.2	<0.5	<0.5	<0.5	
	04/28/00	30	1.9	<0.5	<0.5	100	550	<5.0	<5.0	<5.0	<5.0	<0.5	
	08/04/00	900	110	34	120	2,700	1,380	<0.5	1.0	<0.5	<0.5	<0.5	
	10/24/00	2,000	480	24	110	48,000	1,900	<0.5	1.0	<0.5	<0.5	<0.5	
	01/31/01	68	1.3	5.3	8.2	970	1,820	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	925	97.0	45.4	59.7	2,360	1,180	<0.5	0.8	<0.5	<0.5	<0.5	
	07/30/01	1,720	282	50	359	8,100	7,040	<0.5	1.5	<0.5	<0.5	<0.5	
	10/30/01	870	250	27.6	167	8,960	--	<0.5	1.0	<0.5	<0.5	<0.5	
	01/29/02	197	4.90	1.70	3.60	640	500	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	318	34.4	15.4	18.4	1,070	400	<0.5	<0.5	<0.5	<0.5	<0.5	
29 (CC-1)	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/03/00	1.4	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/30/01	1.12	0.56	<0.5	<0.5	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	1.38	14.6	2.44	16.4	220	<250	<0.5	<0.5	<0.5	<0.5	92.0	Chloromethane detected at 1.3 µg/L, Chloroform detected at 4.7 µg/L.
	11/15/02	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 2.6 µg/L.
	05/06/03	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.7 µg/L.
	04/27/04	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	<0.50	<0.50	<0.50	<0.50	<50	<50	<0.50	<0.50	<0.50	<0.50	<5.0	
30 (CC-2)	07/22/99	0.90	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	0.7	<0.5	<0.5	<0.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	340	<0.5	0.9	<0.5	<0.5	<2.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	

Table 3: Historical Groundwater Sample Results
(1993 - 2008)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
30 (CC-2)	07/30/01	<0.5	1.43	<0.5	1.63	<200	<250	<0.5	1.6	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 2.8 µg/L.
(cont.)	10/29/01	<0.5	<0.5	<1.0	<0.5	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	1.9	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 3.8 µg/L.
	04/29/02	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	2.5	<0.5	<0.5	0.86	Dichlorodifluoromethane detected at 3.6 µg/L.
	10/10/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.6 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.5 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
81	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/22/99	0.70	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
94	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	170	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
210	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	960	--	--	--	--	<0.5	
223	10/26/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/10/00	<0.5	<0.5	<0.5	<0.5	<50	640	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	680	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	1.30	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chlorobenzene detected at 0.9 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	390	<0.5	<0.5	<0.5	<0.5	<0.5	1,2-Dichlorobenzene detected at 0.5 µg/L.
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.5 µg/L.
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 0.8 µg/L.
	01/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
224	07/26/99	<0.5	<0.5	<0.5	<0.5	<50	640	<0.5	<0.5	<0.5	<0.5	<0.5	
239	07/26/99	55,000	85.0	1,500	190	30,000	--	<0.5	<0.5	<0.5	<0.5	5.30	
	10/26/99	23,000	53	1,500	103.2	28,000	10,000	<0.5	<0.5	--	<0.5	--	
	02/10/00	40,000	48	1,900	52	44,000	21,000	<0.5	1.0	<0.5	<0.5	14.0	
	04/28/00	25,000	540	2,000	710	36,000	12,500	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/04/00	25,000	220	1,900	920	45,000	32,500	<0.5	0.6	<0.5	<0.5	<0.5	
	10/24/00	24,000	100	1,500	390	50,000	50,000	<0.5	<0.5	<0.5	<0.5	<5.0	
	01/31/01	23,000	84	1,900	200	52,000	112,000	<0.5	0.9	<0.5	<0.5	<0.5	
	04/26/01	23,900	113	1,990	590	298,000	143,000	<0.5	<0.5	<0.5	<0.5	<25	
	07/30/01	30,200	384	2,000	966	66,500	19,100	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/30/01	41,200	273	1,470	215	54,300	120,000	<0.5	<0.5	<0.5	<0.5	<50	
	01/28/02	24,500	228	1,670	352	112,000	6,900	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroethane detected at 0.6 µg/L.
	04/29/02	25,900	280	1,380	491	71,600	9,400	<0.5	<0.5	<0.5	<0.5	<0.5	
241	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
249	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
SB-16	05/20/08	<0.50	<0.50	<0.50	530	<50	530	NA	<0.50	NA	NA	NA	
SB-17	05/22/08	12,000	3,200	17,000	560,000	120,000	560,000	NA	<0.50	NA	NA	NA	
SB-18	05/22/08	50,000	2,300	46,000	23,000	190,000	23,000	NA	2,200	NA	NA	NA	
SB-19	05/22/08	<12	220	<12	1,600	8,200	1,600	NA	<12	NA	NA	NA	
SB-20/ PCB-7	05/22/08	41,000	3,000	30,000	47,000	170,000	47,000	NA	930	NA	NA	NA	
SB-21/ PCB-8	05/23/08	12,000	2,600	20,000	3,500	110,000	3,500	NA	<250	NA	NA	NA	
SB-22	05/22/08	27,000	13,000	39,000	73,000	870,000	73,000	NA	<2,500	NA	NA	NA	
SB-24/ PCB-1	05/21/08	1.1	<0.50	<0.50	360	<50	360	NA	<0.50	NA	NA	NA	
SB-25/ PCB-2	05/21/08	<0.50	<0.50	<0.50	140	<50	140	NA	<0.50	NA	NA	NA	
SB-26	05/22/08	<0.50	<0.50	<0.50	270	<50	270	NA	<0.50	NA	NA	NA	
SB-27/ PCB-3	05/20/08	<0.50	<0.50	<0.50	NA	NA	NA	NA	<0.50	NA	NA	NA	

Notes:

ND	Not detected.
NA	Not analyzed or not sampled.
µg/L	Micrograms per liter.
TPH-G	Total Petroleum Hydrocarbons as gasoline.
TPH-D	Total Petroleum Hydrocarbons as diesel.
1,1-DCA	1,1-Dichloroethane.
1,2-DCA	1,2-Dichloroethane.
1,1-DCE	1,1-Dichloroethene.
1,1,1-TCA	1,1,1-Trichloroethane.
cis1,2-DCE	cis 1,2-Dichloroethylene.
TCE	Trichloroethene.
MTBE	Methyl tertiary butyl ether

10/22/02 Data was confirmed anomalous by resampling on 11/15/02

Table 4: Historical LPH Monitoring (Product Thickness in Feet)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well	11/4/1993	2/24/1993	3/18/1994	6/2/1994	8/31/1994	12/22/1994	3/13/1995	6/9/1995	7/27/1995	9/22/1995	12/6-28/95	2/27/1996	2/29/1996	6/20/1996	8/30/1996	9/18/1996	10/4/1996	10/11/1996	10/18/1996	10/22/1996	11/22/1996	12/6/1996	12/17/1996	12/21/1996	1/3/1997	1/14/1997	2/10/1997	2/17/1997	2/28/1997	3/7/1997	3/14/1997
MW-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	0.79	1.14	2.82	0.26	0.01	0.04	<0.01	<0.01	--	0.21	--	<0.01	--	0.02	0.20	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	0.47	0.44	0.30	0.31	0.31	0.26	0.08	0.09	0.23	0.24	0.24	<0.01	--	0.03	0.04	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-22	1.83	1.54	>3.0	1.14	0.19	0.03	<0.01	<0.01	<0.01	0.32	0.30	<0.01	--	0.01	0.04	0.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-23	1.21	0.07	1.40	1.79	0.68	0.41	<0.01	0.31	0.44	0.71	0.30	0.19	0.15	1.00	0.24	0.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-24	1.77	12.10	>3.0	0.97	0.39	<0.01	<0.01	<0.01	--	1.41	<0.01	<0.01	--	2.46	1.45	1.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
E-0	--	--	--	--	--	--	--	--	2.72	--	<0.01	3.92	0.07	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.38	1.55	1.45	0.3	0.39	--	<0.01	<0.01	<0.01	<0.01	<0.01
E-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
E-5	--	--	--	--	--	--	--	--	--	--	1.50	0.27	0.03	0.10	0.01	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
E-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
E-8	--	--	--	--	--	--	--	--	0.10	--	0.42	0.19	0.02	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-20	0.91	1.15	3.41	1.45	0.88	1.04	0.14	0.16	2.54	1.12	<0.01	3.5	2.65	3.50	0.69	0.47	0.36	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-21	0.63	--	2.76	1.39	0.42	2.01	4.11	2.42	1.93	0.70	0.60	2.99	0.77	1.50	0.86	0.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-22	0.98	1.43	>3.0	0.90	0.47	0.04	0.60	0.71	0.68	0.71	0.23	1.57	0.94	1.20	0.47	0.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-23	0.67	0.36	1.06	0.38	0.17	0.06	0.34	0.06	0.08	0.12	0.11	<0.01	--	<0.01	0.09	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-24	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-26	0.6	0.54	2.05	0.39	0.17	<0.01	<0.01	<0.01	--	0.13	0.12	0.27	<0.01	0.01	0.07	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-27	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-30	--	--	--	2.81	1.21	1.97	<0.01	<0.01	--	Dry	Dry	Dry	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-34	0.66	1.17	2.81	1.07	0.37	2.45	4.06	3.54	2.30	1.03	0.58	5.10	1.22	1.95	1.14	0.48	0.33	0.23	0.01	<0.01	<0.01	0.26	0.59	0.25	<0.01	<0.01	0.75	0.67	0.98	1.15	1.23
PR-35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-36	-	1.13	1.43	1.13	0.37	0.19	0.15	0.23	0.22	Dry	Dry	0.20	0.05	0.01	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-37	0.41	1.29	2.35	0.96	0.14	0.22	0.83	0.82	0.58	0.58	0.18	1.14	0.32	0.20	0.19	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-41	0.59	0.53	0.42	0.13	0.43	0.03	<0.01	<0.01	--	Dry	Dry	Dry	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-44	0.24	0.22	0.19	<0.01	<0.01	<0.01	<0.01	<0.01	--	Dry	-	<0.01	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-45	0.17	5.27	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-47	0.75	0.41	sheen	<0.01	<0.01	0.01	<0.01	<0.01	--	0.08	0.08	<0.01	--	<0.01	0.08	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-48	1.12	0.20	>3.0	0.83	0.07	1.43	0.64	0.65	0.94	0.50	0.54	0.11	0.06	2.06	1.36	0.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-49	--	3.24	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	Dry	Dry	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-50	1.08	1.58	0.89	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-51	--	6.57	>3.0	<0.01	0.72	2.02	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	--	Dry	Dry	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-52	1.01	5.09	1.16	0.45	0.05	0.03	<0.01	<0.01	<0.01	<0.01	-	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-53	1.15	3.01	>3.0	0.61	0.49	1.52	<0.01	1.55	1.47	1.08	0.17	0.90	0.27	1.01	0.81	0.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-54	0.97	0.99	1.20	<0.01	0.08	0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-55	1.48	0.07	1.31	0.87	<0.01	0.01	<0.01	Dry	Dry	Dry	-	Dry	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-56	0.90	1.30	--	0.89	0.15	1.48	<0.01	<0.01	0.01	<0.01	-	<0.01	--	<0.01	<0.01	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-57	--	6.40	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	-	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-58	0.96	0.85	--	1.48	0.89	2.15	1.41	1.34	2.40	1.18	0.57	2.67	1.25	2.79	1.47	1.01	--	0.52	0.23	0.11	<0.01	<0.01	<0.01	<0.01	0.2	1.04	2.3	2.4	2.21	2.45	--
PR-60	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-61	0.25	0.39	0.35	1.03	<0.01	0.01	<0.01	<0.01	1.30	<0.01	<0.01	1.48	0.45	1.96	0.93	0.38	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.45	0.34	0.6	0.55	0.77
PR-62	0.04	--	0.07	0.09	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-64	1.49	0.11	>3.0	--	1.06	2.15	1.03	1.17	2.12	1.15	0.58	3.08	0.4	3.15	1.01	--	0.82	0.69	0.68	--	--	--	--	--	--	--	--	--	--	--	--
PR-65	0.04	0.02	0.09	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-67	1.05	0.65	0.81	--	--	--	--	--	0.05	--	<0.01	<0.01	--	0.03	0.10	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-70	--	--	1.59	--	--	--	--	--	--	--	--	--	--	*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-8	--	--	--	--	--	--	--	--	0.01	--	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-55	--	--	--	--	--	--	--	--	--	--	0.04	--	--	<0.01	<0.01	*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-77	--	--	--	--	--	--	--	--	0.78	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-78A	--	--	--	--	--	--	--	--	0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-78B	--	--	--	--	--	--	--	--	0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-90	--	1.41	--	0.94	0.16	1.68	0.02	0.02	Dry	Dry	<0.01	Dry	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-94	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
232	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
235	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
239	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
243	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
244	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
247	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
252	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
253	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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-- Well not monitored.

* Well inaccessible.

a = Monitored on 2/5/99; b = mud in well at 3.80 feet; c = well was dry, but probe showed oil on it; d = black, oily substance on probe; e = interface probe not responding accurately to LPH; f = Amount verified on 8/10/01 for wells MW-8, E-5, PR12, PR-32, PR-53, PR-55, PR-67, and 244.

Table 4: Historical LPH Monitoring (Product Thickness in Feet)

Corrective Action Plan, April 2010
Former Nestle USA, Inc. Facility
1310 14th Street, Oakland, CA

Well	3/28/1997	4/11/1997	4/17/1997	4/25/1997	5/2/1997	5/9/1997	5/16/1997	6/6/1997	10/25/1999	11/8/1999	12/1/1999	12/20/1999	1/17/2000	2/7/2000	2/28/2000	3/20/2000	4/10/2000	5/1/2000	5/22/2000	6/12/2000	10/25/2000	11/16/2000	12/11/2000	1/31/2001	2/28/2001	3/28/2001	4/30/2001	5/18/2001	6/29/2001	7/31/01 f	8/29/2001
MW-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	--	--	--	--	--	--	--	--	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
MW-8	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW-22	--	--	--	--	--	--	--	--	0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW-23	--	--	--	--	--	--	--	--	0.03	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.13	0.15	0.05	0.17	0.45	0.40	0.40	0.36	0.42	0.44	0.50	0.47	0.50	0.49	0.48
MW-24	--	--	--	--	--	--	--	--	0.13	0.13	0.13	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.40	0.41	0.41	0.41	0.31	0.34	0.38	0.45	0.60	0.62	0.74
E-0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
E-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
E-5	--	--	--	--	--	--	--	--	<0.01	0.11	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	0.10	0.02	<0.01	<0.01	<0.01	<0.01	0.04	-- e	0.01	0.01
E-6	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
E-8	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-12	--	--	--	--	--	--	--	--	0.01	0.01	0.01	0.01	0.08	<0.01	0.08	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.08
PR-20	--	--	--	--	--	--	--	--	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-21	--	--	--	--	--	--	--	--	Dry	Dry	Dry	Dry	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	Dry	Dry	Dry	<0.01	<0.01	<0.01	<0.01	Dry	Dry	Dry
PR-22	--	--	--	--	--	--	--	--	<0.01	Dry	<0.01	<0.01	Sheen	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-23	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-24	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-26	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-27	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-29	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
PR-32	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-34	0.65	1.31	0.8	1.06	0.7	0.66	0.64	0.75	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01
PR-35	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-36	--	--	--	--	--	--	--	--	Dry	Dry	Dry	Dry	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	Dry	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01
PR-37	--	--	--	--	--	--	--	--	<0.01	Dry	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	Dry	Dry	Dry	<0.01	Dry	Dry	<0.01	<0.01	Dry	Dry
PR-45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-47	--	--	--	--	--	--	--	--	0.04	Sheen	Sheen	<0.01	Sheen	<0.01	<0.01	<0.01	Sheen	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01
PR-48	--	--	--	--	--	--	--	--	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	0.06	0.12	0.07	<0.01	<0.01	<0.01	0.03	<0.01	0.06	<0.01
PR-49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PR-50	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01
PR-51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	--
PR-52	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-53	--	--	--	--	--	--	--	--	0.03	0.04	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Sheen	<0.01	<0.01	<0.01	0.01	0.03	0.06	0.06	<0.01	0.02	<0.01	<0.01	0.04	0.06	0.04
PR-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-55	--	--	--	--	--	--	--	--	0.02	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.10	0.11	0.07	<0.01	<0.01	0.03	0.02	<0.01	0.06	0.06
PR-56	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	Sheen	Sheen	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-58	2.45	2.14	1.8	2.06	1.79	1.64	1.49	1.44	0.06	0.01	<0.01	<0.01	0.06	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.03	0.03	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.06
PR-60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-61	0.02	0.17	0.33	0.42	0.27	0.4	0.34	0.32	0.02	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	<0.01	0.26	0.25	0.24	0.22	0.19	0.18	0.22	0.22	0.24	0.27	<0.01
PR-62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-64	--	--	--	--	--	--	--	--	0.08	0.02	0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.17	<0.01	0.51	0.52	0.49	0.48	0.50	0.64	0.30	0.45	0.63	0.64	0.60
PR-65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-67	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-68	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PR-70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	Dry	Dry	Dry	Dry	Dry	Dry	<0.01	<0.01	Dry
V-54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-55	--	--	--	--	--	--	--	--	Sheen	Sheen	<0.01	Sheen	Sheen	--	<0.01	Sheen	<0.01	<0.01	Sheen	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-56	--	--	--	--	--	--	--	--	0.02	0.03	Sheen	Sheen	Sheen	Sheen	Sheen	Sheen	<0.01	Sheen	Sheen	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-77	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--	--	--	--	--	--	--	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-78A	--	--	--	--	--	--	--	--	--	<0.01	<0.01	--	<0.01	--	--	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-78B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
V-79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	--	--	--	--	--	--	--	--
V-84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-93	--	--	--	--	--	--	--	--	Dry	Dry	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V-94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--	--	--	--
232	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
235	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
239	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
243	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--
244	--	--	--	--	--	--	--	--	--	<0.01	Sheen	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
247	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--
252	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
253	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Dry	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

-- Well not monitored.

* Well inaccessible.

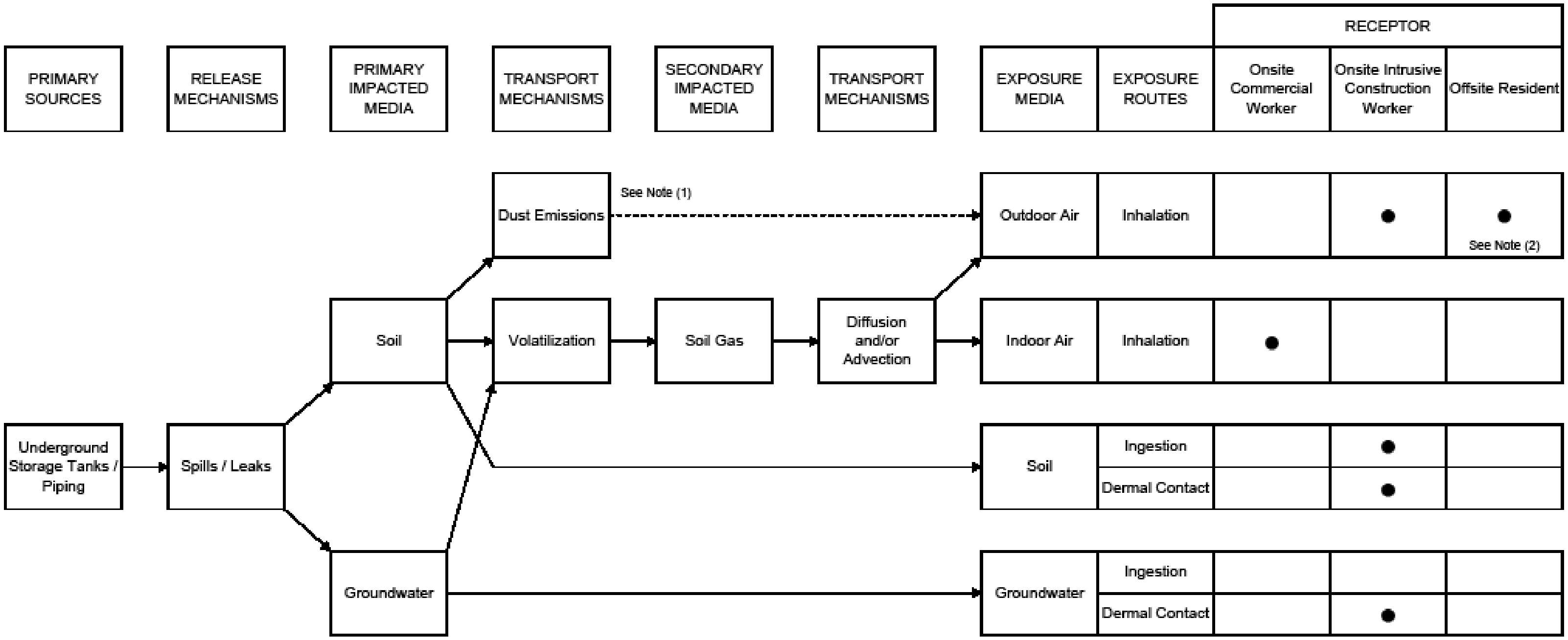
a = Monitored on 2/5/99; b = mud in well at 3.80 feet; c = well was dry, but probe showed oil on it; d = black, oily substance on probe; e = interface probe not responding accurately to LPH; f = Amount verified on 8/10/01 for wells MW-8, E-5, PR12, PR-32, PR-53, PR-55, PR-67, and 244.

TABLE 5
Comparative Matrix of Corrective Action Plan Approaches
Corrective Action Plan
April 2010
1310 14th Street
Oakland, CA

Corrective Action Plan Alternative	Alternative Details	Advantages	Drawbacks	Cost
1. Targeted Excavation of Impacted Soils Targeting areas for excavation identified in SCM above RWQCB-SF direct exposure limits for TPHg (4,200 mg/kg) and TPHd (4,200 mg/kg)	• Excavation of soils to be performed from areas above RWQCB-SF direct exposure limits for TPHg and TPHd • Extent of excavation to be defined by COC soil concentration data and interpolation as presented in November 2008 SCM Report (see Figure 7)	• Provides direct removal of COC mass from site • Excavation of soils likely to provide reduction of direct exposure risks associated with residual COCs • No on-going discharge of treated groundwater or vapor	• All exposure risks associated with remaining hydrocarbons not likely to be eliminated • Concrete/asphalt cap will need to be breeched in order to perform excavation • Engineering protections and shoring likely necessary to protect against any compromises to integrity of existing building and surrounding sidewalks/streets	• $478,600 to $574,000
2. Excavation of all Soils Above TPH Tier I ESLs Targeting areas for excavation identified in SCM above Commercial/Industrial Tier I ESLs for TPHg (180 mg/kg) and TPHd (180 mg/kg)	• Excavation of soils to be performed from areas above RWQCB-SF Tier I commercial/industrial screening levels for TPHg and TPHd • Extent of excavation to be defined by COC soil concentration data and interpolation as presented in November 2008 SCM Report (see Figure 8)	• Provides direct removal of COC mass from site • Excavation of soils likely to provide reduction of direct exposure risks associated with residual COCs • May result in elimination of direct exposure risks at site • As result of possible elimination of direct exposure risks, Deed Restriction and RMP requirements could be reduced or eliminated • Soil excavation activities not likely to remove all hydrocarbon mass dissolved in groundwater • No on-going discharge of treated groundwater or vapor	• All exposure risks associated with remaining hydrocarbons not certain to be eliminated • Concrete/asphalt cap will need to be breeched in order to perform excavation • Complete demolition of existing building necessary to access full extent of soils above Tier I levels • Engineering protections and excavation shoring likely necessary to protect against any compromises to integrity of surrounding sidewalks/streets • Soil excavation activities not likely to remove all hydrocarbon mass dissolved in groundwater	• $1,203,400 to $1,452,800 (excludes $1,653,200 to $1,963,800 in building demo and reconstruction costs)
3. Soil Vapor Extraction / Bioventing Extraction of vapors from areas identified in SCM above Tier I ESLs for TPHg (180 mg/kg) and TPHd (180 mg/kg)	• SVE or bioventing system to be installed with extraction points focused at areas of highest residual hydrocarbon impacts • SVE or bioventing system designed to remove mass via vapor phase, and potentially promote dissolution of hydrocarbon mass from groundwater • Bioventing may be implemented to promote additional circulation of air in subsurface and enhance biodegradation of hydrocarbons	• Provides for removal of COC from subsurface (primarily vadose zone) • Ability to target areas of highest hydrocarbon concentrations in soil • Minimal disruption of existing concrete/asphalt cap and building	• Shallow groundwater reduces effectiveness of SVE and bioventing • Does not directly address submerged residual hydrocarbon • All exposure risks associated with remaining hydrocarbons not likely to be eliminated • Future construction at site will require consideration of any soil vapor extraction and treatment equipment present at site	• $593,700 to $711,600

TABLE 5
Comparative Matrix of Corrective Action Plan Approaches
Corrective Action Plan
April 2010
1310 14th Street
Oakland, CA

4. In-situ Chemical Oxidation In-situ treatment through injection of oxidizer (hydrogen peroxide, Fenton's Reagent, potassium permanganate, or sodium persulfate, ozone) at areas identified in SCM above Tier I ESLs for TPHg and TPHd	• In-situ injection of oxidizer to be performed at injection points installed at areas of highest residual hydrocarbon impact (see Figure 9) • Injection of oxidizer designed to promote degradation/destruction of hydrocarbons in groundwater and (saturated) soils	• Provides for reduction of residual hydrocarbon mass to non-toxic (carbon dioxide, water) by-products • Possible accelerated reduction of residual hydrocarbon mass beneath site • Minimal disruption of existing concrete/asphalt cap and building	• Subsurface distribution of chemical oxidant may be impeded by discontinuous silty-sand zones • Previous high vacuum extraction efforts have revealed challenges in effecting removal of hydrocarbons within soil matrix; similar difficulty likely in generating oxidizer contact with hydrocarbons bound within submerged soils • Future construction at site will require consideration of any injection equipment present at site • On-site worker and building integrity may be an issue due to vigorous oxidizer reaction under building foundation	• $917,600 to $1,101,500
5. Institutional Controls Revised Risk Assessment, in conjunction with Deed Restriction & Risk Management Plan for site outlining required institutional controls	• Risk Assessment (Appendix A) documents risks associated with residual hydrocarbons remaining at site • Risk Assessment concludes that the risks associated with the concentrations of COC in soil and groundwater to indoor and outdoor air are within the USEPA's risk management range for carcinogens. • Direct exposure risks (on-site construction workers) to be addressed through Risk Management Plan and existing Deed Restriction • Institutional controls outlined in Risk Management Plan and Deed Restriction (site to remain commercial/industrial, surface cap to remain in place, etc.) remain applicable to property as part of site closure request	• Consistent with RWQCB/ACEH requirements for risk-based case closure • No disruption of concrete/asphalt cap, as required by existing Deed Restriction for site • Approach provides protection for future occupants and construction workers to any residual impacts at site via following the approved Deed Restriction and RMP	• Requires ongoing notification and approval by oversight agencies of future site development activities, per requirements of RMP and Deed Restriction	• $165,200 to $235,100



		RECEPTOR		
EXPOSURE MEDIA	EXPOSURE ROUTES	Onsite Commercial Worker	Onsite Intrusive Construction Worker	Offsite Resident
Outdoor Air	Inhalation		●	● See Note (2)
Indoor Air	Inhalation	●		
Soil	Ingestion		●	
	Dermal Contact		●	
Groundwater	Ingestion			
	Dermal Contact		●	

KEY:

→ Complete transport pathway

- - -→ Incomplete transport pathway for reason(s) noted below

● Complete exposure pathway for receptor

NOTES:

(1) There are no non-volatile COPCs that could be adhered to emitted dust

(2) Offsite residents are potentially exposed via inhalation to COPCs in outdoor or indoor air that have been transported by advection (*i.e.*, wind) from the site to offsite residential land uses

(adapted from Iris, 2009)

Former Nestlé Oakland Facility
Northwest Parcel
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
3525 Hyland Avenue, Suite 200 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Risk Evaluation Site Conceptual Model
(exposure pathway analysis)
CORRECTIVE ACTION PLAN
April 2010

Table
6

APPENDICES

Appendix A1:
Appendix A2:
Appendix B: Site Conceptual Model Figures
Appendix C: Covenant and Environmental Restriction (Deed Restriction)
Appendix D: Risk Management Plan
Appendix E: CAP Alternatives Cost Estimates
Appendix F: Regulatory Correspondence

Appendix A1: Sub-slab Soil Gas Sampling and Analysis Report

SUB-SLAB SOIL GAS SAMPLING AND ANALYSIS REPORT

Former Nestlé USA, Inc. Facility

1310 14th Street, Oakland, California

March 22, 2010

Prepared for:

Nestlé USA, Inc.
800 North Brand Boulevard
Glendale, California 91203

Prepared by:

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612

REGISTERED PROFESSIONAL ENGINEER
GREGORY S. NOBLET
C 57069
EXPIRES SEP 30, 2011
CIVIL
★ STATE OF CALIFORNIA ★

Gregory Noblet

Robert Balas, Principal

Gregory S. Noblet, P.E. No. C57069

EXECUTIVE SUMMARY

This sub-slab soil gas sampling and analysis report (SAR) documents the methodology and results of a sub-slab soil gas investigation of the northwest portion of the former Nestlé USA, Inc. facility ("Carnation Dairy") located at 1310 14th Street in Oakland, California (the "site"). The investigation was performed by Iris Environmental on behalf of Nestlé USA, Inc. and Encinal 14th Street LLC, at the request of Alameda County Environmental Health (ACEH, 2009a), in accordance with the ACEH-approved *Draft Sub-slab Soil Gas Sampling and Analysis Plan, Former Nestlé USA, Inc. Facility, 1310 14th Street, Oakland, California* (SAP; Iris Environmental, 2009b) and Technical Comment 1 of ACEH's conditional approval of the SAP (ACEH, 2009b).

A draft corrective action plan (CAP) for the site was previously prepared by Environmental Cost Management Inc. and submitted to ACEH on May 19, 2009 (ECM, 2009). The draft CAP summarized site characterization and remediation activities, and developed and evaluated remedial alternatives. The draft CAP included a screening level human health evaluation that evaluated potential health impacts to various receptor populations associated with the presence of VOCs at the site (Iris Environmental, 2009a). The human health evaluation presented site-specific vapor intrusion modeling with the Johnson and Ettinger Model which concluded that site soil gas conditions are such that vapor intrusion into the existing, unoccupied onsite commercial/industrial building is occurring below levels of concern for hypothetical future onsite commercial/industrial workers. The ACEH requested that a sub-slab soil gas investigation be performed to measure VOC concentrations beneath the building and thereby confirm the results of the vapor intrusion modeling evaluation (ACEH, 2009a). Based on the data collected during the sub-slab soil gas investigation, the CAP would be modified as appropriate.

Sub-slab soil gas sampling was performed on January 6, 2009 at six locations beneath the existing, unoccupied onsite commercial/industrial building. The potential vapor intrusion inhalation cancer risk and noncancer hazard to future building occupants, associated with measured concentrations of volatile chemicals in sub-slab soil gas, are estimated here in accordance with United States Environmental Protection Agency (USEPA) inhalation risk assessment guidance (USEPA, 2009a), California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) vapor intrusion guidance (Cal/EPA, 2005b), and Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) and DTSC inhalation risk assessment methodology (Cal/EPA, 2005a; 2009a). Cancer- and noncancer-based screening levels are developed based on a target risk level of 1×10^{-6} and target noncancer quotient of 1.0, respectively. These risk-based screening levels are used to evaluate the results of sub-slab soil gas sampling conducted beneath the building.

The findings of the sub-slab soil gas data evaluation may be summarized as follows.

- No chemical was detected in any sample at a concentration exceeding its cancer-based or noncancer-based screening level.
- The estimated cumulative (multi-chemical) cancer risk ranges across the six primary sub-slab soil gas samples from a minimum of 2.1×10^{-7} at SSG-2 to a maximum of 9.0×10^{-7} at SSG-3. This narrow range (less than an order of magnitude) of estimated risk across the

six samples can be generally attributed to the consistent detection of benzene in all samples. The estimated cumulative cancer risk is below the negligible risk level of 1×10^{-6} at every sampling location.

- The primary risk drivers at the site are benzene and naphthalene (note that naphthalene was detected in only one of six samples). Other chemicals which contribute significantly to cumulative risk in one or more samples are: 1,3-butadiene and tetrachloroethene.
- The estimated cumulative noncancer hazard index ranges from 0.0094 to 0.12 across the six primary sub-slab soil gas samples, and thus is below the threshold noncancer level of 1.0 at all locations.

In conclusion, the concentrations of volatile chemicals detected in sub-slab soil gas beneath the existing unoccupied commercial/industrial building during the January 2010 site investigation are below levels of concern with respect to potential vapor intrusion into the building. These results are consistent with the previous screening-level vapor intrusion evaluation of the building (Iris Environmental, 2009a), which was based on soil gas data previously collected at the site in 1999 and 2008.

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1.0 INTRODUCTION

This sub-slab soil gas sampling and analysis report (SAR) documents the methodology and results of a sub-slab soil gas investigation of the northwest portion of the former Nestlé USA, Inc. facility ("Carnation Dairy") located at 1310 14th Street in Oakland, California (the "site"). The investigation was performed by Iris Environmental on behalf of Nestlé USA, Inc. and Encinal 14th Street LLC, at the request of Alameda County Environmental Health (ACEH, 2009a), in accordance with the ACEH-approved *Draft Sub-slab Soil Gas Sampling and Analysis Plan, Former Nestlé USA, Inc. Facility, 1310 14th Street, Oakland, California* (SAP; Iris Environmental, 2009b) and Technical Comment 1 of ACEH's conditional approval of the SAP (ACEH, 2009b). The purpose of the investigation is to evaluate the potential for volatile chemicals known to be present in the subsurface to migrate upwards through the soil column, through cracks or conduits in the building slab, and into the indoor air space of the existing onsite commercial/industrial building – a transport process known as vapor intrusion – where hypothetical future building occupants (the building is currently vacant) may be exposed to the volatile chemicals via the inhalation route. The potential vapor intrusion inhalation cancer risk and noncancer hazard to future building occupants, associated with measured concentrations of volatile chemicals in sub-slab soil gas, are estimated in accordance with United States Environmental Protection Agency (USEPA) inhalation risk assessment guidance (USEPA, 2009a), California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) vapor intrusion guidance (Cal/EPA, 2005b), and Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) and DTSC inhalation risk assessment methodology (Cal/EPA, 2005a; 2009a).

2.0 BACKGROUND

2.1 Site History

The 1310 14th Street property, which was formerly occupied by the Carnation Dairy facility, is bounded by 16th Street to the north, 14th Street to the south, Poplar Street to the east, and Nelson Mandela Parkway (formerly Cypress Street) to the west (see Figure 1). The primary activities conducted at the Carnation Dairy facility were the manufacture and distribution of ice cream and packaged milk. Delivery trucks were fueled and maintained at the northwest portion of the Carnation Dairy facility; the fuel storage and dispensing system consisted of underground storage tanks and associated underground piping. The subject "site" of this report is the northwest portion of the former Carnation Dairy facility, situated at the southeast corner of 16th Street and Nelson Mandela Parkway, where the fuel storage and dispensing operations were located. These operations were conducted at the site until 1988. The underground storage tanks and associated piping are now known to have leaked petroleum products into site soils, resulting in petroleum contamination of subsurface soils, a layer of petroleum product floating on the groundwater table, and dissolved petroleum hydrocarbons in site groundwater (ETIC, 2001). These impacts have been partially addressed by various remedial activities, as described below.

2.2 Remedial Activities

Five underground storage tanks and associated underground piping were removed from the site between December 1988 and January 1989, including: two 12,000-gallon diesel tanks, two 10,000-gallon gasoline tanks, and one 1,000-gallon used oil tank. At that time, 1,200 cubic yards of petroleum hydrocarbon-impacted soil were excavated, treated onsite, and replaced into the excavation (ETIC, 2001).

Various site investigations and remedial activities have been conducted at the site since the initial underground storage tank excavations. Remedial activities have included the following (COFS, 2000; ETIC, 2001):

- Approximately 1.5 million gallons of groundwater were extracted from the subsurface following removal of the underground storage tanks.
- Product skimming was conducted between January and March 1989. Approximately 1,800 gallons of liquid phase hydrocarbons were removed from the subsurface.
- A soil vapor extraction system was operated from January 1994 to February 1995. An estimated 5,200 gallons of hydrocarbon equivalent were removed from the subsurface.
- A multi-phase extraction system was operated from August 1997 through June 2000. A total of 10,875 pounds of hydrocarbons were removed during this period.

Current site conditions have been previously characterized through soil, soil gas, and groundwater sampling conducted in May of 2008, as described below.

2.3 Previous Site Investigations

Impacts to site soil, groundwater, and soil gas, associated with leaks of petroleum hydrocarbons from underground storage tanks and piping, have been documented in several site investigations performed since 1991. Soil gas investigations were performed in 1999 and in May of 2008. Soil investigations were performed at the time of underground storage tank excavation in 1991, in 1999, and most recently in May of 2008. Groundwater monitoring was performed on a regular basis from 1993 to 2004 and in May of 2008.

As noted in the *Supplemental Soil, Soil Gas, and Groundwater Investigation Report* (ECM, 2008), components of the May 2008 site investigation consisted of:

- soil sampling for total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) at five locations (SB-16 through SB-20), at various depths, to provide current characterization of residual hydrocarbon impacts in the area downgradient from the former underground storage tanks;
- soil sampling for TPH and VOCs at seven locations (SB-21 through SB-27), at various depths, to provide delineation of hydrocarbon impacts in areas of the site which had not been thoroughly characterized;
- soil sampling for polychlorinated biphenyls (PCBs) at seven locations (PCB-1 through PCB-7), at various depths, to document the presence or absence of PCBs at the site;

- soil gas sampling for TPH and VOCs at 12 locations (SB-16 through SB-27), including seven locations in the area downgradient from the former underground storage tanks (SB-20 through SB-27), at a depth of 5 feet, to provide a complete set of soil gas data for use in evaluating vapor intrusion; and
- grab groundwater sampling for TPH and VOCs at 11 locations (SB-16 through SB-27 exclusive of SB-23).

The results of all previous site investigations are provided in Appendix A of the SAP (Iris Environmental, 2009b).

2.4 Corrective Action Plan

A draft corrective action plan (CAP) for the site was prepared by Environmental Cost Management Inc. and submitted to ACEH on May 19, 2009 (ECM, 2009). The draft CAP summarized site characterization and remediation activities, and developed and evaluated remedial alternatives. The draft CAP included a screening level human health evaluation that evaluated potential health impacts to various receptor populations associated with the presence of VOCs at the site (Iris Environmental, 2009a). The human health evaluation presented site-specific vapor intrusion modeling with the Johnson and Ettinger Model which concluded that site conditions are such that any potential indoor air concentrations are below levels of concern for hypothetical future onsite commercial/industrial workers. The ACEH requested that a sub-slab soil gas investigation be performed to measure VOC concentrations beneath the building and thereby confirm the results of the vapor intrusion modeling evaluation (ACEH, 2009a). Based on the data collected during the sub-slab soil gas investigation, the CAP would be modified as appropriate.

3.0 CHEMICALS OF POTENTIAL CONCERN

Chemicals of potential concern (COPCs) (*i.e.*, target analytes) for this sub-slab soil gas investigation are the 38 VOCs proposed as COPCs in the SAP (Iris Environmental, 2009b) plus two additional analytes requested by ACEH (2009b): TPH in the gasoline range (TPH-g) and naphthalene. Previously, laboratory analytical protocols resulted in xylenes being reported as total xylenes. For this investigation, the laboratory protocol resulted in xylenes being reported as two separate analytes: m,p-xylene and o-xylene. Accordingly, there are a total of 41 target analytes included in this investigation. This list of 41 target analytes for the sub-slab soil gas investigation includes all analytes which have been previously detected in site soil gas, in either the 1999 or 2008 soil gas investigations.

4.0 SAMPLE COLLECTION AND ANALYSIS

Sub-slab soil gas sampling was performed in accordance with the ACEH-approved SAP (Iris Environmental, 2009b; ACEH, 2009b), except for minor deviations as noted below. Sub-slab soil gas sampling was performed on January 6, 2009 at the six locations identified in Figure 2. The emplacement of sub-slab probes and the collection and laboratory analysis of sub-slab soil gas samples are described below.

4.1 Utility Survey

Prior to beginning sub-slab work, each sampling location was cleared for potential underground utilities by an independent utility survey subcontractor, ForeSite, under the oversight of Iris Environmental. All sub-slab utilities were clearly marked prior to drilling. Underground Service Alert (USA) was also notified of planned investigation activities more than 48 hours prior to the start of drilling activities.

4.2 Probe Emplacement

A hand-held rotary hammer drill with core bit was used to drill a 2-inch diameter, 2-inch deep hole into the top surface of the slab. A concentric, smaller, 1.25-inch diameter inner hole was then drilled through the remainder of the slab and approximately 1 to 3 inches into the sub-slab material, which was observed to consist of fine silt/sand at each probe location. The larger outer hole was drilled to enable the top probe fitting to be recessed below the top of the concrete slab but still be accessible by hand (see Figure 4). The thickness of the building slab encountered at each probe location varied from approximately 6 to 8-1/2 inches. The inner and outer holes were cleaned with a brush to improve the potential for a good seal during cement application. The sampling probe assembly (see details below) was emplaced in the hole such that the vapor inlet was positioned beneath the bottom of the slab and above the bottom of the boring.

The sampling probe was constructed with the following specifications, in accordance with the ACEH-approved SAP, except where noted.

1) Each vapor probe was constructed of 1/4-inch diameter Teflon-lined polyethylene tubing, with a filter tip at the down-hole end and a quick-disconnect tube coupling at the top end. The SAP specified that brass tubing would be used for this component; Teflon-lined tubing was selected over brass tubing because the thickness of the slab at each location was unknown prior to drilling, and the Teflon-lined tubing could be cut to the correct length in the field more quickly than brass tubing, thereby minimizing the amount of time that the hole was open. The space beneath the probe tip and the annular space between the probe and sub-slab material were filled with sand to cover the filter tip.
2) Bentonite chips were emplaced immediately above the sand pack, followed by a mixture of hydrated bentonite chips and bentonite powder to fill the borehole annular space to approximately 2 inches below the quick-disconnect socket. Sufficient distilled water was added to the bentonite to form a seal. The probe was affixed to the foundation slab up to the base of the quick-disconnect socket with quick-setting contaminant-free cement patch.
3) Upon completion of sampling, the tubing and coupling were replaced with a brass cap and coupling plug to seal the probe. The recessed probe was covered with a plastic cap to be nearly flush with the foundation slab to reduce the tripping hazard and to protect the probe.

A schematic diagram of the sub-slab soil gas probe is presented in Figure 3. A photograph of the probe assembly, prior to emplacement, is provided in Figure 4. A photograph of an emplaced sub-slab soil gas sampling probe is provided in Figure 5.

Following probe emplacement, soil gas sampling was not conducted for at least 30 minutes to allow the cement to cure and to allow for subsurface conditions to equilibrate. The probe installation time and the estimated purge volume of each probe were recorded in the field notes (see Appendix B). The purge volume of each soil gas probe installation was estimated as the summation of the volumes of the sample pipe, the sample line, and the sand pack around the probe tip.

4.3 Sample Collection

Each sub-slab soil gas sample was collected into a batch-certified, 6-liter, silicon-lined, stainless steel Summa canister equipped with a mass flow controller device that regulated the flow of air into the canister at a rate between 100 and 200 milliliters per minute (mL/min) to limit stripping of chemical compounds, to prevent ambient air from diluting the soil gas samples, and to reduce the variability of purging and sampling rates. Teflon-lined polyethylene tubing was used to connect the probe to the Summa canister. Given the volume of soil gas collected, the zone of influence about the probe tip was approximately equal to a half-sphere with radius of 1 foot. After waiting for at least 30 minutes following probe installation, the sampling assembly was purged of three purge volumes in accordance with the ACEH-approved SAP. The sampling assembly was purged with a disposable syringe. Once the sampling assembly was appropriately purged, the Summa canister valve was opened to draw a soil gas sample from the sample line into the canister. As discussed below in Section 4.4, a leak detection test was conducted immediately before and after the soil gas sample was collected.

4.4 Leak Test

A leak test was performed in conjunction with each collected sub-slab soil gas sample to verify that indoor air was not diluting the soil gas sample or contaminating the sample with contaminants. The leak test was conducted using a helium shroud apparatus, as shown in Figure 5 (NYSDOH, 2006). The shroud was placed over the sub-slab probe and the 6-liter Summa canister, so that the probe surface seal and all sampling train components were within the shroud. Helium was injected into the shroud and maintained within the shroud at a stable concentration of between approximately 40 and 50 percent during sample collection. A handheld helium detector was used to measure the helium concentration within the shroud and within the sampling line by use of a tee connection just upstream from the Summa canister. The helium concentration within the sampling line was measured immediately before and after the soil gas sample was collected. These results were recorded in the field notes and are presented in Appendix B. Because minor leakage around the probe seal should not materially affect the usability of the soil vapor sampling results, the mere presence of the tracer gas in the sampling line is not a cause for alarm. New York State vapor intrusion guidance (NYSDOH, 2006) suggests that the helium concentration detected in the sampling line should be 10 percent or less of the helium concentration within the shroud, and emerging DTSC guidance (Cal/EPA, 2009c) appears to be consistent with this threshold. The helium concentration measured in the sampling line was less than 10 percent of the shroud concentration at each sub-slab probe location, as documented in Appendix B.

4.5 Procedure for Low-flow Conditions

Low- or no-flow conditions (sample flow rates of less than 10 mL/min) were not encountered during sampling.

4.6 Sample Handling and Documentation

A unique and descriptive sample identification (ID) number was assigned to each sub-slab soil gas sample by combining the sample type, location, and date. For example, sample ID number "SSG-1-20100106" is associated with the sub-slab soil gas sample collected at location 1 on January 6, 2010. The duplicate sample was identified by adding "Dup" to the end of the sample ID and the trip blank was labeled "Trip Blank." Sample ID numbers are documented in the Canister Sampling Log included in Appendix B and in the laboratory reports and chain of custody form included in Appendix A. For concision, the full sample ID numbers are not shown in the data summary presented in Table 5.

For each sub-slab soil gas sample, the following information was recorded in the field notes:

- Summa canister serial number;
- flow regulator serial number;
- sample location (marked on building floor plan figure);
- sample ID number;
- start time and canister vacuum;
- end time and canister vacuum; and
- sampler's name and affiliation.

This information is documented for each sample in the Canister Sampling Log included in Appendix B.

Following sample collection, the Summa canisters were packed into their shipping containers and were delivered via overnight courier under chain of custody protocol to Air Toxics Limited of Folsom, California. The samples were received at Air Toxics at approximately 3 p.m. on January 8, 2010.

4.7 Field QA/QC Procedures

In accordance with joint DTSC and Los Angeles RWQCB soil gas sampling guidance (Cal/EPA, 2003), one trip blank and one field-duplicate sample were included in the sub-slab soil gas investigation.

One trip blank sample was included in the sub-slab soil gas investigation to assess potential cross-contamination of the sample canisters. The trip blank sample consisted of a Summa canister that was prepared identically to the others (*i.e.*, was cleaned, individually certified, and evacuated by the laboratory), accompanied the others from the laboratory to the site and back to the laboratory, and was analyzed at the laboratory with the others; no sample was drawn into the Summa canister at the site, however, and the trip blank "sample" that was analyzed was comprised of laboratory-certified “clean” air that is injected into every canister when it arrives back at the laboratory. The rationale for transporting an empty trip blank canister, rather than a canister already filled with laboratory-certified clean air, was to provide the greatest opportunity for cross-contamination to occur by maintaining the maximum pressure differential between the evacuated canister and ambient air.

One field duplicate sample was included in the sub-slab soil gas investigation to assess the overall variability in field sampling and laboratory analysis procedures. The field duplicate sample consisted of a second sub-slab soil gas sample collected into a separate Summa canister, collected at the same time and location as the associated primary sample using a duplicate sampling tee. The field duplicate sample was collected at location SSG-2, where concentrations of target analytes were expected to be relatively high, based upon a review of existing site data.

4.8 Post-sampling Activities

All sampling locations were recorded on a building floorplan drawing after measuring distances relative to nearby site features (*i.e.*, building walls). The sub-slab probes were left in-place for potential future use; each probe will be properly decommissioned after all sampling has been completed. The probe tip, probe piping, bentonite, and grout will be removed by redrilling. The borehole will be filled with grout and concrete patch material. Surface restoration will include a follow-up visit for final sanding and finish work to restore the floor slab to its original condition, if necessary.

4.9 Laboratory Analysis

Sub-slab soil gas samples were analyzed offsite by USEPA Method TO-15 by Air Toxics Ltd. of Folsom, California, a State-certified analytical laboratory. It is noted that the ACEH (2009b) requested that TPH-g be quantified by Method TO-3; to achieve a significantly lower laboratory reporting limit, TPH-g was instead quantified by TO-15. Samples were analyzed on a standard laboratory TAT of 10 working days from the date the canisters were received at the laboratory. Preliminary laboratory results were reported to Iris Environmental on January 25, 2010. Final laboratory results were reported to Iris Environmental on February 5, 2010. These results are discussed in Section 5.0 below.

5.0 RISK-BASED SUB-SLAB SOIL GAS SCREENING LEVELS

Risk-based screening levels of COPCs in sub-slab soil gas are established here to provide numerical criteria for evaluation of the sub-slab soil gas sampling results. These sub-slab soil gas screening levels are consistent with those developed prior to field work for the purpose of selecting appropriate sample collection and analysis methods, as presented in the SAP (Iris Environmental, 2009b), with two enhancements.

- As requested by ACEH in their conditional-approval letter (ACEH, 2009b), the following modifications have been made to the screening levels:
    - the cancer-based sub-slab soil gas screening levels developed here are based on a target risk level of 1×10^{-6} rather than 1×10^{-5} ;

  - cancer- and noncancer-based sub-slab soil gas screening levels are developed here for naphthalene; and
  - a noncancer-based sub-slab soil gas screening level is developed here for TPH-g.
- Target concentrations in indoor air are estimated here in accordance with newly promulgated USEPA inhalation risk assessment methodology (USEPA, 2009a).

The risk-based sub-slab soil gas screening levels are developed by combining risk-based target indoor air concentrations as calculated in Section 5.1 with a default sub-slab attenuation factor as discussed in Section 5.2.

5.1 Risk-based Target Indoor Air Concentrations

Risk-based target indoor air concentrations are developed here in accordance with USEPA (2009a), OEHHA (Cal/EPA, 2005a), and DTSC (Cal/EPA, 2009a) inhalation risk assessment methodology and guidance. The methodology and assumptions are consistent with those used by OEHHA in developing California Human Health Screening Levels (CHHSLs) for indoor air under a commercial exposure scenario (Cal/EPA, 2005a), and with those used by DTSC Human and Ecological Risk Division (HERD) in the inhalation-risk module of their Johnson and Ettinger Model (Cal/EPA, 2009a), with respect to: target risk and hazard levels, commercial/industrial worker exposure assumptions, and sources of toxicity values. The target concentrations developed here differ from indoor air CHHSLs in the following ways only.

- Target concentrations in indoor air are developed here for all COPCs of the investigation, including chemicals which were not included in the CHHSLs document.
- The hierarchy of sources for selecting noncancer toxicity values used here is the more conservative hierarchy recommended by DTSC/HERD (Cal/EPA, 2009a); under the DTSC/HERD hierarchy, the lower (more conservative) noncancer value from either Cal/EPA or USEPA is used to develop each noncancer-based target concentration. The less conservative OEHHA hierarchy prioritizes Cal/EPA over USEPA values, regardless of which value is lower.
- A noncancer-based target concentration of TPH-g is derived here from published noncancer toxicity values for specific TPH-g subgroups (*e.g.*, short-chain aliphatics), in accordance with DTSC guidance for evaluation of TPH mixtures (Cal/EPA, 2009b).
- The cancer- and noncancer-based target concentrations developed here incorporate an additional term, exposure time (ET; in hours per day), for consistency with newly promulgated USEPA inhalation risk assessment guidance (USEPA, 2009a).

The development of cancer- and noncancer-based target indoor air concentrations is presented below in Sections 5.1.1 and 5.1.2, respectively.

5.1.1 Cancer Effects

The target indoor air concentration, based on potential cancer effects, of each carcinogenic COPC that could be present in the indoor air of the onsite commercial/industrial building is estimated in accordance with USEPA (2009a), OEHHA (Cal/EPA, 2005a), and DTSC (Cal/EPA, 2009a) inhalation risk assessment methodology and guidance:

$$CA_c = \frac{TR \times AT_c}{URF \times ET \times EF \times ED} \qquad (1)$$

where:

CA_c = concentration of chemical in indoor air (μg/m^3) that produces the target inhalation cancer risk under a commercial/industrial exposure scenario;

TR = target inhalation cancer risk (unitless);

URF = unit risk factor (per μg/m^3);

AT_c = averaging time for carcinogenic effects (hr);

ET = exposure time (hr/d);

EF = exposure frequency (d/yr); and

ED = exposure duration (yr).

The target risk level (TR) is based on an "acceptable" cancer risk level, as defined and endorsed by relevant state and federal agencies. The National Contingency Plan (NCP) is cited by USEPA (1989) as the basis for defining acceptable incremental (from a particular site, *i.e.*, above background) risk levels. According to the NCP, lifetime incremental cancer risk levels posed by a site should not exceed the risk range of one in a million (1×10^{-6}) to 100 in a million (1×10^{-4}). Thus, USEPA and Cal/EPA agencies typically consider the 1×10^{-6} risk level to be an insignificant risk, and consider a calculated excess cancer risk between 1×10^{-6} and 1×10^{-4} to be within the "risk-management" range. For commercial-industrial exposure scenarios, a typical point of departure with respect to risk-management decisions is a risk level of 1×10^{-5}; *i.e.*, if risks are at or below 1×10^{-5}, the agency of record will generally require no further action. Relatedly, California Proposition 65 cites the 1×10^{-5} risk level as the threshold of concern under commercial-industrial exposure scenarios. Notwithstanding typical risk-management thresholds, the target risk level used to develop risk-based target concentrations in indoor air and, by extension, risk-based sub-slab soil gas screening levels, ultimately has no impact on the calculation of inhalation cancer risk associated with a measured chemical concentration in sub-slab soil gas, as the target-risk variable "cancels out" of the calculation (see Section 6.2). As consistent with the target risk level used by OEHHA in developing the CHHSLs, the target risk level used here to develop target concentrations in indoor air is 1×10^{-6}.

The inhalation carcinogenic potency of each COPC is defined by its unit risk factor (URF). The unit risk factor represents the estimated probability of the receptor getting cancer as a result of a continuous exposure to an ambient concentration of 1 microgram per cubic meter (μg/m^3) of the chemical over a 70-year lifetime (USEPA, 1989). Consistent with OEHHA (CHHSLs) guidance (2005a) and current DTSC/HERD recommendation (Cal/EPA, 2009a), URF values are obtained from the OEHHA *Toxicity Criteria Database* (Cal/EPA, 2010). Toxicity values are presented in Table 1.

The values assigned to the exposure frequency (EF), exposure duration (ED), and averaging time for carcinogenic effects (AT_c) are consistent with standard DTSC/HERD exposure assumptions for commercial/industrial workers (Cal/EPA, 2005c; 2009a) and are consistent with the exposure assumptions made by OEHHA in developing the CHHSLs (Cal/EPA, 2005a). The value assigned to the exposure time (ET) is consistent with current USEPA inhalation risk assessment guidance (USEPA, 2009a). Exposure assumptions are documented in Table 2.

Target indoor air concentrations, based on potential cancer effects, of carcinogenic COPCs are presented in Table 3.

5.1.2 Noncancer Effects

The target indoor air concentration, based on potential noncancer effects, of each COPC is estimated in accordance with USEPA (2009a), OEHHA (Cal/EPA, 2005a), and DTSC (Cal/EPA, 2009a) inhalation risk assessment methodology and guidance:

$$CA_{nc} = \frac{THQ \times AT_{nc} \times REL}{ET \times EF \times ED} \tag{2}$$

where:

CA_{nc} = concentration of chemical in indoor air (µg/m^3) that produces the target inhalation noncancer hazard quotient under a commercial/industrial exposure scenario;

THQ = target inhalation noncancer hazard quotient (unitless);

REL = reference exposure level (also known as chronic reference concentration [RfC]) (µg/m^3); and

AT_{nc} = averaging time for noncarcinogenic effects (d).

The target or acceptable noncancer hazard quotient (THQ) is 1.0. A hazard quotient equal to or less than 1.0 indicates that the exposure is not likely to result in adverse noncancer health effects, even for sensitive populations (USEPA, 1989). A target risk level of 1.0 is consistent with that used by OEHHA in developing the CHHSLs (Cal/EPA, 2005a).

The values assigned to the exposure frequency (EF), exposure duration (ED), body weight (BW), and averaging time for noncarcinogenic effects (AT_{nc}) are consistent with standard DTSC/HERD exposure assumptions for commercial/industrial workers (Cal/EPA, 2005c; 2009a) and are consistent with the exposure assumptions made by OEHHA in developing the CHHSLs (Cal/EPA, 2005a). The value assigned to the exposure time (ET) is consistent with current USEPA inhalation risk assessment guidance (USEPA, 2009a). Exposure assumptions are documented in Table 2.

The noncarcinogenic inhalation toxicity of each COPC is defined by its reference exposure level (REL), also known as chronic reference concentration (RfC). The REL represents the constant ambient air exposure concentration, expressed in micrograms per cubic meter (µg/m^3), that would not be expected to cause adverse noncancer health effects in potentially exposed populations, including sensitive subpopulations (USEPA, 1989). Consistent with current DTSC/HERD recommendation (Cal/EPA, 2009a), the RELs used in this analysis (except that for TPH-g, which is discussed separately below) are obtained from the following hierarchy of sources.

1) The lower (more conservative) of noncancer toxicity values from either

  a) OEHHA *Toxicity Criteria Database* (Cal/EPA, 2010) or
  b) *Integrated Risk Information System* (IRIS) (USEPA, 2010); and

2) *Regional Screening Levels for Chemical Contaminants at Superfund Sites* (USEPA, 2009b).

It is noted that this DTSC/HERD-recommended noncancer toxicity value hierarchy is more conservative than that used by OEHHA in developing the CHHSLs (Cal/EPA, 2005a). The noncancer CHHSLs are based on toxicity values taken first from the OEHHA *Toxicity Criteria Database* and then from USEPA IRIS, regardless of which value is more conservative.

A noncancer-based target indoor air concentration for TPH-g mixture is developed here in accordance with recently promulgated DTSC guidance (Cal/EPA, 2009b). The new DTSC TPH guidance provides noncancer toxicity values (*i.e.*, REL values) for three subgroups of TPH within the gasoline range, based on chemical structure and carbon number:

- C_5 to C_8 aliphatics;
- C_9 to C_{18} aliphatics; and
- C_9 to C_{16} aromatics.

DTSC still recommends evaluating the noncancer health effects of C_6 to C_8 aromatics on an individual chemical basis (Cal/EPA, 2009b); the noncancer health effects of the other three TPH-g subgroups, listed above, are evaluated here in accordance with the DTSC interim guidance. A noncancer-based indoor air target concentration is calculated by Equation 2 for each of these three TPH-g subgroups, using the DTSC-published REL values. As discussed in the next paragraph, an assumption is made regarding the composition of the TPH-g mixture measured in site sub-slab soil gas. These assumed fractions are combined with the target indoor air concentrations for the TPH subgroups to calculate a weighted-average noncancer-based target indoor air concentration for the TPH-g mixture.

As recommended in the DTSC TPH guidance (Cal/EPA, 2009b), it is conservatively assumed that the TPH-g mixture measured in site sub-slab soil gas is comprised of 50 percent aliphatics and 50 percent aromatics. With respect to carbon number, it is assumed that the TPH-g measured in site sub-slab soil gas is comprised of 75 percent short-chain hydrocarbons and 25 percent long-chain hydrocarbons within each of the aromatic and aliphatic groups, based upon fractionation data for fresh gasoline product published by Metcalf and Eddy (1993). The TPH-g measured in site sub-slab soil gas is therefore assumed to be comprised of 37.5 percent C_5 to C_8 aliphatics; 37.5 percent C_6 to C_8 aromatics; 12.5 percent C_9 to C_{18} aliphatics; and 12.5 percent C_9 to C_{16} aromatics. These assumed fractions are applied to the noncancer-based target indoor air concentrations for the TPH subgroups calculate a weighted-average noncancer-based target indoor air concentration for TPH-g mixture:

$$CA_{nc,TPH\text{-}g} = \frac{1}{\sum \frac{x_i}{CA_{nc,i}}} \tag{3}$$

where:

$CA_{nc,TPH\text{-}g}$ = noncancer-based target indoor air concentration for TPH-g ($\mu g/m^3$);

x_i = mass fraction of TPH-g within subgroup *i* (unitless); and

$CA_{nc,i}$ = noncancer-based target indoor air concentration for subgroup *i* ($\mu g/m^3$).

It should be noted here that TPH-g is a catch-all measurement that represents the summation of the concentrations of all detected hydrocarbon compounds in the gasoline range, *i.e.*, from C_3 to C_{12}. It should not be assumed, however, that the concentrations of TPH-g measured in site sub-slab soil gas are necessarily associated with gasoline fuel, as there are many hydrocarbons within this range that would be included in the quantitation of TPH-g that are not gasoline constituents. The TPH noncancer toxicity values published by DTSC *do* assume that TPH-g is gasoline-related; *e.g.*, the noncancer toxicity of the C_5 to C_8 aliphatic fraction is (by DTSC) conservatively based upon the most toxic gasoline constituent within that fraction, hexane. Furthermore, it is conservatively assumed here that the fractionation by carbon number of the TPH-g measured at the site is consistent with that of fresh gasoline product. This evaluation of site TPH-g measurements is therefore highly conservative, as the noncancer-based target concentration assumes the TPH-g resembles fresh gasoline product, whereas the TPH-g measured at the site may not be related to gasoline at all, or may be related to highly weathered gasoline which would exhibit a different, and likely less toxic, speciation.

Noncancer-based target concentrations of COPCs, including the three TPH subgroups and the total TPH-g mixture, in indoor air under a commercial/industrial exposure scenario are presented in Table 3.

5.2 Risk-based Sub-slab Soil Gas Screening Levels

Risk-based sub-slab soil gas screening levels are developed here from: 1) the risk-based target concentrations of volatile chemicals in indoor air, calculated above in Section 5.1; and 2) a DTSC-recommended slab attenuation factor of 0.01 (Cal/EPA, 2005b). By definition, the attenuation factor represents the chemical concentration in indoor air (resulting from vapor intrusion) to the chemical concentration in soil gas beneath the building:

$$\alpha \equiv \frac{C_{IA}}{C_{SG}} \tag{4}$$

where:

α = attenuation factor (unitless);

C_{IA} = concentration of volatile chemical in indoor air resulting from vapor intrusion ($\mu g/m^3$); and

C_{SG} = concentration of volatile chemical in soil gas beneath building ($\mu g/m^3$).

It is noted that an attenuation factor (α) may, in general, be defined for soil gas contamination at any specific depth below the building slab. When defined for greater depths than sub-slab, the attenuation factor incorporates diffusive transport through the vadose soil zone as well as advective transport through the building slab, and therefore is a function of soil properties and physicochemical properties. Here, the attenuation factor is defined relative to soil gas contamination present immediately beneath the building slab, and therefore is independent of soil and physicochemical properties.

In accordance with DTSC vapor intrusion guidance (Cal/EPA, 2005b), it is assumed that attenuation of chemical concentrations across the building slab is occurring at an attenuation factor of 0.01. In other words, it is assumed that the concentrations of all volatile chemicals decrease by a factor of 100 as the chemicals are transported from sub-slab soil gas into the indoor air space of the overlying building. Thus, sub-slab soil gas screening levels are 100 times higher than indoor air target concentrations.

For each carcinogenic COPC, the cancer-based sub-slab soil gas screening level is calculated from:

$$SL_c = \frac{CA_c}{\alpha} \tag{5}$$

where:

SL_c = cancer-based sub-slab soil gas screening level ($\mu g/m^3$);

CA_c = cancer-based target concentration in indoor air ($\mu g/m^3$); and

α = slab attenuation factor (unitless).

For each COPC, the noncancer-based sub-slab soil gas screening level is calculated from:

$$SL_{nc} = \frac{CA_{nc}}{\alpha} \tag{6}$$

where:

SL_{nc} = noncancer-based sub-slab soil gas screening level ($\mu g/m^3$);

CA_{nc} = noncancer-based target concentration in indoor air ($\mu g/m^3$); and

α = slab attenuation factor (unitless).

Cancer- and noncancer-based sub-slab soil gas screening levels are presented in Table 4. These screening levels are used to evaluate the sub-slab soil gas data collected at the site, as described in Section 6.0.

6.0 DATA EVALUATION

The risk-based sub-slab soil gas screening levels developed above in Section 5.0 are used here to evaluate the results of sub-slab soil gas sampling performed at the site in January 2010. The sampling results are presented and discussed, generally, in Section 6.1. Individual results are evaluated in Section 6.2 through comparison to the risk-based sub-slab soil gas screening levels. The potential cumulative (multi-chemical) inhalation cancer risk and noncancer hazard associated with each individual sub-slab soil gas sample are estimated in Section 6.3, in order to determine worst-case potential impacts associated with vapor intrusion. The two field QA/QC samples (*i.e.*, field duplicate and trip blank) are evaluated in Section 6.4.

6.1 Data Summary

As discussed above in Section 4.0, seven sub-slab soil gas samples (including one field duplicate sample) were collected at six locations beneath the existing onsite building (see Figure 2). One trip blank sample was also included in the investigation. The eight samples were analyzed for TPH-g and 40 individual volatile chemicals by modified Method TO-15 full scan. Sub-slab soil gas sampling results are presented in Table 5. The complete laboratory report is provided in Appendix A.

Of the 41 target analytes of the investigation, 29 were detected in at least one of the six primary sub-slab soil gas samples, and 12 were not detected in any of the six samples. Of the 29 detected analytes, 14 (including TPH-g) were detected in each of the six primary samples. Considering detection frequencies on an individual-sample basis, analytes were detected at the greatest frequency in the sample from SG-3 (24 of 41 analytes detected), and were detected at the lowest frequency in the sample from SG-2 (17 of 41). The significance of these chemical detections in sub slab soil gas, with respect to potential vapor intrusion inhalation risk and hazard, is evaluated in the two sections below.

6.2 Comparison of Results to Risk-based Sub-Slab Soil Gas Screening Levels

A comparison of sub-slab soil gas sampling results to risk-based sub-slab soil gas screening levels is presented in Table 5. As discussed above in Section 5.0, the cancer- and noncancer-based screening levels are based on a target risk level of 1×10^{-6} and target noncancer hazard quotient of 1.0, respectively. No chemical was detected in any sub-slab soil gas sample at a concentration exceeding its cancer-based or noncancer-based screening level.

As defined above in Section 5.1.1, each cancer-based sub-slab soil gas screening level represents the concentration of the associated carcinogenic COPC in sub-slab soil gas that results – via vapor intrusion transport to indoor air, and subsequent inhalation by building occupants – in the target cancer risk level of 1×10^{-6}, under a commercial/industrial land use scenario. Thus, the cancer risk associated with a measured concentration of a carcinogenic COPC in sub-slab soil gas may be calculated by taking the ratio of the measured concentration in sub-slab soil gas to the associated cancer-based sub-slab soil gas screening level, and multiplying this ratio by the target risk level:

$$\text{RISK} = \frac{C_{SG}}{SL_c} \times \text{TR} \qquad (7)$$

where:

RISK = cancer risk (unitless);

C_{SG} = measured concentration of carcinogenic COPC in sub-slab soil gas ($\mu g/m^3$);

SL_c = cancer-based sub-slab soil gas screening level ($\mu g/m^3$); and

TR = target inhalation cancer risk (unitless).

As noted above (see Section 5.1.1), the selected target risk level (TR) has no impact on the calculated inhalation cancer risk; the target risk "cancels out" of the calculation here in Equation 7.

Analogous to calculation of cancer risk, the noncancer hazard associated with a measured concentration of a COPC in sub-slab soil gas may be calculated by taking the ratio of the measured concentration in sub-slab soil gas to the associated noncancer-based sub-slab soil gas screening level, and multiplying this ratio by the target hazard quotient:

$$HQ = \frac{C_{SG}}{SL_{nc}} \times THQ \tag{8}$$

where:

HQ = noncancer hazard quotient (unitless);

C_{SG} = concentration of COPC in soil gas ($\mu g/m^3$);

SL_{nc} = noncancer-based sub-slab soil gas screening level ($\mu g/m^3$); and

THQ = target noncancer hazard quotient (unitless).

Analogous to target risk level (TR), the selected target noncancer hazard quotient (THQ) has no impact on the calculated inhalation noncancer hazard; the target hazard "cancels out" of the calculation here in Equation 8.

To calculate the cancer risk and noncancer hazard associated with a non-detect result, the chemical concentration in sub-slab soil gas is assumed equal to one-half the laboratory reporting limit if the chemical was detected at least once in any of the six primary sub-slab soil gas samples, or is otherwise assumed to be zero.

The estimated cancer risk and noncancer hazard for each individual sub-slab soil gas sampling result, as calculated from Equations 7 and 8, are presented in Table 5.

6.3 Evaluation of Cumulative (Multi-chemical) Impacts

6.3.1 Cancer Risk

As a matter of policy, USEPA (1989) considers the potential cancer risks from exposure to multiple carcinogens to be additive, regardless of the carcinogens' mechanisms of toxicity or sites (organs of the body) of action. Therefore, the chemical-specific cancer risks calculated by Equation 7 may be summed across all carcinogenic COPCs to produce an estimate of the cumulative (multi-chemical) inhalation cancer risk associated with each sub-slab soil gas sample. This summation is presented in Table 5

The estimated cumulative (multi-chemical) cancer risk associated with each sub-slab soil gas sample may be compared to an acceptable cancer risk level, as defined and endorsed by relevant state and federal agencies. As noted above, the National Contingency Plan (NCP) is cited by USEPA (1989) as the basis for defining acceptable incremental (from a particular site) risk levels. According to the NCP, lifetime incremental (above background) cancer risk levels posed by a site should not exceed the risk range of 1×10^{-6} to 1×10^{-4}. Thus, USEPA and Cal/EPA agencies typically consider the 1×10^{-6} risk level to be an insignificant risk, and consider a calculated incremental cancer risk between 1×10^{-6} and 1×10^{-4} to be within the risk-management range. For commercial/industrial exposure scenarios, a typical point of departure with respect to risk-management decisions is a risk level of 1×10^{-5}; *i.e.*, if risks are at or below 1×10^{-5}, the agency of record will typically accept no further action. Additionally, California Proposition 65 identifies a cancer risk level of 1×10^{-5} as an acceptable risk level for a commercial/industrial exposure scenario.

The estimated cumulative (multi-chemical) inhalation cancer risk associated with each sub-slab soil gas sample is presented in Table 5. The estimated cumulative cancer risk ranges from a minimum of 2.1×10^{-7} at SSG-2 to a maximum of 9.0×10^{-7} at SSG-3. This narrow range (less than an order of magnitude) of estimated risk across the six samples can be attributed to the consistent detection of benzene in all samples. The estimated cumulative cancer risk is below the negligible risk level of 1×10^{-6} at every sampling location.

Benzene is the primary risk driver in five of the six samples, and is the secondary risk driver in the other. Benzene contributes between 39 and 61 percent of the total risk associated with the six samples. Naphthalene is the primary risk driver at SSG-4 (43 percent of total), which is the only location where it was detected. Given that non-detect results are assumed equal to one-half the laboratory reporting limit for those chemicals detected in at least one of the six primary samples, naphthalene is the secondary risk driver at four of the other five locations, even though it was not detected at any of them. Naphthalene contributes between 22 and 29 percent of the total risk in the four samples where it is the secondary risk driver. Based on an arbitrary risk threshold of 1.0×10^{-7}, *i.e.*, 10 percent of the negligible risk level of 1.0×10^{-6}, other chemicals which contribute significantly to cumulative risk in one or more samples are: 1,3-butadiene (at SSG-3, and SSG-4) and tetrachloroethene (SSG-3).

6.3.2 Noncancer Hazard

The chemical-specific noncancer hazard quotients calculated by Equation 8 may be summed across all COPCs to produce an estimate of the cumulative (multi-chemical) inhalation "hazard index" associated with each sub-slab soil gas sample. It should be noted here that the summation of hazard quotients across chemicals, independent of the target organ which is affected by each chemical, is conservative, as chemicals that impact different target organs (*e.g.*, liver, kidney) are not truly additive in their potential to cause the adverse impact. USEPA risk assessment guidance (USEPA, 1989) states, "application of the hazard index equation to a number of compounds that are not expected to induce the same type of effects or that do not act by the same mechanism could overestimate the potential for effects, although such an approach is appropriate at a screening level."

The estimated cumulative noncancer hazard index associated with each sub-slab soil gas sample is compared to the threshold noncancer hazard index of 1.0. A hazard index less than or equal to 1.0 indicates that the exposure is not likely to result in adverse noncancer health effects, even for sensitive populations (USEPA, 1989).

The estimated cumulative (multi-chemical) inhalation noncancer hazard index associated with each sub-slab soil gas sample is presented in Table 5. The estimated cumulative noncancer hazard index ranges from a minimum of 0.0094 at SSG-2 to a maximum of 0.12 at SSG-4, and thus is well below the threshold noncancer level of 1.0 at all locations.

6.4 Comparison to Results of Previous Vapor Intrusion Evaluation

The previous screening-level health risk evaluation of the site (Iris Environmental, 2009a) included an evaluation of potential vapor intrusion into the existing onsite building. That evaluation was based on maximum detected concentrations of VOCs in soil gas, considering the combined dataset from the 1999 and 2008 site soil gas investigations. Soil gas samples were collected at depths of 3 feet bgs and 5 feet bgs in the 1999 and 2008 investigations, respectively. That screening-level vapor intrusion health risk evaluation presented an estimated cancer risk and noncancer hazard index of 8.0×10^{-6} and 0.051, respectively, based on the soil gas data. Of note, the estimated hazard index of 0.051 did not include noncancer hazard effects associated with TPH-g mixture.

The range of cancer risk estimated here of 2.1×10^{-7} to 9.0×10^{-7}, based on the sub-slab soil gas data, is slightly lower than the previous risk estimate of 8.0×10^{-6} based on historical maximum soil gas concentrations. The range of noncancer hazard estimated here of 0.0094 to 0.12, based on the sub-slab soil gas data, is comparable to the previous hazard estimate of 0.051 based on historical maximum soil gas concentrations. Of note, TPH-g is the largest contributor to cumulative noncancer hazard associated with the sub-slab soil gas data, and was not included in the previous noncancer hazard estimate based on the soil gas data.

6.5 Field QA/QC Samples

6.5.1 Trip Blank

Trip blank results are presented in Table 5. All results are non-detect. These trip blank results do not indicate any issue with cross-contamination of the sample canisters.

6.5.2 Field Duplicate

Field duplicate results are presented in Table 5, and are compared to the associated primary sample results in Table 6. The relative percent difference (RPD) ranges from 0 to 75 percent across the 41 pairs of results. The 25-percent rule-of-thumb is exceeded for only four of the 41 analytes, none of which is a risk driver: hexane (RPD of 75 percent), 2-butanone (60 percent), ethanol (57 percent), and acetone (36 percent). The associated primary and duplicate results are in excellent agreement for the risk drivers indentified above: benzene (RPD of 0 percent), naphthalene (0 percent [both results are non-detect]), 1,3-butadiene (0 percent [both results are non-detect]), and tetrachloroethene (11 percent). In sum, these field duplicate results indicate that the overall variability in field sampling and laboratory analysis procedures is low.

7.0 UNCERTAINTIES

7.1 Inhalation Health Risk Evaluation

The development of risk-based target concentrations of volatile chemicals in indoor air, presented in Section 5.1, is based on conservative agency-recommended default assumptions regarding cancer and noncancer toxicity values and regarding commercial/industrial worker exposure assumptions. Per USEPA risk assessment methodology (1989), each parameter represents either a central or upper tendency, such that the combination of parameters results in estimation of a reasonable maximum exposure (RME) for the exposed population. Accordingly, actual inhalation exposures to volatile chemicals are likely to be lower than estimated here.

As noted in Section 6.3.2, chemical-specific noncancer hazard quotients are summed across chemicals to estimate the cumulative noncancer hazard index associated with a particular sub-slab soil gas sample, regardless of the target organ that is affected by each chemical. This approach is conservative, as chemicals that impact different target organs (*e.g.*, liver, kidney) are not truly additive in their potential to cause the adverse impact. USEPA risk assessment guidance (USEPA, 1989) states, "application of the hazard index equation to a number of compounds that are not expected to induce the same type of effects or that do not act by the same mechanism could overestimate the potential for effects, although such an approach is appropriate at a screening level." Accordingly, the actual potential for building occupants to develop noncancer health effects is likely to be lower than estimated here.

7.2 TPH-g Composition

As discussed in Section 5.1.2, TPH-g is a catch-all measurement that represents the summation of the concentrations of all detected hydrocarbon compounds in the gasoline range, *i.e.*, from C3 to C12. The concentrations of TPH-g measured in site sub-slab soil gas are not necessarily associated with gasoline fuel, however, as there are many hydrocarbons within this range that would be included in the quantitation of TPH-g that are not gasoline constituents. The evaluation of the noncancer health effects of TPH-g mixture is based on the conservative assumption that the mixture resembles fresh gasoline product, with respect to fractionation of the TPH-g mixture by compound structure (aliphatic vs. aromatic) and carbon number and with respect to toxicity; whereas the TPH-g measured at the site may not be related to gasoline at all, or may be related to highly weathered gasoline which would exhibit a different, and likely less toxic, speciation. The actual noncancer health hazard associated with inhalation of TPH-g is therefore likely to be lower than estimated here.

7.3 Attenuation Factor

As discussed in Section 5.2, it is assumed that the transport of volatile chemicals from sub-slab soil gas to the indoor air of the overlying building is occurring at an attenuation factor of 0.01, in accordance with DTSC vapor intrusion guidance (Cal/EPA, 2005b). The DTSC guidance notes that USEPA recommends a more conservative slab attenuation factor of 0.1, but that more recent empirical evidence suggests that slab attenuation factors may be closer to 0.01. Vapor intrusion transport modeling with the Johnson and Ettinger Model produces a slab attenuation factor of approximately 0.001 under default commercial/industrial modeling assumptions (Cal/EPA, 2009a). Thus, the DTSC-recommended value of 0.01 used here falls at the midpoint of the 0.1 value recommended by USEPA and the 0.001 value produced by the Johnson and Ettinger Model. While there is uncertainty regarding the degree of attenuation that is occurring across the building slab, it should be noted that there is less uncertainty than if soil gas data were collected at greater depths than sub-slab (*e.g.*, 3 or 5 feet below ground surface) or at locations not directly beneath the building. By collecting soil gas data from directly beneath the building slab, uncertainty associated with chemical transport through the soil zone is eliminated.

8.0 SUMMARY AND CONCLUSIONS

This report documents the methodology and results of a sub-slab soil gas investigation of the northwest portion of the former Carnation Dairy facility located at 1310 14th Street in Oakland, California (the "site"). Sub-slab soil gas sampling was performed at six locations beneath the building on January 6, 2009, in accordance with the ACEH-approved SAP (Iris Environmental, 2009b; ACEH, 2009b). Risk-based sub-slab soil gas screening levels are developed here in accordance with USEPA (2009a), OEHHA (Cal/EPA, 2005a), and DTSC (Cal/EPA, 2009a) inhalation risk assessment methodology and a DTSC-recommended slab attenuation factor (Cal/EPA, 2005b). Cancer- and noncancer-based screening levels are based on a target risk level of 1×10^{-6} and target noncancer quotient of 1.0, respectively. These risk-based screening levels are used to evaluate the results of sub-slab soil gas sampling conducted beneath the building.

The findings of the sub-slab soil gas data evaluation may be summarized as follows.

- No chemical was detected in any sample at a concentration exceeding its cancer-based or noncancer-based screening level.
- The estimated cumulative (multi-chemical) cancer risk ranges across the six primary sub-slab soil gas samples from a minimum of 2.1×10^{-7} at SSG-2 to a maximum of 9.0×10^{-7} at SSG-3. This narrow range (less than an order of magnitude) of estimated risk across the six samples can be generally attributed to the consistent detection of benzene in all samples. The estimated cumulative cancer risk is below the negligible risk level of 1×10^{-6} at every sampling location.
- The primary risk drivers at the site are benzene and naphthalene (note that naphthalene was detected in only one of six samples). Other chemicals which contribute significantly to cumulative risk in one or more samples are: 1,3-butadiene and tetrachloroethene.
- The estimated cumulative noncancer hazard index ranges from 0.0094 to 0.12 across the six primary sub-slab soil gas samples, and thus is below the threshold noncancer level of 1.0 at all locations.

In conclusion, the concentrations of volatile chemicals detected in sub-slab soil gas beneath the existing unoccupied commercial/industrial building during the January 2010 site investigation are below levels of concern with respect to potential vapor intrusion into the building. These results are consistent with the previous screening-level vapor intrusion evaluation of the building (Iris Environmental, 2009a), which was based on soil gas data previously collected at the site in 1999 and 2008.

9.0 REFERENCES

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Table 1. Cancer and Noncancer Toxicity Values

Chemical of Potential Concern	Unit Risk Factor (URF)		Reference Concentration (RfC)	
	Value (per µg/m^3)	Source	Value (µg/m^3)	Source
Total Petroleum Hydrocarbons (TPH)				
Aliphatic C5-C8	NC	NC	7.0E+02	5
Aliphatic C9-C18	NC	NC	3.0E+02	5
Aromatic C9-C16	NC	NC	5.0E+01	5
Volatile Organic Compounds (VOCs)				
Acetone	NC	NC	3.1E+04	3
Benzene	2.9E-05	1	3.0E+01	2
1,3-Butadiene	1.7E-04	1	2.0E+00	2
2-Butanone (methyl ethyl ketone)	NC	NC	5.0E+03	2
Carbon disulfide	NC	NC	7.0E+02	2
Chlorobenzene	NC	NC	1.0E+03	1
Chloroform	5.3E-06	1	3.0E+02	1
Chloromethane (methyl chloride)	NC	NC	9.0E+01	2
Cyclohexane	NC	NC	6.0E+03	2
1,2-Dichlorobenzene	NC	NC	2.0E+02	3
1,3-Dichlorobenzene	NC	NC	1.1E+02	4R
1,4-Dichlorobenzene	1.1E-05	1	8.0E+02	1
Dichlorodifluoromethane (Freon 12)	NC	NC	2.0E+02	3
1,1-Dichloroethane (1,1-DCA)	1.6E-06	1	7.0E+02	3R
1,2-Dichloroethane (1,2-DCA)	2.1E-05	1	4.0E+02	1
1,1-Dichloroethene (1,1-DCE)	NC	NC	7.0E+01	1
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	NC	3.5E+01	2R
1,4-Dioxane	7.7E-06	1	3.0E+03	1
Ethanol	NC	NC	1.1E+03	2b R
Ethylbenzene	2.5E-06	1	1.0E+03	2
4-Ethyltoluene	NC	NC	1.0E+02	2c
Heptane	NC	NC	7.0E+02	2d
Hexane	NC	NC	7.0E+02	2
Methyl tertiary butyl ether (MTBE)	2.6E-07	1	3.0E+03	2

Table 1. Cancer and Noncancer Toxicity Values

	Unit Risk Factor (URF)		Reference Concentration (RfC)	
Chemical of Potential Concern	Value (per $\mu g/m^3$)	Source	Value ($\mu g/m^3$)	Source
Methylene chloride	1.0E-06	1	4.0E+02	1
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	NC	3.0E+03	2
Naphthalene	3.4E-05	1	3.0E+00	2
2-Propanol (isopropanol)	NC	NC	7.0E+03	1
Styrene	NC	NC	9.0E+02	1
Tetrachloroethene (PCE)	5.9E-06	1	3.5E+01	1
Tetrahydrofuran	2.0E-06	6	3.0E+03	6
Toluene	NC	NC	3.0E+02	1
1,1,1-Trichloroethane (1,1,1-TCA)	NC	NC	1.0E+03	1
Trichloroethene (TCE)	2.0E-06	1	6.0E+02	1
Trichlorofluoromethane (Freon 11)	NC	NC	7.0E+02	3
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 11	NC	NC	3.0E+04	3
1,2,4-Trimethylbenzene	NC	NC	7.0E+00	3
1,3,5-Trimethylbenzene	NC	NC	3.5E+01	3R
m-,p-Xylene	NC	NC	1.0E+02	2
o-Xylene	NC	NC	1.0E+02	2

Notes:

(a) Sources of toxicity data are as follows.

1 – *OEHHA Toxicity Criteria Database* (Cal/EPA, 2010)
2 – *Integrated Risk Information System* (IRIS) (USEPA, 2010)
3 – *Regional Screening Levels for Chemical Contaminants at Superfund Sites* (USEPA, 2009b)
4 – *USEPA Region 9 PRG Table* (USEPA, 2004)
5 – *Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH)* (Cal/EPA, 2009b)
6 – Tetrahydrofuran toxicological values were derived from *Draft Toxicological Review of Tetrahydrofuran (USEPA, 2007).*
R – Route-to-route extrapolation

(b) Isobutanol was used as the surrogate for ethanol's inhalation noncancer reference dose.

(c) Xylene was used as the surrogate for 4-ethyltoluene's inhalation noncancer reference dose.

(d) Hexane was used as the surrogate for heptane's inhalation noncancer reference dose.

(e) "NC" indicates that the chemical is classified as a noncarcinogen for the inhalation pathway.

Table 2. Commercial/Industrial Worker Exposure Assumptions

Parameter	Symbol	Value	Units
Exposure frequency	EF	250	d/yr
Exposure duration	ED	25	yr
Exposure time	ET	8	hr/d
Averaging time for carcinogenic effects	AT_c	613,200	hr
Averaging time for noncarcinogenic effects	AT_{nc}	219,000	hr
Target cancer risk	TR	1.0E-06	none
Target noncancer hazard quotient	THQ	1.0	none

Notes:

(1) Exposure assumptions are default values for the commercial/industrial scenario recommended by OEHHA (Cal/EPA, 2005a), DTSC/HERD (Cal/EPA, 2005c; 2009a), and USEPA (2009a).

Table 3. Risk-based Target Indoor Air Concentrations

Chemical of Potential Concern	Cancer-based Target Concentration (CA_c) (μg/m^3)	Noncancer-based Target Concentration (CA_{nc}) (μg/m^3)	Controlling Target Concentration (CA) (μg/m^3)
Total Petroleum Hydrocarbons (TPH)			
Aliphatic C5-C8	NC	2.5E+04	2.5E+04
Aliphatic C9-C18	NC	1.1E+04	1.1E+04
Aromatic C9-C16	NC	1.8E+03	1.8E+03
TPH-g	NC	1.0E+04	1.0E+04
Volatile Organic Compounds (VOCs)			
Acetone	NC	1.1E+06	1.1E+06
Benzene	3.4E+00	1.1E+03	3.4E+00
1,3-Butadiene	5.8E-01	7.0E+01	5.8E-01
2-Butanone (methyl ethyl ketone)	NC	1.8E+05	1.8E+05
Carbon disulfide	NC	2.5E+04	2.5E+04
Chlorobenzene	NC	3.5E+04	3.5E+04
Chloroform	1.9E+01	1.1E+04	1.9E+01
Chloromethane (methyl chloride)	NC	3.2E+03	3.2E+03
Cyclohexane	NC	2.1E+05	2.1E+05
1,2-Dichlorobenzene	NC	7.0E+03	7.0E+03
1,3-Dichlorobenzene	NC	3.7E+03	3.7E+03
1,4-Dichlorobenzene	8.9E+00	2.8E+04	8.9E+00
Dichlorodifluoromethane (Freon 12)	NC	7.0E+03	7.0E+03
1,1-Dichloroethane (1,1-DCA)	6.1E+01	2.5E+04	6.1E+01
1,2-Dichloroethane (1,2-DCA)	4.7E+00	1.4E+04	4.7E+00
1,1-Dichloroethene (1,1-DCE)	NC	2.5E+03	2.5E+03
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	1.2E+03	1.2E+03
1,4-Dioxane	1.3E+01	1.1E+05	1.3E+01
Ethanol	NC	3.7E+04	3.7E+04
Ethylbenzene	3.9E+01	3.5E+04	3.9E+01
4-Ethyltoluene	NC	3.5E+03	3.5E+03
Heptane	NC	2.5E+04	2.5E+04
Hexane	NC	2.5E+04	2.5E+04

Table 3. Risk-based Target Indoor Air Concentrations

Chemical of Potential Concern	Cancer-based Target Concentration (CA_c) (µg/m^3)	Noncancer-based Target Concentration (CA_{nc}) (µg/m^3)	Controlling Target Concentration (CA) (µg/m^3)
Methyl tertiary butyl ether (MTBE)	3.8E+02	1.1E+05	3.8E+02
Methylene chloride	9.8E+01	1.4E+04	9.8E+01
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	1.1E+05	1.1E+05
Naphthalene	2.9E+00	1.1E+02	2.9E+00
2-Propanol (isopropanol)	NC	2.5E+05	2.5E+05
Styrene	NC	3.2E+04	3.2E+04
Tetrachloroethene (PCE)	1.7E+01	1.2E+03	1.7E+01
Tetrahydrofuran	4.9E+01	1.1E+05	4.9E+01
Toluene	NC	1.1E+04	1.1E+04
1,1,1-Trichloroethane (1,1,1-TCA)	NC	3.5E+04	3.5E+04
Trichloroethene (TCE)	4.9E+01	2.1E+04	4.9E+01
Trichlorofluoromethane (Freon 11)	NC	2.5E+04	2.5E+04
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	1.1E+06	1.1E+06
1,2,4-Trimethylbenzene	NC	2.5E+02	2.5E+02
1,3,5-Trimethylbenzene	NC	1.2E+03	1.2E+03
m-,p-Xylene	NC	3.5E+03	3.5E+03
o-Xylene	NC	3.5E+03	3.5E+03

Notes:

(1) Risk-based target indoor air concentrations are developed here in accordance with USEPA (2009a), OEHHA (Cal/EPA, 2005a), and DTSC (Cal/EPA, 2009a) inhalation risk assessment methodology and guidance.

(2) Cancer-based and noncancer-based target concentrations are based on a target risk of 1.0×10^{-6} and target hazard quotient of 1.0, respectively; and commercial/industrial land use.

(3) "NC" indicates that the chemical is classified as a noncarcinogen for the inhalation pathway.

(4) The noncancer-based target concentration for TPH-g is calculated as a weighted average of the noncancer-based target concentrations for the TPH-g subgroups (C5-C8 aliphatics, etc.). See Section 5.1.2 of the text for details.

Table 4. Risk-based Sub-slab Soil Gas Screening Levels

Chemical of Potential Concern	Cancer-based Sub-slab Soil Gas Screening Level ($SL_{SSSG,c}$) (μg/m^3)	Noncancer-based Sub-slab Soil Gas Screening Level ($SL_{SSSG,nc}$) (μg/m^3)	Controlling Sub-slab Soil Gas Screening Level (SL_{SSSG}) (μg/m^3)
Total Petroleum Hydrocarbons (TPH)			
TPH-g	NC	1.3E+05	1.3E+05
Volatile Organic Compounds (VOCs)			
Acetone	NC	1.4E+07	1.4E+07
Benzene	4.2E+01	1.3E+04	4.2E+01
1,3-Butadiene	7.2E+00	8.8E+02	7.2E+00
2-Butanone (methyl ethyl ketone)	NC	2.2E+06	2.2E+06
Carbon disulfide	NC	3.1E+05	3.1E+05
Chlorobenzene	NC	4.4E+05	4.4E+05
Chloroform	2.3E+02	1.3E+05	2.3E+02
Chloromethane (methyl chloride)	NC	3.9E+04	3.9E+04
Cyclohexane	NC	2.6E+06	2.6E+06
1,2-Dichlorobenzene	NC	8.8E+04	8.8E+04
1,3-Dichlorobenzene	NC	4.6E+04	4.6E+04
1,4-Dichlorobenzene	1.1E+02	3.5E+05	1.1E+02
Dichlorodifluoromethane (Freon 12)	NC	8.8E+04	8.8E+04
1,1-Dichloroethane (1,1-DCA)	7.7E+02	3.1E+05	7.7E+02
1,2-Dichloroethane (1,2-DCA)	5.8E+01	1.8E+05	5.8E+01
1,1-Dichloroethene (1,1-DCE)	NC	3.1E+04	3.1E+04
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	1.5E+04	1.5E+04
1,4-Dioxane	1.6E+02	1.3E+06	1.6E+02
Ethanol	NC	4.6E+05	4.6E+05
Ethylbenzene	4.9E+02	4.4E+05	4.9E+02
4-Ethyltoluene	NC	4.4E+04	4.4E+04
Heptane	NC	3.1E+05	3.1E+05
Hexane	NC	3.1E+05	3.1E+05
Methyl tertiary butyl ether (MTBE)	4.7E+03	1.3E+06	4.7E+03
Methylene chloride	1.2E+03	1.8E+05	1.2E+03
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	1.3E+06	1.3E+06

Table 4. Risk-based Sub-slab Soil Gas Screening Levels

Chemical of Potential Concern	Cancer-based Sub-slab Soil Gas Screening Level ($SL_{SSSG,c}$) (µg/m^3)	Noncancer-based Sub-slab Soil Gas Screening Level ($SL_{SSSG,nc}$) (µg/m^3)	Controlling Sub-slab Soil Gas Screening Level (SL_{SSSG}) (µg/m^3)
Naphthalene	3.6E+01	1.3E+03	3.6E+01
2-Propanol (isopropanol)	NC	3.1E+06	3.1E+06
Styrene	NC	3.9E+05	3.9E+05
Tetrachloroethene (PCE)	2.1E+02	1.5E+04	2.1E+02
Tetrahydrofuran	6.1E+02	1.3E+06	6.1E+02
Toluene	NC	1.3E+05	1.3E+05
1,1,1-Trichloroethane (1,1,1-TCA)	NC	4.4E+05	4.4E+05
Trichloroethene (TCE)	6.1E+02	2.6E+05	6.1E+02
Trichlorofluoromethane (Freon 11)	NC	3.1E+05	3.1E+05
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	1.3E+07	1.3E+07
1,2,4-Trimethylbenzene	NC	3.1E+03	3.1E+03
1,3,5-Trimethylbenzene	NC	1.5E+04	1.5E+04
m-,p-Xylene	NC	4.4E+04	4.4E+04
o-Xylene	NC	4.4E+04	4.4E+04

Notes:

(1) Each risk-based sub-slab soil gas screening level is calculated from 1) the risk-based target concentration of the chemical in indoor air (see Table 3) and 2) the DTSC-recommended (Cal/EPA, 2005b) default slab attenuation factor of 0.01:

$SL_{SSSG,c} = CA_c / \alpha$

$SL_{SSSG,nc} = CA_{nc} / \alpha$

(2) Cancer-based and noncancer-based screening levels are based on a target risk of $1.0\text{x}10^{-6}$ and target hazard quotient of 1.0, respectively; and commercial/industrial land use.

(3) "NC" = noncarcinogenic.

Table 5. Results of Sub-slab Soil Gas Investigation

	Risk-based Sub-slab Soil Gas Screening Level		Primary Sample Results																		QA/QC Sample Results	
			SSG-1			SSG-2			SSG-3			SSG-4			SSG-5			SSG-6			Trip Blank	SSG-2-DUP
Chemical of Potential Concern	Cancer (μg/m^3)	Noncancer (μg/m^3)	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Result (μg/m^3)
TPH-g	NC	1.3E+05	1,200	NC	9.5E-03	600	NC	4.7E-03	3,600	NC	2.8E-02	12,000	NC	9.5E-02	1,500	NC	1.2E-02	1,900	NC	1.5E-02	< 8.2	580
Acetone	NC	1.4E+07	43	NC	3.2E-06	30	NC	2.2E-06	340 E	NC	2.5E-05	40	NC	2.9E-06	210	NC	1.5E-05	48	NC	3.5E-06	< 1.2	43
Benzene	4.2E+01	1.3E+04	6.5	1.5E-07	4.9E-04	4.3	1.0E-07	3.3E-04	20	4.7E-07	1.5E-03	14	3.3E-07	1.1E-03	13	3.1E-07	9.9E-04	5.1	1.2E-07	3.9E-04	< 0.32	4.3
1,3-Butadiene	7.2E+00	8.8E+02	< 0.34	2.4E-08	1.9E-04	< 0.36	2.5E-08	2.1E-04	0.92	1.3E-07	1.1E-03	0.78	1.1E-07	8.9E-04	< 0.72	5.0E-08	4.1E-04	< 0.34	2.4E-08	1.9E-04	< 0.22	< 0.36
2-Butanone (methyl ethyl ketone)	NC	2.2E+06	7.5	NC	3.4E-06	2.8	NC	1.3E-06	14	NC	6.4E-06	4.9	NC	2.2E-06	6.4	NC	2.9E-06	6.2	NC	2.8E-06	< 0.29	5.2
Carbon disulfide	NC	3.1E+05	< 2.4	NC	3.9E-06	< 2.5	NC	4.1E-06	2.6	NC	8.5E-06	< 2.5	NC	4.1E-06	< 5.1	NC	8.3E-06	< 2.4	NC	3.9E-06	< 1.6	< 2.6
Chlorobenzene	NC	4.4E+05	< 0.70	NC/ND	ND	< 0.75	NC/ND	ND	< 0.71	NC/ND	ND	< 0.74	NC/ND	ND	< 1.5	NC/ND	ND	< 0.70	NC/ND	ND	< 0.46	< 0.76
Chloroform	2.3E+02	1.3E+05	< 0.74	ND	ND	< 0.80	ND	ND	< 0.76	ND	ND	< 0.79	ND	ND	< 1.6	ND	ND	< 0.75	ND	ND	< 0.49	< 0.80
Chloromethane (methyl chloride)	NC	3.9E+04	< 0.31	NC	3.9E-06	< 0.34	NC	4.3E-06	0.38	NC	9.6E-06	< 0.33	NC	4.2E-06	< 0.67	NC	8.5E-06	< 0.32	NC	4.1E-06	< 0.21	< 0.34
Cyclohexane	NC	2.6E+06	2.8	NC	1.1E-06	< 0.56	NC	1.1E-07	2.8	NC	1.1E-06	160	NC	6.1E-05	2.9	NC	1.1E-06	1.4	NC	5.3E-07	< 0.34	< 0.57
1,2-Dichlorobenzene	NC	8.8E+04	< 0.91	NC/ND	ND	< 0.98	NC/ND	ND	< 0.93	NC/ND	ND	< 0.97	NC/ND	ND	< 2.0	NC/ND	ND	< 0.92	NC/ND	ND	< 0.60	< 0.99
1,3-Dichlorobenzene	NC	4.6E+04	< 0.91	NC/ND	ND	< 0.98	NC/ND	ND	< 0.93	NC/ND	ND	< 0.97	NC/ND	ND	< 2.0	NC/ND	ND	< 0.92	NC/ND	ND	< 0.60	< 0.99
1,4-Dichlorobenzene	1.1E+02	3.5E+05	< 0.91	ND	ND	< 0.98	ND	ND	< 0.93	ND	ND	< 0.97	ND	ND	< 2.0	ND	ND	< 0.92	ND	ND	< 0.60	< 0.99
Dichlorodifluoromethane (Freon 12)	NC	8.8E+04	8.1	NC	9.2E-05	2.6	NC	3.0E-05	3.0	NC	3.4E-05	2.4	NC	2.7E-05	2.6	NC	3.0E-05	2.2	NC	2.5E-05	< 0.49	2.5
1,1-Dichloroethane (1,1-DCA)	7.7E+02	3.1E+05	< 0.62	ND	ND	< 0.66	ND	ND	< 0.63	ND	ND	< 0.65	ND	ND	< 1.3	ND	ND	< 0.62	ND	ND	< 0.40	< 0.67
1,2-Dichloroethane (1,2-DCA)	5.8E+01	1.8E+05	< 0.62	ND	ND	< 0.66	ND	ND	< 0.63	ND	ND	< 0.65	ND	ND	< 1.3	ND	ND	< 0.62	ND	ND	< 0.40	< 0.67
1,1-Dichloroethene (1,1-DCE)	NC	3.1E+04	< 0.60	NC/ND	ND	< 0.65	NC/ND	ND	< 0.61	NC/ND	ND	< 0.64	NC/ND	ND	< 1.3	NC/ND	ND	< 0.61	NC/ND	ND	< 0.40	< 0.65
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	1.5E+04	< 0.60	NC/ND	ND	< 0.65	NC/ND	ND	< 0.61	NC/ND	ND	< 0.64	NC/ND	ND	< 1.3	NC/ND	ND	< 0.61	NC/ND	ND	< 0.40	< 0.65
1,4-Dioxane	1.6E+02	1.3E+06	< 0.55	1.7E-09	2.1E-07	< 0.59	1.9E-09	2.2E-07	< 0.56	1.8E-09	2.1E-07	< 0.58	1.8E-09	2.2E-07	1.7	1.1E-08	1.3E-06	< 0.55	1.7E-09	2.1E-07	< 0.36	< 0.59
Ethanol	NC	4.6E+05	3.6	NC	7.8E-06	1.9	NC	4.1E-06	6.1	NC	1.3E-05	2.9	NC	6.3E-06	13	NC	2.8E-05	2.0	NC	4.3E-06	< 0.94	3.4
Ethylbenzene	4.9E+02	4.4E+05	7.2	1.5E-08	1.6E-05	2.2	4.5E-09	5.0E-06	14	2.9E-08	3.2E-05	18	3.7E-08	4.1E-05	5.5	1.1E-08	1.3E-05	6.3	1.3E-08	1.4E-05	< 0.43	2.2
4-Ethyltoluene	NC	4.4E+04	22	NC	5.0E-04	3.5	NC	8.0E-05	32	NC	7.3E-04	34	NC	7.8E-04	4.8	NC	1.1E-04	7.3	NC	1.7E-04	< 0.49	3.0
Heptane	NC	3.1E+05	2.5	NC	8.2E-06	< 0.67	NC	1.1E-06	2.4	NC	7.8E-06	420 E	NC	1.4E-03	2.7	NC	8.8E-06	1.6	NC	5.2E-06	< 0.41	< 0.68
Hexane	NC	3.1E+05	2.2	NC	7.2E-06	0.64	NC	2.1E-06	2.9	NC	9.5E-06	390 E	NC	1.3E-03	2.7	NC	8.8E-06	1.9	NC	6.2E-06	< 0.35	< 0.58
Methyl tertiary butyl ether (MTBE)	4.7E+03	1.3E+06	< 0.55	ND	ND	< 0.59	ND	ND	< 0.56	ND	ND	< 0.58	ND	ND	< 1.2	ND	ND	< 0.55	ND	ND	< 0.36	< 0.59
Methylene chloride	1.2E+03	1.8E+05	1.2	9.8E-10	6.8E-06	< 1.1	4.5E-10	3.1E-06	1.9	1.5E-09	1.1E-05	< 1.1	4.5E-10	3.1E-06	< 2.3	9.4E-10	6.6E-06	1.4	1.1E-09	8.0E-06	< 0.69	< 1.1
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	1.3E+06	2.2	NC	1.7E-06	0.79	NC	6.0E-07	4.6	NC	3.5E-06	< 0.66	NC	2.5E-07	2.3	NC	1.8E-06	< 0.63	NC	2.4E-07	< 0.41	1.0
Naphthalene	3.6E+01	1.3E+03	< 4.0	5.5E-08	1.5E-03	< 4.3	6.0E-08	1.6E-03	< 4.1	5.7E-08	1.6E-03	13	3.6E-07	9.9E-03	< 8.5	1.2E-07	3.2E-03	< 4.0	5.5E-08	1.5E-03	< 2.6	< 4.3
2-Propanol (isopropanol)	NC	3.1E+06	< 1.9	NC	3.1E-07	< 2.0	NC	3.3E-07	2.9	NC	9.5E-07	< 2.0	NC	3.3E-07	4.7	NC	1.5E-06	< 1.9	NC	3.1E-07	< 1.2	< 2.0
Styrene	NC	3.9E+05	< 0.65	NC	8.2E-07	< 0.69	NC	8.8E-07	1.9	NC	4.8E-06	< 0.68	NC	8.6E-07	< 1.4	NC	1.8E-06	< 0.65	NC	8.2E-07	< 0.42	< 0.70
Tetrachloroethene (PCE)	2.1E+02	1.5E+04	< 1.0	2.4E-09	3.3E-05	2.7	1.3E-08	1.8E-04	44	2.1E-07	2.9E-03	< 1.1	2.6E-09	3.6E-05	< 2.2	5.3E-09	7.2E-05	5.4	2.6E-08	3.5E-04	< 0.68	3.0
Tetrahydrofuran	6.1E+02	1.3E+06	< 2.2	ND	ND	< 2.4	ND	ND	< 2.3	ND	ND	< 2.4	ND	ND	< 4.8	ND	ND	< 2.2	ND	ND	< 1.5	< 2.4
Toluene	NC	1.3E+05	54	NC	4.1E-04	9.0	NC	6.8E-05	69	NC	5.3E-04	42	NC	3.2E-04	28	NC	2.1E-04	69	NC	5.3E-04	< 0.38	8.9
1,1,1-Trichloroethane (1,1,1-TCA)	NC	4.4E+05	< 0.83	NC/ND	ND	< 0.89	NC/ND	ND	< 0.84	NC/ND	ND	< 0.88	NC/ND	ND	< 1.8	NC/ND	ND	< 0.83	NC/ND	ND	< 0.54	< 0.90
Trichloroethene (TCE)	6.1E+02	2.6E+05	< 0.82	6.7E-10	1.6E-06	< 0.88	7.2E-10	1.7E-06	< 0.83	6.8E-10	1.6E-06	< 0.86	7.0E-10	1.6E-06	< 1.8	1.5E-09	3.4E-06	7.8	1.3E-08	3.0E-05	< 0.54	< 0.89
Trichlorofluoromethane (Freon 11)	NC	3.1E+05	2.1	NC	6.8E-06	1.2	NC	3.9E-06	< 0.87	NC	1.4E-06	18	NC	5.9E-05	2.0	NC	6.5E-06	41	NC	1.3E-04	< 0.56	1.2
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	1.3E+07	< 1.2	NC	4.6E-08	< 1.2	NC	4.6E-08	< 1.2	NC	4.6E-08	< 1.2	NC	4.6E-08	< 2.5	NC	9.5E-08	2.1	NC	1.6E-07	< 0.77	< 1.3
1,2,4-Trimethylbenzene	NC	3.1E+03	26	NC	8.5E-03	4.7	NC	1.5E-03	35	NC	1.1E-02	29	NC	9.5E-03	5.9	NC	1.9E-03	5.7	NC	1.9E-03	< 0.49	4.6
1,3,5-Trimethylbenzene	NC	1.5E+04	8.0	NC	5.2E-04	2.0	NC	1.3E-04	13	NC	8.5E-04	10	NC	6.5E-04	2.4	NC	1.6E-04	2.7	NC	1.8E-04	< 0.49	1.9
m-,p-Xylene	NC	4.4E+04	33	NC	7.5E-04	12	NC	2.7E-04	65	NC	1.5E-03	83	NC	1.9E-03	21	NC	4.8E-04	21	NC	4.8E-04	< 0.43	12
o-Xylene	NC	4.4E+04	13	NC	3.0E-04	6.0	NC	1.4E-04	25	NC	5.7E-04	29	NC	6.6E-04	7.0	NC	1.6E-04	6.1	NC	1.4E-04	< 0.43	5.3
Cumulative (multi-chemical)				**2.5E-07**	**2.3E-02**		**2.1E-07**	**9.4E-03**		**9.0E-07**	**5.1E-02**		**8.4E-07**	**1.2E-01**		**5.0E-07**	**2.0E-02**		**2.5E-07**	**2.1E-02**		

Table 5. Results of Sub-slab Soil Gas Investigation

	Risk-based Sub-slab Soil Gas Screening Level		Primary Sample Results																		QA/QC Sample Results	
			SSG-1			SSG-2			SSG-3			SSG-4			SSG-5			SSG-6			Trip Blank	SSG-2-DUP
Chemical of Potential Concern	Cancer (μg/m^3)	Noncancer (μg/m^3)	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Risk	Hazard	Result (μg/m^3)	Result (μg/m^3)

Notes:

(1) Laboratory data qualifying flags are as follows:

E = Exceeds instrument calibration range.

(2) "NC" indicates that the chemical is classified as a noncarcinogen for the inhalation pathway. "ND" indicates the chemical was not detected in any primary sub-slab soil gas sample.

Table 6. Evaluation of Field Duplicate Results

	SSG-2		
Chemical	Primary ($\mu g/m^3$)	Duplicate ($\mu g/m^3$)	RPD (%)
TPH-g	600	580	3.4%
Acetone	30	43	35.6%
Benzene	4.3	4.3	0.0%
1,3-Butadiene	< 0.36	< 0.36	ND
2-Butanone (methyl ethyl ketone)	2.8	5.2	60.0%
Carbon disulfide	< 2.5	< 2.6	ND
Chlorobenzene	< 0.75	< 0.76	ND
Chloroform	< 0.80	< 0.80	ND
Chloromethane (methyl chloride)	< 0.34	< 0.34	ND
Cyclohexane	< 0.56	< 0.57	ND
1,2-Dichlorobenzene	< 0.98	< 0.99	ND
1,3-Dichlorobenzene	< 0.98	< 0.99	ND
1,4-Dichlorobenzene	< 0.98	< 0.99	ND
Dichlorodifluoromethane (Freon 12)	2.6	2.5	3.9%
1,1-Dichloroethane (1,1-DCA)	< 0.66	< 0.67	ND
1,2-Dichloroethane (1,2-DCA)	< 0.66	< 0.67	ND
1,1-Dichloroethene (1,1-DCE)	< 0.65	< 0.65	ND
cis-1,2-Dichloroethene (cis-1,2-DCE)	< 0.65	< 0.65	ND
1,4-Dioxane	< 0.59	< 0.59	ND
Ethanol	1.9	3.4	56.6%
Ethylbenzene	2.2	2.2	0.0%
4-Ethyltoluene	3.5	3.0	15.4%
Heptane	< 0.67	< 0.68	ND
Hexane	0.64	< 0.58	75.3%
Methyl tertiary butyl ether (MTBE)	< 0.59	< 0.59	ND
Methylene chloride	< 1.1	< 1.1	ND
4-Methyl-2-pentanone (methyl isobutyl ketone)	0.79	1.0	23.5%
Naphthalene	< 4.3	< 4.3	ND
2-Propanol (isopropanol)	< 2.0	< 2.0	ND
Styrene	< 0.69	< 0.70	ND
Tetrachloroethene (PCE)	2.7	3.0	10.5%

Table 6. Evaluation of Field Duplicate Results

	SSG-2		
Chemical	Primary ($\mu g/m^3$)	Duplicate ($\mu g/m^3$)	RPD (%)
Tetrahydrofuran	< 2.4	< 2.4	ND
Toluene	9.0	8.9	1.1%
1,1,1-Trichloroethane (1,1,1-TCA)	< 0.89	< 0.90	ND
Trichloroethene (TCE)	< 0.88	< 0.89	ND
Trichlorofluoromethane (Freon 11)	1.2	1.2	0.0%
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	< 1.2	< 1.3	ND
1,2,4-Trimethylbenzene	4.7	4.6	2.2%
1,3,5-Trimethylbenzene	2.0	1.9	5.1%
m-,p-Xylene	12	12	0.0%
o-Xylene	6.0	5.3	12.4%

<u>Notes:</u>

(1) Shown is the relative percent different (RPD) between primary and field duplicate sample results, where RPD is calculated as follows.

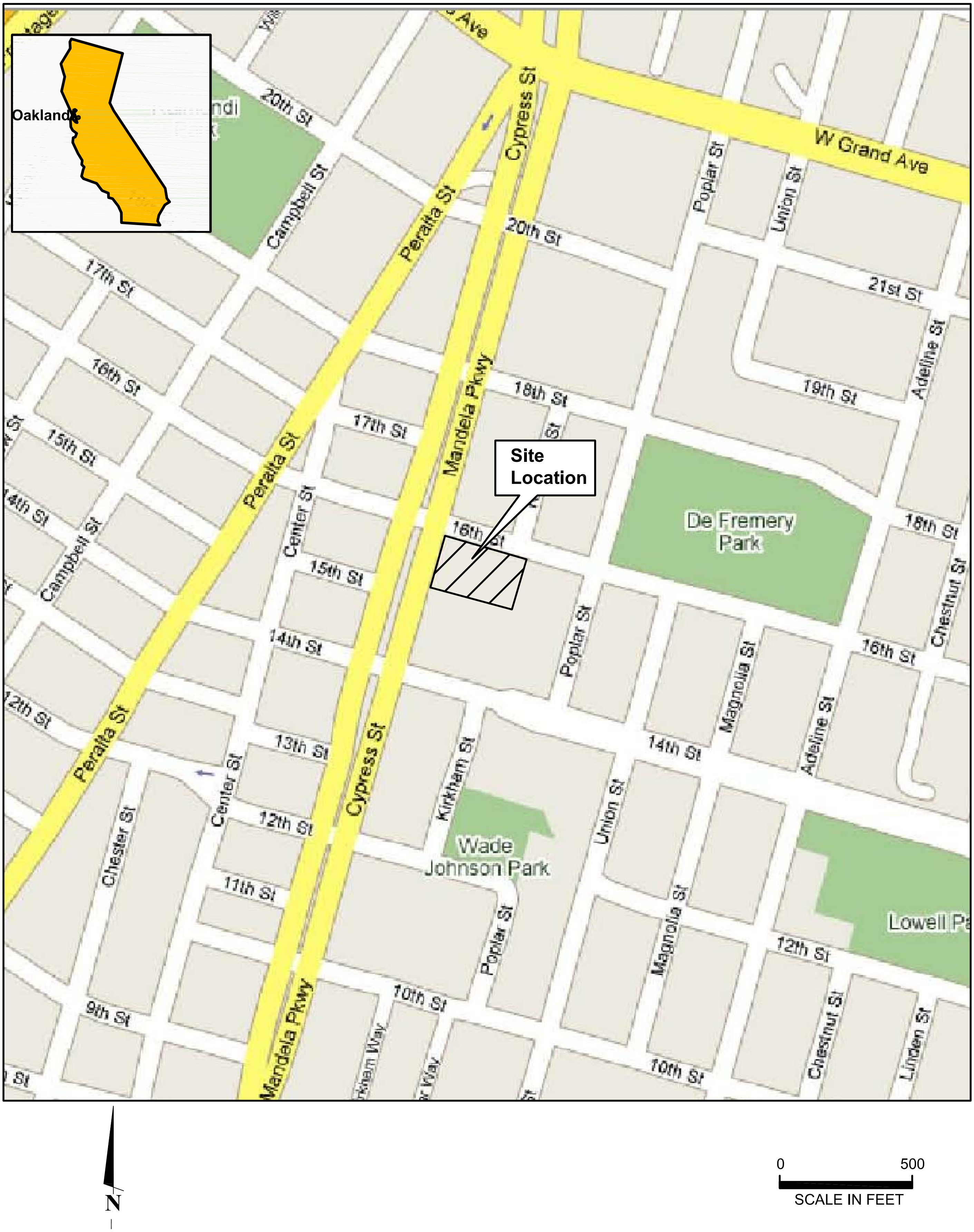
`RPD = 100% × ABS [ 2 × ( D1 - D2 ) / ( D1 + D2 ) ]`

where:

RPD = relative percent difference (%);

D1 = primary sample result ($\mu g/m^3$); and

D2 = field duplicate sample result ($\mu g/m^3$).



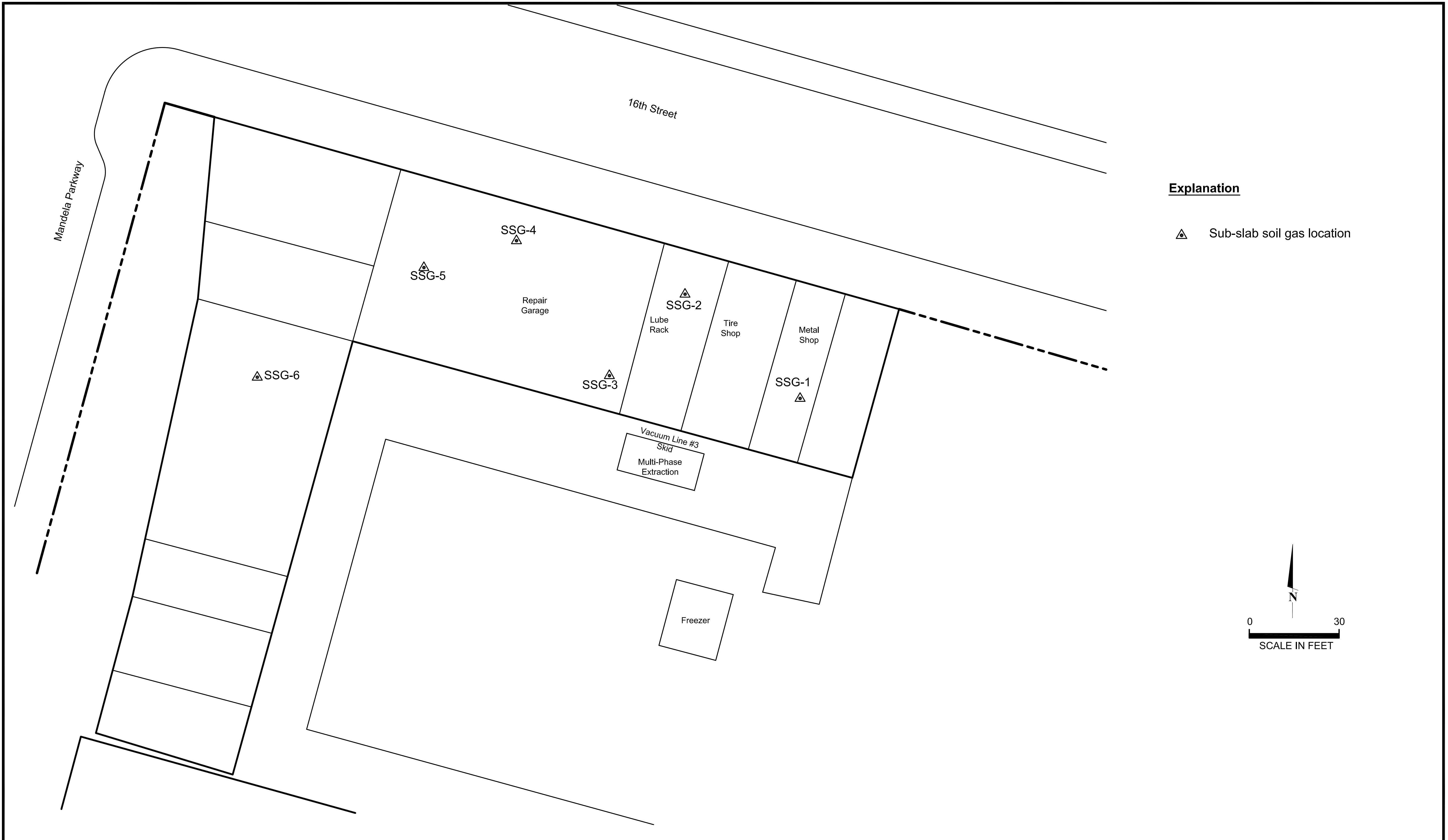
IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
Ph. (510) 834-4747 Fax: (510) 834-4199

Site Location Map
Sub-slab Soil Gas Sampling and Analysis Report
1310 14th Street, Oakland, California

Figure
1

Drafter: EC
Date: 11/12/08
Contract Number: 07-557-A

I:\CAD\07\07-557-A\Site location map.dwg



IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
Ph. (510) 834-4747 Fax: (510) 834-4199

Sub-slab Soil Gas Sampling Locations
Sub-slab Soil Gas Sampling and Analysis Report
1310 14th Street, Oakland, California

Figure
2

Drafter: EC
Date: 01/25/10
Contract Number: 07-557B

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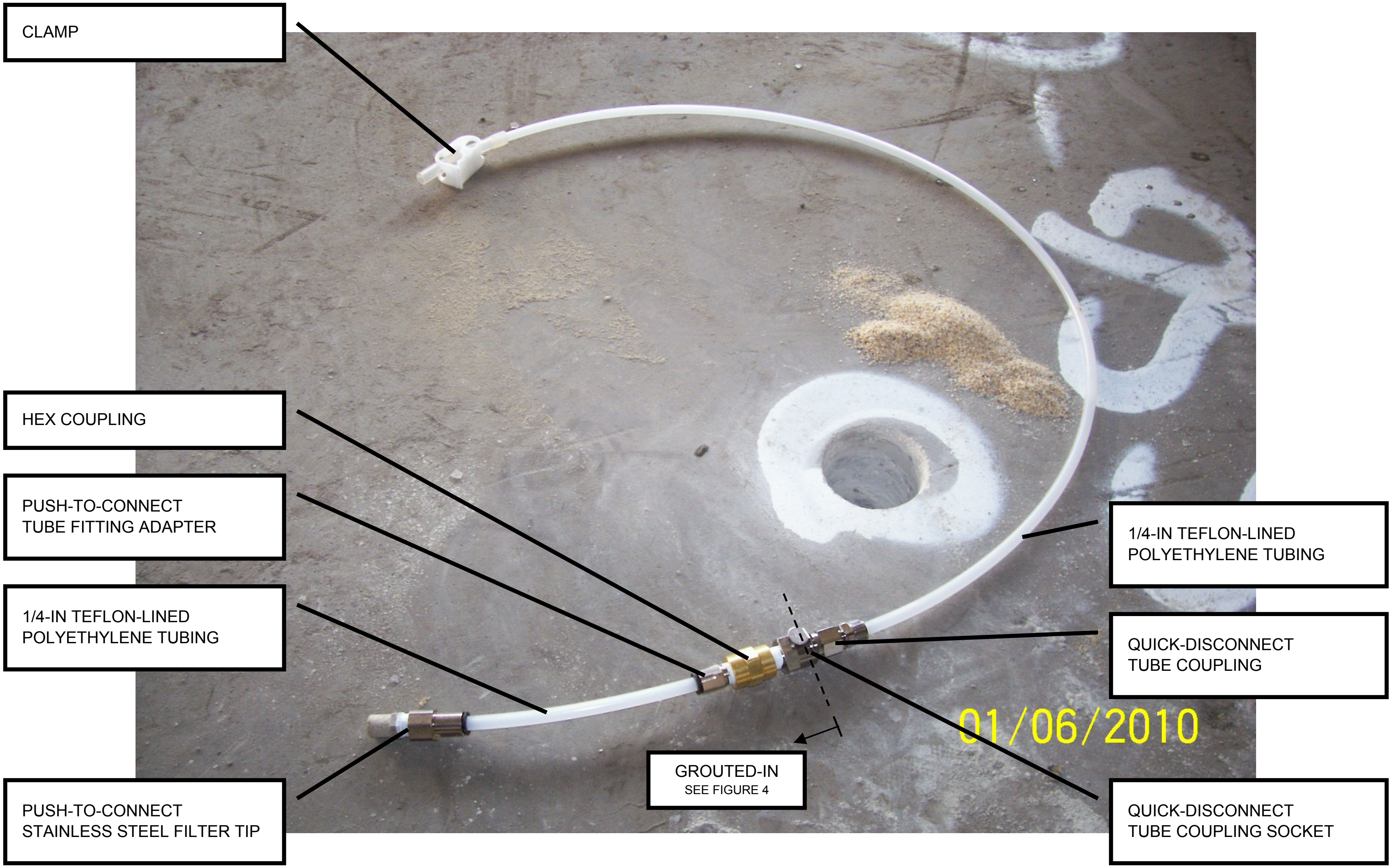


IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
(510) 834-4747

Photograph of Sub-slab Soil Gas Probe Assembly prior to Emplacement
Sub-slab Soil Gas Sampling and Analysis Report
1310 14th Street, Oakland, California

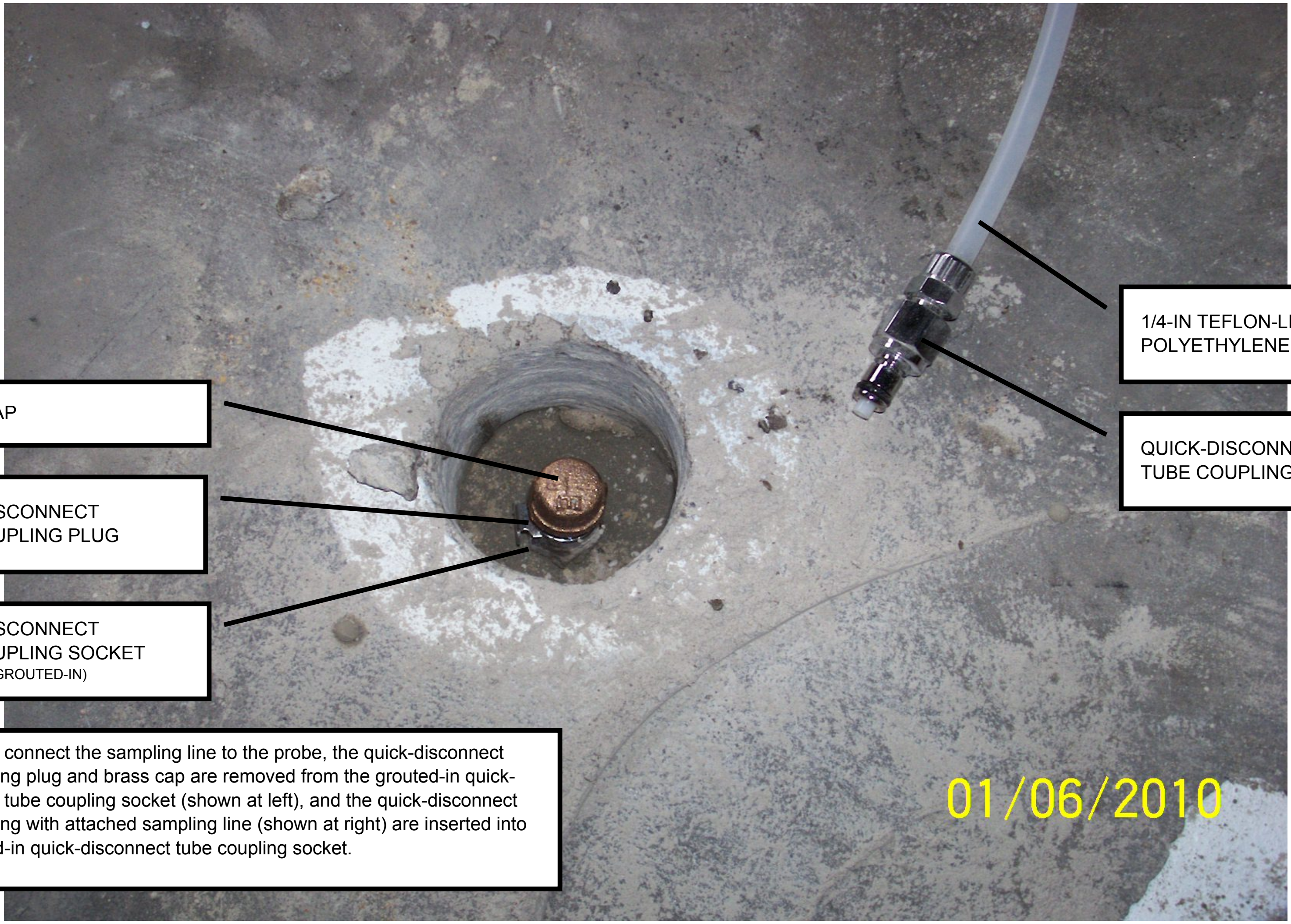
Figure
3

File:

Drafted by:

Date: 2010-02-12

Contract No.: 07-557B



1/4-IN TEFLON-LINED POLYETHYLENE TUBING

QUICK-DISCONNECT TUBE COUPLING

BRASS CAP

QUICK-DISCONNECT TUBE COUPLING PLUG

QUICK-DISCONNECT TUBE COUPLING SOCKET (PARTIALLY GROUTED-IN)

01/06/2010

NOTE: To connect the sampling line to the probe, the quick-disconnect tube coupling plug and brass cap are removed from the grouted-in quick-disconnect tube coupling socket (shown at left), and the quick-disconnect tube coupling with attached sampling line (shown at right) are inserted into the grouted-in quick-disconnect tube coupling socket.

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
(510) 834-4747

Photograph of Sub-slab Soil Gas Probe Assembly after Emplacement

Sub-slab Soil Gas Sampling and Analysis Report
1310 14th Street, Oakland, California

Figure
4

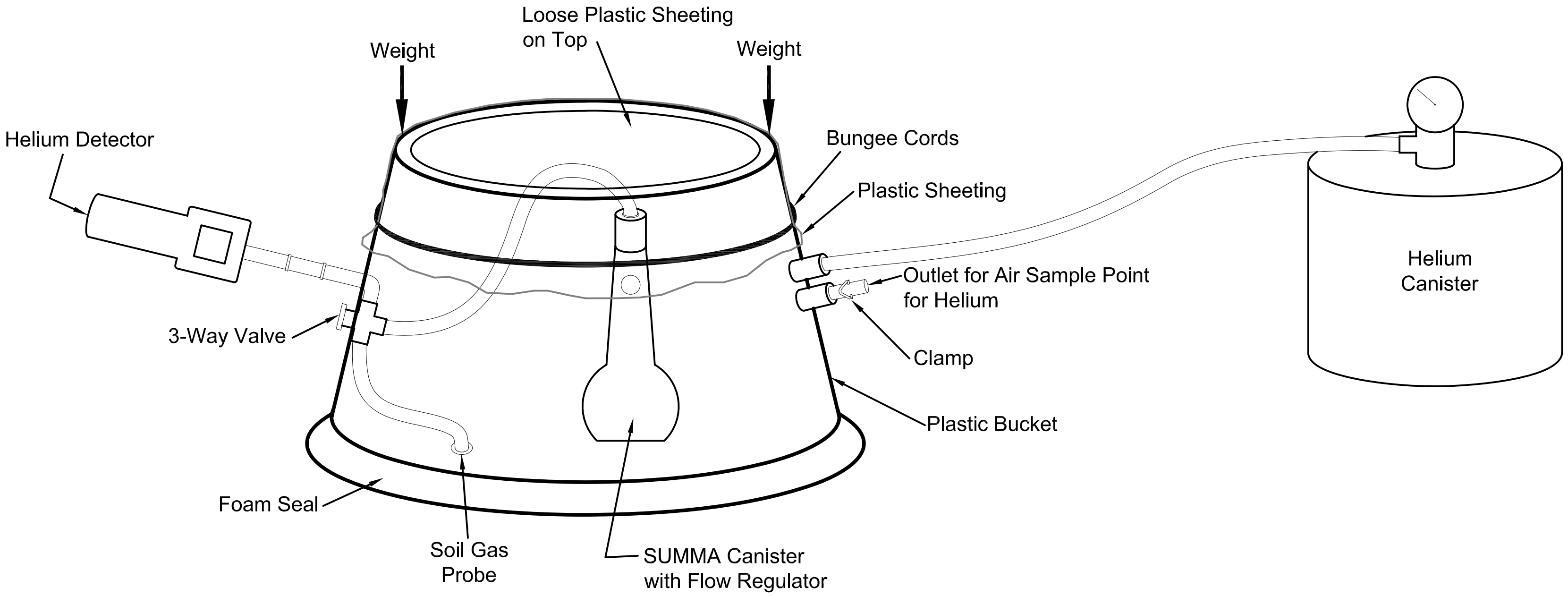
File:

Drafted by:

Date: 2010-02-12

Contract No.: 07-557B

Helium Shroud Schematic



IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
Ph. (510) 834-4747 Fax: (510) 834-4199

Helium Shroud Leak-Detection Apparatus
Sub-slab Soil Gas Sampling and Analysis Report
1310 14th Street, Oakland, California

Figure
5

Drafter: EC
Date: 02/11/10
Contract Number: 07-557B

Appendix A

Air Toxics Ltd. Work Order No. 1001109R2

2/18/2010

Ms. Rebecca Lawrence
Iris Environmental
1438 Webster Street
Suite 302
Oakland CA 94612

Project Name: Carnation Dairy
Project #: 07-557B
Workorder #: 1001109R2

Dear Ms. Rebecca Lawrence

The following report includes the data for the above referenced project for sample(s) received on 1/8/2010 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Kelly Buettner

Project Manager

WORK ORDER #: 1001109R2

Work Order Summary

CLIENT:	Ms. Rebecca Lawrence Iris Environmental 1438 Webster Street Suite 302 Oakland, CA 94612	**BILL TO:**	Ms. Rebecca Lawrence Iris Environmental 1438 Webster Street Suite 302 Oakland, CA 94612
PHONE:	510-834-4747x40	**P.O. #**	
FAX:	510-834-4199	**PROJECT #**	07-557B Carnation Dairy
DATE RECEIVED:	01/08/2010	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	01/25/2010		
DATE REISSUED:	02/17/2010		

			RECEIPT	**FINAL**
FRACTION #	**NAME**	**TEST**	**VAC./PRES.**	**PRESSURE**
01A	SSG-1-20100106	Modified TO-15	3.6 "Hg	5 psi
02A	SSG-2-20100106	Modified TO-15	5.4 "Hg	5 psi
03A	SSG-2-20100106-DUP	Modified TO-15	5.6 "Hg	5 psi
04A	SSG-3-20100106	Modified TO-15	4.0 "Hg	5 psi
05A	SSG-4-20100106	Modified TO-15	5.0 "Hg	5 psi
05AA	SSG-4-20100106 Lab Duplicate	Modified TO-15	5.0 "Hg	5 psi
06A	SSG-5-20100106	Modified TO-15	5.4 "Hg	5 psi
07A	SSG-6-20100106	Modified TO-15	3.8 "Hg	5 psi
08A	Trip Blank	Modified TO-15	28.6 "Hg	5 psi
09A	Lab Blank	Modified TO-15	NA	NA
09B	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
10B	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11B	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda L. Freeman DATE: 02/18/10

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/10
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified TO-15
Iris Environmental
Workorder# 1001109R2

Eight 6 Liter Summa Canister (100% Certified) samples were received on January 08, 2010. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*TO-15*	*ATL Modifications*
ICAL %RSD acceptance criteria	+- 30% RSD with 2 compounds allowed out to < 40% RSD	30% RSD with 4 compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	</= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request

Receiving Notes

The Chain of Custody (COC) information for sample SSG-3-20100106 did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Sample identification for sample SSG-1-20100106 was not provided on the sample tag. Therefore the information on the Chain of Custody was used to process and report the sample.

Analytical Notes

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

All Quality Control Limit exceedences and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

PER CLIENT REQUEST THE WORK ORDER WAS REISSUED ON FEBRUARY 5, 2010 TO AMEND THE TARGET COMPOUND LIST.

PER CLIENT REQUEST THE WORK ORDER WAS REISSUED ON FEBRUARY 17, 2010 TO AMEND THE PREVIOUSLY REPORTED NARRATIVE.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-1-20100106

Lab ID#: 1001109R2-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.15	1.6	0.75	8.1
Freon 11	0.15	0.37	0.85	2.1
Ethanol	0.76	1.9	1.4	3.6
Acetone	0.76	18	1.8	43
Methylene Chloride	0.30	0.34	1.0	1.2
Hexane	0.15	0.63	0.54	2.2
2-Butanone (Methyl Ethyl Ketone)	0.15	2.5	0.45	7.5
Cyclohexane	0.15	0.81	0.52	2.8
Benzene	0.15	2.0	0.48	6.5
Heptane	0.15	0.61	0.62	2.5
4-Methyl-2-pentanone	0.15	0.52	0.62	2.2
Toluene	0.15	14	0.57	54
Ethyl Benzene	0.15	1.7	0.66	7.2
m,p-Xylene	0.15	7.7	0.66	33
o-Xylene	0.15	3.0	0.66	13
4-Ethyltoluene	0.15	4.4	0.75	22
1,3,5-Trimethylbenzene	0.15	1.6	0.75	8.0
1,2,4-Trimethylbenzene	0.15	5.4	0.75	26
TPH ref. to Gasoline (MW=100)	3.0	280	12	1200

Client Sample ID: SSG-2-20100106

Lab ID#: 1001109R2-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.52	0.81	2.6
Freon 11	0.16	0.21	0.92	1.2
Ethanol	0.82	1.0	1.5	1.9
Acetone	0.82	13	1.9	30
Hexane	0.16	0.18	0.57	0.64
2-Butanone (Methyl Ethyl Ketone)	0.16	0.95	0.48	2.8
Benzene	0.16	1.3	0.52	4.3
4-Methyl-2-pentanone	0.16	0.19	0.67	0.79
Toluene	0.16	2.4	0.61	9.0
Tetrachloroethene	0.16	0.39	1.1	2.7
Ethyl Benzene	0.16	0.50	0.71	2.2
m,p-Xylene	0.16	2.8	0.71	12

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-2-20100106

Lab ID#: 1001109R2-02A

o-Xylene	0.16	1.4	0.71	6.0
4-Ethyltoluene	0.16	0.71	0.80	3.5
1,3,5-Trimethylbenzene	0.16	0.40	0.80	2.0
1,2,4-Trimethylbenzene	0.16	0.96	0.80	4.7
TPH ref. to Gasoline (MW=100)	3.3	150	13	600

Client Sample ID: SSG-2-20100106-DUP

Lab ID#: 1001109R2-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.50	0.82	2.5
Freon 11	0.16	0.20	0.93	1.2
Ethanol	0.82	1.8	1.6	3.4
Acetone	0.82	18	2.0	43
2-Butanone (Methyl Ethyl Ketone)	0.16	1.8	0.49	5.2
Benzene	0.16	1.3	0.53	4.3
4-Methyl-2-pentanone	0.16	0.24	0.68	1.0
Toluene	0.16	2.4	0.62	8.9
Tetrachloroethene	0.16	0.44	1.1	3.0
Ethyl Benzene	0.16	0.50	0.72	2.2
m,p-Xylene	0.16	2.7	0.72	12
o-Xylene	0.16	1.2	0.72	5.3
4-Ethyltoluene	0.16	0.60	0.81	3.0
1,3,5-Trimethylbenzene	0.16	0.38	0.81	1.9
1,2,4-Trimethylbenzene	0.16	0.93	0.81	4.6
TPH ref. to Gasoline (MW=100)	3.3	140	13	580

Client Sample ID: SSG-3-20100106

Lab ID#: 1001109R2-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.61	0.77	3.0
Chloromethane	0.16	0.18	0.32	0.38
1,3-Butadiene	0.16	0.42	0.34	0.92
Ethanol	0.78	3.2	1.5	6.1
Acetone	0.78	140 E	1.8	340 E
2-Propanol	0.78	1.2	1.9	2.9
Carbon Disulfide	0.78	0.83	2.4	2.6

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-3-20100106

Lab ID#: 1001109R2-04A

Methylene Chloride	0.31	0.56	1.1	1.9
Hexane	0.16	0.83	0.55	2.9
2-Butanone (Methyl Ethyl Ketone)	0.16	4.8	0.46	14
Cyclohexane	0.16	0.82	0.53	2.8
Benzene	0.16	6.3	0.50	20
Heptane	0.16	0.57	0.64	2.4
4-Methyl-2-pentanone	0.16	1.1	0.63	4.6
Toluene	0.16	18	0.58	69
Tetrachloroethene	0.16	6.5	1.0	44
Ethyl Benzene	0.16	3.3	0.67	14
m,p-Xylene	0.16	15	0.67	65
o-Xylene	0.16	5.8	0.67	25
Styrene	0.16	0.44	0.66	1.9
4-Ethyltoluene	0.16	6.4	0.76	32
1,3,5-Trimethylbenzene	0.16	2.6	0.76	13
1,2,4-Trimethylbenzene	0.16	7.1	0.76	35
TPH ref. to Gasoline (MW=100)	3.1	880	13	3600

Client Sample ID: SSG-4-20100106

Lab ID#: 1001109R2-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.49	0.80	2.4
1,3-Butadiene	0.16	0.35	0.36	0.78
Freon 11	0.16	3.2	0.90	18
Ethanol	0.80	1.5	1.5	2.9
Acetone	0.80	17	1.9	40
Hexane	0.16	110 E	0.57	390 E
2-Butanone (Methyl Ethyl Ketone)	0.16	1.7	0.47	4.9
Cyclohexane	0.16	47	0.55	160
Benzene	0.16	4.3	0.51	14
Heptane	0.16	100 E	0.66	420 E
Toluene	0.16	11	0.61	42
Ethyl Benzene	0.16	4.1	0.70	18
m,p-Xylene	0.16	19	0.70	83
o-Xylene	0.16	6.7	0.70	29
4-Ethyltoluene	0.16	6.9	0.79	34
1,3,5-Trimethylbenzene	0.16	2.1	0.79	10

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-4-20100106

Lab ID#: 1001109R2-05A

1,2,4-Trimethylbenzene	0.16	5.9	0.79	29
Naphthalene	0.80	2.5	4.2	13
TPH ref. to Gasoline (MW=100)	3.2	2900	13	12000

Client Sample ID: SSG-4-20100106 Lab Duplicate

Lab ID#: 1001109R2-05AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.48	0.80	2.4
1,3-Butadiene	0.16	0.38	0.36	0.84
Freon 11	0.16	3.0	0.90	17
Ethanol	0.80	1.9	1.5	3.6
Acetone	0.80	17	1.9	40
Hexane	0.16	110 E	0.57	380 E
2-Butanone (Methyl Ethyl Ketone)	0.16	1.6	0.47	4.8
Cyclohexane	0.16	47	0.55	160
Benzene	0.16	4.2	0.51	14
Heptane	0.16	100 E	0.66	420 E
Toluene	0.16	11	0.61	41
Ethyl Benzene	0.16	4.1	0.70	18
m,p-Xylene	0.16	18	0.70	80
o-Xylene	0.16	6.5	0.70	28
4-Ethyltoluene	0.16	6.6	0.79	32
1,3,5-Trimethylbenzene	0.16	2.1	0.79	10
1,2,4-Trimethylbenzene	0.16	5.8	0.79	28
Naphthalene	0.80	2.4	4.2	12
TPH ref. to Gasoline (MW=100)	3.2	3200	13	13000

Client Sample ID: SSG-5-20100106

Lab ID#: 1001109R2-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.33	0.52	1.6	2.6
Freon 11	0.33	0.36	1.8	2.0
Ethanol	1.6	7.1	3.1	13
Acetone	1.6	87	3.9	210
2-Propanol	1.6	1.9	4.0	4.7
Hexane	0.33	0.76	1.1	2.7

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-5-20100106

Lab ID#: 1001109R2-06A

2-Butanone (Methyl Ethyl Ketone)	0.33	2.2	0.96	6.4
Cyclohexane	0.33	0.84	1.1	2.9
Benzene	0.33	4.2	1.0	13
Heptane	0.33	0.67	1.3	2.7
1,4-Dioxane	0.33	0.48	1.2	1.7
4-Methyl-2-pentanone	0.33	0.57	1.3	2.3
Toluene	0.33	7.5	1.2	28
Ethyl Benzene	0.33	1.2	1.4	5.5
m,p-Xylene	0.33	4.8	1.4	21
o-Xylene	0.33	1.6	1.4	7.0
4-Ethyltoluene	0.33	0.98	1.6	4.8
1,3,5-Trimethylbenzene	0.33	0.48	1.6	2.4
1,2,4-Trimethylbenzene	0.33	1.2	1.6	5.9
TPH ref. to Gasoline (MW=100)	6.5	370	27	1500

Client Sample ID: SSG-6-20100106

Lab ID#: 1001109R2-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.15	0.44	0.76	2.2
Freon 11	0.15	7.2	0.86	41
Ethanol	0.76	1.1	1.4	2.0
Freon 113	0.15	0.27	1.2	2.1
Acetone	0.76	20	1.8	48
Methylene Chloride	0.31	0.40	1.1	1.4
Hexane	0.15	0.55	0.54	1.9
2-Butanone (Methyl Ethyl Ketone)	0.15	2.1	0.45	6.2
Cyclohexane	0.15	0.42	0.53	1.4
Benzene	0.15	1.6	0.49	5.1
Heptane	0.15	0.39	0.63	1.6
Trichloroethene	0.15	1.4	0.82	7.8
Toluene	0.15	18	0.58	69
Tetrachloroethene	0.15	0.80	1.0	5.4
Ethyl Benzene	0.15	1.4	0.66	6.3
m,p-Xylene	0.15	4.8	0.66	21
o-Xylene	0.15	1.4	0.66	6.1
4-Ethyltoluene	0.15	1.5	0.75	7.3
1,3,5-Trimethylbenzene	0.15	0.55	0.75	2.7

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSG-6-20100106

Lab ID#: 1001109R2-07A

1,2,4-Trimethylbenzene	0.15	1.2	0.75	5.7
TPH ref. to Gasoline (MW=100)	3.1	470	12	1900

Client Sample ID: Trip Blank

Lab ID#: 1001109R2-08A

No Detections Were Found.

Client Sample ID: SSG-1-20100106

Lab ID#: 1001109R2-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012021r1**	**Date of Collection: 1/6/10 12:20:00 PM**
Dil. Factor:	**1.52**	**Date of Analysis: 1/21/10 10:25 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.15	1.6	0.75	8.1
Chloromethane	0.15	Not Detected	0.31	Not Detected
1,3-Butadiene	0.15	Not Detected	0.34	Not Detected
Freon 11	0.15	0.37	0.85	2.1
Ethanol	0.76	1.9	1.4	3.6
Freon 113	0.15	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.15	Not Detected	0.60	Not Detected
Acetone	0.76	18	1.8	43
2-Propanol	0.76	Not Detected	1.9	Not Detected
Carbon Disulfide	0.76	Not Detected	2.4	Not Detected
Methylene Chloride	0.30	0.34	1.0	1.2
Methyl tert-butyl ether	0.15	Not Detected	0.55	Not Detected
Hexane	0.15	0.63	0.54	2.2
1,1-Dichloroethane	0.15	Not Detected	0.62	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.15	2.5	0.45	7.5
cis-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected
Tetrahydrofuran	0.76	Not Detected	2.2	Not Detected
Chloroform	0.15	Not Detected	0.74	Not Detected
1,1,1-Trichloroethane	0.15	Not Detected	0.83	Not Detected
Cyclohexane	0.15	0.81	0.52	2.8
Benzene	0.15	2.0	0.48	6.5
1,2-Dichloroethane	0.15	Not Detected	0.62	Not Detected
Heptane	0.15	0.61	0.62	2.5
Trichloroethene	0.15	Not Detected	0.82	Not Detected
1,4-Dioxane	0.15	Not Detected	0.55	Not Detected
4-Methyl-2-pentanone	0.15	0.52	0.62	2.2
Toluene	0.15	14	0.57	54
Tetrachloroethene	0.15	Not Detected	1.0	Not Detected
Chlorobenzene	0.15	Not Detected	0.70	Not Detected
Ethyl Benzene	0.15	1.7	0.66	7.2
m,p-Xylene	0.15	7.7	0.66	33
o-Xylene	0.15	3.0	0.66	13
Styrene	0.15	Not Detected	0.65	Not Detected
4-Ethyltoluene	0.15	4.4	0.75	22
1,3,5-Trimethylbenzene	0.15	1.6	0.75	8.0
1,2,4-Trimethylbenzene	0.15	5.4	0.75	26
1,3-Dichlorobenzene	0.15	Not Detected	0.91	Not Detected
1,4-Dichlorobenzene	0.15	Not Detected	0.91	Not Detected
1,2-Dichlorobenzene	0.15	Not Detected	0.91	Not Detected

Client Sample ID: SSG-1-20100106

Lab ID#: 1001109R2-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012021r1**	**Date of Collection:**	**1/6/10 12:20:00 PM**
Dil. Factor:	**1.52**	**Date of Analysis:**	**1/21/10 10:25 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.76	Not Detected	4.0	Not Detected
TPH ref. to Gasoline (MW=100)	3.0	280	12	1200

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

Client Sample ID: SSG-2-20100106

Lab ID#: 1001109R2-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012022r1**	**Date of Collection:**	**1/6/10 1:40:00 PM**
Dil. Factor:	**1.63**	**Date of Analysis:**	**1/21/10 11:03 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.52	0.81	2.6
Chloromethane	0.16	Not Detected	0.34	Not Detected
1,3-Butadiene	0.16	Not Detected	0.36	Not Detected
Freon 11	0.16	0.21	0.92	1.2
Ethanol	0.82	1.0	1.5	1.9
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Acetone	0.82	13	1.9	30
2-Propanol	0.82	Not Detected	2.0	Not Detected
Carbon Disulfide	0.82	Not Detected	2.5	Not Detected
Methylene Chloride	0.33	Not Detected	1.1	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.59	Not Detected
Hexane	0.16	0.18	0.57	0.64
1,1-Dichloroethane	0.16	Not Detected	0.66	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.16	0.95	0.48	2.8
cis-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Tetrahydrofuran	0.82	Not Detected	2.4	Not Detected
Chloroform	0.16	Not Detected	0.80	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.89	Not Detected
Cyclohexane	0.16	Not Detected	0.56	Not Detected
Benzene	0.16	1.3	0.52	4.3
1,2-Dichloroethane	0.16	Not Detected	0.66	Not Detected
Heptane	0.16	Not Detected	0.67	Not Detected
Trichloroethene	0.16	Not Detected	0.88	Not Detected
1,4-Dioxane	0.16	Not Detected	0.59	Not Detected
4-Methyl-2-pentanone	0.16	0.19	0.67	0.79
Toluene	0.16	2.4	0.61	9.0
Tetrachloroethene	0.16	0.39	1.1	2.7
Chlorobenzene	0.16	Not Detected	0.75	Not Detected
Ethyl Benzene	0.16	0.50	0.71	2.2
m,p-Xylene	0.16	2.8	0.71	12
o-Xylene	0.16	1.4	0.71	6.0
Styrene	0.16	Not Detected	0.69	Not Detected
4-Ethyltoluene	0.16	0.71	0.80	3.5
1,3,5-Trimethylbenzene	0.16	0.40	0.80	2.0
1,2,4-Trimethylbenzene	0.16	0.96	0.80	4.7
1,3-Dichlorobenzene	0.16	Not Detected	0.98	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.98	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.98	Not Detected

Client Sample ID: SSG-2-20100106

Lab ID#: 1001109R2-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012022r1**	**Date of Collection: 1/6/10 1:40:00 PM**
Dil. Factor:	**1.63**	**Date of Analysis: 1/21/10 11:03 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.82	Not Detected	4.3	Not Detected
TPH ref. to Gasoline (MW=100)	3.3	150	13	600

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: SSG-2-20100106-DUP

Lab ID#: 1001109R2-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012023r1**	**Date of Collection:**	**1/6/10 1:40:00 PM**
Dil. Factor:	**1.65**	**Date of Analysis:**	**1/21/10 11:47 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Freon 12	0.16	0.50	0.82	2.5
Chloromethane	0.16	Not Detected	0.34	Not Detected
1,3-Butadiene	0.16	Not Detected	0.36	Not Detected
Freon 11	0.16	0.20	0.93	1.2
Ethanol	0.82	1.8	1.6	3.4
Freon 113	0.16	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Acetone	0.82	18	2.0	43
2-Propanol	0.82	Not Detected	2.0	Not Detected
Carbon Disulfide	0.82	Not Detected	2.6	Not Detected
Methylene Chloride	0.33	Not Detected	1.1	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.59	Not Detected
Hexane	0.16	Not Detected	0.58	Not Detected
1,1-Dichloroethane	0.16	Not Detected	0.67	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.16	1.8	0.49	5.2
cis-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
Tetrahydrofuran	0.82	Not Detected	2.4	Not Detected
Chloroform	0.16	Not Detected	0.80	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.90	Not Detected
Cyclohexane	0.16	Not Detected	0.57	Not Detected
Benzene	0.16	1.3	0.53	4.3
1,2-Dichloroethane	0.16	Not Detected	0.67	Not Detected
Heptane	0.16	Not Detected	0.68	Not Detected
Trichloroethene	0.16	Not Detected	0.89	Not Detected
1,4-Dioxane	0.16	Not Detected	0.59	Not Detected
4-Methyl-2-pentanone	0.16	0.24	0.68	1.0
Toluene	0.16	2.4	0.62	8.9
Tetrachloroethene	0.16	0.44	1.1	3.0
Chlorobenzene	0.16	Not Detected	0.76	Not Detected
Ethyl Benzene	0.16	0.50	0.72	2.2
m,p-Xylene	0.16	2.7	0.72	12
o-Xylene	0.16	1.2	0.72	5.3
Styrene	0.16	Not Detected	0.70	Not Detected
4-Ethyltoluene	0.16	0.60	0.81	3.0
1,3,5-Trimethylbenzene	0.16	0.38	0.81	1.9
1,2,4-Trimethylbenzene	0.16	0.93	0.81	4.6
1,3-Dichlorobenzene	0.16	Not Detected	0.99	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.99	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.99	Not Detected

Client Sample ID: SSG-2-20100106-DUP

Lab ID#: 1001109R2-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012023r1**	**Date of Collection: 1/6/10 1:40:00 PM**
Dil. Factor:	**1.65**	**Date of Analysis: 1/21/10 11:47 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.82	Not Detected	4.3	Not Detected
TPH ref. to Gasoline (MW=100)	3.3	140	13	580

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: SSG-3-20100106

Lab ID#: 1001109R2-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name: e012024r1 **Date of Collection:** 1/6/10 2:50:00 PM
Dil. Factor: 1.55 **Date of Analysis:** 1/21/10 12:42 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.61	0.77	3.0
Chloromethane	0.16	0.18	0.32	0.38
1,3-Butadiene	0.16	0.42	0.34	0.92
Freon 11	0.16	Not Detected	0.87	Not Detected
Ethanol	0.78	3.2	1.5	6.1
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.61	Not Detected
Acetone	0.78	140 E	1.8	340 E
2-Propanol	0.78	1.2	1.9	2.9
Carbon Disulfide	0.78	0.83	2.4	2.6
Methylene Chloride	0.31	0.56	1.1	1.9
Methyl tert-butyl ether	0.16	Not Detected	0.56	Not Detected
Hexane	0.16	0.83	0.55	2.9
1,1-Dichloroethane	0.16	Not Detected	0.63	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.16	4.8	0.46	14
cis-1,2-Dichloroethene	0.16	Not Detected	0.61	Not Detected
Tetrahydrofuran	0.78	Not Detected	2.3	Not Detected
Chloroform	0.16	Not Detected	0.76	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.84	Not Detected
Cyclohexane	0.16	0.82	0.53	2.8
Benzene	0.16	6.3	0.50	20
1,2-Dichloroethane	0.16	Not Detected	0.63	Not Detected
Heptane	0.16	0.57	0.64	2.4
Trichloroethene	0.16	Not Detected	0.83	Not Detected
1,4-Dioxane	0.16	Not Detected	0.56	Not Detected
4-Methyl-2-pentanone	0.16	1.1	0.63	4.6
Toluene	0.16	18	0.58	69
Tetrachloroethene	0.16	6.5	1.0	44
Chlorobenzene	0.16	Not Detected	0.71	Not Detected
Ethyl Benzene	0.16	3.3	0.67	14
m,p-Xylene	0.16	15	0.67	65
o-Xylene	0.16	5.8	0.67	25
Styrene	0.16	0.44	0.66	1.9
4-Ethyltoluene	0.16	6.4	0.76	32
1,3,5-Trimethylbenzene	0.16	2.6	0.76	13
1,2,4-Trimethylbenzene	0.16	7.1	0.76	35
1,3-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.93	Not Detected

Client Sample ID: SSG-3-20100106

Lab ID#: 1001109R2-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012024r1**	**Date of Collection: 1/6/10 2:50:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis: 1/21/10 12:42 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Naphthalene	0.78	Not Detected	4.1	Not Detected
TPH ref. to Gasoline (MW=100)	3.1	880	13	3600

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: SSG-4-20100106

Lab ID#: 1001109R2-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012107r1**	**Date of Collection:**	**1/6/10 3:50:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**1/21/10 05:18 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Freon 12	0.16	0.49	0.80	2.4
Chloromethane	0.16	Not Detected	0.33	Not Detected
1,3-Butadiene	0.16	0.35	0.36	0.78
Freon 11	0.16	3.2	0.90	18
Ethanol	0.80	1.5	1.5	2.9
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	17	1.9	40
2-Propanol	0.80	Not Detected	2.0	Not Detected
Carbon Disulfide	0.80	Not Detected	2.5	Not Detected
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.58	Not Detected
Hexane	0.16	110 E	0.57	390 E
1,1-Dichloroethane	0.16	Not Detected	0.65	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.16	1.7	0.47	4.9
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Tetrahydrofuran	0.80	Not Detected	2.4	Not Detected
Chloroform	0.16	Not Detected	0.79	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Cyclohexane	0.16	47	0.55	160
Benzene	0.16	4.3	0.51	14
1,2-Dichloroethane	0.16	Not Detected	0.65	Not Detected
Heptane	0.16	100 E	0.66	420 E
Trichloroethene	0.16	Not Detected	0.86	Not Detected
1,4-Dioxane	0.16	Not Detected	0.58	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.66	Not Detected
Toluene	0.16	11	0.61	42
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Chlorobenzene	0.16	Not Detected	0.74	Not Detected
Ethyl Benzene	0.16	4.1	0.70	18
m,p-Xylene	0.16	19	0.70	83
o-Xylene	0.16	6.7	0.70	29
Styrene	0.16	Not Detected	0.68	Not Detected
4-Ethyltoluene	0.16	6.9	0.79	34
1,3,5-Trimethylbenzene	0.16	2.1	0.79	10
1,2,4-Trimethylbenzene	0.16	5.9	0.79	29
1,3-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected

Client Sample ID: SSG-4-20100106

Lab ID#: 1001109R2-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012107r1**	**Date of Collection: 1/6/10 3:50:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis: 1/21/10 05:18 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Naphthalene	0.80	2.5	4.2	13
TPH ref. to Gasoline (MW=100)	3.2	2900	13	12000

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	125	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: SSG-4-20100106 Lab Duplicate

Lab ID#: 1001109R2-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name: e012108r1 **Date of Collection:** 1/6/10 3:50:00 PM
Dil. Factor: 1.61 **Date of Analysis:** 1/21/10 05:54 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.16	0.48	0.80	2.4
Chloromethane	0.16	Not Detected	0.33	Not Detected
1,3-Butadiene	0.16	0.38	0.36	0.84
Freon 11	0.16	3.0	0.90	17
Ethanol	0.80	1.9	1.5	3.6
Freon 113	0.16	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	17	1.9	40
2-Propanol	0.80	Not Detected	2.0	Not Detected
Carbon Disulfide	0.80	Not Detected	2.5	Not Detected
Methylene Chloride	0.32	Not Detected	1.1	Not Detected
Methyl tert-butyl ether	0.16	Not Detected	0.58	Not Detected
Hexane	0.16	110 E	0.57	380 E
1,1-Dichloroethane	0.16	Not Detected	0.65	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.16	1.6	0.47	4.8
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Tetrahydrofuran	0.80	Not Detected	2.4	Not Detected
Chloroform	0.16	Not Detected	0.79	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Cyclohexane	0.16	47	0.55	160
Benzene	0.16	4.2	0.51	14
1,2-Dichloroethane	0.16	Not Detected	0.65	Not Detected
Heptane	0.16	100 E	0.66	420 E
Trichloroethene	0.16	Not Detected	0.86	Not Detected
1,4-Dioxane	0.16	Not Detected	0.58	Not Detected
4-Methyl-2-pentanone	0.16	Not Detected	0.66	Not Detected
Toluene	0.16	11	0.61	41
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
Chlorobenzene	0.16	Not Detected	0.74	Not Detected
Ethyl Benzene	0.16	4.1	0.70	18
m,p-Xylene	0.16	18	0.70	80
o-Xylene	0.16	6.5	0.70	28
Styrene	0.16	Not Detected	0.68	Not Detected
4-Ethyltoluene	0.16	6.6	0.79	32
1,3,5-Trimethylbenzene	0.16	2.1	0.79	10
1,2,4-Trimethylbenzene	0.16	5.8	0.79	28
1,3-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,4-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected
1,2-Dichlorobenzene	0.16	Not Detected	0.97	Not Detected

Client Sample ID: SSG-4-20100106 Lab Duplicate

Lab ID#: 1001109R2-05AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012108r1**	**Date of Collection:**	**1/6/10 3:50:00 PM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**1/21/10 05:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.80	2.4	4.2	12
TPH ref. to Gasoline (MW=100)	3.2	3200	13	13000

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	119	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: SSG-5-20100106

Lab ID#: 1001109R2-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012116r1**	**Date of Collection: 1/6/10 4:50:00 PM**
Dil. Factor:	**3.26**	**Date of Analysis: 1/21/10 11:13 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Freon 12	0.33	0.52	1.6	2.6
Chloromethane	0.33	Not Detected	0.67	Not Detected
1,3-Butadiene	0.33	Not Detected	0.72	Not Detected
Freon 11	0.33	0.36	1.8	2.0
Ethanol	1.6	7.1	3.1	13
Freon 113	0.33	Not Detected	2.5	Not Detected
1,1-Dichloroethene	0.33	Not Detected	1.3	Not Detected
Acetone	1.6	87	3.9	210
2-Propanol	1.6	1.9	4.0	4.7
Carbon Disulfide	1.6	Not Detected	5.1	Not Detected
Methylene Chloride	0.65	Not Detected	2.3	Not Detected
Methyl tert-butyl ether	0.33	Not Detected	1.2	Not Detected
Hexane	0.33	0.76	1.1	2.7
1,1-Dichloroethane	0.33	Not Detected	1.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.33	2.2	0.96	6.4
cis-1,2-Dichloroethene	0.33	Not Detected	1.3	Not Detected
Tetrahydrofuran	1.6	Not Detected	4.8	Not Detected
Chloroform	0.33	Not Detected	1.6	Not Detected
1,1,1-Trichloroethane	0.33	Not Detected	1.8	Not Detected
Cyclohexane	0.33	0.84	1.1	2.9
Benzene	0.33	4.2	1.0	13
1,2-Dichloroethane	0.33	Not Detected	1.3	Not Detected
Heptane	0.33	0.67	1.3	2.7
Trichloroethene	0.33	Not Detected	1.8	Not Detected
1,4-Dioxane	0.33	0.48	1.2	1.7
4-Methyl-2-pentanone	0.33	0.57	1.3	2.3
Toluene	0.33	7.5	1.2	28
Tetrachloroethene	0.33	Not Detected	2.2	Not Detected
Chlorobenzene	0.33	Not Detected	1.5	Not Detected
Ethyl Benzene	0.33	1.2	1.4	5.5
m,p-Xylene	0.33	4.8	1.4	21
o-Xylene	0.33	1.6	1.4	7.0
Styrene	0.33	Not Detected	1.4	Not Detected
4-Ethyltoluene	0.33	0.98	1.6	4.8
1,3,5-Trimethylbenzene	0.33	0.48	1.6	2.4
1,2,4-Trimethylbenzene	0.33	1.2	1.6	5.9
1,3-Dichlorobenzene	0.33	Not Detected	2.0	Not Detected
1,4-Dichlorobenzene	0.33	Not Detected	2.0	Not Detected
1,2-Dichlorobenzene	0.33	Not Detected	2.0	Not Detected

Client Sample ID: SSG-5-20100106

Lab ID#: 1001109R2-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012116r1**	**Date of Collection:**	**1/6/10 4:50:00 PM**
Dil. Factor:	**3.26**	**Date of Analysis:**	**1/21/10 11:13 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Naphthalene	1.6	Not Detected	8.5	Not Detected
TPH ref. to Gasoline (MW=100)	6.5	370	27	1500

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

Client Sample ID: SSG-6-20100106

Lab ID#: 1001109R2-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012117r1**	**Date of Collection: 1/6/10 5:45:00 PM**
Dil. Factor:	**1.53**	**Date of Analysis: 1/21/10 11:49 PM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Freon 12	0.15	0.44	0.76	2.2
Chloromethane	0.15	Not Detected	0.32	Not Detected
1,3-Butadiene	0.15	Not Detected	0.34	Not Detected
Freon 11	0.15	7.2	0.86	41
Ethanol	0.76	1.1	1.4	2.0
Freon 113	0.15	0.27	1.2	2.1
1,1-Dichloroethene	0.15	Not Detected	0.61	Not Detected
Acetone	0.76	20	1.8	48
2-Propanol	0.76	Not Detected	1.9	Not Detected
Carbon Disulfide	0.76	Not Detected	2.4	Not Detected
Methylene Chloride	0.31	0.40	1.1	1.4
Methyl tert-butyl ether	0.15	Not Detected	0.55	Not Detected
Hexane	0.15	0.55	0.54	1.9
1,1-Dichloroethane	0.15	Not Detected	0.62	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.15	2.1	0.45	6.2
cis-1,2-Dichloroethene	0.15	Not Detected	0.61	Not Detected
Tetrahydrofuran	0.76	Not Detected	2.2	Not Detected
Chloroform	0.15	Not Detected	0.75	Not Detected
1,1,1-Trichloroethane	0.15	Not Detected	0.83	Not Detected
Cyclohexane	0.15	0.42	0.53	1.4
Benzene	0.15	1.6	0.49	5.1
1,2-Dichloroethane	0.15	Not Detected	0.62	Not Detected
Heptane	0.15	0.39	0.63	1.6
Trichloroethene	0.15	1.4	0.82	7.8
1,4-Dioxane	0.15	Not Detected	0.55	Not Detected
4-Methyl-2-pentanone	0.15	Not Detected	0.63	Not Detected
Toluene	0.15	18	0.58	69
Tetrachloroethene	0.15	0.80	1.0	5.4
Chlorobenzene	0.15	Not Detected	0.70	Not Detected
Ethyl Benzene	0.15	1.4	0.66	6.3
m,p-Xylene	0.15	4.8	0.66	21
o-Xylene	0.15	1.4	0.66	6.1
Styrene	0.15	Not Detected	0.65	Not Detected
4-Ethyltoluene	0.15	1.5	0.75	7.3
1,3,5-Trimethylbenzene	0.15	0.55	0.75	2.7
1,2,4-Trimethylbenzene	0.15	1.2	0.75	5.7
1,3-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected
1,4-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected
1,2-Dichlorobenzene	0.15	Not Detected	0.92	Not Detected

Client Sample ID: SSG-6-20100106

Lab ID#: 1001109R2-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012117r1**	**Date of Collection: 1/6/10 5:45:00 PM**
Dil. Factor:	**1.53**	**Date of Analysis: 1/21/10 11:49 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.76	Not Detected	4.0	Not Detected
TPH ref. to Gasoline (MW=100)	3.1	470	12	1900

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: Trip Blank

Lab ID#: 1001109R2-08A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012118r1**	**Date of Collection: 1/6/10**
Dil. Factor:	**1.00**	**Date of Analysis: 1/22/10 07:01 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Chloromethane	0.10	Not Detected	0.21	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.10	Not Detected	0.29	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected

Client Sample ID: Trip Blank

Lab ID#: 1001109R2-08A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012118r1**	**Date of Collection:**	**1/6/10**
Dil. Factor:	**1.00**	**Date of Analysis:**	**1/22/10 07:01 AM**

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (ug/m3)**	**Amount (ug/m3)**
Naphthalene	0.50	Not Detected	2.6	Not Detected
TPH ref. to Gasoline (MW=100)	2.0	Not Detected	8.2	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: Lab Blank

Lab ID#: 1001109R2-09A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012012**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/20/10 08:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Chloromethane	0.10	Not Detected	0.21	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.10	Not Detected	0.29	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 1001109R2-09A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012012**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**1/20/10 08:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.50	Not Detected	2.6	Not Detected
TPH ref. to Gasoline (MW=100)	2.0	Not Detected	8.2	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: Lab Blank

Lab ID#: 1001109R2-09B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**1/21/10 04:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.10	Not Detected	0.49	Not Detected
Chloromethane	0.10	Not Detected	0.21	Not Detected
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
1,1-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.10	Not Detected	0.29	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
Benzene	0.10	Not Detected	0.32	Not Detected
1,2-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
Toluene	0.10	Not Detected	0.38	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Ethyl Benzene	0.10	Not Detected	0.43	Not Detected
m,p-Xylene	0.10	Not Detected	0.43	Not Detected
o-Xylene	0.10	Not Detected	0.43	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,4-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 1001109R2-09B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**1/21/10 04:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Naphthalene	0.50	Not Detected	2.6	Not Detected
TPH ref. to Gasoline (MW=100)	2.0	Not Detected	8.2	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

Client Sample ID: CCV

Lab ID#: 1001109R2-10A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012009**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/20/10 06:13 PM**

Compound	%Recovery
Freon 12	97
Chloromethane	70
1,3-Butadiene	83
Freon 11	98
Ethanol	82
Freon 113	96
1,1-Dichloroethene	92
Acetone	87
2-Propanol	89
Carbon Disulfide	88
Methylene Chloride	76
Methyl tert-butyl ether	93
Hexane	89
1,1-Dichloroethane	91
2-Butanone (Methyl Ethyl Ketone)	88
cis-1,2-Dichloroethene	90
Tetrahydrofuran	87
Chloroform	95
1,1,1-Trichloroethane	98
Cyclohexane	90
Benzene	89
1,2-Dichloroethane	101
Heptane	89
Trichloroethene	97
1,4-Dioxane	90
4-Methyl-2-pentanone	92
Toluene	94
Tetrachloroethene	96
Chlorobenzene	93
Ethyl Benzene	91
m,p-Xylene	95
o-Xylene	96
Styrene	94
4-Ethyltoluene	103
1,3,5-Trimethylbenzene	93
1,2,4-Trimethylbenzene	103
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	103
1,2-Dichlorobenzene	99

Client Sample ID: CCV

Lab ID#: 1001109R2-10A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012009**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/20/10 06:13 PM**

Compound	**%Recovery**
Naphthalene	109
TPH ref. to Gasoline (MW=100)	114

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

Client Sample ID: CCV

Lab ID#: 1001109R2-10B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012103**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/21/10 02:34 PM**

Compound	**%Recovery**
Freon 12	96
Chloromethane	73
1,3-Butadiene	83
Freon 11	96
Ethanol	88
Freon 113	96
1,1-Dichloroethene	95
Acetone	88
2-Propanol	91
Carbon Disulfide	90
Methylene Chloride	74
Methyl tert-butyl ether	92
Hexane	89
1,1-Dichloroethane	91
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	93
Tetrahydrofuran	87
Chloroform	95
1,1,1-Trichloroethane	96
Cyclohexane	90
Benzene	89
1,2-Dichloroethane	96
Heptane	89
Trichloroethene	96
1,4-Dioxane	87
4-Methyl-2-pentanone	91
Toluene	93
Tetrachloroethene	97
Chlorobenzene	94
Ethyl Benzene	92
m,p-Xylene	96
o-Xylene	100
Styrene	96
4-Ethyltoluene	105
1,3,5-Trimethylbenzene	92
1,2,4-Trimethylbenzene	104
1,3-Dichlorobenzene	100
1,4-Dichlorobenzene	101
1,2-Dichlorobenzene	99

Client Sample ID: CCV

Lab ID#: 1001109R2-10B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	e012103	**Date of Collection: NA**
Dil. Factor:	1.00	**Date of Analysis: 1/21/10 02:34 PM**

Compound	%Recovery
Naphthalene	109
TPH ref. to Gasoline (MW=100)	111

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: LCS

Lab ID#: 1001109R2-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012010**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/20/10 06:49 PM**

Compound	%Recovery
Freon 12	87
Chloromethane	67 Q
1,3-Butadiene	76
Freon 11	87
Ethanol	67
Freon 113	78
1,1-Dichloroethene	76
Acetone	78
2-Propanol	78
Carbon Disulfide	80
Methylene Chloride	67 Q
Methyl tert-butyl ether	83
Hexane	78
1,1-Dichloroethane	79
2-Butanone (Methyl Ethyl Ketone)	76
cis-1,2-Dichloroethene	81
Tetrahydrofuran	78
Chloroform	82
1,1,1-Trichloroethane	85
Cyclohexane	80
Benzene	78
1,2-Dichloroethane	85
Heptane	77
Trichloroethene	86
1,4-Dioxane	77
4-Methyl-2-pentanone	80
Toluene	78
Tetrachloroethene	86
Chlorobenzene	85
Ethyl Benzene	84
m,p-Xylene	86
o-Xylene	86
Styrene	85
4-Ethyltoluene	93
1,3,5-Trimethylbenzene	80
1,2,4-Trimethylbenzene	91
1,3-Dichlorobenzene	89
1,4-Dichlorobenzene	91
1,2-Dichlorobenzene	88

Client Sample ID: LCS

Lab ID#: 1001109R2-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012010**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/20/10 06:49 PM**

Compound	%Recovery
Naphthalene	83
TPH ref. to Gasoline (MW=100)	Not Spiked

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: LCS

Lab ID#: 1001109R2-11B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**e012104**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/21/10 03:14 PM**

Compound	%Recovery
Freon 12	86
Chloromethane	65 Q
1,3-Butadiene	74
Freon 11	86
Ethanol	66
Freon 113	77
1,1-Dichloroethene	74
Acetone	77
2-Propanol	76
Carbon Disulfide	79
Methylene Chloride	62 Q
Methyl tert-butyl ether	82
Hexane	78
1,1-Dichloroethane	79
2-Butanone (Methyl Ethyl Ketone)	75
cis-1,2-Dichloroethene	83
Tetrahydrofuran	78
Chloroform	82
1,1,1-Trichloroethane	84
Cyclohexane	80
Benzene	78
1,2-Dichloroethane	84
Heptane	77
Trichloroethene	84
1,4-Dioxane	78
4-Methyl-2-pentanone	80
Toluene	79
Tetrachloroethene	84
Chlorobenzene	85
Ethyl Benzene	83
m,p-Xylene	86
o-Xylene	87
Styrene	86
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	85
1,2,4-Trimethylbenzene	95
1,3-Dichlorobenzene	90
1,4-Dichlorobenzene	94
1,2-Dichlorobenzene	89

Client Sample ID: LCS

Lab ID#: 1001109R2-11B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	e012104	**Date of Collection: NA**
Dil. Factor:	1.00	**Date of Analysis: 1/21/10 03:14 PM**

Compound	%Recovery
Naphthalene	89
TPH ref. to Gasoline (MW=100)	Not Spiked

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

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(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

Project Manager Greg Noblet

Collected by: (Print and Sign) Rebecca Lawrence

Company IRIS Environmental Email gnoblet@iris-env.com

Address 1438 Webster St. Ste 302 City Oakland State CA Zip 94612

Phone (510) 834-4747 Fax (510) 834-4199

Project Info:

P.O. #

Project # 07-557B

Project Name Carnation Dairy

Turn Around Time:

☒ Normal

☐ Rush

specify

Lab Use Only

Pressurized by:

Date:

Pressurization Gas:

N_2 He

Lab I.D.	**Field Sample I.D. (Location)**	**Can #**	**Date of Collection**	**Time of Collection**	**Analyses Requested**	**Canister Pressure/Vacuum**			
						Initial	Final	Receipt	Final (psi)
01A	SSG-1-20100106	12938	1/6/10	12:20	TO-15LL + naphthalene + TPH-g	-30	-6		
02A	SSG-2-20100106	05699	1/6/~~09~~10	13:40	TO-15LL + naphthalene + TPH-g	-30	-7		
03A	SSG-2-20100106-DUP	5744	1/6/~~09~~10	13:40	TO-15LL + naphthalene + TPH-g	-30	-6		
04A	SSG-3-20100106	10973	1/6/~~09~~10	14:50	TO-15LL + naphthalene + TPH-g	-30	-7		
05A	SSG-4-20100106	13670	1/6/10	15:50	TO-15 LL + naphthalene + TPH-g	-30	-7		
06A	SSG-5-20100106	33547	1/6/10	16:50	TO-15LL + naphthalene + TPH-g	-30	-7		
07A	SSG-6-20100106	23993	1/6/10	17:45	TO-15LL + naphthalene + TPH-g	-30	-7		
08A	Trip Blank	931	1/6/10	NA	TO-15LL + naphthalene + TPH-g	-30	-30		

Relinquished by: (signature) Rebecca Lawrence Date/Time 1/7/10 1336

Received by: (signature) Monica Geezen ATL Date/Time 1/8/10 945

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Notes:

Please analyze TPH-g by TO-15.
Add naphthalene to TO-15-Low-Level.

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex		NA	Good	Yes No [✓ None]	1001109

Form 1293 rev.11

Appendix B

Field Notes

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-1
Date: 1/6/10	**Weather:**	**Sampler:**
# of purge volumes: 3 ≈150mL KLL	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 53.2%	**% Helium in shroud post sampling:** 50.5%
Added Helium to shroud during sampling? [✓ Y] / N	
% Helium in sample line prior to sampling: 2.5%	**% Helium in sample line post sampling:** 2.7%

Sample ID: SSG-1-~~20090106~~ 20100106

Depth: 8.0"	**Time installed:** 9:15	3/16" **Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time: 12:20	**Sample finish time:** 12:55	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -6	
Analyses: TO15 Low-level + naphthalene + TO-3 (TPH-g)	**Summa ID#:** 12938	**Flow Controller ID#:** 6673
Notes: fine sand/silt beneath slab 8" thick slab	probe length = 7 3/4" 2 1/2 ft tubing	1 1/2" sandpack

Sample ID (Duplicate):________________________

Depth:	**Time installed:**	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time:	**Sample finish time:**	**Sample volume: ~6 L**
Initial Summa vacuum:	**Final Summa vacuum:**	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:**	**Flow Controller ID#:**
Notes:		

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-2
Date: 1/6/10	**Weather:**	**Sampler:**
# of purge volumes: 3 78mL	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 49.9	**% Helium in shroud post sampling:** 47.6
Added Helium to shroud during sampling? [✓ Y] N	
% Helium in sample line prior to sampling: 2.58	**% Helium in sample line post sampling:** 0.08

Sample ID: SSG-2-20100106

Depth: ~~7¾"~~ 8"	**Time installed:** 9:39	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3): 3/16"
Sample start time: 13:40	**Sample finish time:** 14:09	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -7	~~7~~
Analyses: TO15 Low-level + naphthalene + TO-3 (TPH)	**Summa ID#:** 05699	**Flow Controller ID#:** 247
Notes: 6" slab 1½" sand layer Probe Length = 7¾" Tubing Length = 2½ ft		

Sample ID (Duplicate): SSG-2-20100106-DUP

Depth: same	**Time installed:** same	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time: 13:40	**Sample finish time:** 14:13	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -6	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:** 5744	**Flow Controller ID#:** 354
Notes:		

-7 14:09

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-3
Date:	**Weather:**	**Sampler:**
# of purge volumes: 3	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 49.78	**% Helium in shroud post sampling:** 48.4
Added Helium to shroud during sampling? [✓ Y] / N	
% Helium in sample line prior to sampling: 14,425 ppm	**% Helium in sample line post sampling:** 3.2%

Sample ID: SSG-3-20100106

Depth: ~~6~~ 7"	**Time installed:** 10:01	3/16" **Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time: 14:50	**Sample finish time:** 15:30	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -7	
Analyses: TO15 Low-level + naphthalene +TO-3 (TPH-g)	**Summa ID#:** 10973	**Flow Controller ID#:** 820
Notes: ~~7" slab 8" hole~~ 6" slab 7" hole Probe length = 6 3/4"		

Sample ID (Duplicate):____________________

Depth:	**Time installed:**	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time:	**Sample finish time:**	**Sample volume: ~6 L**
Initial Summa vacuum:	**Final Summa vacuum:**	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:**	**Flow Controller ID#:**
Notes:		

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-4
Date:	**Weather:**	**Sampler:**
# of purge volumes: 3 78 mL	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 50.0	**% Helium in shroud post sampling:** 47.68
Added Helium to shroud during sampling? [✓ Y] / N	
% Helium in sample line prior to sampling: 0 ppm	**% Helium in sample line post sampling:** 0 ppm

Sample ID: SSG-4-20100106

Depth: 11"	**Time installed:** 10:24	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3): 3/16"
Sample start time: 15:50	**Sample finish time:** 16:24	**Sample volume:** ~6 L
Initial Summa vacuum: -30"	**Final Summa vacuum:** -7	
Analyses: TO15 Low-level + naphthalene +TO-3 (TPH-g)	**Summa ID#:** 13670	**Flow Controller ID#:** 893
Notes: 8½" slab 11" hole 10 3/4" probe 2" sandpack 2½ft tubing		

Sample ID (Duplicate):____________________

Depth:	**Time installed:**	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time:	**Sample finish time:**	**Sample volume:** ~6 L
Initial Summa vacuum:	**Final Summa vacuum:**	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:**	**Flow Controller ID#:**
Notes:		

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-5
Date:	**Weather:**	**Sampler:**
# of purge volumes: 3	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 40.2	**% Helium in shroud post sampling:** 38.5
Added Helium to shroud during sampling? [✓ Y] / N	
% Helium in sample line prior to sampling: 0.0	**% Helium in sample line post sampling:** 7000 ppm

Sample ID:________________________

Depth: 8½"	**Time installed:** 10:53	3/16" **Calculated purge volume** $(R_{tube}^{2}*3.14*L_{tube} + R_{borehole}^{2}*3.14*H_{sandpack}*0.3)$:
Sample start time: 16:50	**Sample finish time:** 17:24	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -7	
Analyses: TO15 Low-level + naphthalene +TO-3 (TPH-g)	**Summa ID#:** 33547	**Flow Controller ID#:** 40786
Notes: 8½" hole 8" slab	1½" sandpack 8¼" probe	

Sample ID (Duplicate):________________________

Depth:	**Time installed:**	**Calculated purge volume** $(R_{tube}^{2}*3.14*L_{tube} + R_{borehole}^{2}*3.14*H_{sandpack}*0.3)$:
Sample start time:	**Sample finish time:**	**Sample volume: ~6 L**
Initial Summa vacuum:	**Final Summa vacuum:**	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:**	**Flow Controller ID#:**
Notes:		

SOIL GAS SAMPLING LOG
IRIS ENVIRONMENTAL

COMPLETE ONE LOG PER SAMPLING LOCATION 1 in^3=16.387 ml, 1 gallon=2785.412 ml

Project: Carnation Dairy	**Contract #: 07-557B**	**Boring #:** SSG-6
Date:	**Weather:**	**Sampler:**
# of purge volumes: 3	**Leak check compound: Helium**	**Sample flow rate: 167 mL/min**

Helium Shroud

% Helium in shroud prior to sampling: 41.2	**% Helium in shroud post sampling:** 48.2
Added Helium to shroud during sampling? Y / N	
% Helium in sample line prior to sampling: 825 ppm	**% Helium in sample line post sampling:** 3.1%

Sample ID:________________________

Depth:	**Time installed:** 1115	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3): 3/16"
Sample start time: 18:15 ~~17:45~~	**Sample finish time:** 18:49	**Sample volume: ~6 L**
Initial Summa vacuum: -30"	**Final Summa vacuum:** -7	
Analyses: TO15 Low-level + naphthalene +TO-3 (TPH-g)	**Summa ID#:** 23993	**Flow Controller ID#:** 6748
Notes: 9½" hole 6" slab		

Sample ID (Duplicate):________________________

Depth:	**Time installed:**	**Calculated purge volume** (R_{tube}^2*3.14*L_{tube} + $R_{borehole}^2$*3.14*$H_{sandpack}$*0.3):
Sample start time:	**Sample finish time:**	**Sample volume: ~6 L**
Initial Summa vacuum: ~~-30"~~	**Final Summa vacuum:**	
Analyses: TO15 Low-level + naphthalene	**Summa ID#:** ~~5744~~ ~~36045~~ AB	**Flow Controller ID#:** ~~354~~ ~~146~~ AB
Notes: moved to SSG-2 (dup)		

Appendix A2: : Screening Health Risk Evaluation

IRIS ENVIRONMENTAL

Via Email and FTP

May 18, 2009

Jerry Wickham
Senior Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Screening Health Risk Evaluation
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Dear Mr. Wickham:

On behalf of Nestlé USA, Inc., Iris Environmental is pleased to submit this Screening Health Risk Evaluation for the former Nestlé USA, Inc. facility located at 1310 14th Street in Oakland, California (the former Carnation Dairy).

We declare, under penalty of perjury, that the information and recommendations contained in the attached report are true and correct to the best of our knowledge.

Please don't hesitate to call us at (510) 834-4747 if you have any questions regarding this report.

Sincerely,

IRIS ENVIRONMENTAL

Robert Balas
Principal, Air Sciences

Gregory S. Noblet, P.E.
Senior Manager

Attachments: Screening Health Risk Evaluation, Former Nestlé USA, Inc. Facility, 1310 14th Street, Oakland, California

SCREENING HEALTH RISK EVALUATION

Former Nestlé USA, Inc. Facility

1310 14th Street, Oakland, California

May 18, 2009

Prepared for:

Nestlé USA, Inc.
800 North Brand Boulevard
Glendale, California 91203

Prepared by:

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
(510) 834-4747

EXECUTIVE SUMMARY

This report describes the methodology and results of a screening level human health risk evaluation for the northwestern portion of the commercial property located at 1310 14th Street in Oakland, California. The potential health impacts to onsite and offsite populations, associated with exposures to site-related chemicals, have been quantified. Potentially exposed populations which have been considered in this evaluation are onsite indoor commercial/industrial workers who are assumed to work full-time in the onsite commercial building for 25 years, onsite outdoor intrusive construction workers who are assumed to work onsite for 4 weeks, and offsite residents who are assumed to live near the site for 30 years. Estimated potential cancer risks for residential and commercial receptor populations are compared to the typical points of departure, with respect to risk management, of one in a million (1×10^{-6}) and 10 in a million (1×10^{-5}), respectively. Estimated potential noncancer hazard indices for all receptor populations are compared to the threshold noncancer hazard index of 1.

The main conclusions of the screening health risk evaluation are as follows.

- The estimated potential cancer risk for onsite indoor commercial/industrial workers is 8.0×10^{-6}. The estimated potential noncancer hazard index for onsite indoor commercial/industrial workers is 0.051. Both the estimated cancer risk and the noncancer hazard index are below levels of concern.
- The estimated potential cancer risk for onsite outdoor intrusive construction workers is 9.8×10^{-5}. The estimated potential noncancer hazard index for onsite outdoor intrusive construction workers is 21. Both the estimated cancer risk and the noncancer hazard index are above levels of concern. However, this cancer risk and noncancer hazard are attributable entirely to assumed dermal contact with COPCs in groundwater at the bottom of a construction trench, and do not account for personal protective equipment that intrusive construction workers would be required to use. Actual exposures after implementation of a site-specific Environmental Health and Safety Plan are highly likely to much lower than estimated here, and the actual cancer risk and hazard are likely to be below levels of concern.
- The estimated potential cancer risk for offsite residents is 4.1×10^{-7}. The estimated noncancer hazard index for offsite residents is 0.0040. Both the estimated cancer risk and the noncancer hazard index are below levels of concern.

The human health risk evaluation presented in this report is a screening-level evaluation that is based on a combination of conservative assumptions – regarding exposure point concentrations (including vapor intrusion modeling assumptions), exposure assumptions, toxicological data, and summation of health effects across chemicals and exposure routes – and therefore it is likely that actual health risks to exposed populations would be lower, or significantly lower, than those estimated in this analysis.

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1.0 INTRODUCTION

This report describes the methodology and results of a screening level human health risk evaluation for the northwestern portion of the commercial property located at 1310 14th Street in Oakland, California (the site). The site is the former location of the Carnation Dairy. Historical operations at the site are known to have resulted in release of petroleum hydrocarbons to soil and groundwater. Remedial activities have resulted in the removal of hydrocarbon product and a reduction in hydrocarbon concentrations in site soil, soil gas, and groundwater, however residual concentrations of hydrocarbons remain in these site media, as documented by a recent May 2008 site investigation. The purpose of this screening level human health risk evaluation is to conservatively estimate the potential health impacts to onsite and offsite populations, associated with exposures to site-related chemicals.

2.0 SITE DESCRIPTION

2.1 Site History

The 1310 14th Street site (see Figure 1) was formerly occupied by the Carnation Dairy. The primary activities conducted at the site were the manufacturing and distribution of ice cream and packaged milk. Delivery trucks were fueled and maintained onsite; the fuel storage and dispensing system was located in the northwest portion of the site, and consisted of underground storage tanks and associated underground piping. These activities were conducted at the site until 1988. The underground storage tanks and associated piping are now known to have leaked petroleum products into site soils, resulting in petroleum contamination of subsurface soils, a layer of petroleum product floating on the groundwater table, and dissolved petroleum hydrocarbons in site groundwater (ETIC, 2001a). These impacts have been partially addressed by various remedial activities, as described below.

2.2 Remedial Activities

Five underground storage tanks and associated underground piping were removed from the site between December 1988 and January 1989, including: two 12,000-gallon diesel tanks, two 10,000-gallon gasoline tanks, and one 1,000-gallon used oil tank. At that time, 1,200 cubic yards of petroleum hydrocarbon-impacted soil were excavated, treated onsite, and replaced into the excavation. Noted at the time of this removal action was the presence of petroleum hydrocarbons in the soil and floating on the groundwater table outside of the excavation area (ETIC, 2001a).

Various site investigations and remedial activities have been conducted at the site since the initial underground storage tank excavations. Remedial activities have included the following (COFS, 2000; ETIC, 2001a).

- Approximately 1.5 million gallons of groundwater were extracted from the subsurface following removal of the underground storage tanks.

- Product skimming was conducted between January and March 1989. Approximately 1,800 gallons of liquid phase hydrocarbons were removed from the subsurface.
- A soil vapor extraction system was operated from January 1994 to February 1995. An estimated 5,200 gallons of hydrocarbon equivalent were removed from the subsurface.
- A multi-phase extraction system was operated from August 1997 through June 2000. A total of 10,875 pounds of hydrocarbons were removed during this period.

Current site conditions have been characterized through soil, soil gas, and groundwater sampling conducted in May of 2008, as described below.

2.3 Site Investigations

Impacts to site soil, groundwater, and soil gas, associated with leaks of petroleum hydrocarbons from underground storage tanks and piping, have been documented in several site investigations performed since 1991. Soil gas investigations were performed in 1999 and in May of 2008. Soil investigations were performed at the time of underground storage tank excavation in 1991, in 1999, and most recently in May of 2008. Groundwater monitoring was performed on a regular basis from 1993 to 2004 and in May of 2008.

As noted in the *Supplemental Soil, Soil Gas, and Groundwater Investigation Report* (ECM, 2008a), components of the May 2008 site investigation consisted of

- soil sampling for total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) at five locations (SB-16 through SB-20), at various depths, to provide current characterization of residual hydrocarbon impacts in the area downgradient from the former underground storage tanks;
- soil sampling for TPH and VOCs at seven locations (SB-21 through SB-27), at various depths, to provide delineation of hydrocarbon impacts in areas of the site which had not been thoroughly characterized;
- soil sampling for polychlorinated biphenyls (PCBs) at seven locations (PCB-1 through PCB-7), at various depths, to document the presence or absence of PCBs at the site;
- soil gas sampling for TPH and VOCs at 12 locations (SB-16 through SB-27), including seven locations in the area downgradient from the former underground storage tanks (SB-20 through SB-27), at a depth of 5 feet, to provide a complete set of soil gas data for use in evaluating vapor intrusion; and
- grab groundwater sampling for TPH and VOCs at 11 locations (SB-16 through SB-27 exclusive of SB-23).

The results of all previous site investigations, as summarized in Table 1a (1999 soil gas data), Table 1b (2008 soil gas data), Table 2 (soil TPH and VOC data), Table 3 (soil PCB data), and Table 4 (groundwater data) of the *Revised Site Conceptual Model Report* (ECM, 2008b), are provided in Appendix A.

In addition to the investigations performed to characterize impacts to site soil, soil gas, and groundwater, noted above, a site investigation was conducted in January 2009 to characterize site-specific soil properties, specifically to support transport modeling (see Sections 4.5.1 and 4.5.2). The number and location of soil properties samples were determined by the project geologist, in order to ensure that the soil at the site is well characterized. The soil properties data collected during this investigation are documented in Figure 2.

3.0 CHEMICALS OF POTENTIAL CONCERN

Chemicals of potential concern (COPCs) for the screening-level human health risk evaluation are defined for each of three impacted site media: soil gas, soil, and groundwater. In general, any chemical that has been detected above the laboratory reporting limit in any sample from any site investigation is designated as a COPC in that medium. The COPCs in soil gas, soil, and groundwater are identified below.

3.1 Soil Gas

As discussed above, site soil gas has been characterized by investigations conducted in 1999 and 2008. The soil gas data from the 2008 investigation are considered to be generally more appropriate for evaluation of future vapor transport into the onsite commercial building, for one primary reason: the data collected in 2008 are likely more representative of current and future conditions than the data collected in 1999, particularly since remedial activities were conducted after 1999 to remove product from the subsurface. As shown in the historical soil gas data summaries presented in Appendix A, VOCs were generally detected at higher concentrations in 1999 (ECM Table 1a) than in 2008 (ECM Table 1b). Also of note, the 2008 soil gas data were collected at a depth of 5 feet below ground surface (bgs), whereas the 1999 soil gas data were collected at 3 feet bgs.

Current DTSC soil gas sampling guidance (Cal/EPA, 2005b) states that, “soil gas samples should not be collected depths shallower than 5 feet in order to minimize barometric pumping effects.” That the 1999 soil gas samples were collected at depths shallower than 5 feet provides a secondary rationale for favoring the 2008 data. However, the 1999 dataset includes detections of 1,3-butadiene, a potentially significant carcinogen which was not sampled for in 2008. Therefore, to be comprehensive, both the 1999 and the 2008 soil gas data are used to characterize COPCs in soil gas for this screening level health risk evaluation. The COPCs in soil gas are defined as those 38 VOCs which were detected above their respective laboratory reporting limit in at least one soil gas sample from either the 1999 or 2008 soil gas investigation:

- acetone;
- benzene;
- 1,3-butadiene;

- 2-butanone (methyl ethyl ketone);
- carbon disulfide;
- chlorobenzene;
- chloroform;
- chloromethane (methyl chloride);
- cyclohexane;
- 1,2-dichlorobenzene;
- 1,3-dichlorobenzene;
- 1,4-dichlorobenzene;
- dichlorodifluoromethane (Freon 12);
- 1,1-dichloroethane;
- 1,2-dichloroethane;
- 1,1-dichloroethene (1,1-DCE);
- *cis*-1,2-dichloroethene (*cis*-1,2-DCE);
- 1,4-dioxane;
- ethanol;
- ethylbenzene;
- 4-ethyltoluene;
- heptane;
- hexane;
- methyl tertiary butyl ether (MTBE);
- methylene chloride;
- 4-methyl-2-pentanone (methyl isobutyl ketone);
- 2-propanol;
- styrene;
- tetrachloroethene (PCE);
- tetrahydrofuran;
- toluene;
- 1,1,1-trichloroethane;
- trichloroethene (TCE);
- trichlorofluoromethane (Freon 11);
- 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113);
- 1,2,4-trimethylbenzene;

- 1,3,5-trimethylbenzene; and
- xylenes.

The derivation of representative concentrations of these COPCs in soil gas is described in Section 4.5 below.

3.2 Soil

As discussed above, site soils have been characterized by several investigations conducted since 1991. Results of these soil investigations are included in Appendix A. The COPCs in soil for this screening risk evaluation are defined as those ten VOCs which have been detected above their respective laboratory reporting limit in at least one site soil sample from any investigation:

- benzene;
- chlorobenzene;
- 1,2-dichlorobenzene;
- 1,3-dichlorobenzene;
- 1,4-dichlorobenzene;
- 1,2-dichloroethane;
- ethylbenzene;
- methyl tertiary butyl ether (MTBE);
- toluene; and,
- xylenes.

The derivation of representative concentrations of these COPCs in soil is described in Section 4.5 below.

3.3 Groundwater

Groundwater monitoring has been performed at the site since 1993. Results of these groundwater investigations are included in Appendix A. The COPCs in groundwater for this screening risk evaluation are defined as those 20 VOCs which have been detected above their respective laboratory reporting limit in at least one site groundwater sample from any investigation or sampling event:

- benzene;
- bromodichloromethane;
- chlorobenzene;
- chloroethane (ethyl chloride);
- chloroform;
- chloromethane (methyl chloride);

- 1,2-dichlorobenzene;
- dichlorodifluoromethane (Freon 12);
- 1,1-dichloroethane;
- 1,2-dichloroethane;
- 1,1-dichloroethene (1,1-DCE);
- *cis*-1,2-dichloroethene (*cis*-1,2-DCE);
- ethylbenzene;
- methyl tertiary butyl ether (MTBE);
- methylene chloride;
- 1,1,2,2-tetrachloroethane;
- toluene;
- 1,1,1-trichloroethane;
- trichloroethene (TCE); and,
- xylenes.

The derivation of representative exposure point concentrations of these COPCs in groundwater is described in Section 4.5 below.

4.0 EXPOSURE ASSESSMENT

The purpose of exposure assessment is to estimate the type and magnitude of exposures to the chemicals of potential concern that are present at, or migrating from, the site. The results of the exposure assessment are combined with chemical-specific toxicity information (see Section 5) to characterize potential risks (see Section 6).

4.1 Physical Setting

The 1310 14th Street property is located in West Oakland, approximately 2 miles from San Francisco Bay. The deed-restricted portion of the 1310 14th Street property (the site) is approximately 1.3 acres in size. The site contains one existing unoccupied L-shaped building of approximately 29,000 square feet which was formerly used for maintenance of delivery trucks. The site is relatively flat, and is covered with concrete and asphalt pavement in addition to the large building. There are no onsite surface water bodies. Groundwater has been historically detected at the site at depths ranging from 5 to 12 feet. The site is surrounded by a mix of light industrial, commercial, and residential land uses.

4.2 Sources of Contamination

As noted above, the underground storage tanks and associated piping which comprised the fuel storage and distribution system are known to have leaked gasoline, diesel fuel, and waste oil into the subsurface, resulting in hydrocarbon impacts to soil and groundwater and a layer of hydrocarbon product floating on the groundwater table. The various remedial activities performed at the site have apparently been successful in extracting the free-phase hydrocarbons, and in reducing hydrocarbon concentrations in soil and groundwater.

4.3 Potential Transport Mechanisms

As noted above, the primary impacted media at the site are soil and groundwater. Direct exposures to impacted site soil and groundwater are evaluated for intrusive onsite construction workers, as described below in Section 4.4. Described in this section are the transport pathways by which COPCs in site soil and groundwater may migrate to other media, where exposures may also occur.

Volatilization of chemicals from soil and groundwater has resulted in impacts to soil gas in the vadose (unsaturated) soil zone above the groundwater table. Given the presence of volatile COPCs in site soil, groundwater, and soil gas, there are several transport mechanisms whereby COPCs could potentially migrate to another medium. These potential transport mechanisms are evaluated below. Transport pathways which are determined to be complete and are included in the screening health risk evaluation are shown in the conceptual site model depicted in Figure 3.

4.3.1 Particulate Emission into Outdoor Air

This transport pathway comprises the release of particulate matter (*i.e.*, dust) from the ground surface to ambient air, either by wind erosion or by mechanical disturbance. The dust-inhalation pathway is evaluated when there are non-volatile chemicals present in site soils; the non-volatile chemicals may be adhered to the dust which is emitted from soil into ambient air. Based on the site characterization, however, it appears that COPCs in site media are primarily volatile, and thus would generally be emitted into ambient air in the vapor phase, not the particulate phase. Further, the site is essentially capped with pavement and the existing commercial building, and the site deed restriction (COFS, 2000) and Risk Management Plan (ETIC, 2001b) require that future site development maintains a surface cap of site soil, exclusive of minor landscaped areas, by buildings or pavement. Because site soils are capped, the potential for dust emissions is very low. Therefore, based on the volatile nature of identified site-related COPCs and the presence of the cap, the inhalation of respirable particulate matter (*i.e.*, dust) is not included in this screening level health risk evaluation.

4.3.2 Vapor Intrusion from Soil Gas into Indoor Air

The conceptual site model (see Figure 3) assumes that volatile COPCs which are present in the subsurface may migrate upwards via diffusion through the vadose (unsaturated) soil zone, and be transported by advection through cracks, conduits, or seams in the building foundation and into the indoor air space of the onsite building (a transport phenomenon known as “vapor intrusion”), where building occupants may be exposed to the COPCs via the inhalation route.

4.3.3 Volatilization from Soil Gas to Outdoor Air

The conceptual site model (see Figure 3) assumes that volatile COPCs which are present in the subsurface may migrate upwards via diffusion through the vadose soil zone and be emitted from the ground surface into ambient air, where outdoor workers may be exposed to the COPCs via the inhalation route.

4.3.4 Advective Transport to Offsite Locations

The conceptual site model (see Figure 3) assumes that, once volatile COPCs have been emitted from the ground surface into onsite outdoor air (see Section 4.3.2 above), they may be transported downwind to offsite locations. As described below, the offsite populations which are evaluated in this screening risk evaluation are child and adult residents. Thus, the conceptual site model assumes the advective transport of volatile COPCs from the site to downwind offsite residential land uses.

4.3.5 Groundwater and Soil Gas Transport to Offsite Locations

The SCM Report (ECM, 2008b) concludes that the plume of dissolved hydrocarbons in site groundwater is not migrating offsite. The SCM Report notes that chemical concentrations measured in groundwater wells located downgradient of the primary area of impact have stabilized at low or non-detect levels. The SCM Report further notes that a review of subsurface utilities indicates that subsurface utilities do not act as conduits for migration of chemicals in the subsurface. Based on these findings, it appears that significant offsite transport of COPCs is not occurring, via either groundwater transport or diffusive transport of soil gas. Accordingly, these subsurface transport pathways are considered to be incomplete based on the information provided in the SCM Report.

4.3.6 Surface Water Transport

The potential for COPCs to migrate offsite via storm water runoff has been considered. The 1310 14th Street site is essentially capped with pavement and the existing commercial building. The Covenant and Environmental Restriction on Property ("deed restriction") between Nestlé USA, Inc. and City of Oakland Fire Services (COFS, 2000) and the site Risk Management Plan (ETIC, 2001b) require that future site development maintains a surface cap of site soil, exclusive of minor landscaped areas, by buildings or pavement. Because site soils are capped, the potential for storm water runoff to become impacted by site-related COPCs is likely to be low. Accordingly, the offsite transport of COPCs via storm water runoff is considered to be incomplete.

4.3.7 Onsite Extraction of Groundwater

While not a considered a "transport" pathway in the formal sense, the extraction and onsite use of impacted site groundwater as a potable water supply could lead to exposures for onsite indoor commercial/industrial workers to COPCs present in the groundwater via ingestion and dermal contact. However, because use of site groundwater (via an extraction well) is prohibited by the deed restriction (COFS, 2000), this transport pathway is considered to be incomplete, and no ingestion or dermal contact exposures to groundwater (*i.e.*, tap water) are possible.

4.3.8 Summary of Complete Transport Pathways and Exposure Media

In summary, the primary impacted media at the site are soil, groundwater, and soil gas. The site deed restriction (COFS, 2000) effectively breaks certain transport pathways, including transport from site soil to other media via surface water runoff or dust emissions, and extraction of groundwater for use as potable water supply. Other potential transport pathways are considered to be incomplete for the reasons described above. The transport pathways which are considered to be potentially complete are:

- vapor intrusion from soil gas to indoor air of the onsite commercial building;
- volatilization from soil gas to onsite outdoor; and
- advective transport from onsite outdoor air to the outdoor or indoor air of offsite residential land uses.

Thus, the exposure media which are included in the quantitative screening risk evaluation are:

- onsite soil;
- onsite groundwater;
- onsite soil gas;
- indoor air of the existing onsite commercial building;
- onsite outdoor air; and
- outdoor or indoor air at offsite residential land uses.

Potentially exposed human populations and routes of exposure (ingestion, etc.) are discussed below in Section 4.4.

4.4 Potentially Exposed Populations and Exposure Routes

This section describes the potentially exposed populations and associated exposure routes that are included in the screening health risk evaluation of the 1310 14th Street site. These populations and routes are summarized in the conceptual site model depicted in Figure 3.

4.4.1 Onsite Commercial/Industrial Worker

The intended future land use for the 1310 14th Street site is commercial/industrial, consistent with the site deed restriction (COFS; 2000). Thus, the primary population of potential concern is future commercial/industrial workers, who are assumed to work full-time in the onsite building. Because the site is effectively capped by the existing building and by pavement as required by the deed restriction, no direct contact between the commercial/industrial worker and site soil or groundwater is possible, and therefore these exposure routes are considered to be incomplete. Because use of site groundwater (via an extraction well) is prohibited by the deed restriction, no ingestion or dermal contact exposures to groundwater are possible, and therefore these exposure routes are also considered to be incomplete. Therefore, as indicated in the conceptual site model depicted in Figure 3, the only complete exposure pathway/route for the onsite indoor commercial/industrial is inhalation of volatile COPCs that are present in indoor air as a result of transport from soil gas to indoor air (*i.e.*, vapor intrusion).

4.4.2 Onsite Intrusive Construction Worker

Also included in this screening level health risk evaluation are onsite, outdoor intrusive construction workers who are assumed to engage in excavation of site soils (*e.g.*, trenching for utility installation) over a relatively short period of time. These intrusive construction workers are assumed to contact impacted soils via dermal contact and incidental ingestion, and are assumed to contact impacted groundwater via dermal contact with groundwater that could be present at the floor of a utility trench. Intrusive construction workers are also assumed to be exposed via inhalation to volatile COPCs present in onsite outdoor air as a result of volatilization from soil gas to outdoor air. For the purpose of quantifying exposures, it is assumed that intrusive construction workers are onsite and in a utility trench for 8 hours per day, for a total of 20 working days (*i.e.*, four weeks). It should be noted that intrusive construction work would necessarily puncture the site cap and likely lead to dust emissions; because the identified site-related COPCs are volatile in nature, however, exposure of intrusive construction workers to fugitive dust is not evaluated (USEPA, 2002).

4.4.3 Offsite Resident

The current land uses in the vicinity of the 1310 14th Street site include commercial, industrial, and residential uses. In this screening analysis, no distinction is made with respect to the actual locations of these various land uses, relative to the site. As explained above (see Section 4.3), the only potentially complete offsite transport pathway is advective transport (*i.e.*, by wind) of volatile COPCs, and the only complete exposure route for offsite populations is inhalation of volatile COPCs in air. Due to the greater exposure frequency and exposure duration associated with residential exposures compared with commercial and industrial exposures, the offsite receptor that is included in the analysis is the offsite resident. As discussed below, it is conservatively assumed that the concentrations of volatile COPCs that an offsite residential building occupant may be exposed to are equal to the concentrations of those volatile COPCs in onsite outdoor air.

4.5 Exposure Point Concentrations

An exposure point is defined as a location of potential contact between an organism (*e.g.*, human receptor) and a physical or chemical agent. The exposure point concentration is defined as the average concentration of the physical or chemical agent in the exposure medium over the period of exposure. The exposure point concentration does not represent the maximum concentration that could be contacted at any one time, but rather represents a reasonable estimate of the concentration likely to be contacted over time

(USEPA, 1989). In this screening level health risk evaluation, however, exposure point concentrations are conservatively based on historical maximum detected concentrations in site media. Exposure point concentrations in each of the relevant exposure media – indoor air of the onsite commercial building, onsite outdoor air, indoor or outdoor air inhaled by an offsite resident, onsite soil, and onsite groundwater – are discussed below.

4.5.1 Indoor Air of Onsite Commercial Building

The conceptual site model (see Figure 3) assumes that volatile COPCs present in the subsurface may migrate upwards through the vadose soil zone and into the indoor air space of the overlying onsite commercial building, where workers may be exposed to the volatile COPCS via inhalation; this transport phenomenon is referred to as vapor intrusion. The transport of COPCs from soil gas to the indoor air of the onsite building is modeled using the United States Environmental Protection Agency (USEPA)-recommended Johnson & Ettinger Model for soil gas (SG-SCREEN Version 2.0), as modified by the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) Human and Ecological Risk Division (HERD) (Johnson and Ettinger, 1991; USEPA, 2004a; Cal/EPA, 2005a), and as modified by Iris Environmental to allow for the input of multiple chemicals and site-specific building parameters. As recommended by DTSC (Cal/EPA, 2005c), soil gas data, rather than soil or groundwater data, are used to evaluate the vapor intrusion pathway, because soil gas data represent a direct measurement of the volatile chemicals that may potentially migrate into indoor air.

The Johnson and Ettinger model is a conservative, screening-level model that incorporates both convective and diffusive mechanisms for estimating the transport of vapor-phase chemicals from soil gas to an indoor air space located directly above the source of contamination. The Johnson and Ettinger model is described in detail in the *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* (USEPA, 2004a). Inputs to the Johnson and Ettinger model include depth and concentration of contamination, physicochemical properties of the chemicals being transported, lithology and building parameters, and soil properties. Model input data are documented in Tables 1 through 3 and are discussed below.

Source Characterization

The soil gas data collected during both the 1999 and 2008 site soil gas investigations are used to characterize the contaminant source in soil gas. The maximum detected concentration of each COPC in soil gas, from the combined 1999 and 2008 datasets, is conservatively assumed to be representative of the contaminant source strength. This assumption is consistent with current DTSC vapor intrusion guidance (Cal/EPA, 2005b), which recommends the use of maximum detected soil gas concentrations in vapor intrusion screening risk evaluations.

As noted above, the 1999 soil gas samples were collected at 3 feet bgs, while the 2008 soil gas samples were collected at 5 feet bgs. For the purpose of modeling vapor intrusion transport, all COPCs are conservatively assumed to be present at the shallower

3 feet bgs sampling depth. The concentration in soil gas and depth to contamination of each COPC, used as Johnson and Ettinger model inputs, are documented in Table 1.

Physicochemical Properties

Physicochemical properties that are used by the Johnson and Ettinger model to simulate the transport of volatile chemicals through the subsurface include: diffusivity in water, diffusivity in air, Henry's Law constant, molecular weight, and other properties. These data are used by the model to calculate the effective diffusivity of the volatile chemical through the vadose zone, which varies slightly from chemical-to-chemical. These input data are documented in Table 2.

Lithology and Building Parameters

The screening-level Johnson and Ettinger model for soil gas used in this analysis (SG-SCREEN Version 2.0) is a one-soil-layer model; assumed soil properties are documented below. The existing on-site commercial building is assumed to be of slab-on-grade construction. Building-parameter inputs to the screening-level Johnson and Ettinger model are the area of the building footprint, the depth below grade of the bottom of the foundation slab, the building air exchange rate, and the flow rate of soil gas into the building. The values assigned to these building parameters include site-specific values of building area and height, and Cal/EPA default values of depth below grade of the bottom of the foundation slab, building air exchange rate, and flow rate of soil gas into the building. The modeled site lithology and building geometry are depicted in Figures 4 and 5. These input data are documented in Table 3.

Soil Properties

Soil-property inputs to the screening-level Johnson and Ettinger model are total porosity, water-filled porosity, bulk density, and temperature. Soil properties were measured in eight soil samples collected from four soil borings (Appendix A, Figure 3) on January 22, 2009; as noted above, that investigation was performed specifically to obtain soil properties data to support transport modeling, and the number and location of soil samples were determined by the project geologist to adequately characterize site soil conditions. Results of that investigation are presented in Figure 2. The site average bulk density, total porosity, and water-filled porosity from these eight soil samples are assigned to the soil property inputs in the model. The assumed soil temperature of the soil layer is the USEPA-recommended default value for the San Francisco Bay area (USEPA, 2004a). These input data are documented in Table 3.

Modeling Results

The modeled concentrations of volatile COPCs in the indoor air space of the onsite commercial building, predicted by the Johnson and Ettinger model, are presented in Table 4. These modeling results represent the exposure point concentrations of volatile COPCs in indoor air that onsite commercial/industrial workers are assumed to be exposed to via the inhalation route.

4.5.2 Onsite Outdoor Air

The conceptual site model (see Figure 3) assumes that volatile COPCs present in soil gas may migrate upwards through the vadose soil zone and into ambient (outdoor) air, where onsite intrusive construction workers may be exposed to the volatile COPCS via inhalation. This transport process is similar to vapor intrusion, except that the volatile COPCs are emitted from the ground surface into outdoor air rather than into the indoor air space of an overlying building. The transport of volatile COPCs from soil gas to outdoor air is modeled using the USEPA methodology presented in *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, 2002). In this methodology, the transport of volatile COPCs from soil gas to outdoor air is comprised of two components: the diffusive transport of volatile chemicals from soil gas to the ground surface; and the dispersion of volatile chemicals from the ground surface into the ambient air (USEPA, 2002; ASTM, 1995):

$$C_{OA} = \left[\frac{D_{eff} \times C_{SG}}{d} \times CF1 \times CF2\right] \times \left[\frac{1}{(Q/C)_{vol}}\right] \qquad \text{(Eq. 1)}$$

where:

C_{OA} = concentration of volatile COPC in outdoor air (mg/m^3);

D_{eff} = effective diffusivity of COPC through vadose soil zone (cm^2/s) (see Equation 2, below);

C_{SG} = concentration of COPC in soil gas (mg/m^3);

d = depth of COPC contamination in soil gas (m);

CF1 = units conversion factor (m^2/cm^2);

CF2 = units conversion factor (g/kg);

$(Q/C)_{vol}$ = dispersion factor (g/m^2/s per kg/m^3).

The first bracketed term of Equation 1 represents the steady-state flux of the volatile COPC from the ground surface into ambient air. This flux is a function of the concentration of the COPC in soil gas (C_{SG}), the effective diffusivity of the COPC through the vadose soil zone (D_{eff}), and the length (*i.e.*, height of soil column) over which the COPC must diffuse to reach the ground surface (d). The concentration of the COPC in soil gas and the depth to contamination are as-assumed in the evaluation of vapor intrusion transport, discussed above in Section 2.4.1 and documented in Table 1. The effective diffusivity of the COPC through the vadose soil zone (D_{eff}) is calculated as follows (USEPA, 2002; ASTM, 1995):

$$D_{eff} = \frac{(D_a \times q_a^{10/3})}{\eta^2} + \frac{(D_w \times q_w^{10/3})}{\eta^2 \times H'} \qquad \text{(Eq. 2)}$$

where:

D_a = diffusivity of COPC in air (cm^2/s);

q_a = air-filled soil porosity (cm^3/cm^3);
η = total soil porosity (cm^3/cm^3);
D_w = diffusivity of COPC in water (cm^2/s);
q_w = water-filled soil porosity (cm^3/cm^3); and
H' = Henry's law constant (cm^3/cm^3).

Values of the physicochemical properties appearing in Equation 2 – diffusivity in air (D_a), diffusivity in water (D_w), and Henry's law constant – are taken from the DTSC/HERD Johnson and Ettinger model (Cal/EPA, 2005a); these physicochemical data are documented in Table 2. Values of the soil properties appearing in Equation 2 – air filled soil porosity, water-filled soil porosity, and total soil porosity – are the average site-specific values measured during the January 2009 site investigation, and are the same values used as inputs to the Johnson and Ettinger modeling analysis of vapor intrusion transport to indoor air (see Section 4.5.1). As noted above, that investigation was performed specifically to obtain soil properties data to support transport modeling, and the number and location of soil samples were determined by the project geologist to adequately characterize site soil conditions. These soil properties data are documented in Table 3.

The second bracketed term of Equation 1 represents the dispersion of the volatile COPC, from the point of release at the ground surface into the larger body of onsite ambient air. The dispersion of volatile chemicals from the ground surface to ambient air is estimated as recommended in the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, 2002). The USEPA soil-screening guidance document defines an annual-average dispersion factor, $(Q/C)_{vol}$, which represents the reciprocal of the ratio of the geometric mean air concentration at the center of a square source area to the emission flux from the square source area; *i.e.*, the $(Q/C)_{vol}$ dispersion factor is specifically designed to estimate the annual-average concentration of a volatile COPC in ambient air at the center of an area source from which it is emitted. The dispersion factor is a function of the source size and of empirical coefficients which are based on air dispersion modeling for specific climate zones (USEPA, 2002):

$$(Q/C)_{vol} = A \times \exp\left[\frac{(\ln A_{site} - B)^2}{C}\right] \qquad \text{(Eq. 3)}$$

where:

A = empirical dispersion coefficient (unitless);
A_{site} = area of source (acres);
B = empirical dispersion coefficient (unitless); and
C = empirical dispersion coefficient (unitless).

The site area from which volatilization of COPCs is modeled to occur (A_{site}) is conservatively assumed to be the size of the deed-restricted portion of the property.

Values assigned to the empirical dispersion coefficients (A, B, and C) are USEPA-recommended conservative default values specific for the San Francisco Bay region (USEPA, 2002). The values assigned to the variables in Equation 3 and the resulting dispersion factor are documented in Table 5.

In summary, the effective diffusivity (D_{eff}) of each volatile COPC is calculated by Equation 2, based on soil properties (porosity, etc.) and the physicochemical properties of the COPC (diffusivity in air, etc.). A site-specific dispersion factor [$(Q/C)_{vol}$] is calculated by Equation 3, based on the site area (A_{site}) and based on default regional dispersion coefficients (A, B, and C). These two derived parameters, and the depth and concentration of the COPC in soil gas(d and C_{SG}), are plugged into Equation 1 to calculate the concentration of the COPC in ambient air at the center of the site, resulting from volatilization from soil gas to ambient air. These exposure point concentrations of COPCs in onsite outdoor air, used to quantify potential health impacts associated with inhalation by intrusive construction workers, are documented in Table 6.

4.5.3 Indoor and Outdoor Air of Offsite Residences

The conceptual site model (see Figure 3) assumes that volatile COPCs present in the subsurface may migrate upwards through the vadose soil zone and into ambient (outdoor) air at the site (as described in the previous section). The volatile COPCs are then assumed be transported downwind to offsite residential land uses, where residents may be exposed to the VOCs via the inhalation route. In this screening level health risk evaluation, it is conservatively assumed that the concentrations of volatile COPCs that offsite residents are exposed to in outdoor or indoor air are equal to those in onsite ambient air. In other words, the exposure point concentrations of COPCs that offsite residents are potentially exposed to are assumed equal to the exposure point concentrations of COPCs in onsite outdoor air, as documented in Table 6. This is a highly conservative assumption, as the concentrations of COPCs in air would be diluted during downwind transport from the site to offsite residential land uses.

4.5.4 Onsite Soil

The conceptual site model (see Figure 3) assumes that onsite outdoor intrusive construction workers are exposed to COPCs in site soils via ingestion and dermal contact. (Direct soil exposures for the indoor commercial/industrial worker are assumed to be incomplete, due to the cap provided by the building and pavement.) For this screening level risk evaluation, it is assumed that intrusive construction workers are exposed to the maximum detected concentrations of COPCs in site soils, from any site soil investigation, at any sampling location, at any depth below ground surface. The exposure point concentrations of COPCs in site soils, used to quantify potential health impacts associated with ingestion and direct contact exposures, are documented in Table 7.

4.5.5 Onsite Groundwater

The conceptual site model (see Figure 3) assumes that onsite outdoor intrusive construction workers are exposed to COPCs in site groundwater via dermal contact with the groundwater, such as at the bottom of a utility trench. For this screening level risk evaluation, it is assumed that the intrusive construction workers are exposed to the maximum detected concentrations of COPCs in site groundwater, from any site groundwater investigation or sampling event, at any sampling location. The exposure point concentrations of COPCs in site groundwater, used to quantify potential health impacts associated with direct contact exposures, are documented in Table 8.

4.6 Quantification of Potential Chemical Intakes

Exposure is defined as contact between an organism (*e.g.*, human body) and a chemical or physical agent. In accordance with USEPA risk assessment methodology (USEPA, 1989), exposures are averaged over time and to the body weight of the receptor, and are referred to as intakes. In this formulation, chemical intake is a function of: the concentration of the chemical in the exposure medium (*e.g.*, soil), the contact rate between the receptor and the exposure medium, the frequency and duration of the exposure, the body weight of the receptor, and the time period over which the exposure is normalized. Intakes are averaged over long periods of time are referred to as chronic daily intakes.

The generic equation for estimating the chronic daily intake of a chemical in air, soil, or water is as follows (USEPA, 1989):

$$\mathrm{CDI} = \frac{\mathrm{C} \times \mathrm{CR} \times \mathrm{EF} \times \mathrm{ED}}{\mathrm{BW}} \times \frac{1}{\mathrm{AT}} \qquad \text{(Eq. 4)}$$

where:

CDI = chronic daily intake (mg/kg/d);

C = exposure point concentration of chemical in soil (mg/kg), groundwater (mg/L), or air (mg/m^3);

CR = contact rate with soil (kg/d), groundwater (L/d), or air (m^3/d);

EF = exposure frequency (d/yr);

ED = exposure duration (yr);

BW = body weight (kg); and

AT = averaging time (d).

Chronic daily intakes are specific to the exposure pathway, the receptor, and the type of health effect being evaluated (*i.e.*, cancer or noncancer). The pathway-specific equations used to quantify chronic daily intakes are documented in Table 9. The values assigned to the intake parameters are documented in Table 10, with the exception of dermal permeability coefficients which are documented in Table 2, and exposure point concentrations which are documented in Table 4 (onsite indoor air), Table 6 (onsite outdoor air and offsite indoor or outdoor air), Table 7 (onsite soil), and Table 8 (onsite groundwater). As documented in Table 10, the values assigned to the intake parameters are standard, conservative default values recommended by USEPA and/or Cal/EPA.

In evaluating the potential health impacts to residential populations, both child and adult receptors are considered. For noncancer health hazard, the child receptor experiences the largest intakes (due to lower body weight), and thus the noncancer hazard assessment for the offsite resident is based on the child receptor. Per DTSC guidance (Cal/EPA, 1994), cancer risks for residential populations are calculated using an age-adjusted approach, to account for the higher per-body weight exposures that occur during the childhood years; accordingly, the cancer risk assessment for the offsite resident is based on an "age adjusted" receptor who is assumed to be a child for the first 6 years of exposure and an adult for the remaining 24 years of an assumed 30-year residential exposure duration.

Chronic daily intakes calculated for all exposure pathways and exposed populations are presented in Table 11. In conjunction with toxicity data (see Section 5.0), these chronic daily intakes are used to characterize potential cancer risks and noncancer hazards, as discussed in Section 6.0.

5.0 TOXICITY ASSESSMENT

Toxicity assessment characterizes the relationship between the magnitude of exposure to a chemical and the potential for adverse effects. More specifically, toxicity assessment identifies or derives toxicity values that can be used to estimate the likelihood of adverse effects occurring in humans at different exposure levels. Consistent with regulatory risk assessment policy, adverse health effects resulting from chemical exposures are evaluated in two categories: carcinogenic effects and noncarcinogenic effects. The hierarchy of sources for the toxicity criteria used for this health risk evaluation generally corresponds to DTSC guidelines (Cal/EPA, 1994); all carcinogenic and noncarcinogenic toxicity values used to evaluate the potential health effects associated with exposure to COPCs in groundwater are presented and documented in Table 13.

5.1 Toxicity Assessment for Carcinogenic Effects

Current health risk assessment practice for carcinogens is based on the assumption that, for most substances, there is no threshold dose below which carcinogenic effects do not occur. This no-threshold assumption for carcinogenic effects is based on an assumption that the carcinogenic processes are the same at high and low doses. This approach has generally been adopted by regulatory agencies as a conservative practice to protect public health. The no-threshold assumption is used in this risk assessment for evaluating carcinogenic effects. Although the magnitude of the risk declines with decreasing exposure, the risk is believed to be zero only at zero exposure.

The response potency of a potential carcinogen is quantified by the cancer slope factor (SF). The slope factor represents the excess lifetime cancer risk due to a continuous, constant exposure to a specified level (*i.e.*, unit dose) of a carcinogen. Slope factors are generally reported as excess incremental cancer risk per milligram of chemical per kilogram body weight per day (per mg/kg/day). Separate slope factors are generally reported for inhalation and oral exposures; these slope factors are referred to as the inhalation slope factor (SF_i) and the oral slope factor (SF_o), respectively. Both dermal and oral exposures are generally evaluated using the oral slope factor.

The inhalation and oral slope factors (SF_i and SF_o values) used in this risk evaluation are taken from the following hierarchy of sources:

1) Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) on-line *Toxicity Criteria Database* (Cal/EPA, 2008); and
2) USEPA on-line *Integrated Risk Information System* (IRIS) (USEPA, 2008).

The slope factors, and their sources, used to evaluate the potential carcinogenic toxicity of COPCs are documented in Table 12.

5.2 Toxicity Assessment for Noncarcinogenic Effects

The toxicity assessment for noncarcinogenic effects is based on the assumption that there exists a threshold level of exposure below which no adverse health effects occur. This threshold level varies from individual to individual. In developing a toxicity parameter for noncarcinogenic effects, the approach is to identify a threshold value that is protective of sensitive individuals in the population. For most chemicals, this level can only be estimated, and the developed toxicity value incorporates uncertainty factors indicating the degree of extrapolation used to derive the estimated value. The developed toxicity level is generally considered to have uncertainty spanning an order of magnitude or more, and should not be viewed as a strict scientific demarcation between what level is toxic and nontoxic (USEPA, 1989).

The toxicity parameter that is typically used to evaluate noncarcinogenic effects is the reference dose (RfD). The reference dose represents an intake level, expressed in milligrams of chemical per kilogram of body weight per day (mg/kg/day), that would not be expected to cause adverse noncancer health effects in potentially exposed populations, including sensitive subpopulations (USEPA, 1989). Thus, the reference dose is often referred to as the "acceptable dose." The chronic reference dose specifically represents the daily exposure level that is unlikely to produce adverse noncancer health effects in potentially exposed populations, including sensitive subpopulations, over a lifetime. Analogous to slope factors, chronic reference doses are generally reported for inhalation and oral exposures; these chronic reference doses are referred to as the inhalation chronic reference dose (RfD_i) and the oral chronic reference dose (RfD_o), respectively. Both dermal and oral exposures are generally evaluated using the oral chronic reference dose.

The inhalation and oral chronic reference doses (RfD_i and RfD_o values) used in this risk assessment are taken directly from the following hierarchy of sources:

1) Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) on-line *Toxicity Criteria Database* (Cal/EPA, 2008);
2) USEPA on-line Integrated Risk Information System (IRIS) (USEPA, 2008); and
3) USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, 2008).

The chronic reference doses, and their sources, used to evaluate the potential noncarcinogenic toxicity of COPCs are documented in Table 13.

6.0 RISK CHARACTERIZATION

6.1 Cancer Risk

For carcinogens, risk is estimated as the incremental probability of an individual developing cancer over a lifetime as a result of daily exposure to the potential carcinogen. The cancer slope factor (SF) (see Section 5.1) converts the estimated daily intake averaged over a lifetime of exposure directly to incremental risk of an individual developing cancer. Because relatively low intakes are likely to result from exposure to chemicals at contaminated sites (compared to those experienced by laboratory test animals), it is assumed the dose-response relationship is linear. Under this assumption, the slope factor is constant and risk is directly related to intake (USEPA, 1989):

$$\mathrm{RISK} = \mathrm{SF} \times \mathrm{CDI} \qquad \text{(Eq. 5)}$$

where:

RISK = cancer risk, *i.e.*, the probability of an individual developing cancer over a lifetime as a result of daily exposure to a particular carcinogen (unitless);

SF = cancer slope factor, *i.e.*, the lifetime incremental cancer risk per unit dose of the carcinogen (per mg/kg/d); and

CDI = chronic daily intake of the carcinogen (mg/kg/d).

Cancer risks are estimated by Equation 5 for each relevant exposure pathway and receptor and each carcinogenic chemical. As a matter of policy, USEPA (1989b) considers the cancer risk for contact with multiple carcinogens to be additive, regardless of the carcinogens' mechanisms of toxicity or sites (organs of the body) of action. Therefore, within each exposure pathway (*e.g.*, inhalation of indoor air), the chemical-specific cancer risks are summed to produce an estimate of the cumulative (multi-chemical) risk associated with the exposure pathway. In addition, cancer risk for a given receptor across multiple exposure routes is also considered to be additive (USEPA, 1989b). Therefore, the pathway-specific risks are summed to produce an estimate of the cumulative (multi-chemical and multi-pathway) risk to each specific receptor. This cumulative risk estimate represents the incremental probability of an individual within that receptor population (*e.g.*, onsite indoor commercial/industrial workers) developing cancer over a lifetime as a result of exposure to site-related carcinogenic COPCs. Estimated cancer risks are presented in Table 14.

The estimated incremental cancer risks presented in Table 14 are compared to the "acceptable" cancer risk level, as defined and endorsed by relevant state and federal agencies. The National Contingency Plan (NCP) is cited by USEPA (1989) as the basis for defining acceptable incremental risk levels. According to the NCP, lifetime incremental cancer risk levels posed by a site should be within the risk range of one in a million (1×10^{-6}) to 100 in a million (1×10^{-4}). Thus, USEPA and Cal/EPA agencies typically consider the 1×10^{-6} risk level to be an insignificant risk, and consider a calculated excess cancer risk between 1×10^{-6} and 1×10^{-4} to be within the acceptable risk range. For commercial exposure scenarios, a typical point of departure is a risk level of 1×10^{-5}; *i.e.*, if risks are at or below 1×10^{-5}, the agency of record will generally accept no further action.

6.2 Noncancer Hazard

The reference-dose approach (see Section 5.2) is based on the theory that there exists a threshold level of exposure below which it is unlikely for even sensitive subpopulations to experience adverse noncancer health effects. If the actual exposure level (*i.e.*, the chronic daily intake) exceeds this threshold value (*i.e.*, the chronic reference dose), there may be concern for potential noncancer health effects. Generally, the larger ratio of chronic daily intake to chronic reference dose, the greater the level of concern. This ratio is not to be interpreted as a probability of developing noncancer health effects, however, and the level of concern does not increase linearly with this ratio USEPA (1989).

The ratio of the chronic daily intake of a chemical to the chronic reference dose for that chemical is referred to as the noncancer hazard quotient:

$$\mathrm{HQ} = \frac{\mathrm{CDI}}{\mathrm{RfD}} \qquad \text{(Eq. 6)}$$

where:

HQ = noncancer hazard quotient, *i.e.*, the potential (not probability) for an individual to develop adverse noncancer health effects over a lifetime as a result of daily exposure to a particular chemical (unitless);

CDI = chronic daily intake of the chemical (mg/kg/d); and

RfD = chronic reference dose, *i.e.*, the threshold level of exposure that would not be expected to cause adverse noncancer health effects in potentially exposed populations, including sensitive subpopulations (unitless).

Noncancer hazard quotients are estimated by Equation 6 for each relevant exposure pathway and receptor and each chemical. Within each exposure pathway (*e.g.*, inhalation of indoor air), the chemical-specific noncancer hazard quotients are summed to produce an estimate of the cumulative (multi-chemical) “hazard index” associated with the exposure pathway. It should be noted here that the summation of hazard quotients across chemicals, independent of the target organ which is affected by each chemical, is conservative, as chemicals that impact different target organs (*e.g.*, liver, kidney) are not truly additive in their potential to cause the adverse impact. The pathway-specific hazard indices are then summed to produce an estimate of the cumulative (multi-chemical and multi-pathway) noncancer hazard index for the specific receptor. This cumulative hazard index estimate represents the incremental potential (not probability) of an individual within that receptor population (*e.g.*, onsite indoor commercial/industrial workers) developing adverse noncancer health effects as a result of exposure to site-related COPCs. Estimated noncancer hazards are presented in Table 15.

The estimated incremental noncancer hazards presented in Table 15 are compared to the threshold level of 1. Chemical exposures that yield hazard indices of less than 1 are not expected to result in adverse noncancer health effects (USEPA, 1989).

7.0 DISCUSSION OF RESULTS

7.1 Cancer Risk

A summary of estimated cancer risks, for all potentially exposed populations and associated routes of exposure, is presented in Table 14. These results are discussed in this section by receptor population.

As indicated in Table 14, the total (summed across all COPCs) estimated cancer risk for onsite indoor commercial/industrial workers, associated with inhalation of volatile COPCs that are present in indoor air as a result of vapor intrusion (the only complete exposure pathway for this receptor), is 8.0×10^{-6}. This estimated risk is below the 1×10^{-5} risk level that is the typical point of departure for commercial exposure scenarios. Nearly all of this risk may be attributed to inhalation of benzene (85 percent of total risk) and 1,3-butadiene (10 percent).

As indicated in Table 14, the total (summed across all COPCs and four exposure pathways) estimated cancer risk for onsite outdoor intrusive construction workers is 9.8×10^{-5}, which is approximately 10 times greater than the 1×10^{-5} risk level that is the typical point of departure for commercial/industrial exposure scenarios. This risk level is attributable to assumed dermal contact with COPCs in groundwater at the bottom of a construction trench – the estimated risks associated with inhalation of volatile COPCs in outdoor air, ingestion of COPCs in soil, and dermal contact with COPCs in soil are all well below levels of concern. The groundwater-dermal contact risk may be attributed to dermal contact with benzene (77 percent of total risk) and ethylbenzene (23 percent) in groundwater.

It should be noted that dermal exposures to soil and groundwater for the intrusive construction worker conservatively assume that the hands and forearms are exposed, *i.e.*, that the worker is wearing a short-sleeved shirt and no gloves. The site Risk Management Plan (ETIC, 2001b), however, requires that constructor contractors develop a site-specific Environmental Health and Safety Plan that specifies appropriate safety equipment to minimize contact between the construction worker and site soil and groundwater. Therefore, actual exposures after implementation of a site-specific Environmental Health and Safety Plan are highly likely to much lower than estimated here, and actual cancer risks are likely to be below levels of concern.

As indicated in Table 14, the total (summed across all COPCs) estimated cancer risk for offsite residents, associated with inhalation of volatile COPCs in indoor or outdoor air that have migrated downwind from the site (the only complete exposure pathway for this receptor), is 4.1×10^{-7}. This estimated risk is below the 1×10^{-6} risk level that is typically considered to be the point of departure for residential exposure scenarios.

7.2 Noncancer Hazard

A summary of estimated noncancer hazard indices, for all potentially exposed populations and associated routes of exposure, are presented in Table 15. These results are discussed in this section by receptor population.

As indicated in Table 15, the total (summed across all COPCs) estimated noncancer hazard index for onsite indoor commercial/industrial workers, associated with inhalation of volatile COPCs that are present in indoor air as a result of vapor intrusion (the only complete exposure pathway for this receptor), is 0.051. This estimated hazard is well below the threshold hazard index of 1, and thus may be considered negligible.

As indicated in Table 15, the total (summed across all COPCs and four exposure pathways) estimated noncancer hazard index for onsite outdoor intrusive construction workers is 21, which is 21 times greater than the threshold hazard index of 1. This hazard level is attributable to assumed dermal contact with COPCs in groundwater at the bottom of a construction trench – the estimated hazards associated with inhalation of volatile COPCs in outdoor air, ingestion of COPCs in soil, and dermal contact with COPCs in soil are all well below levels of concern. The groundwater-dermal contact hazard may be attributed primarily to dermal contact with benzene (63 percent of total hazard) and xylenes (23 percent) in groundwater.

As noted above, dermal exposures to soil and groundwater for the intrusive construction worker conservatively assume that the hands and forearms are exposed, *i.e.*, that the worker is wearing a short-sleeved shirt and no gloves. The site Risk Management Plan (ETIC, 2001b), however, requires that constructor contractors develop a site-specific Environmental Health and Safety Plan that specifies appropriate safety equipment to minimize contact between the construction worker and site soil and groundwater. Therefore, actual exposures after implementation of a site-specific Environmental Health and Safety Plan are highly likely to much lower than estimated here, and actual noncancer hazards are likely to be below levels of concern.

As indicated in Table 15, the total (summed across all COPCs) estimated noncancer hazard index for offsite residents, associated with inhalation of volatile COPCs in indoor or outdoor air that have migrated downwind from the site (the only complete exposure pathway for this receptor), is 0.0040. This estimated hazard is well below the threshold hazard index of 1, and may be considered negligible.

8.0 DEVELOPMENT OF RISK-BASED SOIL GAS CLEANUP GOALS

Risk-based soil gas cleanup goals are calculated in anticipation of potential site cleanup. Following the risk evaluation methodologies of Sections 5.0 and 6.0, risk-based indoor air concentrations protective of commercial workers are calculated for both carcinogenic and noncarcinogenic endpoints. These indoor air concentrations are presented in Table 16.

Transport of soil gas from 5.0 feet below ground surface into indoor air of the onsite commercial building is modeled with the Johnson and Ettinger Model as described in

Section 4.5.1. Site-specific soil and building parameters are used. The output parameter of the Johnson and Ettinger model is the attenuation factor (α). By definition, the attenuation factor is the ratio of the COPC concentration in indoor air (resulting from vapor intrusion) to the COPC concentration in soil gas beneath the building:

$$\alpha \equiv \frac{C_{IA}}{C_{SG}} \qquad \text{(Eq. 7)}$$

where:

α = attenuation factor (unitless);

C_{IA} = concentration of COPC in indoor air ($\mu g/m^3$); and

C_{SG} = concentration of COPC in soil gas ($\mu g/m^3$).

An attenuation factor is calculated with the Johnson and Ettinger model for each COPC in soil gas (38 total), at a depth of 5.0 feet bgs. These attenuation factors are presented in Table 16.

Chemical-specific risk-based soil gas cleanup goals at 5.0 feet bgs are calculated from the attenuation factors developed using the Johnson and Ettinger model and from the target indoor air concentrations estimated using standard USEPA and Cal/EPA inhalation risk-assessment methodology. For each chemical, the risk-based soil gas cleanup goal is calculated from:

$$RBCG = \frac{CA}{\alpha} \qquad \text{(Eq. 8)}$$

where:

RBCG = chemical- and depth-specific risk-based soil gas cleanup goal ($\mu g/m^3$);

CA = risk-based target concentration of COPC in indoor air ($\mu g/m^3$); and

α = chemical- and depth-specific attenuation factor (unitless).

Risk-based cleanup goals are presented in Table 16. By definition, each soil gas cleanup goal represents the concentration of that COPC in soil gas at 5.0 feet bgs that would be considered safe and acceptable for commercial use of the existing onsite building. It is important to note that exceedances of these soil gas screening levels should not be interpreted to mean that conditions in the building are unsafe. Rather, the soil gas screening levels are set sufficiently low, and incorporate many levels of conservatism, in order to allow for prudent and proactive additional analyses and actions. The soil gas screening levels developed in this assessment can be used to assess the effectiveness of the cleanup activities.

9.0 UNCERTAINTIES

Many of the assumptions used in the human health screening evaluation – regarding the representativeness of the sampling data, human exposures, fate and transport modeling, and chemical toxicity – are conservative, follow agency guidance, and reflect a 90th or

95th percentile value rather than a typical or average value. The use of several conservative exposure and toxicity assumptions can introduce considerable uncertainty into the human health screening evaluation. By using conservative exposure or toxicity estimates, the evaluation can develop a significant conservative bias that may result in the calculation of significantly higher cancer risks or noncancer hazards than are actually posed by the chemicals present in soil, soil gas, and groundwater. The key uncertainties in the human health screening evaluation are discussed in Appendix B. The uncertainty analysis focuses on the site-specific assumptions contributing most to uncertainty in the risk and hazard calculations, and does not assess the validity of default assumptions used in the health screening evaluation. Assumptions/data evaluated in the uncertainty analysis are: representative concentrations in soil gas, soil properties, and building height.

As noted above and discussed in Appendix B, uncertainties exist in the human health risk evaluation regarding representative concentrations of COPCs in soil gas, soil properties, and building air exchange rate. The baseline evaluation, the results of which are summarized above in Section 7, is based on a combination of assumptions regarding these three parameters, based primarily on DTSC vapor intrusion guidance (Cal/EPA, 2005b), and represents a relatively conservative estimate of potential risk and hazard. Discussed in Appendix B and documented in Appendices C and D are two sensitivity analyses which bound the range of potential risks and hazards associated with the uncertainties in these three input parameters. The first sensitivity analysis combines the most conservative, but likely least representative, options of the three parameters, to produce a high-end estimate of potential risk and hazard. The second sensitivity analysis combines the least conservative, but likely most representative, options of the three parameters, to produce a low-end estimate of potential risks and hazards. The conceptual differences between the three evaluations are summarized in the following table.

Summary of Health Risk Evaluations

Evaluation	Where Documented	Soil Gas Concentrations	Soil Properties	Building Ventilation Rate
High-end estimate	Appendix C	Maxima	Default	Default
Baseline estimate	Main report	Maxima	Site-specific	Default
Low-end estimate	Appendix D	Averages	Site-specific	Site-specific

Based on the results of these analyses, the following conclusions may be drawn regarding the sensitivity of the results of the health risk evaluation to the uncertainties regarding representative concentrations of COPCs in soil gas, soil properties, and building air exchange rate.

- Estimated potential risk and hazard for onsite indoor commercial/industrial workers range over approximately 2-1/2 orders of magnitude. The high-end estimates are approximately 8 times greater than the baseline estimates presented above in Section 7. The low-end estimates are less than the baseline estimates by a factor of approximately 47.

- Estimated potential risk and hazard for onsite outdoor intrusive construction workers are not sensitive to these uncertainties, as the estimated potential health effects for this receptor are driven by dermal contact with groundwater.
- Estimated potential risk and hazard for offsite residents range over approximately 2 orders of magnitude. The high-end estimates are approximately 17 times greater than the baseline estimates presented above in Section 7. The low-end estimates are less than the baseline estimates by a factor of approximately 11.
- The high-end estimates of potential risk are the within the 1×10^{-6} to 1×10^{-4} risk management range for all three receptors (onsite indoor commercial/industrial workers, onsite outdoor intrusive construction workers, and offsite residents). The high-end estimates of potential hazard are below the threshold hazard level of 1 for onsite indoor commercial/industrial workers and offsite residents. The high-end estimate of potential hazard exceeds the threshold hazard level of 1 for onsite outdoor intrusive construction workers; as noted above, this hazard is driven by dermal contact with groundwater.
- The low-end estimates of potential risk are below the 1×10^{-6} to 1×10^{-4} risk management range for onsite indoor commercial/industrial workers and offsite residents, and within the risk management range for onsite outdoor intrusive construction workers. The low-end estimates of potential hazard are below the threshold hazard level of 1 for onsite indoor commercial/industrial workers and offsite residents. The low-end estimate of potential hazard exceeds the threshold hazard level of 1 for onsite outdoor intrusive construction workers; as noted above, this hazard is driven by dermal contact with groundwater.

10.0 CONCLUSIONS

This report describes the methodology and results of a screening level human health risk evaluation for the northwestern portion of the commercial property located at 1310 14th Street in Oakland, California. The potential health impacts to onsite and offsite populations, associated with exposures to site-related chemicals, have been quantified. Of note, the site deed restriction (COFS, 2000) effectively breaks certain transport pathways, including transport from site soil to other media via surface water runoff or dust emissions, and extraction of groundwater for use as potable water supply; and physically prevents direct contact between onsite commercial workers and impacted site soils.

Potentially exposed populations which have been considered in this evaluation are onsite indoor commercial/industrial workers who are assumed to work full-time in the onsite commercial building for 25 years, onsite outdoor intrusive construction workers who are assumed to work onsite for 4 weeks, and offsite residents who are assumed to live near the site for 30 years. Estimated potential cancer risks for residential and commercial receptor populations are compared to the typical points of departure, with respect to risk management, of 1×10^{-6} and 1×10^{-5}, respectively. Estimated potential noncancer hazard indices for all receptor populations are compared to the threshold noncancer hazard index of 1.

The main conclusions of the screening health risk evaluation are as follows.

- The estimated potential cancer risk for onsite indoor commercial workers is 8.0×10^{-6}. The estimated potential noncancer hazard index for onsite indoor commercial workers is 0.051. Both the estimated cancer risk and the noncancer hazard index are below levels of concern.
- The estimated potential cancer risk for onsite outdoor intrusive construction workers is 9.8×10^{-5}. The estimated potential noncancer hazard index for onsite outdoor intrusive construction workers is 21. Both the estimated cancer risk and the noncancer hazard index are above levels of concern. However, this cancer risk and noncancer hazard are attributable entirely to assumed dermal contact with COPCs in groundwater at the bottom of a construction trench, and do not account for personal protective equipment that intrusive construction workers would be required to use. Actual exposures after implementation of a site-specific Environmental Health and Safety Plan are highly likely to much lower than estimated here, and the actual cancer risk and hazard are likely to be below levels of concern.
- The estimated potential cancer risk for offsite residents is 4.1×10^{-7}. The estimated noncancer hazard index for offsite residents is 0.0040. Both the estimated cancer risk and the noncancer hazard index are below levels of concern.

The human health risk evaluation presented in this report is a screening-level evaluation that is based on a combination of conservative assumptions – regarding vapor intrusion modeling assumptions, exposure assumptions, toxicological data, summation of health effects across chemicals and exposure routes – and therefore it is likely that actual health risks to exposed populations could be lower, or significantly lower, than those estimated in this analysis.

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Table 1. Representative Concentrations of Chemicals of Potential Concern in Soil Gas

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Acetone	620
Benzene	40,000
1,3-Butadiene	310
2-Butanone (methyl ethyl ketone)	420
Carbon disulfide	440
Chlorobenzene	160
Chloroform	170
Chloromethane (methyl chloride)	75
Cyclohexane	480
1,2-Dichlorobenzene	2,900
1,3-Dichlorobenzene	210
1,4-Dichlorobenzene	460
Dichlorodifluoromethane (Freon 12)	10,000
1,1-Dichloroethane	140
1,2-Dichloroethane	140
1,1-Dichloroethene (1,1-DCE)	140
cis-1,2-Dichloroethene (cis-1,2-DCE)	140
1,4-Dioxane	500
Ethanol	2,600
Ethylbenzene	7,700
4-Ethyltoluene	3,700
Heptane	550
Hexane	63,000
Methyl tertiary butyl ether (MTBE)	500
Methylene chloride	1,200
4-Methyl-2-pentanone (methyl isobutyl ketone)	550
2-Propanol	350
Styrene	150
Tetrachloroethene (PCE)	1,100
Tetrahydrofuran	420
Toluene	32,000
1,1,1-Trichloroethane	190

Table 1. Representative Concentrations of Chemicals of Potential Concern in Soil Gas

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Trichloroethene (TCE)	190
Trichlorofluoromethane (Freon 11)	200
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	270
1,2,4-Trimethylbenzene	2,900
1,3,5-Trimethylbenzene	3,600
Xylenes	19,000

Notes:

(1) Soil gas samples were collected at depths of 3 and 5 feet below ground surface (bgs) in 1999 and 2008, respectively.

(2) Concentration units are micrograms per cubic meter ($\mu g/m^3$).

(3) Representative concentration is the maximum of all samples collected in 1999 and 2008.

Table 2. Physicochemical Properties of Chemicals of Potential Concern

Chemical of Potential Concern	Diffusivity in Air (D_a)		Diffusivity In Water (D_w)		Henry's Law Constant at Reference Temperature (H)		Henry's Law Constant Reference Temperature (T_R)		Henry's Law Constant Unitless (H')		Enthalpy of Vaporization at The Normal Boiling Point ($DH_{v,b}$)		Normal Boiling Point (T_B)		Critical Temperature (T_C)		Organic Carbon Partition Coefficient, (K_{oc})		Pure Component Water Solubility, (S)		Vapor Pressure, (VP)		Dermal Permeability Constant, (K_p)		Soil Absorption Factor (ABS)	
	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source	Value	Source
	(cm^2/s)		(cm^2/s)		(atm-m^3/mol)		(^{o}C)		(unitless)		(cal/mol)		(^{o}K)		(^{o}K)		(cm^3/g)		(mg/L)		(mmHg)		(cm/hr)		(unitless)	
Acetone	1.24E-01	1	1.14E-05	1	3.87E-05	1	2.50E+01	1	1.59E-03	1	6.96E+03	1	3.29E+02	1	5.08E+02	1	5.75E-01	1	1.00E+06	1	5.06E+02	1	NA	NA	0.1	7
Benzene	8.80E-02	1	9.80E-06	1	5.54E-03	1	2.50E+01	1	2.27E-01	1	7.34E+03	1	3.53E+02	1	5.62E+02	1	5.89E+01	1	1.79E+03	1	9.64E+01	1	1.49E-02	3	0.1	7
Bromodichloromethane	2.98E-02	1	1.06E-05	1	1.60E-03	1	2.50E+01	1	6.54E-02	1	7.80E+03	1	3.63E+02	1	5.86E+02	1	5.50E+01	1	6.74E+03	1	4.99E+01	1	4.62E-03	3	0.1	7
1,3-Butadiene	2.49E-01	1	1.08E-05	1	7.34E-02	1	2.50E+01	1	3.01E+00	1	5.37E+03	1	2.69E+02	1	4.25E+02	1	1.91E+01	1	7.35E+02	1	7.58E+02	1	1.64E-02	3	0.1	7
2-Butanone (methyl ethyl ketone)	8.08E-02	1	9.80E-06	1	5.58E-05	1	2.50E+01	1	2.29E-03	1	7.48E+03	1	3.53E+02	1	5.37E+02	1	2.30E+00	1	2.23E+05	1	1.31E+02	1	9.63E-04	3	0.1	7
Carbon disulfide	1.04E-01	1	1.00E-05	1	3.02E-02	1	2.50E+01	1	1.24E+00	1	6.39E+03	1	3.19E+02	1	5.52E+02	1	4.57E+01	1	1.19E+03	1	3.58E+02	1	1.72E-02	3	0.1	7
Chlorobenzene	7.30E-02	1	8.70E-06	1	3.69E-03	1	2.50E+01	1	1.51E-01	1	8.41E+03	1	4.05E+02	1	6.32E+02	1	2.19E+02	1	4.72E+02	1	1.18E+01	1	2.82E-02	3	0.1	7
Chloroethane (ethyl chloride)	2.71E-01	1	1.15E-05	1	8.80E-03	1	2.50E+01	1	3.61E-01	1	5.88E+03	1	2.85E+02	1	4.60E+02	1	4.40E+00	1	5.68E+03	1	5.89E+02	1	6.07E-03	3	0.1	7
Chloroform	1.04E-01	1	1.00E-05	1	3.66E-03	1	2.50E+01	1	1.50E-01	1	6.99E+03	1	3.34E+02	1	5.36E+02	1	3.98E+01	1	7.92E+03	1	1.85E+02	1	6.83E-03	3	0.1	7
Chloromethane (methyl chloride)	1.26E-01	1	6.50E-06	1	8.80E-03	1	2.50E+01	1	3.61E-01	1	5.11E+03	1	2.49E+02	1	4.16E+02	1	2.12E+00	1	5.33E+03	1	7.05E+02	1	3.28E-03	3	0.1	7
Cyclohexane	8.00E-02	2	9.10E-06	2	1.50E-01	4	2.50E+01	4	6.10E+00	2	NA	NA	3.54E+02	4	NA	NA	1.66E+02	2	5.50E+01	2	9.69E+01	4	NA	NA	0.1	7
1,2-Dichlorobenzene	6.90E-02	1	7.90E-06	1	1.90E-03	1	2.50E+01	1	7.77E-02	1	9.70E+03	1	4.54E+02	1	7.05E+02	1	6.17E+02	1	1.56E+02	1	1.53E+00	1	4.13E-02	3	0.1	7
1,3-Dichlorobenzene	6.92E-02	1	7.86E-06	1	3.09E-03	1	2.50E+01	1	1.27E-01	1	9.23E+03	1	4.46E+02	1	6.84E+02	1	1.98E+03	1	1.34E+02	1	2.14E+00	1	5.79E-02	3	0.1	7
1,4-Dichlorobenzene	6.90E-02	1	7.90E-06	1	2.39E-03	1	2.50E+01	1	9.82E-02	1	9.27E+03	1	4.47E+02	1	6.85E+02	1	6.17E+02	1	7.90E+01	1	9.78E-01	1	4.20E-02	3	0.1	7
Dichlorodifluoromethane (Freon 12)	6.65E-02	1	9.92E-06	1	3.42E-01	1	2.50E+01	1	1.40E+01	1	9.42E+03	1	2.43E+02	1	3.85E+02	1	4.57E+02	1	2.80E+02	1	6.02E+02	1	8.95E-03	3	0.1	7
1,1-Dichloroethane	7.42E-02	1	1.05E-05	1	5.61E-03	1	2.50E+01	1	2.30E-01	1	6.90E+03	1	3.31E+02	1	5.23E+02	1	3.16E+01	1	5.06E+03	1	2.18E+02	1	6.74E-03	3	0.1	7
1,2-Dichloroethane	1.04E-01	1	9.90E-06	1	9.77E-04	1	2.50E+01	1	4.00E-02	1	7.64E+03	1	3.57E+02	1	5.61E+02	1	1.74E+01	1	8.52E+03	1	6.39E+01	1	4.20E-03	3	0.1	7
1,1-Dichloroethene (1,1-DCE)	9.00E-02	1	1.04E-05	1	2.60E-02	1	2.50E+01	1	1.07E+00	1	6.25E+03	1	3.05E+02	1	5.76E+02	1	5.89E+01	1	2.25E+03	1	4.59E+02	1	1.17E-02	3	0.1	7
cis-1,2-Dichloroethene (cis-1,2-DCE)	7.36E-02	1	1.13E-05	1	4.07E-03	1	2.50E+01	1	1.67E-01	1	7.19E+03	1	3.34E+02	1	5.44E+02	1	3.55E+01	1	3.50E+03	1	1.12E+02	1	NA	NA	0.1	7
1,4-Dioxane	8.70E-02	2	1.10E-05	2	4.80E-06	4	2.50E+01	4	2.00E-04	2	NA	NA	3.75E+02	4	NA	NA	1.00E+00	2	1.00E+06	2	3.81E+01	4	3.32E-04	3	0.1	7
Ethanol	1.23E-01	4	1.30E-05	6	5.00E-06	4	2.50E+01	4	2.05E-04	4	NA	NA	3.51E+02	4	NA	NA	1.85E-01	4	1.00E+06	4	5.93E+01	4	5.38E-04	3	0.1	7
Ethylbenzene	7.50E-02	1	7.80E-06	1	7.86E-03	1	2.50E+01	1	3.22E-01	1	8.50E+03	1	4.09E+02	1	6.17E+02	1	3.63E+02	1	1.69E+02	1	9.51E+00	1	4.93E-02	3	0.1	7
4-Ethyltoluene	6.81E-02	4	7.84E-06	6	5.01E-03	4	2.50E+01	4	2.05E-01	4	NA	NA	4.33E+02	4	NA	NA	1.77E+03	4	9.49E+01	4	3.01E+00	4	NA	NA	0.1	7
Heptane	7.04E-02	4	7.59E-06	6	2.00E+00	4	2.50E+01	4	8.20E+01	4	NA	NA	3.72E+02	4	NA	NA	1.94E+04	4	3.40E+00	4	5.16E+01	4	NA	NA	0.1	7
Hexane	2.00E-01	1	7.77E-06	1	1.66E+00	1	2.50E+01	1	6.82E+01	1	6.90E+03	1	3.42E+02	1	5.08E+02	1	4.34E+01	1	1.24E+01	1	1.82E+02	1	NA	NA	0.1	7
Methyl tertiary butyl ether (MTBE)	1.02E-01	1	1.05E-05	1	6.23E-04	1	2.50E+01	1	2.56E-02	1	6.68E+03	1	3.28E+02	1	4.97E+02	1	7.26E+00	1	5.10E+04	1	2.74E+02	1	NA	NA	0.1	7
Methylene chloride	1.01E-01	1	1.17E-05	1	2.18E-03	1	2.50E+01	1	8.96E-02	1	6.71E+03	1	3.13E+02	1	5.10E+02	1	1.17E+01	1	1.30E+04	1	2.55E+02	1	3.54E-03	3	0.1	7
4-Methyl-2-pentanone (methyl isobutyl ketone)	7.50E-02	1	7.80E-06	1	1.38E-04	1	2.50E+01	1	5.64E-03	1	8.24E+03	1	3.90E+02	1	5.71E+02	1	9.06E+00	1	1.90E+04	1	1.98E+01	1	2.66E-03	3	0.1	7
2-Propanol	1.02E-01	4	1.04E-05	6	8.10E-06	4	2.50E+01	4	3.32E-04	4	NA	NA	3.55E+02	4	NA	NA	4.28E-01	4	1.00E+06	4	4.54E+01	4	NA	NA	0.1	7
Styrene	7.10E-02	1	8.00E-06	1	2.74E-03	1	2.50E+01	1	1.12E-01	1	8.74E+03	1	4.18E+02	1	6.36E+02	1	7.76E+02	1	3.10E+02	1	6.21E+00	1	3.73E-02	3	0.1	7
1,1,2,2-Tetrachloroethane	7.10E-02	1	7.90E-06	1	3.44E-04	1	2.50E+01	1	1.41E-02	1	9.00E+03	1	4.20E+02	1	6.61E+02	1	9.33E+01	1	2.96E+03	1	4.62E+00	1	6.94E-03	3	0.1	7
Tetrachloroethene (PCE)	7.20E-02	1	8.20E-06	1	1.84E-02	1	2.50E+01	1	7.53E-01	1	8.29E+03	1	3.94E+02	1	6.20E+02	1	1.55E+02	1	2.00E+02	1	1.68E+01	1	3.34E-02	3	0.1	7
Tetrahydrofuran	1.02E-01	4	1.05E-05	6	7.05E-05	4	2.50E+01	4	2.89E-03	4	NA	NA	3.38E+02	4	NA	NA	1.11E+00	4	1.00E+06	4	7.43E+02	4	NA	NA	0.1	7
Toluene	8.70E-02	1	8.60E-06	1	6.62E-03	1	2.50E+01	1	2.72E-01	1	7.93E+03	1	3.84E+02	1	5.92E+02	1	1.82E+02	1	5.26E+02	1	2.87E+01	1	3.11E-02	3	0.1	7
1,1,1-Trichloroethane	7.80E-02	1	8.80E-06	1	1.72E-02	1	2.50E+01	1	7.03E-01	1	7.14E+03	1	3.47E+02	1	5.45E+02	1	1.10E+02	1	1.33E+03	1	1.30E+02	1	1.26E-02	3	0.1	7
Trichloroethene (TCE)	7.90E-02	1	9.10E-06	1	1.03E-02	1	2.50E+01	1	4.21E-01	1	7.51E+03	1	3.60E+02	1	5.44E+02	1	1.66E+02	1	1.47E+03	1	8.75E+01	1	1.16E-02	3	0.1	7
Trichlorofluoromethane (Freon 11)	8.70E-02	1	9.70E-06	1	9.68E-02	1	2.50E+01	1	3.97E+00	1	6.00E+03	1	2.97E+02	1	4.71E+02	1	4.97E+02	1	1.10E+03	1	5.89E+02	1	1.27E-02	3	0.1	7
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	7.80E-02	1	8.20E-06	1	4.80E-01	1	2.50E+01	1	1.97E+01	1	6.46E+03	1	3.21E+02	1	4.87E+02	1	1.11E+04	1	1.70E+02	1	3.31E+02	1	NA	NA	0.1	7
1,2,4-Trimethylbenzene	6.06E-02	1	7.92E-06	1	6.14E-03	1	2.50E+01	1	2.52E-01	1	9.37E+03	1	4.42E+02	1	6.49E+02	1	1.35E+03	1	5.70E+01	1	2.21E+00	1	NA	NA	0.1	7
1,3,5-Trimethylbenzene	6.02E-02	1	8.67E-06	1	5.87E-03	1	2.50E+01	1	2.41E-01	1	9.32E+03	1	4.38E+02	1	6.37E+02	1	1.35E+03	1	2.00E+00	1	7.42E-02	1	NA	NA	0.1	7
Xylenes	8.50E-02	2	9.90E-06	2	7.30E-03	5	2.50E+01	1,8	2.70E-01	2	8.66E+03	1,8	4.18E+02	1,8	6.30E+02	1,8	4.43E+02	2	1.06E+02	2	6.60E+00	1,8	NA	NA	0.1	7

Table 2. Physicochemical Properties of Chemicals of Potential Concern

Notes:

(a) Sources of chemical properties are as follows:

- 1 – USEPA. 2003. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Office of Emergency and Remedial Response. June 19.
- 2 – USEPA. 2008. Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites. URL: http://www.epa.gov/region09/waste/sfund/prg/. September 12.
- 3 – USEPA. 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. July.
- 4 – SRC PhysProp Database. 2003. Found at http://esc.syrres.com/interkow/physdemo.htm. And methods from Schwarzenback R. P. et al. 1993. Environmental Organic Chemistry. John Wiley and Sons, Inc., New York, NY.
- 5 – Regional Water Quality Control Board (RWQCB). 2000. Risked Based Screening Levels. Table J. Physio-chemical and Toxicity Constants used in Models. August.
- 6 – USEPA. 2006. *Water9, Version 3.* June 29. URL: http://www.epa.gov/ttn/chief/software/water/water9_3
- 7 – Cal/EPA. 2004. Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control. January.
- 8 – For xylenes, o-xylene physicochemical properties are used.

(b) "NA" indicates not available.

Table 3. Johnson and Ettinger Model Inputs

Parameter	Symbol	Value	Units	Reference
Building Properties				
Depth below grade to bottom of enclosed space floor	L_F	15	cm	DTSC/HERD default (Cal/EPA, 2005a; 2005b)
Area of enclosed space below grade	$A_{b,sg}$	2.05E+07	cm^2	Site-specific
Building air exchange rate	AXR_b	1	hr^{-1}	DTSC default (Cal/EPA, 2005b)
Building height	Bh	503	cm	Site-specific
Building ventilation rate	Q_b	2.86E+06	cm^3/s	Calculated: $A_{b,sg}$ x AXR_b x B_h
Vapor flow rate into building	Q_{soil}	102	L/min	Calculated (Cal/EPA, 2005b)
Vapor flow rate into building	Q_{soil}	1707	cm^3/s	Calculated via units conversion
Soil Properties				
Average soil temperature	T_s	17	^oC	Region-specific (USEPA, 2004)
SCS soil type	Site-specific	Site-specific	–	Site-specific
Dry bulk density	ρ_b	1.79	g/cm^3	Site-specific average
Total porosity	n	0.339	cm^3/cm^3	Site-specific average
Water-filled porosity	θ_w	0.236	cm^3/cm^3	Site-specific average
Air-filled porosity	θ_a	0.103	cm^3/cm^3	Site-specific average

Table 4. Exposure Point Concentrations of Chemicals of Potential Concern in Indoor Air of the Onsite Building

	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
Analyte	C_{SG} (μg/m^3)	Depth (cm)	α	C_{IA} (μg/m^3)
Acetone	620	91	9.9E-05	6.1E-02
Benzene	40,000	91	3.5E-05	1.4E+00
1,3-Butadiene	310	91	8.8E-05	2.7E-02
2-Butanone (methyl ethyl ketone)	420	91	6.7E-05	2.8E-02
Carbon disulfide	440	91	4.0E-05	1.8E-02
Chlorobenzene	160	91	2.9E-05	4.7E-03
Chloroform	170	91	4.1E-05	7.0E-03
Chloromethane (methyl chloride)	75	91	4.8E-05	3.6E-03
Cyclohexane	480	91	3.2E-05	1.5E-02
1,2-Dichlorobenzene	2,900	91	2.8E-05	8.3E-02
1,3-Dichlorobenzene	210	91	2.8E-05	5.9E-03
1,4-Dichlorobenzene	460	91	2.8E-05	1.3E-02
Dichlorodifluoromethane (Freon 12)	10,000	91	2.7E-05	2.7E-01
1,1-Dichloroethane	140	91	3.0E-05	4.2E-03
1,2-Dichloroethane	140	91	4.3E-05	6.0E-03
1,1-Dichloroethene (1,1-DCE)	140	91	3.5E-05	5.0E-03
cis-1,2-Dichloroethene (cis-1,2-DCE)	140	91	3.0E-05	4.2E-03
1,4-Dioxane	500	91	2.4E-04	1.2E-01
Ethanol	2,600	91	2.6E-04	6.8E-01
Ethylbenzene	7,700	91	3.0E-05	2.3E-01
4-Ethyltoluene	3,700	91	2.7E-05	1.0E-01
Heptane	550	91	2.8E-05	1.5E-02
Hexane	63,000	91	7.3E-05	4.6E+00
Methyl tertiary butyl ether (MTBE)	500	91	4.3E-05	2.2E-02
Methylene chloride	1,200	91	4.0E-05	4.8E-02
4-Methyl-2-pentanone (methyl isobutyl ketone)	550	91	4.2E-05	2.3E-02
2-Propanol	350	91	1.7E-04	6.1E-02
Styrene	150	91	2.9E-05	4.3E-03
Tetrachloroethene (PCE)	1,100	91	2.9E-05	3.2E-02
Tetrahydrofuran	420	91	6.0E-05	2.5E-02

Table 4. Exposure Point Concentrations of Chemicals of Potential Concern in Indoor Air of the Onsite Building

	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
Analyte	C_{SG} (µg/m^3)	Depth (cm)	α	C_{IA} (µg/m^3)
Toluene	32,000	91	3.4E-05	1.1E+00
1,1,1-Trichloroethane	190	91	3.1E-05	5.9E-03
Trichloroethene (TCE)	190	91	3.1E-05	6.0E-03
Trichlorofluoromethane (Freon 11)	200	91	3.4E-05	6.8E-03
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	270	91	3.1E-05	8.3E-03
1,2,4-Trimethylbenzene	2,900	91	2.5E-05	7.1E-02
1,3,5-Trimethylbenzene	3,600	91	2.4E-05	8.8E-02
Xylenes	19,000	91	3.4E-05	6.4E-01

Notes:

(1) This vapor intrusion transport analysis is based on maximum concentrations of volatile organic compounds (VOCs) in soil gas from the August 1999 and May 2008 site investigations (see Table 1). Chemicals of potential concern (COPCs) with respect to vapor intrusion are those VOCs detected above reporting limits in at least one soil gas sample.

(2) The shallower sampling depth between the 1999 and 2008 sampling events, 3 feet below ground surface, is used in the model because it is a more conservative assumption, i.e., it produces higher indoor air concentrations.

(3) Non source-related inputs to the Johnson and Ettinger Model are documented in Table 3. Shown here are the results of the Johnson and Ettinger Model, consisting of, for each chemical of potential concern, the predicted attenuation factor (α) and the predicted concentration of the chemical in indoor air (CIA).

Table 5. Dispersion Factor Calculation

Parameter	Name	Value	Units	Reference
A_{site}	Area of site	1.3	acre	Area of deed-restricted portion of the site
A	Dispersion coefficient	13.81	–	Zone 2 / San Francisco (USEPA, 2002)
B	Dispersion coefficient	20.16	–	Zone 2 / San Francisco (USEPA, 2002)
C	Dispersion coefficient	234.29	–	Zone 2 / San Francisco (USEPA, 2002)
Q/C_{vol}	Dispersion factor	74.89	$g/m^2/s$ per kg/m^3	Equation D-1 (USEPA, 2002)

Table 6. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air

Chemical of Potential Concern	Concentration (μg/m^3)
Acetone	9.6E-04
Benzene	2.3E-02
1,3-Butadiene	5.0E-04
2-Butanone (methyl ethyl ketone)	4.0E-04
Carbon disulfide	2.9E-04
Chlorobenzene	7.6E-05
Chloroform	1.1E-04
Chloromethane (methyl chloride)	6.1E-05
Cyclohexane	2.5E-04
1,2-Dichlorobenzene	1.3E-03
1,3-Dichlorobenzene	9.5E-05
1,4-Dichlorobenzene	2.1E-04
Dichlorodifluoromethane (Freon 12)	4.3E-03
1,1-Dichloroethane	6.7E-05
1,2-Dichloroethane	9.7E-05
1,1-Dichloroethene (1,1-DCE)	8.1E-05
cis-1,2-Dichloroethene (cis-1,2-DCE)	6.7E-05
1,4-Dioxane	3.1E-03
Ethanol	1.9E-02
Ethylbenzene	3.7E-03
4-Ethyltoluene	1.6E-03
Heptane	2.5E-04
Hexane	8.1E-02
Methyl tertiary butyl ether (MTBE)	3.5E-04
Methylene chloride	8.0E-04
4-Methyl-2-pentanone (methyl isobutyl ketone)	3.4E-04
2-Propanol	1.4E-03
Styrene	7.0E-05
Tetrachloroethene (PCE)	5.1E-04
Tetrahydrofuran	4.3E-04
Toluene	1.8E-02
1,1,1-Trichloroethane	9.6E-05

Table 6. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Trichloroethene (TCE)	9.7E-05
Trichlorofluoromethane (Freon 11)	1.1E-04
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1.4E-04
1,2,4-Trimethylbenzene	1.1E-03
1,3,5-Trimethylbenzene	1.4E-03
Xylenes	1.0E-02

Table 7. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Soil

Chemical of Potential Concern	Concentration (mg/kg)
Benzene	140
Chlorobenzene	0.0017
1,2-Dichlorobenzene	3.1
1,3-Dichlorobenzene	0.038
1,4-Dichlorobenzene	0.33
1,2-Dichloroethane	0.43
Ethylbenzene	170
Methyl tertiary butyl ether (MTBE)	0.084
Toluene	580
Xylenes	990

Notes:

(1) Concentration units are milligrams per kilograms (mg/kg).

(2) Exposure point concentrations (EPCs) in soil are historical maximum detected concentrations.

Table 8. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Groundwater

Chemical of Potential Concern	Concentration (μg/L)
Benzene	99,000
Bromodichloromethane	0.84
Chlorobenzene	0.90
Chloroethane (ethyl chloride)	46
Chloroform	4.7
Chloromethane (methyl chloride)	13
1,2-Dichlorobenzene	0.50
Dichlorodifluoromethane (Freon 12)	3.8
1,1-Dichloroethane	240
1,2-Dichloroethane	2,200
1,1-Dichloroethene (1,1-DCE)	31
cis-1,2-Dichloroethene (cis-1,2-DCE)	8.9
Ethylbenzene	80,000
Methyl tertiary butyl ether (MTBE)	2,800
Methylene chloride	7.9
1,1,2,2-Tetrachloroethane	0.50
Toluene	110,000
1,1,1-Trichloroethane	1.0
Trichloroethene (TCE)	3.8
Xylenes	640,000

Notes:

(1) Concentration units are micrograms per liter (μg/L).

(2) Exposure point concentrations (EPCs) in groundwater are historical maximum detected concentrations.

Table 9. Chronic Daily Intake (CDI) Equations

Inhalation of Vapors

Noncancer

$$CDI_{inhv,worker} = \frac{C_a \times BR_{worker} \times EF_{worker} \times ED_{worker}}{BW_{worker} \times AT_{nc,worker}}$$

$$CDI_{inhv,child} = \frac{C_a \times BR_{child} \times EF_{child} \times ED_{child}}{BW_{child} \times AT_{nc,child}}$$

Cancer

$$CDI_{inhv,worker} = \frac{C_a \times BR_{worker} \times EF_{worker} \times ED_{worker}}{BW_{worker} \times AT_{c}}$$

$$CDI_{inhv,age\text{-}adjusted} = \frac{C_a \times BR_{child} \times EF_{child} \times ED_{child}}{BW_{child} \times AT_{c}} + \frac{C_a \times BR_{adult} \times EF_{adult} \times ED_{adult,\,age\text{-}adjusted}}{BW_{adult} \times AT_{c}}$$

Soil Ingestion

Noncancer

$$CDI_{ing,worker} = \frac{C_s \times IR_{worker} \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{nc,worker}}$$

Cancer

$$CDI_{ing,worker} = \frac{C_s \times IR_{worker} \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{c}}$$

Soil Dermal Contact

Noncancer

$$CDI_{derm\_s,worker} = \frac{C_s \times SA_{worker} \times AF_{worker} \times ABS \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{nc,worker}}$$

Cancer

$$CDI_{derm\_s,worker} = \frac{C_s \times SA_{worker} \times AF_{worker} \times ABS \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{c}}$$

Groundwater Dermal Contact

Noncancer

$$CDI_{derm\_gw,worker} = \frac{C_w \times SA_{worker} \times K_P \times ET_{worker} \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{nc,worker}}$$

Cancer

$$CDI_{derm\_gw,worker} = \frac{C_w \times SA_{worker} \times K_P \times ET_{worker} \times EF_{worker} \times ED_{worker} \times CF}{BW_{worker} \times AT_{c}}$$

Notes:

(1) Definitions and values of symbols used are given in Tables 2 and 10.

(2) Worker indicates commercial and construction worker scenario; adult and child indicate residential scenario.

Table 10. Exposure Assumptions

Parameter	Symbol	Units	Offsite Resident Adult	Offsite Resident Age-Adjusted	Offsite Resident Child	Indoor Commercial Worker	Onsite Outdoor Intrusive Construction Worker
Dermal Contact with Soil and Groundwater							
Surface area	SA	cm^2/d	NA	NA	NA	NA	5,700
Adherence factor (soil only)	AF	mg/cm^2	NA	NA	NA	NA	0.8
Conversion Factor	CF	kg/mg	NA	NA	NA	NA	1.0E-06
Ingestion of Soil							
Ingestion Rate	IR	mg/d	NA	NA	NA	NA	330
Conversion Factor	CF	kg/mg	NA	NA	NA	NA	0.000001
Inhalation of Volatiles							
Breathing Rate	BR	m^3/d	20	20	10	14	20
General Intake Parameters							
Exposure Time		hrs/d	NA	NA	NA	8	8
Exposure Frequency	EF	d/y	350	350	350	250	20
Exposure Duration	ED	y	30	24	6	25	1
Body Weight	BW	kg	70	70	15	70	70
Averaging Time-Carcinogens	AT_c	d	25,550	25,550	25,550	25,550	25,550
Averaging Time-Noncarcinogens	AT_{nc}	d	10,950	NA	2,190	9,125	365

Notes:

(1) Exposure assumptions are derived from default values for the commercial scenario established in Cal/EPA's *Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities* (Cal/EPA, 2005).

(2) For the outdoor instrusive construction worker, it is assumed that the duration of instrusive construction work is 4 weeks (20 work days).

Table 11. Chronic Daily Intakes – Cancer

	Onsite Commercial Worker	Onsite Intrusive Construction Worker				Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact	Inhalation
Acetone	3.0E-06	2.1E-10	–	–	–	1.4E-07
Benzene	6.8E-05	5.1E-09	5.2E-07	7.1E-07	7.5E-04	3.4E-06
Bromodichloromethane	–	–	–	–	2.0E-09	–
1,3-Butadiene	1.3E-06	1.1E-10	–	–	–	7.4E-08
2-Butanone (methyl ethyl ketone)	1.4E-06	9.1E-11	–	–	–	6.0E-08
Carbon disulfide	8.7E-07	6.6E-11	–	–	–	4.4E-08
Chlorobenzene	2.3E-07	1.7E-11	6.3E-12	8.7E-12	1.3E-08	1.1E-08
Chloroethane (ethyl chloride)	–	–	–	–	1.4E-07	–
Chloroform	3.4E-07	2.6E-11	–	–	1.6E-08	1.7E-08
Chloromethane (methyl chloride)	1.8E-07	1.4E-11	–	–	2.2E-08	9.1E-09
Cyclohexane	7.4E-07	5.5E-11	–	–	–	3.7E-08
1,2-Dichlorobenzene	4.0E-06	2.9E-10	1.1E-08	1.6E-08	1.1E-08	2.0E-07
1,3-Dichlorobenzene	2.9E-07	2.1E-11	1.4E-10	1.9E-10	–	1.4E-08
1,4-Dichlorobenzene	6.4E-07	4.7E-11	1.2E-09	1.7E-09	–	3.1E-08
Dichlorodifluoromethane (Freon 12)	1.3E-05	9.6E-10	–	–	1.7E-08	6.4E-07
1,1-Dichloroethane	2.0E-07	1.5E-11	–	–	8.3E-07	1.0E-08
1,2-Dichloroethane	2.9E-07	2.2E-11	1.6E-09	2.2E-09	4.7E-06	1.4E-08
1,1-Dichloroethene (1,1-DCE)	2.4E-07	1.8E-11	–	–	1.8E-07	1.2E-08
cis-1,2-Dichloroethene (cis-1,2-DCE)	2.0E-07	1.5E-11	–	–	2.9E-08	1.0E-08
1,4-Dioxane	5.9E-06	7.0E-10	–	–	–	4.7E-07
Ethanol	3.3E-05	4.3E-09	–	–	–	2.8E-06
Ethylbenzene	1.1E-05	8.4E-10	6.3E-07	8.7E-07	2.0E-03	5.6E-07
4-Ethyltoluene	4.9E-06	3.7E-10	–	–	–	2.4E-07
Heptane	7.5E-07	5.6E-11	–	–	–	3.7E-08
Hexane	2.3E-04	1.8E-08	–	–	–	1.2E-05

Table 11. Chronic Daily Intakes – Cancer

	Onsite Commercial Worker	Onsite Intrusive Construction Worker				Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact	Inhalation
Methyl tertiary butyl ether (MTBE)	1.1E-06	7.8E-11	3.1E-10	4.3E-10	5.0E-06	5.2E-08
Methylene chloride	2.4E-06	1.8E-10	–	–	1.4E-08	1.2E-07
4-Methyl-2-pentanone (methyl isobutyl ketone)	1.1E-06	7.7E-11	–	–	–	5.1E-08
2-Propanol	3.0E-06	3.1E-10	–	–	–	2.0E-07
Styrene	2.1E-07	1.6E-11	–	–	–	1.0E-08
1,1,2,2-Tetrachloroethane	–	–	–	–	1.8E-09	–
Tetrachloroethene (PCE)	1.5E-06	1.1E-10	–	–	–	7.6E-08
Tetrahydrofuran	1.2E-06	9.7E-11	–	–	–	6.5E-08
Toluene	5.4E-05	4.0E-09	2.1E-06	3.0E-06	1.7E-03	2.7E-06
1,1,1-Trichloroethane	2.9E-07	2.1E-11	–	–	6.4E-09	1.4E-08
Trichloroethene (TCE)	2.9E-07	2.2E-11	–	–	2.3E-08	1.4E-08
Trichlorofluoromethane (Freon 11)	3.3E-07	2.5E-11	–	–	–	1.7E-08
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	4.1E-07	3.0E-11	–	–	–	2.0E-08
1,2,4-Trimethylbenzene	3.5E-06	2.5E-10	–	–	–	1.7E-07
1,3,5-Trimethylbenzene	4.3E-06	3.1E-10	–	–	–	2.1E-07
Xylenes	3.1E-05	2.3E-09	3.7E-06	5.0E-06	1.3E-02	1.6E-06

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

Table 12. Chronic Daily Intakes – Noncancer

	Onsite Commercial Worker	Onsite Intrusive Construction Worker				Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact	Inhalation
Acetone	8.4E-06	1.7E-09	–	–	–	6.9E-08
Benzene	1.9E-04	4.2E-05	9.0E-03	1.2E-02	1.3E+01	1.7E-03
Bromodichloromethane	–	–	–	–	6.9E-06	–
1,3-Butadiene	3.8E-06	1.4E-05	–	–	–	5.6E-04
2-Butanone (methyl ethyl ketone)	3.8E-06	4.4E-09	–	–	–	1.8E-07
Carbon disulfide	2.4E-06	2.3E-08	–	–	–	9.4E-07
Chlorobenzene	6.5E-07	4.2E-09	2.2E-08	3.0E-08	4.5E-05	1.7E-07
Chloroethane (ethyl chloride)	–	–	–	–	2.5E-05	–
Chloroform	9.5E-07	2.1E-08	–	–	1.1E-04	8.6E-07
Chloromethane (methyl chloride)	5.0E-07	3.7E-08	–	–	5.9E-05	1.5E-06
Cyclohexane	2.1E-06	2.3E-09	–	–	–	9.2E-08
1,2-Dichlorobenzene	1.1E-05	3.6E-07	8.9E-06	1.2E-05	8.2E-06	1.5E-05
1,3-Dichlorobenzene	8.1E-07	4.9E-08	3.3E-07	4.5E-07	–	2.0E-06
1,4-Dichlorobenzene	1.8E-06	1.4E-08	2.8E-06	3.9E-06	–	5.8E-07
Dichlorodifluoromethane (Freon 12)	3.6E-05	1.2E-06	–	–	6.1E-06	4.8E-05
1,1-Dichloroethane	5.7E-07	7.5E-09	–	–	2.9E-04	3.1E-07
1,2-Dichloroethane	8.2E-07	1.3E-08	5.6E-06	7.7E-06	1.6E-02	5.4E-07
1,1-Dichloroethene (1,1-DCE)	6.8E-07	6.4E-08	–	–	2.6E-04	2.6E-06
cis-1,2-Dichloroethene (cis-1,2-DCE)	5.7E-07	1.1E-07	–	–	2.0E-04	4.3E-06
1,4-Dioxane	1.6E-05	5.7E-08	–	–	–	2.3E-06
Ethanol	9.3E-05	1.0E-06	–	–	–	4.1E-05
Ethylbenzene	3.2E-05	2.0E-07	4.4E-04	6.1E-04	1.4E+00	8.4E-06
4-Ethyltoluene	1.4E-05	9.0E-07	–	–	–	3.7E-05
Heptane	2.1E-06	1.9E-08	–	–	–	8.0E-07

Table 12. Chronic Daily Intakes – Noncancer

	Onsite Commercial Worker	Onsite Intrusive Construction Worker				Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact	Inhalation
Hexane	6.3E-04	6.3E-06	–	–	–	2.6E-04
Methyl tertiary butyl ether (MTBE)	3.0E-06	6.4E-09	2.5E-08	3.5E-08	4.1E-04	2.6E-07
Methylene chloride	6.6E-06	1.1E-07	–	–	1.7E-05	4.5E-06
4-Methyl-2-pentanone (methyl isobutyl ketone)	3.2E-06	6.3E-09	–	–	–	2.6E-07
2-Propanol	8.4E-06	1.1E-08	–	–	–	4.4E-07
Styrene	5.9E-07	4.2E-09	–	–	–	1.7E-07
1,1,2,2-Tetrachloroethane	–	–	–	–	3.1E-05	–
Tetrachloroethene (PCE)	4.3E-06	8.0E-07	–	–	–	3.3E-05
Tetrahydrofuran	3.4E-06	7.9E-09	–	–	–	3.2E-07
Toluene	1.5E-04	3.3E-06	1.9E-03	2.6E-03	1.5E+00	1.3E-04
1,1,1-Trichloroethane	8.1E-07	5.2E-09	–	–	2.3E-07	2.1E-07
Trichloroethene (TCE)	8.2E-07	8.9E-09	–	–	5.3E-03	3.6E-07
Trichlorofluoromethane (Freon 11)	9.4E-07	8.8E-09	–	–	–	3.6E-07
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1.1E-06	2.5E-10	–	–	–	1.0E-08
1,2,4-Trimethylbenzene	9.8E-06	8.9E-06	–	–	–	3.6E-04
1,3,5-Trimethylbenzene	1.2E-05	1.3E-05	–	–	–	5.2E-04
Xylenes	8.8E-05	5.7E-06	1.3E-03	1.8E-03	4.7E+00	2.3E-04

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

Table 13. Carcinogenic and Noncarcinogenic Toxicity Values

	Cancer Slope Factor (CSF)				Chronic Noncancer Reference Dose (RfD)			
Chemical of Potential Concern	Inhalation (per mg/kg/d)	Source	Oral (per mg/kg/d)	Source	Inhalation (mg/kg/d)	Source	Oral (mg/kg/d)	Source
Acetone	NC	NA	NC	NA	8.9E+00	3A	9.0E-01	2
Benzene	1.0E-01	1	1.0E-01	1	8.6E-03	2	4.0E-03	2
Bromodichloromethane	1.3E-01	1	1.3E-01	1	2.0E-02	R	2.0E-02	2
1,3-Butadiene	6.0E-01	1	3.4E+00	1	5.7E-04	2	5.7E-04	R
2-Butanone (methyl ethyl ketone)	NC	NA	NC	NA	1.4E+00	2	6.0E-01	2
Carbon disulfide	NC	NA	NC	NA	2.0E-01	2	1.0E-01	2
Chlorobenzene	NC	NA	NC	NA	2.9E-01	1	2.0E-02	2
Chloroethane (ethyl chloride)	NC	NA	NC	NA	2.9E+00	2	4.0E-01	4N
Chloroform	1.9E-02	1	3.1E-02	1	8.6E-02	1	1.0E-02	2
Chloromethane (methyl chloride)	6.3E-03	3H	1.3E-02	3H	2.6E-02	2	2.6E-02	R
Cyclohexane	NC	NA	NC	NA	1.7E+00	2	1.7E+00	R
1,2-Dichlorobenzene	NC	NA	NC	NA	5.7E-02	3H	9.0E-02	2
1,3-Dichlorobenzene	NC	NA	NC	NA	3.0E-02	R	3.0E-02	4N
1,4-Dichlorobenzene	4.0E-02	1	5.4E-03	1	2.3E-01	1	3.0E-02	4N
Dichlorodifluoromethane (Freon 12)	NC	NA	NC	NA	5.7E-02	3H	2.0E-01	2
1,1-Dichloroethane	5.7E-03	1	5.7E-03	1	1.4E-01	4H	2.0E-01	3P
1,2-Dichloroethane	7.2E-02	1	4.7E-02	1	1.1E-01	1	2.0E-02	3P
1,1-Dichloroethene (1,1-DCE)	NC	NA	NC	NA	2.0E-02	1	5.0E-02	2
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	NA	NC	NA	1.0E-02	R	1.0E-02	3P
1,4-Dioxane	2.7E-02	1	2.7E-02	1	8.6E-01	1	8.6E-01	R
Ethanol	NC	NA	NC	NA	3.0E-01	R	3.0E-01	2
Ethylbenzene	8.7E-03	1	1.1E-02	1	2.9E-01	2	1.0E-01	2
4-Ethyltoluene	NC	NA	NC	NA	2.9E-02	2	2.0E-01	2
Heptane	NC	NA	NC	NA	2.0E-01	2	6.0E-02	3H
Hexane	NC	NA	NC	NA	2.0E-01	2	6.0E-02	3H
Methyl tertiary butyl ether (MTBE)	9.1E-04	1	1.8E-03	1	8.6E-01	2	8.6E-01	R
Methylene chloride	3.5E-03	1	1.4E-02	1	1.1E-01	1	6.0E-02	2
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	NA	NC	NA	8.6E-01	2	8.0E-02	3H
2-Propanol	NC	NA	NC	NA	2.0E+00	1	2.0E+00	R
Styrene	NC	NA	NC	NA	2.6E-01	1	2.0E-01	2
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.7E-01	1	4.0E-03	R	4.0E-03	3P
Tetrachloroethene (PCE)	2.1E-02	1	5.4E-01	1	1.0E-02	1	1.0E-02	2
Tetrahydrofuran	7.0E-03	N	7.6E-03	4N	8.6E-01	N	3.0E-01	N
Toluene	NC	NA	NC	NA	8.6E-02	1	8.0E-02	2
1,1,1-Trichloroethane	NC	NA	NC	NA	2.9E-01	1	2.0E+00	2
Trichloroethene (TCE)	7.0E-03	1	1.3E-02	1	1.7E-01	1	3.0E-04	4N
Trichlorofluoromethane (Freon 11)	NC	NA	NC	NA	2.0E-01	3H	3.0E-01	2
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	NA	NC	NA	8.6E+00	3H	3.0E+00	2
1,2,4-Trimethylbenzene	NC	NA	NC	NA	2.0E-03	3P	5.0E-02	4P
1,3,5-Trimethylbenzene	NC	NA	NC	NA	1.7E-03	3P	5.0E-02	3P
Xylenes	NC	NA	NC	NA	2.9E-02	2	2.0E-01	2

Table 13. Carcinogenic and Noncarcinogenic Toxicity Values

Notes:

(a) Sources of toxicity data are as follows.

1	–	OEHHA *Toxicity Criteria Database*
2	–	USEPA *Integrated Risk Information System* (IRIS)
3	–	USEPA *Region 9 Regional Screening Levels Table (2008)*
4	–	USEPA *Region 9 PRG Table (2004)*
A	–	Agency for Toxic Substances & Disease Registry (ATSDR)
P	–	USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) Database
N	–	USEPA National Center for Environmental Assessment
H	–	USEPA HEAST
R	–	Route-to-route extrapolation

(b) Isobutanol was used as the surrogate for ethanol's oral and inhalation noncancer reference dose.

(c) Xylene was used as the surrogate for 4-ethyltoluene's oral and inhalation noncancer reference dose.

(d) Hexane was used as the surrogate for this heptane's oral and inhalation noncancer reference dose.

(e) Tetrahydrofuran toxicological values were derived from *Draft Toxicological Review of Tetrahydrofuran (USEPA, 2007).*

(f) "NC" indicates that the chemical is classified as a noncarcinogen for the inhalation pathway.

(g) "NA" means not-applicable (see note [e]).

Table 14. Summary of Estimated Cancer Risks – Baseline

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	NC	NC	–	–	–	–	NC
Benzene	6.8E-06	5.1E-10	5.2E-08	7.1E-08	7.5E-05	7.5E-05	3.4E-07
Bromodichloromethane	–	–	–	–	2.6E-10	2.6E-10	–
1,3-Butadiene	8.0E-07	6.7E-11	–	–	–	6.7E-11	4.4E-08
2-Butanone (methyl ethyl ketone)	NC	NC	–	–	–	–	NC
Carbon disulfide	NC	NC	–	–	–	–	NC
Chlorobenzene	NC	NC	NC	NC	NC	–	NC
Chloroethane (ethyl chloride)	–	–	–	–	NC	–	–
Chloroform	6.5E-09	4.9E-13	–	–	5.1E-10	5.1E-10	3.2E-10
Chloromethane (methyl chloride)	1.1E-09	8.6E-14	–	–	2.8E-10	2.8E-10	5.7E-11
Cyclohexane	NC	NC	–	–	–	–	NC
1,2-Dichlorobenzene	NC	NC	NC	NC	NC	–	NC
1,3-Dichlorobenzene	NC	NC	NC	NC	–	–	NC
1,4-Dichlorobenzene	2.5E-08	1.9E-12	6.6E-12	9.1E-12	–	1.8E-11	1.2E-09
Dichlorodifluoromethane (Freon 12)	NC	NC	–	–	NC	–	NC
1,1-Dichloroethane	1.2E-09	8.6E-14	–	–	4.7E-09	4.7E-09	5.7E-11
1,2-Dichloroethane	2.1E-08	1.6E-12	7.5E-11	1.0E-10	2.2E-07	2.2E-07	1.0E-09
1,1-Dichloroethene (1,1-DCE)	NC	NC	–	–	NC	–	NC
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	NC	–	–	NC	–	NC
1,4-Dioxane	1.6E-07	1.9E-11	–	–	–	1.9E-11	1.3E-08
Ethanol	NC	NC	–	–	–	–	NC
Ethylbenzene	9.8E-08	7.3E-12	6.9E-09	9.5E-09	2.2E-05	2.2E-05	4.8E-09
4-Ethyltoluene	NC	NC	–	–	–	–	NC
Heptane	NC	NC	–	–	–	–	NC
Hexane	NC	NC	–	–	–	–	NC
Methyl tertiary butyl ether (MTBE)	9.6E-10	7.1E-14	5.6E-13	7.7E-13	9.0E-09	9.0E-09	4.7E-11
Methylene chloride	8.3E-09	6.2E-13	–	–	2.0E-10	2.0E-10	4.1E-10
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	NC	–	–	–	–	NC

Table 14. Summary of Estimated Cancer Risks – Baseline

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
2-Propanol	NC	NC	–	–	–	–	NC
Styrene	NC	NC	–	–	–	–	NC
1,1,2,2-Tetrachloroethane	–	–	–	–	4.8E-10	4.8E-10	–
Tetrachloroethene (PCE)	3.2E-08	2.4E-12	–	–	–	2.4E-12	1.6E-09
Tetrahydrofuran	8.6E-09	6.8E-13	–	–	–	6.8E-13	4.5E-10
Toluene	NC	NC	NC	NC	NC	–	NC
1,1,1-Trichloroethane	NC	NC	–	–	NC	–	NC
Trichloroethene (TCE)	2.0E-09	1.5E-13	–	–	2.9E-10	2.9E-10	1.0E-10
Trichlorofluoromethane (Freon 11)	NC	NC	–	–	–	–	NC
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	NC	–	–	–	–	NC
1,2,4-Trimethylbenzene	NC	NC	–	–	–	–	NC
1,3,5-Trimethylbenzene	NC	NC	–	–	–	–	NC
Xylenes	NC	NC	NC	NC	NC	–	NC
Cumulative Risk	8.0E-06	6.1E-10	5.9E-08	8.1E-08	9.7E-05	9.8E-05	4.1E-07

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

(2) "NC" indicates chemical was determined to be a noncarcinogen.

Table 15. Summary of Estimated Noncancer Hazard Indices – Baseline

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	9.5E-07	1.7E-09	–	–	–	1.7E-09	6.9E-08
Benzene	2.2E-02	4.2E-05	9.0E-03	1.2E-02	1.3E+01	1.3E+01	1.7E-03
Bromodichloromethane	–	–	–	–	6.9E-06	6.9E-06	–
1,3-Butadiene	6.6E-03	1.4E-05	–	–	–	1.4E-05	5.6E-04
2-Butanone (methyl ethyl ketone)	2.7E-06	4.4E-09	–	–	–	4.4E-09	1.8E-07
Carbon disulfide	1.2E-05	2.3E-08	–	–	–	2.3E-08	9.4E-07
Chlorobenzene	2.3E-06	4.2E-09	2.2E-08	3.0E-08	4.5E-05	4.5E-05	1.7E-07
Chloroethane (ethyl chloride)	–	–	–	–	2.5E-05	2.5E-05	–
Chloroform	1.1E-05	2.1E-08	–	–	1.1E-04	1.1E-04	8.6E-07
Chloromethane (methyl chloride)	1.9E-05	3.7E-08	–	–	5.9E-05	5.9E-05	1.5E-06
Cyclohexane	1.2E-06	2.3E-09	–	–	–	2.3E-09	9.2E-08
1,2-Dichlorobenzene	2.0E-04	3.6E-07	8.9E-06	1.2E-05	8.2E-06	3.0E-05	1.5E-05
1,3-Dichlorobenzene	2.7E-05	4.9E-08	3.3E-07	4.5E-07	–	8.3E-07	2.0E-06
1,4-Dichlorobenzene	7.8E-06	1.4E-08	2.8E-06	3.9E-06	–	6.8E-06	5.8E-07
Dichlorodifluoromethane (Freon 12)	6.4E-04	1.2E-06	–	–	6.1E-06	7.2E-06	4.8E-05
1,1-Dichloroethane	4.1E-06	7.5E-09	–	–	2.9E-04	2.9E-04	3.1E-07
1,2-Dichloroethane	7.1E-06	1.3E-08	5.6E-06	7.7E-06	1.6E-02	1.6E-02	5.4E-07
1,1-Dichloroethene (1,1-DCE)	3.4E-05	6.4E-08	–	–	2.6E-04	2.6E-04	2.6E-06
cis-1,2-Dichloroethene (cis-1,2-DCE)	5.7E-05	1.1E-07	–	–	2.0E-04	2.0E-04	4.3E-06
1,4-Dioxane	1.9E-05	5.7E-08	–	–	–	5.7E-08	2.3E-06
Ethanol	3.1E-04	1.0E-06	–	–	–	1.0E-06	4.1E-05
Ethylbenzene	1.1E-04	2.0E-07	4.4E-04	6.1E-04	1.4E+00	1.4E+00	8.4E-06
4-Ethyltoluene	4.8E-04	9.0E-07	–	–	–	9.0E-07	3.7E-05
Heptane	1.1E-05	1.9E-08	–	–	–	1.9E-08	8.0E-07
Hexane	3.2E-03	6.3E-06	–	–	–	6.3E-06	2.6E-04
Methyl tertiary butyl ether (MTBE)	3.4E-06	6.4E-09	2.5E-08	3.5E-08	4.1E-04	4.1E-04	2.6E-07
Methylene chloride	5.8E-05	1.1E-07	–	–	1.7E-05	1.7E-05	4.5E-06
4-Methyl-2-pentanone (methyl isobutyl ketone)	3.7E-06	6.3E-09	–	–	–	6.3E-09	2.6E-07
2-Propanol	4.2E-06	1.1E-08	–	–	–	1.1E-08	4.4E-07

Table 15. Summary of Estimated Noncancer Hazard Indices – Baseline

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Styrene	2.3E-06	4.2E-09	–	–	–	4.2E-09	1.7E-07
1,1,2,2-Tetrachloroethane	–	–	–	–	3.1E-05	3.1E-05	–
Tetrachloroethene (PCE)	4.3E-04	8.0E-07	–	–	–	8.0E-07	3.3E-05
Tetrahydrofuran	4.0E-06	7.9E-09	–	–	–	7.9E-09	3.2E-07
Toluene	1.8E-03	3.3E-06	1.9E-03	2.6E-03	1.5E+00	1.5E+00	1.3E-04
1,1,1-Trichloroethane	2.8E-06	5.2E-09	–	–	2.3E-07	2.3E-07	2.1E-07
Trichloroethene (TCE)	4.8E-06	8.9E-09	–	–	5.3E-03	5.3E-03	3.6E-07
Trichlorofluoromethane (Freon 11)	4.7E-06	8.8E-09	–	–	–	8.8E-09	3.6E-07
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1.3E-07	2.5E-10	–	–	–	2.5E-10	1.0E-08
1,2,4-Trimethylbenzene	4.9E-03	8.9E-06	–	–	–	8.9E-06	3.6E-04
1,3,5-Trimethylbenzene	7.0E-03	1.3E-05	–	–	–	1.3E-05	5.2E-04
Xylenes	3.1E-03	5.7E-06	1.3E-03	1.8E-03	4.7E+00	4.7E+00	2.3E-04
Cumulative Hazard	5.1E-02	9.7E-05	1.3E-02	1.7E-02	2.1E+01	2.1E+01	4.0E-03

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

Table 16. Risk-based Soil Gas Cleanup Goals

Chemical of Potential Concern	Cancer-based Indoor Air Target Concentration (CA_c) (µg/m^3)	Noncancer-based Indoor Air Target Concentration (CA_{nc}) (µg/m^3)	Controlling Indoor Air Target Concentration (CA) (µg/m^3)	Attenuation Factor at 5.0 feet bgs	Risk-based Cleanup Goal at 5.0 ft bgs (µg/m^3)
Acetone	NC	6.5E+04	6.5E+04	5.9E-05	1.1E+09
Benzene	2.0E+00	6.3E+01	2.0E+00	2.0E-05	1.0E+05
1,3-Butadiene	3.4E-01	4.2E+00	3.4E-01	5.3E-05	6.5E+03
2-Butanone (methyl ethyl ketone)	NC	1.0E+04	1.0E+04	3.9E-05	2.7E+08
Carbon disulfide	NC	1.5E+03	1.5E+03	2.3E-05	6.3E+07
Chlorobenzene	NC	2.1E+03	2.1E+03	1.7E-05	1.2E+08
Chloroform	1.1E+01	6.3E+02	1.1E+01	2.3E-05	4.6E+05
Chloromethane (methyl chloride)	3.2E+01	1.9E+02	3.2E+01	2.8E-05	1.2E+06
Cyclohexane	NC	1.3E+04	1.3E+04	1.8E-05	7.0E+08
1,2-Dichlorobenzene	NC	4.2E+02	4.2E+02	1.6E-05	2.6E+07
1,3-Dichlorobenzene	NC	2.2E+02	2.2E+02	1.6E-05	1.4E+07
1,4-Dichlorobenzene	5.1E+00	1.7E+03	5.1E+00	1.6E-05	3.2E+05
Dichlorodifluoromethane (Freon 12)	NC	4.2E+02	4.2E+02	1.5E-05	2.8E+07
1,1-Dichloroethane	3.6E+01	1.0E+03	3.6E+01	1.7E-05	2.1E+06
1,2-Dichloroethane	2.8E+00	8.3E+02	2.8E+00	2.4E-05	1.2E+05
1,1-Dichloroethene (1,1-DCE)	NC	1.5E+02	1.5E+02	2.0E-05	7.2E+06
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	7.3E+01	7.3E+01	1.7E-05	4.3E+06
1,4-Dioxane	7.6E+00	6.3E+03	7.6E+00	1.6E-04	4.7E+04
Ethanol	NC	2.2E+03	2.2E+03	1.8E-04	1.2E+07

Table 16. Risk-based Soil Gas Cleanup Goals

Chemical of Potential Concern	Cancer-based Indoor Air Target Concentration (CA_c) (µg/m^3)	Noncancer-based Indoor Air Target Concentration (CA_{nc}) (µg/m^3)	Controlling Indoor Air Target Concentration (CA) (µg/m^3)	Attenuation Factor at 5.0 feet bgs	Risk-based Cleanup Goal at 5.0 ft bgs (µg/m^3)
Ethylbenzene	2.3E+01	2.1E+03	2.3E+01	1.7E-05	1.4E+06
4-Ethyltoluene	NC	2.1E+02	2.1E+02	1.5E-05	1.3E+07
Heptane	NC	1.5E+03	1.5E+03	1.6E-05	9.2E+07
Hexane	NC	1.5E+03	1.5E+03	4.3E-05	3.4E+07
Methyl tertiary butyl ether (MTBE)	2.2E+02	6.3E+03	2.2E+02	2.5E-05	9.1E+06
Methylene chloride	5.8E+01	8.3E+02	5.8E+01	2.3E-05	2.5E+06
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	6.3E+03	6.3E+03	2.4E-05	2.6E+08
2-Propanol	NC	1.5E+04	1.5E+04	1.1E-04	1.3E+08
Styrene	NC	1.9E+03	1.9E+03	1.6E-05	1.1E+08
Tetrachloroethene (PCE)	9.7E+00	7.3E+01	9.7E+00	1.6E-05	6.0E+05
Tetrahydrofuran	2.9E+01	6.3E+03	2.9E+01	3.5E-05	8.4E+05
Toluene	NC	6.3E+02	6.3E+02	2.0E-05	3.2E+07
1,1,1-Trichloroethane	NC	2.1E+03	2.1E+03	1.8E-05	1.2E+08
Trichloroethene (TCE)	2.9E+01	1.3E+03	2.9E+01	1.8E-05	1.6E+06
Trichlorofluoromethane (Freon 11)	NC	1.5E+03	1.5E+03	2.0E-05	7.5E+07
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	NC	6.3E+04	6.3E+04	1.8E-05	3.6E+09
1,2,4-Trimethylbenzene	NC	1.5E+01	1.5E+01	1.4E-05	1.1E+06
1,3,5-Trimethylbenzene	NC	1.3E+01	1.3E+01	1.4E-05	9.0E+05
Xylenes	NC	2.1E+02	2.1E+02	1.9E-05	1.1E+07

Table 16. Risk-based Soil Gas Cleanup Goals

Chemical of Potential Concern	Cancer-based Indoor Air Target Concentration (CA_c) (µg/m^3)	Noncancer-based Indoor Air Target Concentration (CA_{nc}) (µg/m^3)	Controlling Indoor Air Target Concentration (CA) (µg/m^3)	Attenuation Factor at 5.0 feet bgs	Risk-based Cleanup Goal at 5.0 ft bgs (µg/m^3)

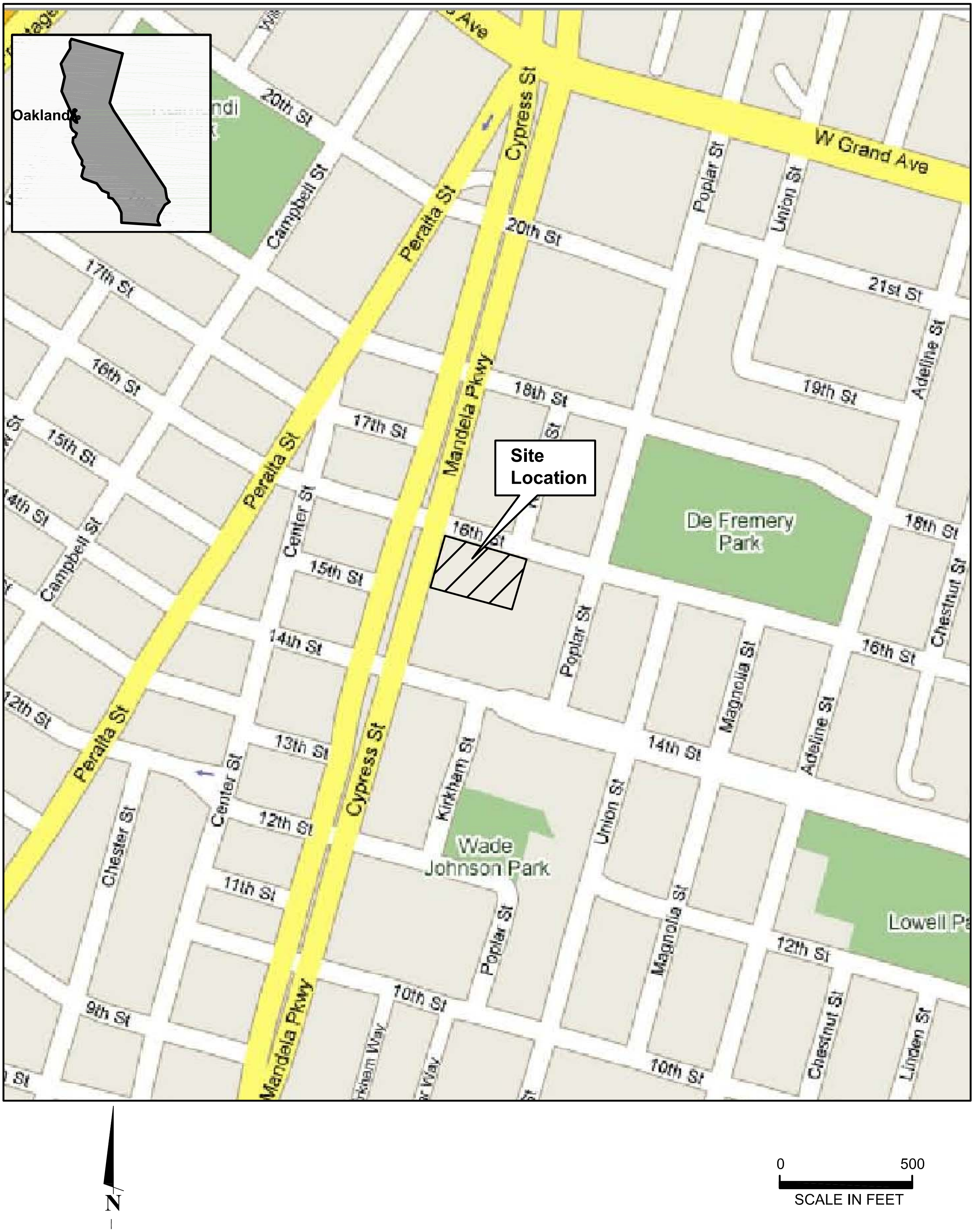
Notes:

(1) Cancer-based indoor air target concentrations assume a target risk of $1x10^{-5}$. Noncancer-based indoor air target concentrations assume a target hazard quotient of 1.

(2) Soil gas screening levels are calculated from the chemical-specific risk-based indoor air target concentration and attenuation factor:

$C_{SG} = C_{IA} / \alpha$

(3) NC = Noncarcinogenic



I:\CAD\07\07-557-A\Site location map.dwg

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
Ph. (510) 834-4747 Fax: (510) 834-4199

Site Location Map
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Figure
1

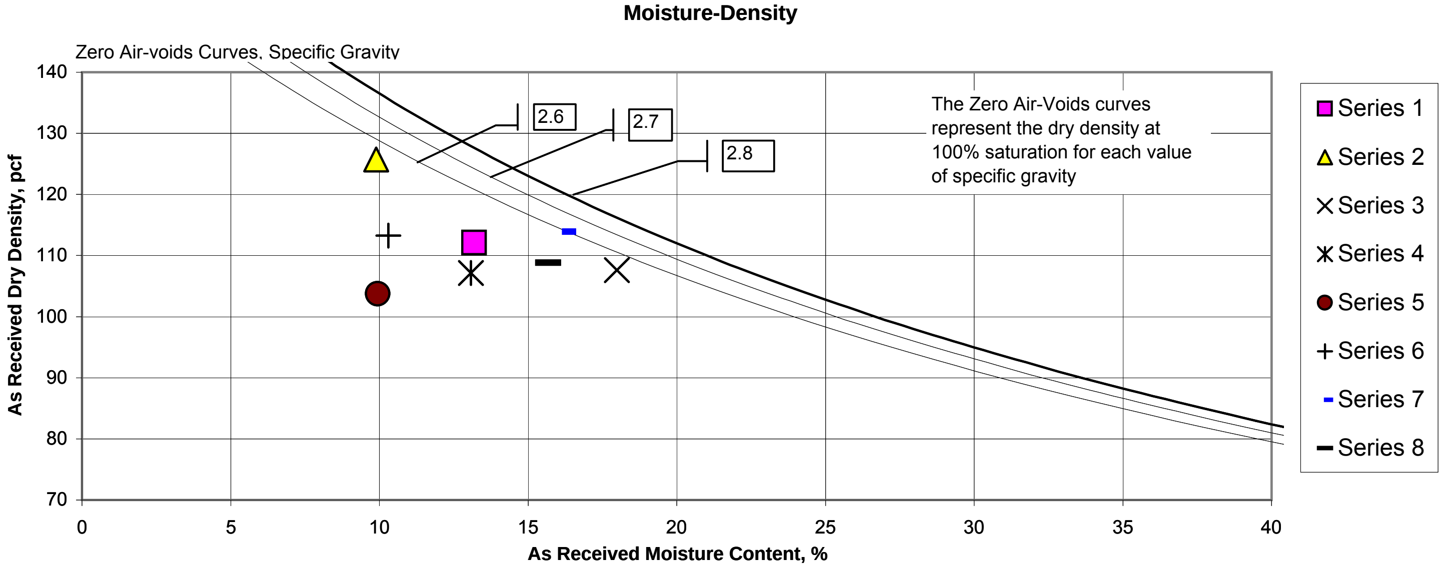
Drafter: EC
Date: 11/12/08
Contract Number: 07-557-A

Total and Effective Porosity Report
(API RP40 and ASTM D6836m)

Job No: 634-013
Project No.: 720-17784-1
Client: TestAmerica
Date: 2/17/09
Project Name: Nestle-Oakland
By: PJ

Boring:	GT-A-4.5	GT-A-5.0	GT-B-4.5	GT-B-5.0	GT-C-4.5	GT-C-5.0	GT-D-4.5	GT-D-5.0
Sample:	720-17784-1	720-17784-2	720-17784-3	720-17784-4	720-17784-5	720-17784-6	720-17784-7	720-17784-8
Depth, ft:								
Visual Description:	Grayish Brown Clayey SAND w/ Gravel	Grayish Brown Clayey GRAVEL w/ Sand	Mottled Reddish Brown Clayey SAND	Mottled Reddish Brown SAND w/ Clay*	Grayish Brown SAND w/ Clay*	Grayish Brown Clayey SAND	Mottled Brown Clayey SAND	Brown SAND w/ Clay*
Total Porosity, %	33.5	25.7	36.4	36.5	38.3	32.4	32.5	35.7
Effective Porosity, %	12.9	7.0	7.3	16.1	23.7	4.2	4.9	10.3
Air-filled Porosity, %	9.9	5.8	5.5	14.1	21.8	13.7	3.0	8.4
Water-filled Porosity, %	23.7	19.9	31.0	22.4	16.5	18.7	29.5	27.3
Saturation, %	70.6	77.3	85.0	61.5	43.1	57.7	90.9	76.4
Moisture, %	13.2	9.9	18.0	13.1	9.9	10.3	16.2	15.7
Wet Unit wt, pcf	126.9	138.2	127.0	121.1	114.1	124.9	132.3	125.9
Dry Unit wt, pcf	112.1	125.7	107.6	107.1	103.7	113.2	113.9	108.8
Series	1	2	3	4	5	6	7	8

Note: All reported values above are for the "as received" condition except for the effective porosity which is measured at a tension of 1/3 Bar. Both GT-A samples required significant patching due to gravel. This could have a significant impact on the reported values. * The material tested for effective porosity was slightly more coarsely grained than the portion tested for sieve analysis.



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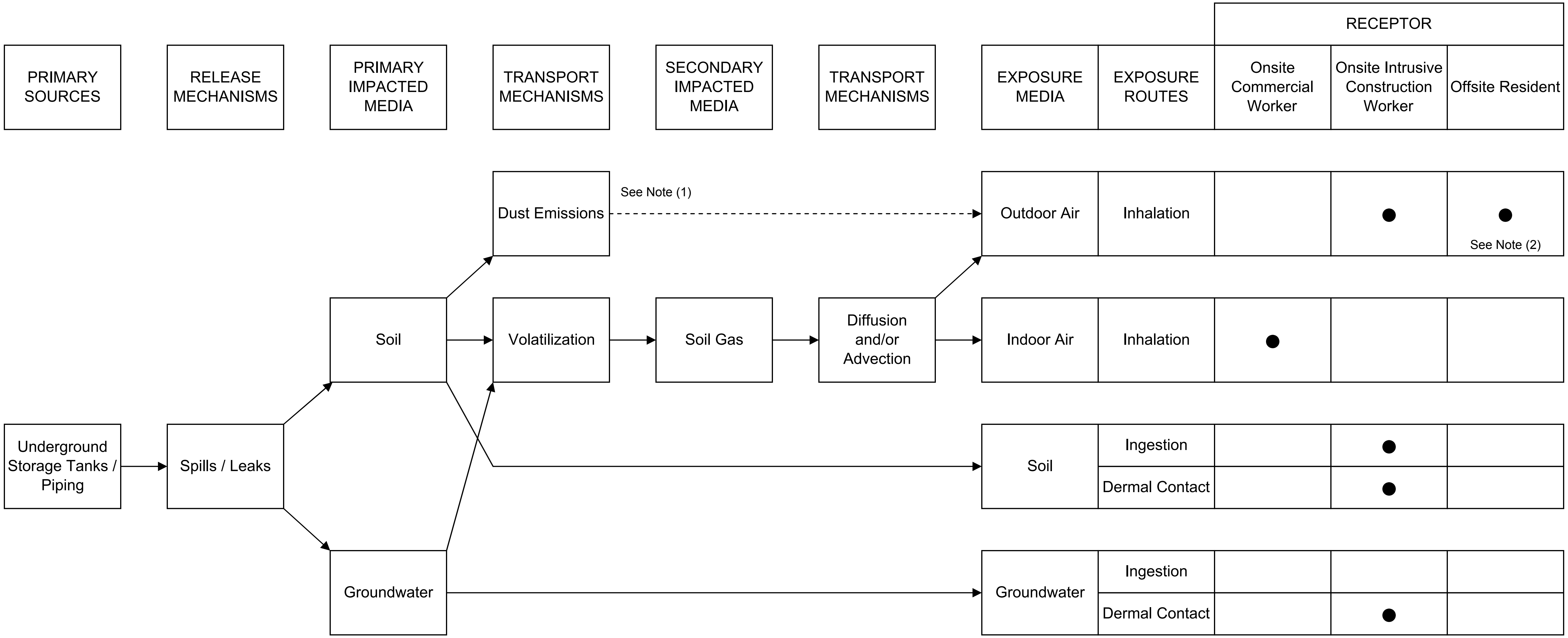
Oakland, California 94612
(510) 834-4747

Total and Effective Porosity Report (Cooper, 2009)
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Figure
2

Drafted by: DT
Date: 2009-03-18



		RECEPTOR		
EXPOSURE MEDIA	EXPOSURE ROUTES	Onsite Commercial Worker	Onsite Intrusive Construction Worker	Offsite Resident
Outdoor Air	Inhalation		●	● See Note (2)
Indoor Air	Inhalation	●		
Soil	Ingestion		●	
	Dermal Contact		●	
Groundwater	Ingestion			
	Dermal Contact		●	

KEY:

——→	Complete transport pathway
- - - -→	Incomplete transport pathway for reason(s) noted below
●	Complete exposure pathway for receptor

NOTES:

(1) There are no non-volatile COPCs that could be adhered to emitted dust

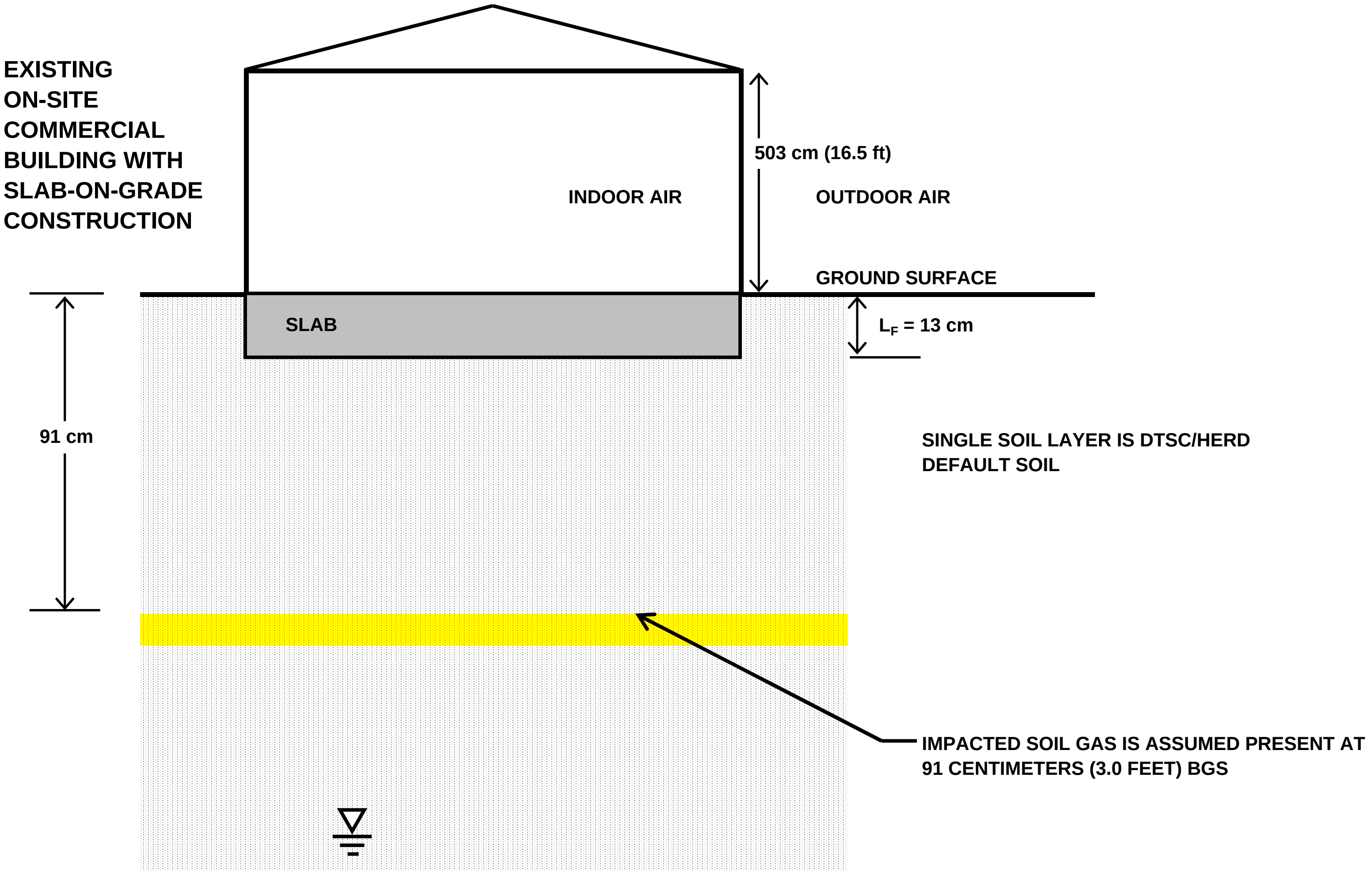
(2) Offsite residents are potentially exposed via inhalation to COPCs in outdoor or indoor air that have been transported by advection (*i.e.* , wind) from the site to offsite residential land uses

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California

Conceptual Site Model
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Figure
3

I:\Carnation_Dairy\Figures\Carnation_Dairy_CSM.xls



NOT TO SCALE

IRIS ENVIRONMENTAL
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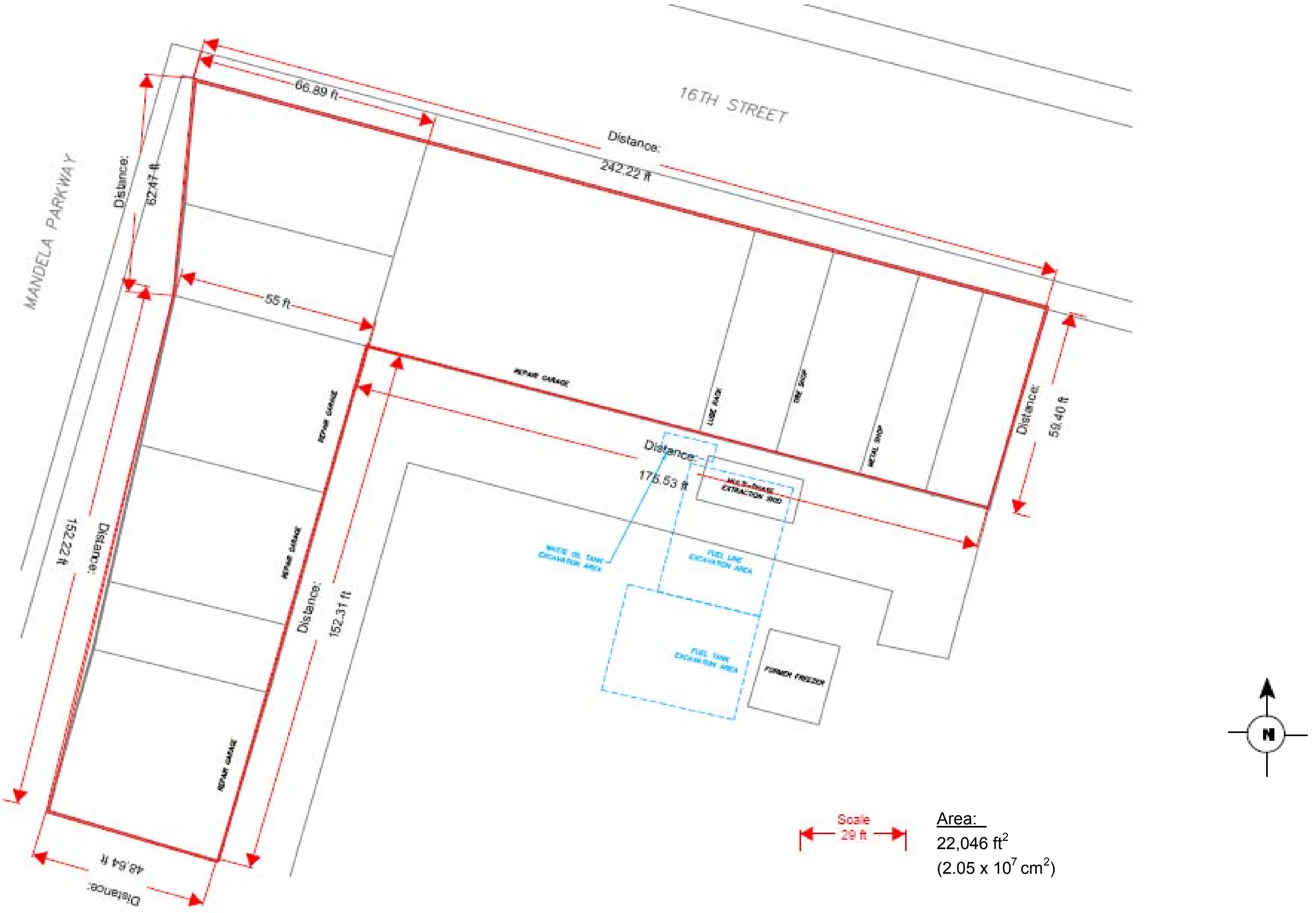
Oakland, California 94612
(510) 834-4747

Modeled Soil Lithology and Building Geometry
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Figure
4

File: I:\Carnation_Dairy\Figures\[Fig - lithology & building.xls]Fig_4
Drafted by: GSN
Date: 2008-12-05
Contract No.: 07-557-A



Area:
22,046 ft^2
(2.05×10^7 cm^2)

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Oakland, California 94612
(510) 834-4747

Building Dimensions and Area
Former Nestlé USA, Inc. Facility
1310 14th Street, Oakland, California

Figure
5

File: I:\Carnation_Dairy\Figures\[Fig - lithology & building.xls]Fig_5
Drafted by: GSN
Date: 2008-12-05
Contract No.: 07-557-A

APPENDIX A

SUMMARY OF PREVIOUS SITE INVESTIGATIONS

Table 1a: Soil Gas Sampling Results
Vapors in Soil - August 99

Concentration (ppbv)

Sample ID	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH-g	TPH-d	Acetone	1,3-Butadiene	2-Butanone	Carbon Disulfide	Chlorobenzene	Chloroform	Chloromethane	Cyclohexane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	1,4-Dioxane	Ethanol	4-Ethyltoluene	Freon 11	Freon 12	Freon 113	Heptane	Hexane	4-Methyl-2-pentanone	Methylene Chloride	Methyl t-butyl ether	2-Propanol	Styrene	Tetrachloroethene	Tetrahydrofuran	1,1,1-Trichloroethane	Trichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene
SB1, 3'	**4.3**	**3.1**	<0.65	**2.74**	**800**	NA	**77 a**	**2.8**	**13**	**6.2**	<0.65	<0.65	<0.65	<2.6	<0.65	<0.65	**0.77**	<0.65	<0.65	<0.65	<0.65	<2.6	**63**	<2.6	**0.74**	**0.93**	**27**	<2.6	**4.4**	**3.8**	**3.7**	<2.6	**5.6**	<0.65	**1.2**	<2.6	<0.65	<0.65	**1.1**	<0.65
SB2, 3'	**7.5**	**12**	**3.6**	**17.6**	**1,100**	NA	**260 a**	<2.7	**24**	**9.0**	<0.67	**3.9**	<0.67	**12**	<0.67	<0.67	**1.8**	<0.67	<0.67	<0.67	<0.67	<2.7	**110**	<2.7	**1.2**	**200**	<0.67	**3.3**	**5.3**	**8.1**	**2.2**	<2.7	<2.7	**3.0**	<0.67	<2.7	<0.67	<0.67	**2.0**	**0.77**
SB3, 3'	**9,900**	**230**	**68**	**67**	**36,000**	NA	<190	<190	<190	<190	<48	<48	<48	<190	<48	<48	<48	<48	<48	<48	<48	<190	<190	<190	<48	**180**	<48	<190	**590**	<190	<48	<190	<190	<48	<48	<190	<48	<48	<48	<48
SB3, 3' dup	**9,500**	**240**	<140	<140	**40,000**	NA	<580	<580	<580	<580	<140	<140	<140	<580	<140	<140	<140	<140	<140	<140	<140	<580	<580	<580	<140	**160**	<140	<580	**580**	<580	<140	<580	<580	<140	<140	<580	<140	<140	<140	<140
SB4, 3'	**1,200**	**76**	**8.1**	**18.7**	**4,600**	NA	**200 a**	**19**	<14	<14	<3.5	<3.5	<3.5	**32**	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<14	**1,400**	<14	<3.5	**100**	<3.5	<14	**19**	**15**	**340**	<14	**22**	<3.5	**160**	<14	**21**	<3.5	<3.5	<3.5
SB5, 3'	**7.6**	**5.6**	**0.80**	**1.9**	**1,900**	NA	**45 a**	**61**	**12**	**18**	<0.71	<0.71	**0.77**	**8.2**	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	**3.3**	**55**	<2.8	**4.4**	**1.2**	**3.4**	<2.8	<2.8	<2.8	<0.71	<2.8	<2.8	<0.71	<0.71	<2.8	<0.71	<0.71	<0.71	<0.71
SB6, 3'	**3.0**	**4.2**	<0.68	**2.52**	**560**	NA	**11 a**	<2.7	**4.0**	<2.7	<0.68	<0.68	<0.68	<2.7	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<2.7	**35**	<2.7	<0.68	<0.68	<0.68	<2.7	<2.7	<2.7	<0.68	<2.7	<2.7	<0.68	<0.68	<2.7	<0.68	<0.68	**1.1**	<0.68
SB7, 3'	**5.9**	**6.2**	**0.87**	**4.3**	**780**	NA	**43 a**	**3.4**	**7.9**	**3.3**	<0.73	<0.73	<0.73	**5.1**	<0.73	<0.73	**2.0**	<0.73	<0.73	<0.73	<0.73	**8.2**	**94**	<2.9	**0.74**	**1.1**	<0.73	<2.9	**6.8**	**4.4**	<0.73	<2.9	**3.8**	**1.0**	**2.0**	<2.9	<0.73	<0.73	**1.8**	<0.73
SB8, 3'	**10**	**12**	**3.8**	**15.7**	**1,300**	NA	**42 a**	<11	<11	<11	<2.8	<2.8	<2.8	<11	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<11	**62**	<11	**6.5**	**630**	<2.8	<11	<11	<11	<2.8	<11	<11	<2.8	<2.8	<11	<2.8	<2.8	**5.3**	<2.8
SB9, 3'	**12**	**18**	**1.7**	**9.9**	**690**	NA	**19 a**	<2.7	**6.0**	<2.7	<0.68	**1.1**	<0.68	**4.9**	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<0.68	<2.7	**47**	<2.7	**1.5**	**20**	<0.68	<2.7	**4.3**	<2.7	<0.68	<2.7	<2.7	<0.68	<0.68	<2.7	<0.68	<0.68	**2.3**	**0.77**
SB10, 3'	**3.5**	**2.8**	<0.80	**1.7**	**610**	NA	**39 a**	<3.2	**9.7**	<3.2	<0.80	**1.6**	<0.80	<3.2	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<3.2	**40**	<3.2	<0.80	**1.4**	<0.80	<3.2	**3.9**	<3.2	<0.80	<3.2	<3.2	<0.80	<0.80	<3.2	<0.80	<0.80	**1.2**	<0.80
SB11, 3'	**2.7**	**1.9**	<0.82	**0.91**	**520**	NA	**38 a**	<3.3	**9.9**	<3.3	<0.82	<0.82	**3.7**	<3.3	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	**22**	**23**	<3.3	**4.6**	<0.82	<0.82	<3.3	<3.3	<3.3	**1.2**	<3.3	<3.3	<0.82	<0.82	<3.3	<0.82	<0.82	**0.85**	<0.82
SB12, 3'	**250**	<70	<70	**610**	**750,000**	NA	<280	<280	<280	<280	<70	<70	<70	<280	**480**	<70	**76**	<70	<70	<70	<70	<280	<280	**760**	<70	<70	<70	<280	**18,000**	<280	<70	<280	<280	<70	<70	<280	<70	<70	**580**	**740**
SB13, 3'	**0.91**	**8.5**	<0.67	**1.3**	**550**	NA	**49 a**	<2.7	**5.5**	**6.4**	<0.67	<0.67	<0.67	<2.7	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67	**4.3**	**410 b**	<2.7	<0.67	<0.67	<0.67	**3.4**	<2.7	<2.7	**5.6**	<2.7	**26**	<0.67	<0.67	**58**	<0.67	<0.67	**1.1**	<0.67
SB14, 3'	**2.7**	**5.3**	**0.87**	**4.7**	**620**	NA	**10 a**	<2.8	**3.5**	<2.8	<0.70	<0.70	<0.70	<2.8	<0.70	<0.70	**1.6**	<0.70	<0.70	<0.70	<0.70	<2.8	**67**	<2.8	<0.70	<0.70	<0.70	<2.8	<2.8	**2.8**	**1.3**	**2.9**	<2.8	**0.82**	<0.70	<2.8	<0.70	<0.70	**2.0**	**0.81**
SB15, 3'	**42**	**12**	**1.6**	**6.7**	**2,100**	NA	**51 a**	**13**	**13**	<5.8	<1.4	<1.4	<1.4	<5.8	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<5.8	**190**	<5.8	<1.4	**46**	<1.4	<5.8	**50**	<5.8	**4.8**	<5.8	<5.8	<1.4	**2.1**	<5.8	<1.4	<1.4	**1.8**	<1.4

Notes:

ppbv	Parts per billion volumetric.
a	Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
b	Exceeds instrument calibration range.
NA	Not analyzed.
TPH-g	Total Petroleum Hydrocarbons as gasoline.
TPH-d	Total Petroleum Hydrocarbons as diesel.

Table 1b: Soil Gas Sampling Results

Vapors in Soil - May 08

Boring Location	Sample Depth (feet bgs)	Date of Sample Collection	Analytical results (ug/L) of Vapor							
			TPH g	TPH d	Benzene	Ethylbenzene	Toluene	Xylenes, Tot	1,2-DCA	Others
SB-16	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-17	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-18	5	19-May-08	630	<50	2.2	<0.10	0.44	<0.30	<0.10	
SB-19	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-20/ PCB-7	5	19-May-08	19	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-21/ PCB-8	5	19-May-08	25	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-22	5	19-May-08	2,600	<50	40	7.7	32	19.1	<0.10	Dichlorodifluoromethane: 0.39
SB-23	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-24/ PCB-1	5	19-May-08	<10	<50	<0.10	<0.10	0.22	<0.30	<0.10	
SB-25/ PCB-2	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-26	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	Dichlorodifluoromethane: 10
SB-27/ PCB-3	5	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	
SB-22 dup	5	19-May-08	2,600	<50	40	7.5	32	18.0	<0.10	Dichlorodifluoromethane: 0.38
Probe Blank	NA	19-May-08	<10	<50	<0.10	<0.10	<0.20	<0.30	<0.10	

Notes:

EPA Method 8260B for VOC Analyses of soil vapor
EPA Mentod 8015m for TPH-g and TPH-d analyses of soil vapor

Table 2: Historical Soil Sample Results (1999 - 2008)

Boring Location	Sample Depth (feet bgs)	Date of Sample Collection	Analytical results (mg/Kg)								
			TPH g	TPH d	TPH mo	Benzene	Toluene	Ethylbenzene	Xylenes, Tot	1,2-DCA	Others
SB-1	3.5-4.0	08/12/99	<0.13	**1,200**	NA	<0.0013	<0.0013	<0.0013	<0.0013	<0.0011	
SB-1	6.5-7.0	08/12/99	<0.10	<5.9	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-2	3.5-4.0	08/12/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.001	
SB-2	6.5-7.0	08/12/99	<0.10	<5.9	NA	<0.001	<0.001	<0.001	<0.001	**0.001**	
SB-3	3.5-4.0	08/12/99	<0.10	<5.6	NA	<0.001	<0.001	<0.001	<0.001	**0.0007**	
SB-3	6.5-7.0	08/12/99	**6,160**	<5.7	NA	**11**	**190**	**100**	**460**	**0.0018**	MTBE: 0.073
SB-4	3.5-4.0	08/12/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0007	
SB-4	6.5-7.0	08/12/99	**1**	**94**	NA	**0.082**	**0.0085**	**0.0073**	**0.013**	**0.001**	
SB-5	3.5-4.0	08/12/99	<0.09	<5.5	NA	<0.0009	<0.0009	<0.0009	<0.0009	**0.0006**	
SB-5	6.5-7.0	08/12/99	<0.08	<5.9	NA	<0.0008	<0.0008	<0.0008	<0.0008	**0.0009**	
SB-6	3.5-4.0	08/13/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-6	6.5-7.0	08/13/99	10,100	**1,100**	NA	**76**	**490**	**170**	**990**	**0.43**	
SB-7	3.5-4.0	08/12/99	<0.10	<5.4	NA	<0.001	<0.001	<0.001	<0.001	<0.0008	
SB-7	6.5-7.0	08/12/99	<0.11	<5.8	NA	<0.0011	<0.0011	<0.0011	<0.0011	<0.0009	
SB-8	3.5-4.0	08/12/99	<0.10	<5.6	NA	<0.001	<0.001	<0.001	<0.001	<0.0007	
SB-8	6.5-7.0	08/12/99	**13**	<5.8	NA	**0.43**	**0.36**	**0.12**	**0.83**	**0.0012**	MTBE: 0.022
SB-9	3.5-4.0	08/13/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.001	
SB-9	6.5-7.0	08/13/99	<0.61	<5.8	NA	**0.024**	<0.0061	<0.0061	<0.0061	<0.0011	
SB-10	3.5-4.0	08/13/99	<0.09	<5.6	NA	<0.0009	<0.0009	<0.0009	<0.0009	<0.0008	
SB-10	6.5-7.0	08/13/99	<0.13	<6.4	NA	<0.0013	<0.0013	<0.0013	<0.0013	<0.001	
SB-11	3.5-4.0	08/13/99	<0.20	<5.5	NA	<0.002	<0.002	<0.002	<0.002	<0.0011	
SB-11	6.5-7.0	08/13/99	<0.11	<5.7	NA	<0.0011	<0.0011	<0.0011	<0.0011	<0.001	
SB-12	3.5-4.0	08/12/99	<0.10	<5.5	NA	<0.001	<0.001	<0.001	<0.001	<0.0006	
SB-12	4.5-5.0	08/12/99	**496**	**2,900**	NA	**0.07**	**0.032**	**4**	**6.7**	<0.0009	Chlorobenzene: 0.0017 1,2-DCB: 3.1 1,3-DCB: 0.038 1,4-DCB: 0.33 MTBE:
SB-12	6.5-7.0	08/12/99	**2**	**60**		<0.001	<0.001	**0.023**	**0.0098**	<0.0011	MTBE: 0.001
SB-13	3.5-4.0	08/13/99	**1**	**390**	NA	<0.0012	**0.002**	**0.0027**	**0.0027**	**0.0025**	
SB-13	6.5-7.0	08/13/99	**12**	**65**	NA	**0.25**	**0.048**	**0.15**	**0.49**	**0.0014**	
SB-14	3.5-4.0	08/12/99	<0.08	<5.5	NA	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	MTBE: 0.084
SB-14	6.5-7.0	08/12/99	**29**	**450**	NA	**0.56**	**0.29**	**0.33**	**1.7**	**0.0097**	
SB-15	3.5-4.0	08/12/99	<0.51	**140**	NA	<0.0054	<0.0054	<0.0054	<0.0054	<0.0091	
SB-15	6.5-7.0	08/12/99	<0.57	**81**	NA	<0.0061	**0.012**	<0.0061	**0.0085**	<0.0098	
SB-16	6-6.5	05/19/08	<0.22	**30**	<50	<0.0043	<0.0043	<0.0043	<0.0087	<0.0043	
SB-17	8-8.5	05/22/08	**2,500**	**3,600**	**2,900**	**30**	**130**	**27**	**120**	ND	
SB-17	10-10.5	05/22/08	12,000	17,000	13,000	**140**	**580**	**120**	**620**	<8.3	
SB-17	15-15.5	05/22/08	**64**	**1,400**	**1,300**	<0.89	<0.89	<0.89	<1.8	<0.89	
SB-17	20-20.5	05/22/08	<0.21	<0.99	<49	<0.0042	<0.0042	<0.0042	<0.0084	<0.0042	
SB-18	8-8.5	05/21/08	**1,900**	**67**	<49	**41**	**110**	**28**	**130**	<19	
SB-19	8-8.5	05/21/08	<0.25	<0.99	<49	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	
SB-20/ PCB-7	8-8.5	05/22/08	**5,600**	**390**	**51**	**86**	**280**	**54**	**280**	<8.3	
SB-21/ PCB-8	8-8.5	05/21/08	**3,800**	**2,500**	<49	**40**	**210**	**69**	**360**	<19	
SB-22	8-8.5	05/21/08	**3,200**	**1,100**	<500	<47	**140**	<47	**190**	<47	
SB-23	11.5-12	05/22/08	<0.21	**1.2**	<49	<0.0041	<0.0041	<0.0041	<0.0082	<0.0041	
SB-24/ PCB-1	9-9.5	05/20/08	<0.19	**1.6**	<50	<0.0039	<0.0039	<0.0039	<0.0078	<0.0039	
SB-25/ PCB-2	8-8.5	05/20/08	<0.19	**1.1**	<50	<0.0037	<0.0037	<0.0037	<0.0075	<0.0037	
SB-26	8.5-9	05/21/08	<0.23	**10**	<50	<0.0047	<0.0047	<0.0047	<0.0093	<0.0047	
SB-27/ PCB-3	8.5-9	05/20/08	<0.27	<0.99	<49	<0.0054	<0.0054	<0.0054	<0.011	<0.0054	
SB-20/ PCB-7 Dup	8-8.5	05/22/08	**4,900**	**610**	<250	**99**	**300**	**64**	**340**	<21	
SB-25/ PCB-2 Dup	8-8.5	05/20/08	NA	<1.0	<50	NA	NA	NA	NA	NA	

Notes:

NA = Not Analyzed
EPA Method 8260 for BTEX and 1,2-DCA analyses of soil
EPA Mentod 8015m for TPH-g, TPH-d, and TPM-mo analyses of soil

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-2	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	--	--	--	--	--	--	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	<0.5	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	<0.3	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.8	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	0.7	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	<0.5	<0.5	<0.5	<0.5	<50	<150	0.7	<0.5	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	01/27/98	<0.5	<0.5	<0.5	<0.5	100	<150	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-3	03/23/93	35	2.9	2	3.2	300	ND	--	--	--	--	--	
	07/27/93	97	1	4	1.1	220	ND	--	--	--	--	--	
	11/05/93	4.9	ND	ND	1.2	170	ND	--	--	--	--	--	
	02/25/94	42	<1	<1	<1	100	<1,000	--	--	--	--	--	
	06/03/94	120	8.2	8.4	4.5	320	<20,000	--	--	--	--	--	
	08/31/94	83	1.1	5.3	2.9	<500	<500	--	--	--	--	--	
	12/22/94	1,460	18	100	50	3,800	270	--	--	--	--	--	
	03/13/95	3,600	260	270	280	14,000	1,700	--	--	--	--	--	
	06/09/95	4,700	58	140	71	3,700	120	--	--	--	--	--	
	09/21/95	9,800	58	600	95	14,000	300	--	--	--	--	--	
	12/12/95	330	2.1	47	5.3	700	<50	--	--	--	--	--	
	03/12/96	350	4.6	23	8.7	600	<50	--	--	--	--	--	
	06/21/96	940	76	98	57	1,900	<50	--	--	--	--	--	
	08/29/96	420	29	44	28	900	<150	--	--	--	--	--	
	01/16/97	1,600	270	120	194	3,600	700	<0.5	9.2	<0.5	<0.5	--	
	04/15/97	1,300	300	180	160	4,300	800	<0.5	16	<0.5	1.1	6.9	
	07/07/97	100	84	100	67	1,900	350	--	--	--	--	3.8	
	10/27/97	1,030	60	54	40	2,200	--	<0.5	2.4	<0.5	<0.5	3.1	
	01/27/98	1,070	98	73	69	3,200	--	--	--	--	--	3.9	
	04/22/98	610	56	49	54	1,800	--	<0.5	3.0	<0.5	<0.5	1.1	
	07/22/98	1,800	230	160	180	3,600	370	--	--	--	--	5.0	
	10/21/98	78	1.0	3.8	0.6	110	<250	<0.5	0.6	<0.5	<0.5	<0.5	
	07/23/99	1,500	140	76.0	260	4,000	790	<0.5	1.0	<0.5	<0.5	5.60	
	10/28/99	1,100	43	58	102	3,000	600	<0.5	0.9	--	<0.5	--	
	02/10/00	690	22	36	49	1,400	520	<0.5	<0.5	<0.5	<0.5	2.20	
	04/27/00	1,100	140	73	163	2,400	250	<0.5	0.6	<0.5	<0.5	<0.5	
	08/03/00	520	7.7	21	27	1,100	750	<0.5	0.6	<0.5	<0.5	<0.5	
	10/23/00	2,000	16	22	46	3,800	760	<0.5	0.7	<0.5	<0.5	<0.5	
	01/31/01	360	8.6	14	28	860	300	<0.5	0.6	<0.5	<0.5	<0.5	
	04/26/01	808	60.6	46.8	115	1,530	280	<0.5	0.8	<0.5	<0.5	<0.5	
	07/30/01	788	23.3	44.6	80.7	1,400	350	<0.5	0.6	<0.5	<0.5	<0.5	
	10/29/01	852	14.3	24.5	38.6	1,730	500	<0.5	0.5	<0.5	<0.5	<0.5	
	01/29/02	1,250	85.3	64.7	95.7	4,240	490	<0.5	1.4	<0.5	<0.5	<0.5	
	04/29/02	1,120	51.5	84.4	117	5,710	700	<0.5	1.1	<0.5	<0.5	<0.5	
MW-5	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-6	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	3.5	<100	<1,000	--	--	--	--	--	
	06/03/94	2.7	<0.5	<0.5	<0.5	69	<20,000	--	--	--	--	--	
	08/31/94	<0.3	8.7	1.6	3.5	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	1.2	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	0.6	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	5.5	16	2.9	16	140	220	<0.5	6.3	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	10/24/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	7.7	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	6.9	<0.5	<0.5	<0.5	

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-6 (cont.)	04/27/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	6.6	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	9.2	<0.5	<0.5	<0.5	
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	10	<0.5	<0.5	<0.5	
	01/29/02	0.54	<0.5	<0.5	<1.0	<200	<250	<0.5	10	<0.5	<0.5	<0.5	
	04/30/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	14	<0.5	<0.5	<0.5	
MW-11	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-12	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-13	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
MW-15	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	430	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
MW-25	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	4.2	4.4	2.5	20	170	ND	--	--	--	--	--	
	02/25/94	2.1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	2.4	14	<0.5	3.4	97	<20,000	--	--	--	--	--	
	08/31/94	0.5	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.58	<0.5	<0.5	<0.5	150	950	--	--	--	--	--	
	06/09/95	0.8	<0.5	<0.5	<0.5	<100	60	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	120	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	90	<150	--	--	--	--	--	
	01/16/97	0.6	<0.5	<0.5	<0.5	80	<150	25	41	<0.5	<0.5	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	140	<150	--	--	--	--	11	
	01/27/98	<0.5	<0.5	<0.5	<0.5	<100	--	--	--	--	--	10	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	24	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	340	28	59	<0.5	<0.5	28	1,1-DCE detected, 0.9 µg/L.
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	27	72	<0.5	<0.5	27	1,1-DCE detected, 1.6 µg/L.
	07/23/99	1.80	<0.5	<0.5	<0.5	<50	<200	30	58	<0.5	<0.5	23.0	
	10/27/99	<0.5	1.4	<0.5	1.0	<100	<200	35	47	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	100	<250	39	41	<0.5	<0.5	29.0	1,1-Dichloroethene detected at 3.1 µg/L.
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	51	38	<0.5	<0.5	18	1,1-Dichloroethene detected at 4.2 µg/L.
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	40	57	<0.5	<0.5	27	1,1-Dichloroethene detected at 2.6 µg/L.
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	54	68	<0.5	<0.5	38	1,1-Dichloroethene detected at 3.5 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	90	<250	52	46	<0.5	<0.5	22	1,1-Dichloroethene detected at 6.5 µg/L.
	04/26/01	<0.5	0.62	<0.5	<0.5	<200	<250	49	37	<0.5	<0.5	15.8	1,1-Dichloroethene detected at 6.0 µg/L.
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	33	36	<0.5	<0.5	10.9	Chloromethane detected at 0.8 µg/L; 1,1-Dichloroethene detected at 4.6 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	22	38	<0.5	<0.5	10.5	Chloromethane detected at 0.5 µg/L; 1,1-Dichloroethene detected at 1.8 µg/L.
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	25	56	<0.5	<0.5	8.90	1,1-Dichloroethene detected at 2.8 µg/L.
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	14	44	<0.5	<0.5	6.92	1,1-Dichloroethene detected at 1.7 µg/L; 1,1,2,2-Tetrachloroethane detected at 0.5 µg/L.
	10/22/02	7.64	248	133	843	4,790	1,240	9.6	34	<0.5	<0.5	1,410	1,1-Dichloroethene detected at 0.9 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	11	35	<0.5	<0.5	7.3	Chloroethane detected at 22 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	8.5	34	<0.5	<0.5	5.7	1,1-Dichloroethene detected at 0.8 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	7.6	27	<0.5	<0.5	6.3	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	5.1	18	<0.5	<0.5	5.2	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**190**	**6.7**	**25**	**<0.50**	**<0.50**	**6.1**	1,1-Dichloroethene detected at 0.51 µg/L.
MW-26	03/23/93	180	190	55	330	7,000	1,300	ND	ND	ND	ND	--	
	07/27/93	470	96	30	80	1,800	ND	ND	140	ND	ND	--	
	11/05/93	4,700	1,300	9	1,400	19,000	ND	ND	120	ND	ND	--	
	02/25/94	4,800	570	200	860	14,000	<1,000	<1	28	<1	<1	--	
	06/03/94	4,100	300	120	230	12,000	<20,000	1.7	140	<0.5	<0.5	--	Bromodichloromethane detected, 0.84 µg/L.
	08/31/94	4,100	360	170	450	93,000	1,400	<4.0	<4.0	<4.0	<4.0	--	
	12/22/94	1,030	170	85	290	5,000	560	<2.0	<2.0	<2.0	<2.0	--	8 other volatiles detected by 8260.
	03/13/95	320	19	23	66	3,000	810	53	5.8	<0.5	<0.5	--	
	06/09/95	14,000	64	31	230	10,800	310	240	3.1	1	<0.5	--	
	09/21/95	1,900	160	160	330	8,000	200	1.3	120	<0.5	<0.5	--	
	12/12/95	13,000	38	36	120	25,000	0.6	1.4	180	<0.5	<0.5	--	No diesel pattern detected; result due to high gasoline concentration.
	03/12/96	9,000	33	30	65	4,400	<50	<0.5	180	<0.5	<0.5	--	
	06/21/96	14,000	27	16	66	5,400	<50	3.2	170	<0.5	<0.5	--	
	08/29/96	8,500	26	28	74	19,000	<150	<0.5	160	<0.5	<0.5	--	
	01/16/97	6,500	21	31	47	4,600	--	4.3	>50	<0.5	<0.5	26	
	04/15/97	16,000	33	40	160	26,000	2,200	3.5	97	<0.5	2.4	40	cis-1,2-DCE detected, 0.7 µg/L.
	07/07/97	22,000	44	170	200	28,000	1,100	<5.0	<5.0	<5.0	<5.0	95	
	10/27/97	16,000	26	100	37	30,000	--	3.6	92	<0.5	<0.5	38	
	01/27/98	23,600	<5.0	<5.0	<5.0	26,000	420	8.3	100	<0.5	<0.5	100	
	04/22/98	5,000	4.3	9.2	16	14,000	--	13	130	<0.5	<0.5	27	

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-26 (cont.)	07/22/98	3,800	5.7	6.9	11	5,200	750	10	110	--	<1.0	33	
	10/21/98	420	<0.5	2.1	2.7	820	<250	24	82	<0.5	<0.5	31	
	02/05/99	20	<0.5	0.60	0.80	230	230	10	51	<0.5	<0.5	29	
	04/07/99	<0.5	<0.5	<0.5	<0.5	80	<250	15	54	<0.5	<0.5	25	
	07/23/99	7.10	<0.5	<0.5	0.80	180	<200	12	32	<0.5	<0.5	12.0	
	10/27/99	14	1.4	2.9	7.8	400	<200	13	30	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	80	<250	13	32	<0.5	<0.5	28.0	
	04/26/00	0.7	<0.5	0.6	<0.5	200	340	7.5	39	<0.5	<0.5	22	
	08/03/00	6.8	<0.5	0.6	1.4	<50	<250	7.4	19	<0.5	<0.5	19	
	10/23/00	10	0.8	1.7	1.7	80	<250	5.1	37	<0.5	<0.5	26	
	01/31/01	26	0.70	2.4	2.2	390	320	5.7	51	<0.5	<0.5	33	
	04/26/01	10.6	<0.5	0.70	1.04	400	350	16	39	<0.5	<0.5	28.5	
	07/30/01	107	<0.5	1.42	1.06	1,920	380	22	44	<0.5	<0.5	31.4	
	10/29/01	31.6	<0.5	<0.5	<1.0	2,020	500	26	25	<0.5	<0.5	27	
	01/28/02	30.0	<0.5	0.70	<1.0	450	380	43	<0.5	<0.5	<0.5	14.5	1,1-Dichloroethene detected at 1.8 µg/L.
	04/29/02	394	<0.5	<0.5	<1.0	1,870	550	50	23	<0.5	<0.5	8.62	1,1-Dichloroethene detected at 2.5 µg/L.
	10/22/02	1,440	25.7	6.60	20.4	4,440	890	53	26	<0.5	<0.5	168	1,1-Dichloroethene detected at 3.7 µg/L.
	11/15/02	1,630	0.56	3.22	3.86	5,590	780	18	33	<0.5	<0.5	49.2	1,1-dichloroethene detected at 1.0 µg/L.
	05/06/03	1,250	<0.5	2.42	<1.0	3,730	380	46	24	<0.5	<0.5	13.1	1,1-Dichloroethene detected at 3.1 µg/L.
	10/14/03	51	<0.5	1.38	<1.0	3,100	<250	83	28	<0.5	<0.5	23.8	1,1-Dichloroethene detected at 3.3 µg/L.
	04/27/04	467	<0.5	1.24	<1.0	1,380	<250	82	33	<0.5	<0.5	<0.5	1,1-Dichloroethene detected at 5.2 µg/L.
	11/17/04	**120**	**<1.0**	**2.50**	**1.3**	**740**	**820**	**31**	**44**	**<0.50**	**<0.50**	**120**	1,1-Dichloroethene detected at 1.1 µg/L.
MW-27	06/21/96	<0.5	<0.5	<0.5	<0.5	<50	<50	<0.5	6.8	<0.5	<0.5	--	
	08/29/96	--	--	--	--	--	--	--	--	--	--	--	
	01/16/97	12	5.0	<0.5	2.6	70	<150	<0.5	5.7	<0.5	<0.5	--	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	<1.0	1.4	--	<1.0	<0.5	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	0.7	<0.5	<0.5	<0.5	
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	0.7	<0.5	<0.5	<0.5	
	10/27/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/16/00	<0.5	<0.5	<0.5	<0.5	<50	--	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	8.56	56.2	9.37	59.3	650	600	<0.5	<0.5	<0.5	<0.5	331	
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**64**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	
MW-28	03/23/93	ND	ND	ND	ND	110	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	2.1	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1	--	--	--	--	--	
	06/03/94	3.1	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	1.4	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.91	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	18	20	2.2	13	220	<150	5.1	85	<0.5	<0.5	8.2	
	04/15/97	<0.5	<0.5	<0.5	<0.5	120	<150	1.1	150	<0.5	<0.5	7.1	
	07/07/97	<0.5	<0.5	<0.5	<0.5	110	<150	<5.0	170	<5.0	<5.0	7.2	
	10/27/97	3.6	<0.5	<0.5	<0.5	300	--	6.2	120	<0.5	<0.5	36	
	01/27/98	7.6	<0.5	<0.5	<0.5	500	<150	--	--	--	--	56	
	04/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	1.0	89	<0.5	<0.5	8.6	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	<1.0	85	--	<1.0	18	
	10/21/98	<0.5	<0.5	<0.5	<0.5	<50	<250	0.5	80	<0.5	<0.5	12	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	32	29	<0.5	<0.5	5.0	1,1-DCE detected, 0.9 µg/L.
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	62	<0.5	<0.5	4.5	
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	50	<0.5	<0.5	1.80	
	10/27/99	--	--	--	--	--	<200	--	--	--	--	--	
	11/02/99	0.7	<0.5	<0.5	<0.5	<100	--	<0.5	32	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	39	<0.5	<0.5	4.30	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	50	<0.5	<0.5	1.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	47	<0.5	<0.5	3.7	

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-28 (cont.)	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	57	<0.5	<0.5	4.7	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	46	<0.5	<0.5	4.4	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	26	<0.5	<0.5	1.98	
	07/30/01	0.5	<0.5	0.64	2.58	<200	<250	<0.5	38	<0.5	<0.5	3.0	Chloromethane detected at 3.3 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	29	<0.5	<0.5	3.74	
	01/28/02	6.20	<0.5	<0.5	<1.0	<200	<250	2.8	50	<0.5	<0.5	6.00	
	04/29/02	1.64	<0.5	<0.5	<1.0	<200	<250	3.7	44	<0.5	<0.5	4.81	
	10/22/02	25.0	<0.5	<0.5	<1.0	750	<250	2.0	59	<0.5	<0.5	<0.5	
	11/15/02	13.4	<0.5	1.29	<1.0	610	<250	1.3	54	<0.5	<0.5	<0.5	Chloromethane detected at 1.0 µg/L.
	05/06/03	3.1	<0.5	<0.5	<1.0	390	<250	0.8	70	<0.5	<0.5	9.29	Chloroethane detected at 0.8 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	38	<0.5	<0.5	6.44	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	9.29	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**<50**	**<0.50**	**4.7**	**<0.50**	**<0.50**	**<5.0**	
MW-29	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	2.1	11	ND	ND	--	--	--	--	--	
	02/25/94	<1	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	<0.5	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	<0.3	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.59	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	6.6	8.9	0.6	9.3	120	<150	47	24	<0.5	<0.5	1.8	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	52	21	<5.0	<5.0	1.2	
	01/27/98	<0.5	<0.5	<0.5	<0.5	100	<150	--	--	--	--	8.0	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	<250	12	29	--	<1.0	7.8	
	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	68	<0.5	<0.5	8.5	
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	30	38	<0.5	<0.5	4.9	1,1-DCE detected, 1.4 µg/L.
	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	44	33	<0.5	1.9	4.70	1,1-Dichloroethene detected at 2.3 µg/L; cis-1,2-Dichloroethene detected at 2.3 µg/L.
	10/27/99	<0.5	<0.5	<0.5	<0.5	<100	<200	36	23	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	87	25	<0.5	<0.5	18.0	1,1-Dichloroethene detected at 9.6 µg/L.
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	61	38	<0.5	<0.5	12	1,1-Dichloroethene detected at 5.2 µg/L.
	08/16/00	<0.5	<0.5	<0.5	<0.5	<50	--	49	21	<0.5	<0.5	17	1,1-Dichloroethene detected at 6.0 µg/L.
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	94	40	<0.5	<0.5	34	1,1-Dichloroethene detected at 14 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	60	<250	100	35	<0.5	<0.5	26	1,1-Dichloroethene detected at 13 µg/L.
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	270	87	38	<0.5	<0.5	39.1	1,1-Dichloroethene detected at 12 µg/L.
	07/30/01	1.25	1.28	1.1	5.99	220	<250	120	42	<0.5	<0.5	42.3	1,1-Dichloroethene detected at 13 µg/L.
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	120	34	<0.5	<0.5	28.0	1,1-Dichloroethene detected at 14 µg/L.
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	120	44	<0.5	<0.5	28.9	1,1-Dichloroethene detected at 26 µg/L.
	04/29/02	4.95	<0.5	<0.5	<1.0	<200	<250	130	29	<0.5	<0.5	20.9	1,1-Dichloroethene detected at 23 µg/L.
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	140	26	<0.5	<0.5	18.1	1,1-Dichloroethene detected at 19 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	120	26	<0.5	<0.5	13.9	1,1-dichloroethene detected at 15 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	140	31	<0.5	<0.5	13.1	1,1-Dichloroethene detected at 24 µg/L.
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	110	22	<0.5	<0.5	11.9	Chloromethane detected at 0.9 µg/L.
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	160	28	<0.5	<0.5	15.3	1,1-Dichloroethene detected at 31 µg/L.
	11/17/04	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**120**	**<50**	**33**	**6.5**	**<0.50**	**<0.50**	**120**	1,1-Dichloroethene detected at 5.5 µg/L.
MW-30	03/23/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	07/27/93	ND	ND	ND	ND	ND	ND	--	--	--	--	--	
	11/05/93	ND	ND	ND	2.8	ND	ND	--	--	--	--	--	
	02/25/94	1.3	<1	<1	<1	<100	<1,000	--	--	--	--	--	
	06/03/94	1.1	<0.5	<0.5	<0.5	<50	<20,000	--	--	--	--	--	
	08/31/94	0.8	<0.3	<0.3	<0.6	<500	<500	--	--	--	--	--	
	12/22/94	0.6	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	Non-diesel peak reported.
	03/13/95	0.98	<0.5	<0.5	<0.5	<50	<400	--	--	--	--	--	
	06/09/95	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	09/21/95	<0.5	<0.5	<0.5	<0.5	<50	<50	--	--	--	--	--	
	12/12/95	<0.5	<0.5	<0.5	<1.0	<100	<50	--	--	--	--	--	
	03/12/96	<0.5	<0.5	<0.5	<0.5	<100	<50	--	--	--	--	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	--	
	01/16/97	<0.5	<0.5	<0.5	0.6	80	<150	<0.5	<0.5	<0.5	0.9	--	
	07/07/97	<0.5	<0.5	<0.5	<0.5	<50	<150	--	--	--	--	<0.5	
	01/27/98	5.4	<0.5	<0.5	<0.5	100	--	--	--	--	--	<0.5	
	07/22/98	<0.5	<0.5	<0.5	<0.5	<50	--	--	--	--	--	<0.5	
	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	--	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	

Revised Site Conceptual Model
Former Nestlé USA, Inc. Facility-Oakland, CA
1310 14th Street, Oakland, CA

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-30 (cont.)	08/04/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/24/00	5.4	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/29/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroethane detected at 1.3 µg/L.
	01/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/30/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**140**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	
MW-32	03/23/93	391	6.2	3.1	9	440	ND	ND	60	ND	ND	--	
	07/27/93	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	--	
	11/05/93	20	ND	1.8	2.1	170	ND	ND	7.9	ND	ND	--	
	02/25/94	5.6	<1	<1	<1	<100	<1,000	<1	<1	<1	<1	--	
	06/03/94	120	1.3	<0.5	1.4	350	<20,000	<0.5	11	<0.5	<0.5	--	
	08/31/94	39	0.5	2.2	1.2	<500	<500	<4.0	10	<4.0	<4.0	--	
	12/22/94	4.8	<0.5	<0.5	<0.5	<50	<50	<2.0	4.6	<2.0	<2.0	--	Non-diesel peak reported.
	03/13/95	220	3.6	6.5	5.8	1,100	<400	<0.5	16	<0.5	<0.5	--	
	06/09/95	1,500	7.9	43	14	2,200	180	0.7	<0.5	0.5	<0.5	--	
	09/21/95	1,200	2.4	72	4.5	2,300	60	<0.5	6.7	<0.5	1.4	--	
	12/12/95	230	<0.5	8.9	<1.0	500	<50	<0.5	28	<0.5	<0.5	--	
	03/12/96	40	<0.5	1.7	<0.5	110	<50	<0.5	6.8	<0.5	<0.5	--	
	06/21/96	--	--	--	--	--	--	--	--	--	--	--	
	08/29/96	150	<0.5	49	<0.5	700	<150	<0.5	27	<0.5	<0.5	--	
	01/16/97	14	<0.5	1.9	<0.5	150	<150	<0.5	10	<0.5	0.7	--	cis-1,2-DCE detected, 0.8 µg/L.
	07/07/97	370	11	110	21	1,600	190	--	--	--	--	11	
	01/27/98	13	<0.5	1.0	<0.5	300	--	<0.5	7.5	<0.5	<0.5	2.5	
	07/22/98	700	55	88	66	2,300	--	--	--	--	--	14	
	07/22/99	59.0	0.80	1.80	<0.5	900	220	<0.5	5.9	<0.5	<0.5	8.70	
	10/28/99	95	2.5	2.1	1.6	500	<200	<0.5	12	--	<0.5	--	
	02/10/00	7.0	<0.5	<0.5	<0.5	120	<250	<0.5	4.3	<0.5	<0.5	1.10	
	04/27/00	240	7.0	12	18.8	800	250	<0.5	9.8	<0.5	<0.5	<0.5	
	08/03/00	620	3.0	14	4.1	1,300	<250	<0.5	3.0	<0.5	<0.5	<0.5	
	10/23/00	430	4.30	5.50	8.80	1,200	260	<0.5	7.8	<0.5	<0.5	<0.5	
	01/31/01	42	1.5	0.90	2.8	280	<250	<0.5	5.7	<0.5	<0.5	3.6	
	04/26/01	268	13.0	22.1	22.0	780	<250	<0.5	6.3	<0.5	<0.5	<0.5	
	07/30/01	29.4	<0.5	0.52	0.51	320	<250	<0.5	6.6	<0.5	<0.5	<0.5	
	10/29/01	16.1	2.01	1.14	3.96	<200	<500	<0.5	5.4	<0.5	<0.5	<0.5	
	01/29/02	12.0	<0.5	0.70	<1.0	<200	<250	<0.5	4.9	<0.5	2.0	<0.5	cis 1,2-Dichloroethene detected at 1.3 µg/L.
	04/29/02	188	5.52	9.70	13.0	680	<250	<0.5	6.0	<0.5	<0.5	<0.5	
	10/22/02	4.84	<0.5	<0.5	<1.0	<200	<250	<0.5	4.8	<0.5	<0.5	<0.5	
	05/06/03	20.72	0.76	0.86	2.08	<200	<250	<0.5	5.8	<0.5	<0.5	<0.5	
	10/14/03	6.02	<0.5	<0.5	<1.0	<200	<250	<0.5	3.2	<0.5	<0.5	<0.5	
	04/27/04	23.60	1.68	0.67	3.91	<200	<250	<0.5	3.0	<0.5	<0.5	<0.5	
	11/17/04	**2.0**	**<0.50**	**<0.50**	**<0.50**	**<50**	**<50**	**<0.50**	**2.1**	**<0.50**	**<0.50**	**<5.0**	
MW-33	04/07/99	0.60	<0.5	0.90	<0.5	<50	<250	--	--	--	--	<0.5	
	07/22/99	8.90	<0.5	1.00	<0.5	<50	<200	0.6	0.7	<0.5	<0.5	<0.5	
	10/28/99	40	0.9	21	3.8	200	<200	0.8	1.3	--	<0.5	--	
	02/10/00	20	0.7	12	10.0	380	<250	0.9	0.6	<0.5	<0.5	1.30	
	04/27/00	6.9	<0.5	6.4	<0.5	<100	250	4.3	0.9	<0.5	<0.5	<0.5	
	08/03/00	31	0.5	20	1.0	150	550	<0.5	0.6	<0.5	<0.5	<0.5	
	10/23/00	89	1.5	36	3.9	350	<250	<0.5	2.1	<0.5	<0.5	<0.5	
	01/31/01	6.8	<0.5	2.0	<0.5	<50	<250	1.9	0.6	<0.5	<0.5	0.7	
	04/26/01	6.61	0.56	1.63	0.61	<200	<250	2.6	<0.5	<0.5	<0.5	<0.5	
	07/30/01	4.43	2.61	1.34	6.6	<200	<250	2.2	0.5	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.6 µg/L.
	10/29/01	14.2	<0.5	0.63	<1.0	<200	<500	1.3	0.7	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	1.1	0.5	<0.5	3.8	<0.5	Dichlorodiflouromethane detected at 1.9 µg/L.; cis 1,2-Dichloroethene detected at 8.9 µg/L.
	04/29/02	14.6	<0.5	1.41	<1.0	<200	<250	0.8	0.9	<0.5	<0.5	<0.5	Dichlorodiflouromethane detected at 1.9 µg/L.
MW-100	07/06/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
MW-?	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	430	--	--	--	--	<0.5	
PR-26	07/26/99	20,000	15,000	1,100	7,250	82,500	11,000	--	--	--	--	33.0	
	10/26/99	28,000	25,000	2,300	8,400	110,000	60,000	<0.5	24	--	<0.5	--	
PR-45	07/26/99	13,200	8,200	2,600	15,600	82,500	39,000	--	--	--	--	35.0	
	10/28/99	12,000	8,200	1,700	8,500	45,000	25,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	24,000	25,000	10,000	53,000	360,000	82,000	<0.5	4.0	<0.5	<0.5	1,000	
	04/27/00	17,000	9,500	16,000	92,000	1,300,000	20,300	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/04/00	20,000	8,800	2,600	16,000	73,000	54,500	<0.5	1.0	<0.5	<0.5	<0.5	
	10/23/00	26,000	12,000	4,000	20,000	96,000	36,000	<0.5	1.2	<0.5	<0.5	<5.0	Chloroethane detected at 6.0 µg/L.
	04/27/01	16,200	8,600	3,220	19,000	178,000	22,700	<0.5	14	<0.5	<0.5	<25	Chloroethane detected at 4.6 µg/L.
	07/30/01	14,500	8,900	4,400	24,700	132,000	29,700	<0.5	11	<0.5	<0.5	<50	Chloromethane detected at 0.6 µg/L; Chloroethane detected at 11 µg/L; Methylene chloride detected at 0.5 µg/L.
	10/29/01	12,600	6,650	2,260	12,400	86,100	50,000	<0.5	7.8	<0.5	<0.5	<25	Chloroethane detected at 6.0 µg/L.
	01/29/02	8,930	4,860	2,640	12,700	114,000	19,400	<0.5	30	<0.5	<0.5	<0.5	Chloroethane detected at 7.5 µg/L.
	05/16/02	14,300	2,630	1,580	7,780	125,000	15,600	<0.5	1.0	<0.5	<0.5	<0.5	Chloroethane detected at 7.3 µg/L.
PR-52	07/26/99	12,000	1,720	750	12,400	172,000	40,000	<0.5	1.8	<0.5	<0.5	217	Methylene chloride detected at 7.9 µg/L.
	10/28/99	19,000	530	1,800	5,800	40,000	450,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	22,000	1,600	4,100	15,800	200,000	140,000	<0.5	1.3	<0.5	<0.5	430	
	04/28/00	20,000	2,200	4,700	18,600	270,000	88,000	<1.0	<1.0	<1.0	<1.0	<5.0	
	08/04/00	26,000	1,600	2,900	15,000	150,000	110,000	<0.5	2.3	<0.5	<0.5	<0.5	
	10/24/00	52,000	13,000	41,000	180,000	650,000	280,000	<5.0	<5.0	<5.0	<5.0	<5.0	
	01/31/01	81,000	840	57,000	210,000	5,300,000	276,000	<0.5	1.0	<0.5	<0.5	500	Chloroethane detected at 2.4 µg/L; Methylene chloride detected at 0.6 µg/L.
	04/27/01	25,000	16,300	14,700	55,000	886,000	134,000	<0.5	<0.5	<0.5	<0.5	1,040	Chloroethane detected at 1.5 µg/L.
	07/30/01	31,100	2,480	13,500	51,700	340,000	185,000	<0.5	1.3	<0.5	<0.5	2,510	Chloromethane detected at 13 µg/L; Chloroethane detected at 46 µg/L; Methylene chloride detected at 0.6 µg/L.
	10/29/01	22,700	1,630	3,070	11,500	126,000	140,000	<0.5	0.9	<0.5	<0.5	<50	Chloromethane detected at 0.6 µg/L; Chloroethane detected at 4.0 µg/L; Methylene chloride detected at 0.7 µg/L.
	01/29/02	21,500	1,840	4,540	16,800	517,000	272,000	<0.5	<0.5	<0.5	<0.5	44.1	Chloroethane detected at 1.5 µg/L.
	05/16/02	31,600	53,600	43,800	216,000	2,020,000	75,000	<5.0	<5.0	<5.0	<5.0	63.5	Chloroethane detected at 8.3 µg/L.
PR-53	07/26/99	31,000	12,000	1,900	8,800	110,000	98,000	<0.5	43	<0.5	<0.5	43.0	Methylene chloride detected at 6.2 µg/L.
	10/27/99	17,000	3,900	890	3,320	54,000	16,000	<0.5	18	--	<0.5	--	
	02/09/00	21,000	5,000	1,200	5,300	65,000	9,400	0.6	20	<0.5	<0.5	67.0	Methylene chloride detected at 0.8 µg/L.
	04/28/00	34,000	30,000	9,300	51,000	730,000	104,000	<1.0	<1.0	<1.0	<1.0	340	
	08/04/00	35,000	17,000	3,800	24,000	180,000	69,500	<0.5	1.7	<0.5	<0.5	110	
	10/24/00	99,000	110,000	80,000	640,000	580,000	380,000	<5.0	5.0	<5.0	<5.0	380	
	01/31/01	66,000	15,000	28,000	140,000	2,400,000	960,000	<0.5	1.5	<0.5	<0.5	660	Chloroethane detected at 1.7 µg/L; Methylene chloride detected at 0.9 µg/L.
	04/27/01	55,500	10,000	23,700	137,000	4,240,000	806,000	<0.5	<0.5	<0.5	<0.5	<5,000	Chloroethane detected at 1.7 µg/L; Methylene chloride detected at 1.1 µg/L.
	10/29/01	46,500	9,520	12,900	74,000	1,630,000	130,000	<0.5	0.8	<0.5	<0.5	<500	Chloroethane detected at 3.0 µg/L; Methylene chloride detected at 0.9 µg/L.
	01/29/02	33,000	7,340	10,300	41,800	495,000	462,000	<0.5	1.8	<0.5	<0.5	122	Chloroethane detected at 3.2 µg/L.
	05/16/02	35,800	10,500	18,700	130,000	3,280,000	113,000	<5.0	<5.0	<5.0	<5.0	242	
PR-54	07/26/99	32,000	22,000	1,500	21,800	170,000	28,000	<0.5	3.0	<0.5	<0.5	56.0	Methylene chloride detected at 2.5 µg/L.
	10/26/99	27,000	10,000	3,700	19,500	190,000	350,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	27,000	23,000	9,900	50,000	960,000	110,000	<0.5	3.9	<0.5	<0.5	1,000	
	04/28/00	24,000	14,000	1,200	9,000	76,000	80,000	<1.0	1.6	<1.0	<1.0	300	
	08/04/00	27,000	7,600	1,400	11,000	120,000	54,500	<0.5	2.0	<0.5	<0.5	200	
	10/24/00	23,000	4,400	2,000	13,000	140,000	96,000	<0.5	2.3	<0.5	<0.5	<100	Chloroethane detected at 5.3 µg/L; Methylene chloride detected at 2.3 µg/L.
	01/31/01	30,000	8,300	3,300	21,000	220,000	236,000	<0.5	2.6	<0.5	<0.5	480	Chloroethane detected at 2.8 µg/L; Methylene chloride detected at 1.7 µg/L.
	04/27/01	26,100	8,650	2,120	15,900	51,300	108,000	<0.5	<0.5	<0.5	<0.5	<500	Chloroethane detected at 3.0 µg/L.
	07/30/01	31,700	18,000	9,880	58,400	320,000	71,200	<0.5	3.9	<0.5	<0.5	2,750	Chloromethane detected at 2.2 µg/L; Chloroethane detected at 22 µg/L; Methylene chloride detected at 2.6 µg/L.
	10/30/01	25,400	11,300	3,500	18,800	222,000	530,000	<0.5	1.2	<0.5	<0.5	276	Chloroethane detected at 7.4 µg/L; Methylene chloride detected at 2.0 µg/L.
	01/29/02	13,300	9,850	4,240	33,100	108,000	48,000	<0.5	7.5	<0.5	<0.5	51.3	Chloroethane detected at 6.2 µg/L.
	05/16/02	27,900	34,500	5,630	36,400	324,000	172,000	<5.0	43	<5.0	<5.0	251	Chloroethane detected at 9.8 µg/L.
PR-64	07/26/99	22,000	18,000	1,700	10,300	110,000	--	<0.5	130	<0.5	<0.5	35.0	Methylene chloride detected at 1.4 µg/L.
	10/27/99	11,000	7,400	1,200	3,900	66,000	50,000	<0.5	110	--	<0.5	--	
	02/09/00	22,000	20,000	6,000	17,000	120,000	40,000	<0.5	>50	<0.5	<0.5	110	
	04/28/00	19,000	16,000	1,800	13,900	130,000	78,000	<1.0	67	<1.0	<1.0	300	
	05/16/02	18,300	40,100	10,400	104,000	30,600,000	419,000	<5.0	<5.0	<5.0	<5.0	<500	
PR-65	07/26/99	12,000	1,400	1,300	13,000	68,000	16,500	<0.5	2.6	<0.5	<0.5	20.0	
	10/26/99	14,000	2,300	1,800	11,000	65,000	50,000	<0.5	<0.5	--	<0.5	--	
PR-68	07/26/99	1,900	24.0	27.0	62.0	4,900	11,000	<0.5	1.2	<0.5	<0.5	4.40	
	10/26/99	2,800	36	86	62	8,000	2,800	<0.5	<0.5	--	<0.5	--	

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
PR-76	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
	10/22/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/04	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**85**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	
V-24	04/07/99	<0.5	<0.5	<0.5	<0.5	120	<250	--	--	--	--	0.5	
V-31	07/26/99	7,000	600	550	1,370	17,500	5,350	--	--	--	--	19.0	
	10/26/99	7,000	120	850	950	18,000	3,000	<0.5	<0.5	--	<0.5	--	
V-46	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	270	<0.5	<0.5	<0.5	<0.5	<0.5	
V-55	07/22/99	8,000	480	740	2,880	30,000	2,100	<0.5	<0.5	<0.5	<0.5	13.0	
	10/28/99	11,000	59	1,200	317	28,000	38,000	<0.5	<0.5	--	<0.5	--	
	02/09/00	2,200	59	760	350	7,900	10,000	<0.5	<0.5	<0.5	<0.5	9.70	
	04/28/00	2,900	510	440	2,340	14,000	26,500	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/03/00	9,400	380	720	2,200	28,000	70,000	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	11,000	140	900	1,300	30,000	51,000	<0.5	<0.5	<0.5	<0.5	<12	
	01/31/01	4,600	57	550	1,200	34,000	88,500	<0.5	<0.5	<0.5	<0.5	44	
	04/26/01	6,400	61.5	250	336	34,200	227,000	<0.5	<0.5	<0.5	<0.5	<25	
	10/30/01	5,360	70.0	1,090	1,450	32,700	78,000	<0.5	<0.5	<0.5	<0.5	<25	
	01/29/02	1,660	140	492	818	12,000	4,100	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	5,170	95.1	572	523	30,600	35,100	<0.5	<0.5	<0.5	<0.5	1.06	
V-72	07/26/99	13,500	6.80	1.10	3.90	3,900	12,900	<0.5	11	<0.5	<0.5	<0.5	
	10/28/99	2,900	58	21	47.7	6,000	48,000	<0.5	3.4	--	<0.5	--	
	02/09/00	670	8.2	<0.5	17.8	890	6,100	<0.5	3.0	<0.5	<0.5	<0.5	
	04/28/00	130	<0.5	<0.5	<0.5	200	5,950	<0.5	0.7	<0.5	<0.5	<0.5	
	08/04/00	460	0.8	<0.5	0.6	440	4,120	<0.5	2.8	<0.5	<0.5	<0.5	
	10/24/00	2,700	3.2	0.5	2.3	3,500	17,000	<0.5	4.0	<0.5	<0.5	<0.5	
	04/27/01	1,240	2.05	<0.5	2.78	1,310	6,290	<0.5	5.1	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.8 µg/L.
	07/30/01	1,790	69.8	1.22	2.50	1,490	4,290	<0.5	6.2	<0.5	<0.5	<0.5	Chloromethane detected at 1.5 µg/L.
	10/29/01	1,330	4.38	0.55	3.32	1,960	--	<0.5	5.6	<0.5	<0.5	<0.5	Chloromethane detected at 1.1 µg/L.
	01/29/02	655	6.40	<0.5	8.00	1,840	2,250	<0.5	3.9	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
	05/16/02	43.8	1.09	<0.5	4.36	230	5,120	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 1.8 µg/L.
V-84	07/26/99	2,400	440	80.0	340	8,700	2,350	<0.5	2.4	<0.5	<0.5	6.40	
	10/26/99	1,100	130	46	108	4,000	700	<0.5	<0.5	--	<0.5	--	
	02/09/00	300	30	8.9	53	2,300	1,100	<0.5	1.2	<0.5	<0.5	<0.5	
	04/28/00	30	1.9	<0.5	<0.5	100	550	<5.0	<5.0	<5.0	<5.0	<0.5	
	08/04/00	900	110	34	120	2,700	1,380	<0.5	1.0	<0.5	<0.5	<0.5	
	10/24/00	2,000	480	24	110	48,000	1,900	<0.5	1.0	<0.5	<0.5	<0.5	
	01/31/01	68	1.3	5.3	8.2	970	1,820	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	925	97.0	45.4	59.7	2,360	1,180	<0.5	0.8	<0.5	<0.5	<0.5	
	07/30/01	1,720	282	50	359	8,100	7,040	<0.5	1.5	<0.5	<0.5	<0.5	
	10/30/01	870	250	27.6	167	8,960	--	<0.5	1.0	<0.5	<0.5	<0.5	
	01/29/02	197	4.90	1.70	3.60	640	500	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	318	34.4	15.4	18.4	1,070	400	<0.5	<0.5	<0.5	<0.5	<0.5	
29 (CC-1)	07/23/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/03/00	1.4	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/30/01	1.12	0.56	<0.5	<0.5	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/22/02	1.38	14.6	2.44	16.4	220	<250	<0.5	<0.5	<0.5	<0.5	92.0	Chloromethane detected at 1.3 µg/L, Chloroform detected at 4.7 µg/L.
	11/15/02	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 2.6 µg/L.
	05/06/03	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/14/03	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.7 µg/L.
	04/27/04	<0.50	<0.50	<0.50	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	11/17/04	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<50**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	
30 (CC-2)	07/22/99	0.90	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/28/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/08/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/00	<0.5	<0.5	<0.5	<0.5	<100	<250	<0.5	0.7	<0.5	<0.5	<0.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	<0.5	<0.5	<0.5	<0.5	<50	340	<0.5	0.9	<0.5	<0.5	<2.5	
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/30/01	<0.5	1.43	<0.5	1.63	<200	<250	<0.5	1.6	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 2.8 µg/L.

Table 3: Historical Groundwater Sample Results (1993 - 2008)

Well Number	Date Sampled	Benzene µg/L	Toluene µg/L	Ethyl-Benzene µg/L	Xylenes µg/L	TPH-G µg/L	TPH-D µg/L	1,1-DCA µg/L	1,2-DCA µg/L	1,1,1-TCA µg/L	TCE µg/L	MTBE µg/L	Notes
30 (CC-2)	10/29/01	<0.5	<0.5	<1.0	<0.5	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	
(cont.)	01/28/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	1.9	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 3.8 µg/L.
	04/29/02	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	2.5	<0.5	<0.5	0.86	Dichlorodifluoromethane detected at 3.6 µg/L.
	10/10/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.6 µg/L.
	11/15/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroform detected at 0.5 µg/L.
	05/06/03	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
81	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	<150	<0.5	<0.5	<0.5	<0.5	<0.5	
	07/22/99	0.70	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
94	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	170	--	--	--	--	<0.5	
	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
210	02/05/99	<0.5	<0.5	<0.5	<0.5	<50	960	--	--	--	--	<0.5	
223	10/26/99	<0.5	<0.5	<0.5	<0.5	<100	<200	<0.5	<0.5	--	<0.5	--	
	02/10/00	<0.5	<0.5	<0.5	<0.5	<50	640	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/27/00	<0.5	<0.5	<0.5	<0.5	<100	250	<0.5	<0.5	<0.5	<0.5	<0.5	
	08/03/00	<0.5	<0.5	<0.5	<0.5	<50	680	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/23/00	1.30	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Chlorobenzene detected at 0.9 µg/L.
	01/31/01	<0.5	<0.5	<0.5	<0.5	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/26/01	<0.5	<0.5	<0.5	<0.5	<200	390	<0.5	<0.5	<0.5	<0.5	<0.5	1,2-Dichlorobenzene detected at 0.5 µg/L.
	07/30/01	<0.5	<0.5	<0.5	<0.5	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	Dichlorodifluoromethane detected at 0.5 µg/L.
	10/30/01	<0.5	<0.5	<0.5	<1.0	<200	<500	<0.5	<0.5	<0.5	<0.5	<0.5	Chloromethane detected at 0.8 µg/L.
	01/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
	04/29/02	<0.5	<0.5	<0.5	<1.0	<200	<250	<0.5	<0.5	<0.5	<0.5	<0.5	
224	07/26/99	<0.5	<0.5	<0.5	<0.5	<50	640	<0.5	<0.5	<0.5	<0.5	<0.5	
239	07/26/99	55,000	85.0	1,500	190	30,000	--	<0.5	<0.5	<0.5	<0.5	5.30	
	10/26/99	23,000	53	1,500	103.2	28,000	10,000	<0.5	<0.5	--	<0.5	--	
	02/10/00	40,000	48	1,900	52	44,000	21,000	<0.5	1.0	<0.5	<0.5	14.0	
	04/28/00	25,000	540	2,000	710	36,000	12,500	<5.0	<5.0	<5.0	<5.0	<5.0	
	08/04/00	25,000	220	1,900	920	45,000	32,500	<0.5	0.6	<0.5	<0.5	<0.5	
	10/24/00	24,000	100	1,500	390	50,000	50,000	<0.5	<0.5	<0.5	<0.5	<5.0	
	01/31/01	23,000	84	1,900	200	52,000	112,000	<0.5	0.9	<0.5	<0.5	<0.5	
	04/26/01	23,900	113	1,990	590	298,000	143,000	<0.5	<0.5	<0.5	<0.5	<25	
	07/30/01	30,200	384	2,000	966	66,500	19,100	<0.5	<0.5	<0.5	<0.5	<0.5	
	10/30/01	41,200	273	1,470	215	54,300	120,000	<0.5	<0.5	<0.5	<0.5	<50	
	01/28/02	24,500	228	1,670	352	112,000	6,900	<0.5	<0.5	<0.5	<0.5	<0.5	Chloroethane detected at 0.6 µg/L.
	04/29/02	25,900	280	1,380	491	71,600	9,400	<0.5	<0.5	<0.5	<0.5	<0.5	
241	04/07/99	<0.5	<0.5	<0.5	<0.5	<50	<250	--	--	--	--	<0.5	
249	07/22/99	<0.5	<0.5	<0.5	<0.5	<50	<200	<0.5	<0.5	<0.5	<0.5	<0.5	
SB-16	05/20/08	<0.50	<0.50	<0.50	530	<50	530	NA	<0.50	NA	NA	NA	
SB-17	05/22/08	12,000	3,200	17,000	560,000	120,000	560,000	NA	<0.50	NA	NA	NA	
SB-18	05/22/08	50,000	2,300	46,000	23,000	190,000	23,000	NA	2,200	NA	NA	NA	
SB-19	05/22/08	<12	220	<12	1,600	8,200	1,600	NA	<12	NA	NA	NA	
SB-20/ PCB-7	05/22/08	41,000	3,000	30,000	47,000	170,000	47,000	NA	930	NA	NA	NA	
SB-21/ PCB-8	05/23/08	12,000	2,600	20,000	3,500	110,000	3,500	NA	<250	NA	NA	NA	
SB-22	05/22/08	27,000	13,000	39,000	73,000	870,000	73,000	NA	<2,500	NA	NA	NA	
SB-24/ PCB-1	05/21/08	1.1	<0.50	<0.50	360	<50	360	NA	<0.50	NA	NA	NA	
SB-25/ PCB-2	05/21/08	<0.50	<0.50	<0.50	140	<50	140	NA	<0.50	NA	NA	NA	
SB-26	05/22/08	<0.50	<0.50	<0.50	270	<50	270	NA	<0.50	NA	NA	NA	
SB-27/ PCB-3	05/20/08	<0.50	<0.50	<0.50	NA	NA	NA	NA	<0.50	NA	NA	NA	

Notes:

ND	Not detected.
NA	Not analyzed or not sampled.
µg/L	Micrograms per liter.
TPH-G	Total Petroleum Hydrocarbons as gasoline.
TPH-D	Total Petroleum Hydrocarbons as diesel.
1,1-DCA	1,1-Dichloroethane.
1,1-DCA	1,2-Dichloroethane.
cis-1,1-DCE	1,1-Dichloroethene.
1,1,1-TCA	1,1,1-Trichloroethane.
1,2-DCE	cis 1,2-Dichloroethylene.
TCE	Trichloroethene.
MTBE	Methyl tertiary butyl ether.

10/22/02 Data was confirmed anomalous by resampling on 11/15/02.

Project: Former Nestle Oakland Facility

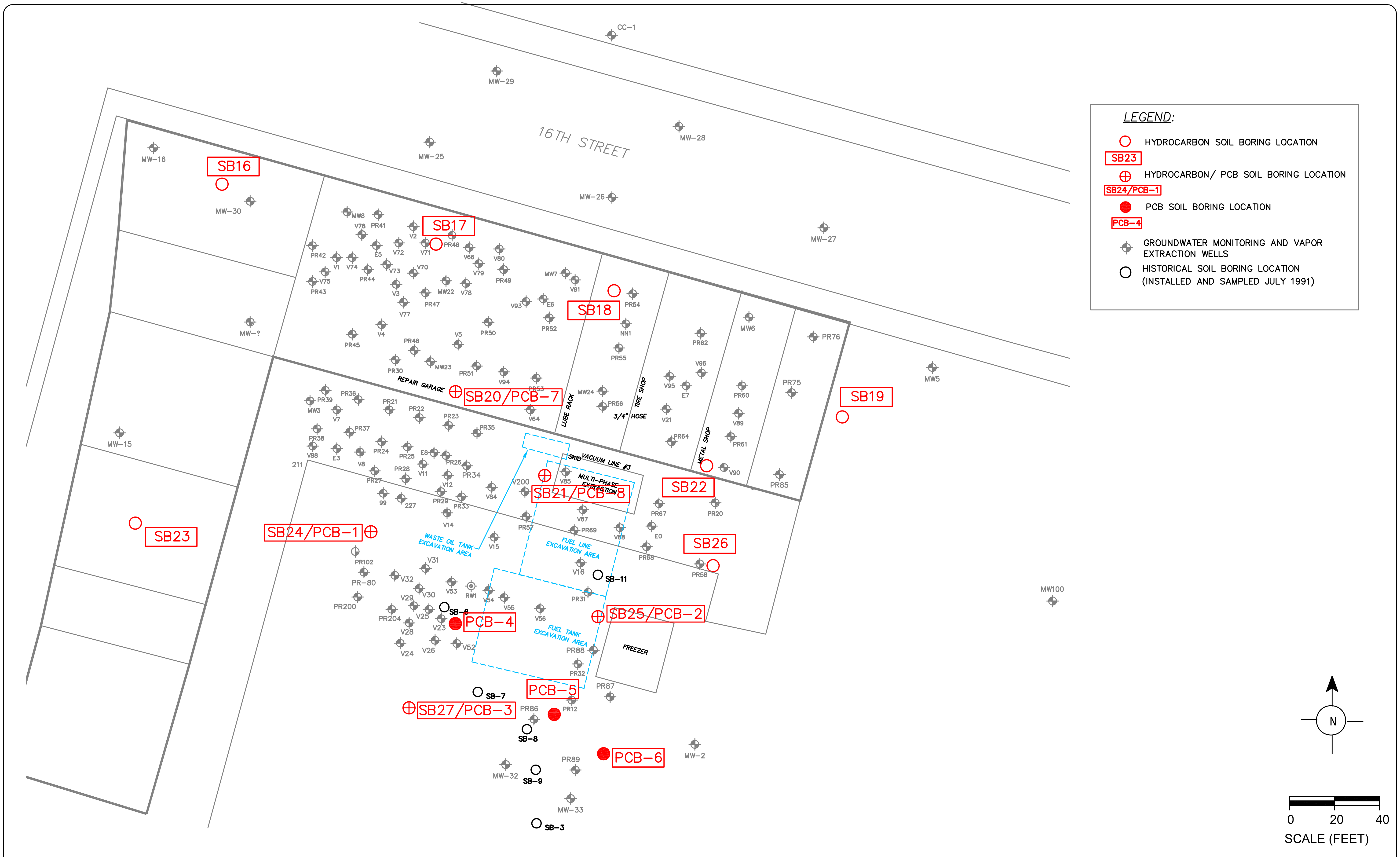
Proj. Manager B. Acharya

Date drafted: 7/2/08

Chkd by: T. Loof

Drafter: J. Plummer

File Path:



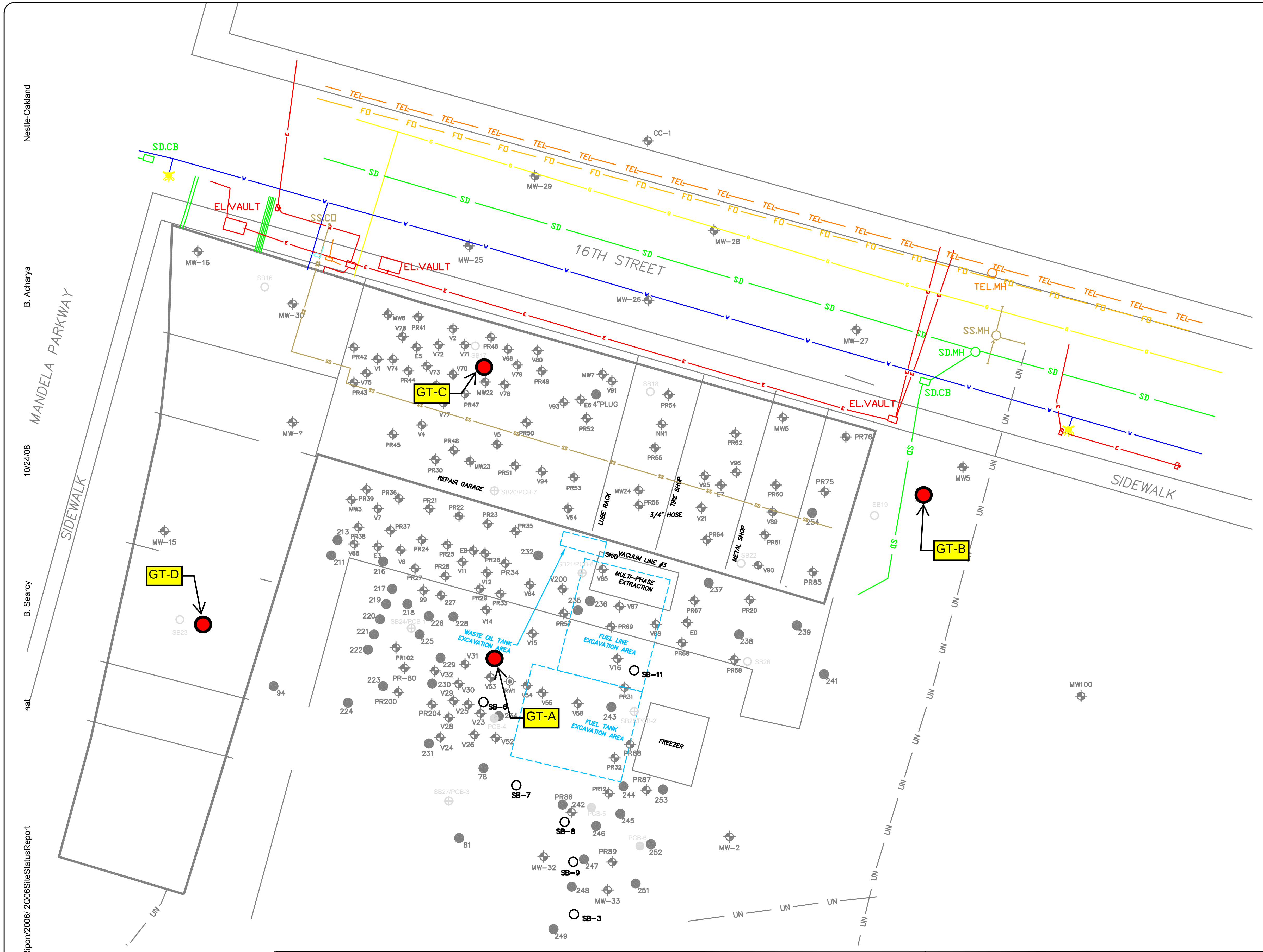
Former Nestle Oakland Facility
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

SUPPLEMENTAL SOIL, SOIL GAS AND GROUNDWATER INVESTIGATION
Soil Boring Locations
May 2008

Figure
2

Project: Nestle-Oakland
Proj. Manager: B. Achariya
Date drafted: 10/24/08
Chkd by: B. Searcy
Drafter: hat
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport



LEGEND:

○ SB23	HYDROCARBON SOIL BORING LOCATION
⊕ SB24/PCB-1	HYDROCARBON/ PCB SOIL BORING LOCATION
● PCB-4	PCB SOIL BORING LOCATION
⊕	GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS
○	HISTORICAL SOIL BORING LOCATION (INSTALLED AND SAMPLED JULY 1991)
● 239	WELL OF UNKNOWN CONSTRUCTION

UTILITIES

—TEL— —TEL—	TELEPHONE
—FO— —FO—	FIBER OPTICS
—G—	GAS LINE
—SD—	STORM DRAIN MAIN
—V—	WATER MAIN
—E—	ELECTRICAL
—UN— —UN—	UNKNOWN

NOTES:

1. SURVEY CONDUCTED BY SUBTRONIC CORPORATION IN NOVEMBER 2007.
2. NOT ALL UTILITIES MAY BE SHOWN. SOME LATERALS WERE NOT ACCESSIBLE AND WERE NOT LOCATED DURING SURVEY.
3. MOST UTILITIES ON THE PROPERTY ARE ABANDONED.

N

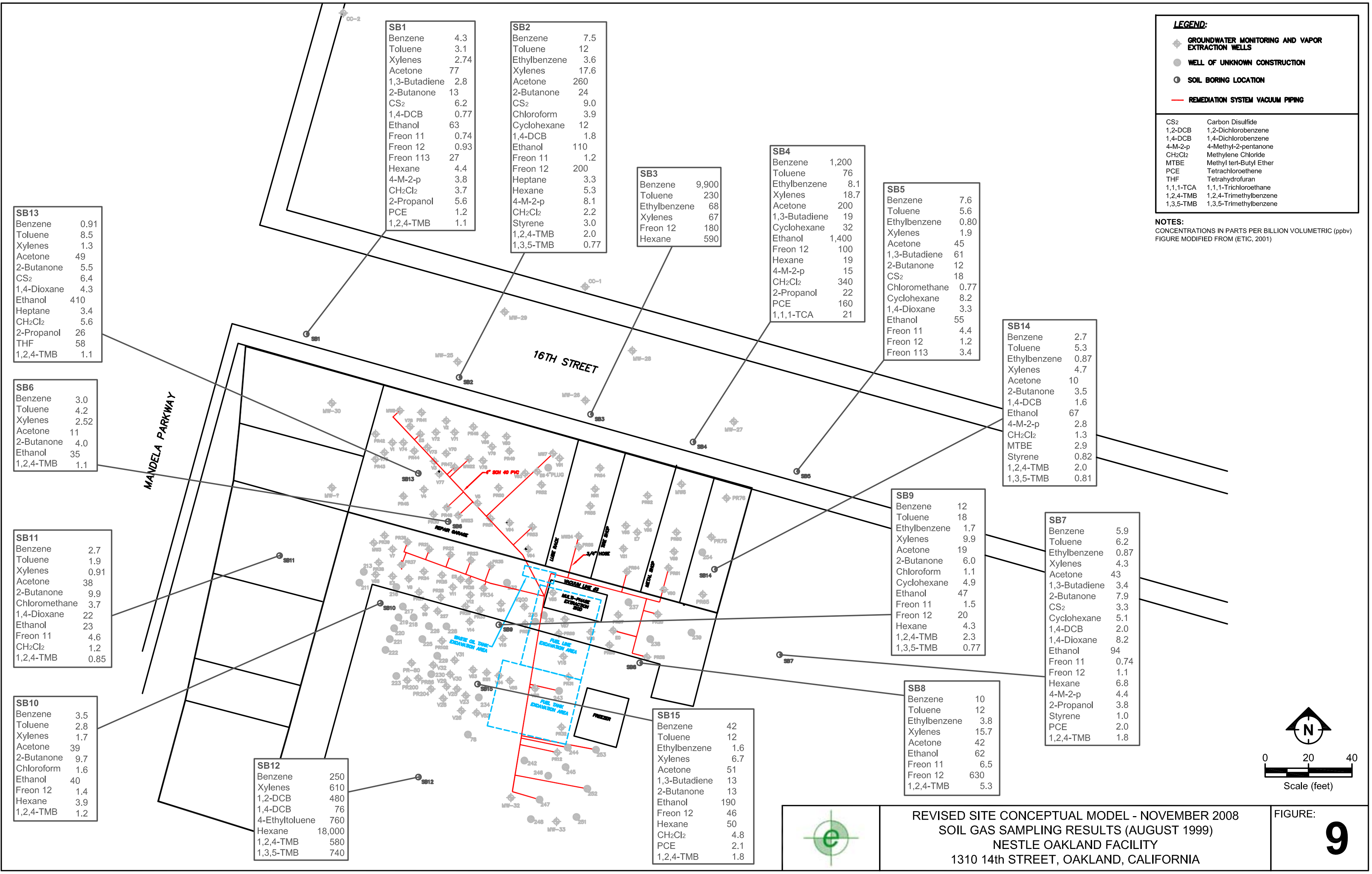
0 20 40
SCALE (FEET)

Former Nestlé Oakland Facility
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Soil Parameters Sampling Locations

Figure
3



SB1

Benzene	4.3
Toluene	3.1
Xylenes	2.74
Acetone	77
1,3-Butadiene	2.8
2-Butanone	13
CS_2	6.2
1,4-DCB	0.77
Ethanol	63
Freon 11	0.74
Freon 12	0.93
Freon 113	27
Hexane	4.4
4-M-2-p	3.8
CH_2Cl_2	3.7
2-Propanol	5.6
PCE	1.2
1,2,4-TMB	1.1

SB2

Benzene	7.5
Toluene	12
Ethylbenzene	3.6
Xylenes	17.6
Acetone	260
2-Butanone	24
CS_2	9.0
Chloroform	3.9
Cyclohexane	12
1,4-DCB	1.8
Ethanol	110
Freon 11	1.2
Freon 12	200
Heptane	3.3
Hexane	5.3
4-M-2-p	8.1
CH_2Cl_2	2.2
Styrene	3.0
1,2,4-TMB	2.0
1,3,5-TMB	0.77

SB3

Benzene	9,900
Toluene	230
Ethylbenzene	68
Xylenes	67
Freon 12	180
Hexane	590

SB4

Benzene	1,200
Toluene	76
Ethylbenzene	8.1
Xylenes	18.7
Acetone	200
1,3-Butadiene	19
Cyclohexane	32
Ethanol	1,400
Freon 12	100
Hexane	19
4-M-2-p	15
CH_2Cl_2	340
2-Propanol	22
PCE	160
1,1,1-TCA	21

SB5

Benzene	7.6
Toluene	5.6
Ethylbenzene	0.80
Xylenes	1.9
Acetone	45
1,3-Butadiene	61
2-Butanone	12
CS_2	18
Chloromethane	0.77
Cyclohexane	8.2
1,4-Dioxane	3.3
Ethanol	55
Freon 11	4.4
Freon 12	1.2
Freon 113	3.4

SB13

Benzene	0.91
Toluene	8.5
Xylenes	1.3
Acetone	49
2-Butanone	5.5
CS_2	6.4
1,4-Dioxane	4.3
Ethanol	410
Heptane	3.4
CH_2Cl_2	5.6
2-Propanol	26
THF	58
1,2,4-TMB	1.1

SB6

Benzene	3.0
Toluene	4.2
Xylenes	2.52
Acetone	11
2-Butanone	4.0
Ethanol	35
1,2,4-TMB	1.1

SB11

Benzene	2.7
Toluene	1.9
Xylenes	0.91
Acetone	38
2-Butanone	9.9
Chloromethane	3.7
1,4-Dioxane	22
Ethanol	23
Freon 11	4.6
CH_2Cl_2	1.2
1,2,4-TMB	0.85

SB10

Benzene	3.5
Toluene	2.8
Xylenes	1.7
Acetone	39
2-Butanone	9.7
Chloroform	1.6
Ethanol	40
Freon 12	1.4
Hexane	3.9
1,2,4-TMB	1.2

SB12

Benzene	250
Xylenes	610
1,2-DCB	480
1,4-DCB	76
4-Ethyltoluene	760
Hexane	18,000
1,2,4-TMB	580
1,3,5-TMB	740

SB15

Benzene	42
Toluene	12
Ethylbenzene	1.6
Xylenes	6.7
Acetone	51
1,3-Butadiene	13
2-Butanone	13
Ethanol	190
Freon 12	46
Hexane	50
CH_2Cl_2	4.8
PCE	2.1
1,2,4-TMB	1.8

SB9

Benzene	12
Toluene	18
Ethylbenzene	1.7
Xylenes	9.9
Acetone	19
2-Butanone	6.0
Chloroform	1.1
Cyclohexane	4.9
Ethanol	47
Freon 11	1.5
Freon 12	20
Hexane	4.3
1,2,4-TMB	2.3
1,3,5-TMB	0.77

SB8

Benzene	10
Toluene	12
Ethylbenzene	3.8
Xylenes	15.7
Acetone	42
Ethanol	62
Freon 11	6.5
Freon 12	630
1,2,4-TMB	5.3

SB14

Benzene	2.7
Toluene	5.3
Ethylbenzene	0.87
Xylenes	4.7
Acetone	10
2-Butanone	3.5
1,4-DCB	1.6
Ethanol	67
4-M-2-p	2.8
CH_2Cl_2	1.3
MTBE	2.9
Styrene	0.82
1,2,4-TMB	2.0
1,3,5-TMB	0.81

SB7

Benzene	5.9
Toluene	6.2
Ethylbenzene	0.87
Xylenes	4.3
Acetone	43
1,3-Butadiene	3.4
2-Butanone	7.9
CS_2	3.3
Cyclohexane	5.1
1,4-DCB	2.0
1,4-Dioxane	8.2
Ethanol	94
Freon 11	0.74
Freon 12	1.1
Hexane	6.8
4-M-2-p	4.4
2-Propanol	3.8
Styrene	1.0
PCE	2.0
1,2,4-TMB	1.8

LEGEND:

- ⌖ GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS
- ● WELL OF UNKNOWN CONSTRUCTION
- ◐ SOIL BORING LOCATION
- — REMEDIATION SYSTEM VACUUM PIPING

CS_2	Carbon Disulfide
1,2-DCB	1,2-Dichlorobenzene
1,4-DCB	1,4-Dichlorobenzene
4-M-2-p	4-Methyl-2-pentanone
CH_2Cl_2	Methylene Chloride
MTBE	Methyl tert-Butyl Ether
PCE	Tetrachloroethene
THF	Tetrahydrofuran
1,1,1-TCA	1,1,1-Trichloroethane
1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene

NOTES:

CONCENTRATIONS IN PARTS PER BILLION VOLUMETRIC (ppbv)
FIGURE MODIFIED FROM (ETIC, 2001)

REVISED SITE CONCEPTUAL MODEL - NOVEMBER 2008
SOIL GAS SAMPLING RESULTS (AUGUST 1999)
NESTLE OAKLAND FACILITY
1310 14th STREET, OAKLAND, CALIFORNIA

FIGURE:
9

FILENAME: SG_DATA.DWG 09/20/99

APPENDIX B

UNCERTAINTIES ANALYSIS

1.0 INTRODUCTION

Many of the assumptions used in the screening level human health risk evaluation – regarding the representativeness of the sampling data, human exposures, fate and transport modeling, and chemical toxicity – are conservative, follow agency guidance, and reflect a 90th or 95th percentile value rather than a typical or average value. The use of several conservative exposure and toxicity assumptions can introduce considerable uncertainty into the human health screening evaluation. By using conservative exposure or toxicity estimates, the evaluation can develop a significant conservative bias that may result in the calculation of significantly higher cancer risks or noncancer hazards than are actually posed by the chemicals present in soil, soil gas, and groundwater. The key uncertainties in the human health screening evaluation are discussed below. This uncertainty analysis focuses on the site-specific assumptions contributing most to uncertainty in the risk and hazard calculations, and does not assess the validity of default assumptions used in the health screening evaluation. The parameters evaluated in the uncertainty analysis are: representative concentrations in soil gas, soil properties, and building air exchange rate.

The uncertainties associated with representative concentrations in soil gas, soil properties, and building air exchange rate are discussed below. Two sensitivity analyses have been performed, to bound the range of potential risks and hazards associated with the uncertainties in these three input parameters. The first sensitivity analysis combines the most conservative options of the three parameters, to produce a high-end estimate of potential risk and hazard. The second sensitivity analysis combines the least conservative options of the three parameters, to produce a low-end estimate of potential risks and hazards. The baseline health risk evaluation, the results of which are presented in Section 7 of the main report, is based on a combination of assumptions regarding these three parameters, based primarily on DTSC vapor intrusion guidance (Cal/EPA, 2005b), and represents a relatively conservative estimate of potential risk and hazard. The conceptual differences between the three evaluations are summarized in the following table.

Summary of Health Risk Evaluations

Evaluation	Where Documented	Soil Gas Concentrations	Soil Properties	Building Ventilation Rate
High-end estimate	Appendix C	Maxima	Default	Default
Baseline estimate	Main report	Maxima	Site-specific	Default
Low-end estimate	Appendix D	Averages	Site-specific	Site-specific

2.0 Uncertainty in Representative Concentrations in Soil Gas

As discussed in Sections 4.5.1, and 4.5.2 of the main report, the baseline analyses of vapor transport from soil gas to indoor air and outdoor air are based on the historical maximum detected concentration of each COPC in soil gas, from the combined 1999 and 2008 datasets. This assumption is consistent with current DTSC vapor intrusion guidance (Cal/EPA, 2005b), which recommends the use of maximum detected soil gas concentrations in vapor intrusion screening risk evaluations. It should be noted that this recommendation is based on an assumed scenario of residential development on quarter-acre lots, with soil gas data collected at this same density (quarter-acre density is equivalent to 100-foot spacing between sampling locations), so that the worst-case residence is evaluated. At this site, however, soil gas sampling has been performed at a much greater density, including numerous samples collected beneath the one on-site commercial building (see ECM Figures 2 and 9 in Appendix A). Furthermore, the 1999 results are generally higher than the 2008 results and so provide most of the maximum concentrations, but are likely to be less representative of current site conditions than the 2008 data. Therefore, the use of average, rather than historical maximum, soil gas concentrations is arguably more appropriate for estimating the long-term average indoor air concentrations associated with vapor intrusion into the onsite commercial building. The sensitivity of the results of the health risk evaluation to the use of maximum versus average concentrations of COPCs in soil gas is discussed below in Section 5.0.

3.0 Uncertainty in Soil Properties

As discussed in Sections 4.5.1, and 4.5.2 of the main report, the baseline analyses of vapor transport from soil gas to indoor air and outdoor air are based on site-specific soil properties (total porosity, water-filled porosity, and bulk density) as recommended in the DTSC vapor intrusion guidance (Cal/EPA, 2005b). These properties were measured during the January 2009 site investigation. While measured site-specific soil properties are likely to be most representative of actual site soil conditions, these site-specific properties are less conservative than the DTSC/HERD default soil properties (Cal/EPA, 2005a). The sensitivity of the results of the health risk evaluation to the use of default versus site-specific soil properties is discussed below in Section 5.0.

4.0 Uncertainty in Building Air Exchange Rate

The predicted vapor intrusion transport of COPCs from soil gas into the onsite building is dependent upon the building air exchange rate; specifically, predicted concentrations of COPCs in indoor air are inversely proportional to the air exchange rate. As noted in Section 4.5.1 of the main report, the baseline vapor intrusion transport analysis assumes the DTSC/HERD default air exchange rate of 1 building volume per hour (Cal/EPA, 2005a). This default air exchange rate is conservative and very likely underestimates the actual air exchange rate of the existing onsite commercial building. The existing onsite building is an old, warehouse-type structure with several rollup doors; a reasonable estimate of the actual air exchange rate of this structure, based on engineering judgment, is 4 building volumes per hour. The sensitivity of the results of the health risk evaluation to the use of a default versus site-specific building air exchange rate is discussed below in Section 5.0.

5.0 High-end and Low-end Estimates of Potential Risk and Hazard

As discussed above, uncertainties exist in the human health risk evaluation regarding representative concentrations of COPCs in soil gas, soil properties, and building air exchange rate. The baseline health risk evaluation, the results of which are summarized in Section 7 of the main report, is based on a combination of assumptions regarding these three parameters; these assumptions are consistent with DTSC vapor intrusion guidance (Cal/EPA, 2005b) and produce a reasonably conservative estimate of potential risk and hazard.

Discussed here are two sensitivity analyses which bound the range of potential risks and hazards associated with the uncertainties in these three input parameters. The first sensitivity analysis combines the most conservative, but likely least representative, options of the three parameters, to produce a high-end estimate of potential risk and hazard. The second sensitivity analysis combines the least conservative, but likely most representative, options of the three parameters, to produce a low-end estimate of potential risks and hazards.

The high-end estimate of potential risk and hazard is based on a combination of historical maximum concentrations of COPCs in soil gas, DTSC/HERD default soil properties, and the DTSC/HERD default building air exchange rate. This worst-case estimate is likely the least representative of actual exposures and associated health effects, of the three evaluations. This analysis is documented in Tables C-1 through C-5 of Appendix C. The results of this high-end estimate may be summarized as follows.

- Using default soil properties, the estimated cancer risk for onsite indoor commercial/industrial workers, associated with vapor intrusion (the only complete exposure pathway for this receptor), is 6.7×10^{-5}, which is within the 1×10^{-6} to 1×10^{-4} risk management range (see Table C-4). The estimated noncancer hazard index is 0.44, which is below the threshold hazard index of 1 (see Table C-5).
- Using default soil properties, the estimated cancer risk for onsite outdoor intrusive construction workers, summed across the four complete exposure pathways, is 9.8×10^{-5}, which is within the 1×10^{-6} to 1×10^{-4} risk management range (see Table C-4). The estimated noncancer hazard index is 21, which is above the threshold hazard index of 1 (see Table C-5).
- Using default soil properties, the estimated cancer risk for offsite residents, associated with inhalation of volatile COPCs in indoor or outdoor air that have migrated downwind from the site (the only complete exposure pathway for this receptor), is 6.9×10^{-6}, which is within the 1×10^{-6} to 1×10^{-4} risk management range (see Table C-4). The estimated noncancer hazard index is 0.069, which is below the threshold hazard index of 1 (see Table C-5).

The low-end estimate of potential risk and hazard is based on a combination of average concentrations of COPCs in soil gas, site-specific soil properties, and site-specific building air exchange rate. This estimate is likely the most representative of actual exposures and associated health effects, of the three evaluations. This analysis is documented in Tables D-1 through D-6 of Appendix C. The results of this low-end estimate may be summarized as follows.

- Using average concentrations of COPCs in soil gas and a site-specific building air exchange rate, the estimated cancer risk for onsite indoor commercial/industrial workers, associated with vapor intrusion (the only complete exposure pathway for this receptor), is 1.7×10^{-7}, which is below the 1×10^{-6} to 1×10^{-4} risk management range (see Table D-5). The estimated noncancer hazard index is 0.0011, which is below the threshold hazard index of 1 (see Table D-6).
- Using average concentrations of COPCs in soil gas and a site-specific building air exchange rate, the estimated cancer risk for onsite outdoor intrusive construction workers, summed across the four complete exposure pathways, is 9.8×10^{-5}, which is within the 1×10^{-6} to 1×10^{-4} risk management range (see Table D-5). The estimated noncancer hazard index is 21, which is above the threshold hazard index of 1 (see Table D-6).
- Using average concentrations of COPCs in soil gas and a site-specific building air exchange rate, the estimated cancer risk for offsite residents, associated with inhalation of volatile COPCs in indoor or outdoor air that have migrated downwind from the site (the only complete exposure pathway for this receptor), is 3.5×10^{-8}, which is below the 1×10^{-6} to 1×10^{-4} risk management range (see Table D-5). The estimated noncancer hazard index is 0.00033, which is below the threshold hazard index of 1 (see Table D-6).

The following conclusions may be drawn regarding the sensitivity of the results of the human health risk evaluation to the uncertainties regarding representative concentrations of COPCs in soil gas, soil properties, and building air exchange rate.

- Estimated potential risk and hazard for onsite indoor commercial/industrial workers range over approximately 2-1/2 orders of magnitude. The high-end estimates are approximately 8 times greater than the baseline estimates presented in Section 7 of the main report. The low-end estimates are less than the baseline estimates by a factor of approximately 47.
- Estimated potential risk and hazard for onsite outdoor intrusive construction workers are not sensitive to these uncertainties, as the estimated potential health effects for this receptor are driven by dermal contact with groundwater.
- Estimated potential risk and hazard for offsite residents range over approximately 2 orders of magnitude. The high-end estimates are approximately 17 times greater than the baseline estimates presented above in Section 7 of the main report. The low-end estimates are less than the baseline estimates by a factor of approximately 11.

APPENDIX C

HIGH-END ESTIMATE OF RISK AND HAZARD

Table C-1. Johnson and Ettinger Model Inputs – High-end Estimate

Parameter	Symbol	Value	Units	Reference
Building Properties				
Depth below grade to bottom of enclosed space floor	L_F	15	cm	DTSC/HERD default (Cal/EPA, 2005a; 2005b)
Area of enclosed space below grade	$A_{b,sg}$	2.05E+07	cm^2	Site-specific
Building air exchange rate	AXR_b	1	hr^{-1}	DTSC default (Cal/EPA, 2005b)
Building height	Bh	503	cm	Site-specific
Building ventilation rate	Q_b	2.86E+06	cm^3/s	Calculated: $A_{b,sg}$ x AXR_b x B_h
Vapor flow rate into building	Q_{soil}	102	L/min	Calculated (Cal/EPA, 2005b)
Vapor flow rate into building	Q_{soil}	1707	cm^3/s	Calculated via units conversion
Soil Properties				
Average soil temperature	T_s	17	^oC	Site-specific (USEPA, 2004)
SCS soil type	–	Herd Default	–	Site-specific
Dry bulk density	ρ_b	1.50	g/cm^3	DTSC default (Cal/EPA, 2005b)
Total porosity	n	0.430	cm^3/cm^3	DTSC default (Cal/EPA, 2005b)
Water-filled porosity	θ_w	0.150	cm^3/cm^3	DTSC default (Cal/EPA, 2005b)
Air-filled porosity	θ_a	0.280	cm^3/cm^3	DTSC default (Cal/EPA, 2005b)

Table C-2. Exposure Point Concentrations of Chemicals of Potential Concern in the Indoor Air of the Onsite Building – High-end Estimate

Chemical of Potential Concern	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
	C_{SG} (µg/m^3)	Depth (cm)	α	C_{IA} (µg/m^3)
Acetone	620	91	3.6E-04	2.2E-01
Benzene	40,000	91	3.1E-04	1.2E+01
1,3-Butadiene	310	91	4.5E-04	1.4E-01
2-Butanone (methyl ethyl ketone)	420	91	3.0E-04	1.3E-01
Carbon disulfide	440	91	3.3E-04	1.5E-01
Chlorobenzene	160	91	2.8E-04	4.5E-02
Chloroform	170	91	3.3E-04	5.7E-02
Chloromethane (methyl chloride)	75	91	3.6E-04	2.7E-02
Cyclohexane	480	91	3.0E-04	1.4E-01
1,2-Dichlorobenzene	2,900	91	2.7E-04	7.9E-01
1,3-Dichlorobenzene	210	91	2.7E-04	5.8E-02
1,4-Dichlorobenzene	460	91	2.7E-04	1.3E-01
Dichlorodifluoromethane (Freon 12)	10,000	91	2.7E-04	2.7E+00
1,1-Dichloroethane	140	91	2.8E-04	4.0E-02
1,2-Dichloroethane	140	91	3.3E-04	4.7E-02
1,1-Dichloroethene (1,1-DCE)	140	91	3.1E-04	4.4E-02
cis-1,2-Dichloroethene (cis-1,2-DCE)	140	91	2.8E-04	4.0E-02
1,4-Dioxane	500	91	3.2E-04	1.6E-01
Ethanol	2,600	91	3.7E-04	9.6E-01
Ethylbenzene	7,700	91	2.9E-04	2.2E+00
4-Ethyltoluene	3,700	91	2.7E-04	1.0E+00
Heptane	550	91	2.8E-04	1.5E-01
Hexane	63,000	91	4.2E-04	2.7E+01
Methyl tertiary butyl ether (MTBE)	500	91	3.3E-04	1.7E-01
Methylene chloride	1,200	91	3.3E-04	4.0E-01
4-Methyl-2-pentanone (methyl isobutyl ketone)	550	91	2.9E-04	1.6E-01
2-Propanol	350	91	3.4E-04	1.2E-01
Styrene	150	91	2.8E-04	4.2E-02
Tetrachloroethene (PCE)	1,100	91	2.8E-04	3.1E-01
Tetrahydrofuran	420	91	3.3E-04	1.4E-01

Table C-2. Exposure Point Concentrations of Chemicals of Potential Concern in the Indoor Air of the Onsite Building – High-end Estimate

Chemical of Potential Concern	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
	C_{SG} (µg/m^3)	Depth (cm)	α	C_{IA} (µg/m^3)
Toluene	32,000	91	3.1E-04	9.9E+00
1,1,1-Trichloroethane	190	91	2.9E-04	5.5E-02
Trichloroethene (TCE)	190	91	2.9E-04	5.6E-02
Trichlorofluoromethane (Freon 11)	200	91	3.1E-04	6.2E-02
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	270	91	2.9E-04	7.9E-02
1,2,4-Trimethylbenzene	2,900	91	2.5E-04	7.4E-01
1,3,5-Trimethylbenzene	3,600	91	2.5E-04	9.1E-01
Xylenes	19,000	91	3.0E-04	5.8E+00

Notes:

(1) This vapor intrusion transport analysis is based on maximum concentrations of volatile organic compounds (VOCs) in soil gas from the August 1999 and May 2008 site investigations (see Table 1). Chemicals of potential concern (COPCs) with respect to vapor intrusion are those VOCs detected above reporting limits in at least one soil gas sample.

(2) The shallower sampling depth between the 1999 and 2008 sampling events, 3 feet below ground surface, is used in the model because it is a more conservative assumption, *i.e.* , it produces higher indoor air concentrations.

(3) Non source-related inputs to the Johnson and Ettinger Model are documented in Table C-1. Shown here are the results of the Johnson and Ettinger Model, consisting of, for each chemical of potential concern, the predicted attenuation factor (α) and the predicted concentration of the chemical in indoor air (C_{IA}).

Table C-3. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air – High-end Estimate

Chemical of Potential Concern	Concentration (µg/m^3)
Acetone	8.8E-03
Benzene	4.0E-01
1,3-Butadiene	8.8E-03
2-Butanone (methyl ethyl ketone)	3.9E-03
Carbon disulfide	5.2E-03
Chlorobenzene	1.3E-03
Chloroform	2.0E-03
Chloromethane (methyl chloride)	1.1E-03
Cyclohexane	4.4E-03
1,2-Dichlorobenzene	2.3E-02
1,3-Dichlorobenzene	1.6E-03
1,4-Dichlorobenzene	3.6E-03
Dichlorodifluoromethane (Freon 12)	7.5E-02
1,1-Dichloroethane	1.2E-03
1,2-Dichloroethane	1.7E-03
1,1-Dichloroethene (1,1-DCE)	1.4E-03
cis-1,2-Dichloroethene (cis-1,2-DCE)	1.2E-03
1,4-Dioxane	5.3E-03
Ethanol	3.9E-02
Ethylbenzene	6.6E-02
4-Ethyltoluene	2.9E-02
Heptane	4.4E-03
Hexane	1.4E+00
Methyl tertiary butyl ether (MTBE)	5.8E-03
Methylene chloride	1.4E-02
4-Methyl-2-pentanone (methyl isobutyl ketone)	4.7E-03
2-Propanol	4.2E-03
Styrene	1.2E-03
Tetrachloroethene (PCE)	9.0E-03
Tetrahydrofuran	4.9E-03
Toluene	3.2E-01
1,1,1-Trichloroethane	1.7E-03

Table C-3. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air – High-end Estimate

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Trichloroethene (TCE)	1.7E-03
Trichlorofluoromethane (Freon 11)	2.0E-03
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	2.4E-03
1,2,4-Trimethylbenzene	2.0E-02
1,3,5-Trimethylbenzene	2.5E-02
Xylenes	1.8E-01

Table C-4. Summary of Estimated Cancer Risks – High-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	NC	NC	–	–	–	–	NC
Benzene	6.1E-05	8.9E-09	5.2E-08	7.1E-08	7.5E-05	7.5E-05	5.9E-06
Bromodichloromethane	–	–	–	–	2.6E-10	2.6E-10	–
1,3-Butadiene	4.1E-06	1.2E-09	–	–	–	1.2E-09	7.8E-07
2-Butanone (methyl ethyl ketone)	NC	NC	–	–	–	–	NC
Carbon disulfide	NC	NC	–	–	–	–	NC
Chlorobenzene	NC	NC	NC	NC	NC	–	NC
Chloroethane (ethyl chloride)	–	–	–	–	NC	–	–
Chloroform	5.3E-08	8.5E-12	–	–	5.1E-10	5.2E-10	5.7E-09
Chloromethane (methyl chloride)	8.4E-09	1.5E-12	–	–	2.8E-10	2.8E-10	1.0E-09
Cyclohexane	NC	NC	–	–	–	–	NC
1,2-Dichlorobenzene	NC	NC	NC	NC	NC	–	NC
1,3-Dichlorobenzene	NC	NC	NC	NC	–	–	NC
1,4-Dichlorobenzene	2.5E-07	3.2E-11	6.6E-12	9.1E-12	–	4.8E-11	2.1E-08
Dichlorodifluoromethane (Freon 12)	NC	NC	–	–	NC	–	NC
1,1-Dichloroethane	1.1E-08	1.5E-12	–	–	4.7E-09	4.7E-09	1.0E-09
1,2-Dichloroethane	1.7E-07	2.7E-11	7.5E-11	1.0E-10	2.2E-07	2.2E-07	1.8E-08
1,1-Dichloroethene (1,1-DCE)	NC	NC	–	–	NC	–	NC
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	NC	–	–	NC	–	NC
1,4-Dioxane	2.1E-07	3.2E-11	–	–	–	3.2E-11	2.1E-08
Ethanol	NC	NC	–	–	–	–	NC
Ethylbenzene	9.4E-07	1.3E-10	6.9E-09	9.5E-09	2.2E-05	2.2E-05	8.5E-08
4-Ethyltoluene	NC	NC	–	–	–	–	NC
Heptane	NC	NC	–	–	–	–	NC
Hexane	NC	NC	–	–	–	–	NC
Methyl tertiary butyl ether (MTBE)	7.4E-09	1.2E-12	5.6E-13	7.7E-13	9.0E-09	9.0E-09	7.9E-10
Methylene chloride	6.8E-08	1.1E-11	–	–	2.0E-10	2.1E-10	7.2E-09
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	NC	–	–	–	–	NC

Table C-4. Summary of Estimated Cancer Risks – High-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
2-Propanol	NC	NC	–	–	–	–	NC
Styrene	NC	NC	–	–	–	–	NC
1,1,2,2-Tetrachloroethane	–	–	–	–	4.8E-10	4.8E-10	–
Tetrachloroethene (PCE)	3.2E-07	4.2E-11	–	–	–	4.2E-11	2.8E-08
Tetrahydrofuran	4.8E-08	7.6E-12	–	–	–	7.6E-12	5.1E-09
Toluene	NC	NC	NC	NC	NC	–	NC
1,1,1-Trichloroethane	NC	NC	–	–	NC	–	NC
Trichloroethene (TCE)	1.9E-08	2.7E-12	–	–	2.9E-10	3.0E-10	1.8E-09
Trichlorofluoromethane (Freon 11)	NC	NC	–	–	–	–	NC
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	NC	–	–	–	–	NC
1,2,4-Trimethylbenzene	NC	NC	–	–	–	–	NC
1,3,5-Trimethylbenzene	NC	NC	–	–	–	–	NC
Xylenes	NC	NC	NC	NC	NC	–	NC
Cumulative Risk	6.7E-05	1.0E-08	5.9E-08	8.1E-08	9.7E-05	9.8E-05	6.9E-06

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

(2) "NC" indicates chemical is classified as a noncarcinogen.

Table C-5. Summary of Estimated Noncancer Hazard Indices – High-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	3.5E-06	1.6E-08	–	–	–	1.6E-08	6.3E-07
Benzene	2.0E-01	7.3E-04	9.0E-03	1.2E-02	1.3E+01	1.3E+01	3.0E-02
Bromodichloromethane	–	–	–	–	6.9E-06	6.9E-06	–
1,3-Butadiene	3.3E-02	2.4E-04	–	–	–	2.4E-04	9.8E-03
2-Butanone (methyl ethyl ketone)	1.2E-05	4.2E-08	–	–	–	4.2E-08	1.7E-06
Carbon disulfide	1.0E-04	4.1E-07	–	–	–	4.1E-07	1.7E-05
Chlorobenzene	2.2E-05	7.3E-08	2.2E-08	3.0E-08	4.5E-05	4.5E-05	3.0E-06
Chloroethane (ethyl chloride)	–	–	–	–	2.5E-05	2.5E-05	–
Chloroform	9.1E-05	3.7E-07	–	–	1.1E-04	1.1E-04	1.5E-05
Chloromethane (methyl chloride)	1.4E-04	6.5E-07	–	–	5.9E-05	6.0E-05	2.7E-05
Cyclohexane	1.1E-05	4.0E-08	–	–	–	4.0E-08	1.6E-06
1,2-Dichlorobenzene	1.9E-03	6.2E-06	8.9E-06	1.2E-05	8.2E-06	3.6E-05	2.5E-04
1,3-Dichlorobenzene	2.6E-04	8.6E-07	3.3E-07	4.5E-07	–	1.6E-06	3.5E-05
1,4-Dichlorobenzene	7.5E-05	2.5E-07	2.8E-06	3.9E-06	–	7.0E-06	1.0E-05
Dichlorodifluoromethane (Freon 12)	6.4E-03	2.1E-05	–	–	6.1E-06	2.7E-05	8.4E-04
1,1-Dichloroethane	3.9E-05	1.3E-07	–	–	2.9E-04	2.9E-04	5.4E-06
1,2-Dichloroethane	5.6E-05	2.3E-07	5.6E-06	7.7E-06	1.6E-02	1.6E-02	9.2E-06
1,1-Dichloroethene (1,1-DCE)	3.0E-04	1.1E-06	–	–	2.6E-04	2.6E-04	4.6E-05
cis-1,2-Dichloroethene (cis-1,2-DCE)	5.4E-04	1.8E-06	–	–	2.0E-04	2.0E-04	7.5E-05
1,4-Dioxane	2.6E-05	9.7E-08	–	–	–	9.7E-08	4.0E-06
Ethanol	4.4E-04	2.0E-06	–	–	–	2.0E-06	8.2E-05
Ethylbenzene	1.1E-03	3.6E-06	4.4E-04	6.1E-04	1.4E+00	1.4E+00	1.5E-04
4-Ethyltoluene	4.8E-03	1.6E-05	–	–	–	1.6E-05	6.4E-04
Heptane	1.0E-04	3.4E-07	–	–	–	3.4E-07	1.4E-05
Hexane	1.8E-02	1.1E-04	–	–	–	1.1E-04	4.6E-03
Methyl tertiary butyl ether (MTBE)	2.7E-05	1.1E-07	2.5E-08	3.5E-08	4.1E-04	4.1E-04	4.3E-06
Methylene chloride	4.8E-04	1.9E-06	–	–	1.7E-05	1.9E-05	7.7E-05

Table C-5. Summary of Estimated Noncancer Hazard Indices – High-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
4-Methyl-2-pentanone (methyl isobutyl ketone)	2.5E-05	8.6E-08	–	–	–	8.6E-08	3.5E-06
2-Propanol	8.1E-06	3.3E-08	–	–	–	3.3E-08	1.4E-06
Styrene	2.2E-05	7.4E-08	–	–	–	7.4E-08	3.0E-06
1,1,2,2-Tetrachloroethane	–	–	–	–	3.1E-05	3.1E-05	–
Tetrachloroethene (PCE)	4.2E-03	1.4E-05	–	–	–	1.4E-05	5.7E-04
Tetrahydrofuran	2.2E-05	8.9E-08	–	–	–	8.9E-08	3.6E-06
Toluene	1.6E-02	5.8E-05	1.9E-03	2.6E-03	1.5E+00	1.5E+00	2.4E-03
1,1,1-Trichloroethane	2.7E-05	9.2E-08	–	–	2.3E-07	3.2E-07	3.8E-06
Trichloroethene (TCE)	4.5E-05	1.6E-07	–	–	5.3E-03	5.3E-03	6.3E-06
Trichlorofluoromethane (Freon 11)	4.2E-05	1.5E-07	–	–	–	1.5E-07	6.3E-06
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1.3E-06	4.4E-09	–	–	–	4.4E-09	1.8E-07
1,2,4-Trimethylbenzene	5.1E-02	1.6E-04	–	–	–	1.6E-04	6.4E-03
1,3,5-Trimethylbenzene	7.3E-02	2.2E-04	–	–	–	2.2E-04	9.2E-03
Xylenes	2.8E-02	1.0E-04	1.3E-03	1.8E-03	4.7E+00	4.7E+00	4.1E-03
Cumulative Hazard	4.4E-01	1.7E-03	1.3E-02	1.7E-02	2.1E+01	2.1E+01	6.9E-02

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

APPENDIX D

LOW-END ESTIMATE OF RISK AND HAZARD

Table D-1. Average Concentrations of Chemicals of Potential Concern in Soil Gas

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Acetone	180
Benzene	2,900
1,3-Butadiene	51
2-Butanone (methyl ethyl ketone)	70
Carbon disulfide	62
Chlorobenzene	20
Chloroform	35
Chloromethane (methyl chloride)	9.9
Cyclohexane	72
1,2-Dichlorobenzene	210
1,3-Dichlorobenzene	27
1,4-Dichlorobenzene	45
Dichlorodifluoromethane (Freon 12)	940
1,1-Dichloroethane	32
1,2-Dichloroethane	32
1,1-Dichloroethene (1,1-DCE)	32
cis-1,2-Dichloroethene (cis-1,2-DCE)	32
1,4-Dioxane	71
Ethanol	350
Ethylbenzene	330
4-Ethyltoluene	290
Heptane	72
Hexane	4,400
Methyl tertiary butyl ether (MTBE)	64
Methylene chloride	77
4-Methyl-2-pentanone (methyl isobutyl ketone)	77
2-Propanol	52
Styrene	20
Tetrachloroethene (PCE)	80
Tetrahydrofuran	63
Toluene	1,300
1,1,1-Trichloroethane	39
Trichloroethene (TCE)	36

Table D-1. Average Concentrations of Chemicals of Potential Concern in Soil Gas

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Trichlorofluoromethane (Freon 11)	39
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	50
1,2,4-Trimethylbenzene	210
1,3,5-Trimethylbenzene	250
Xylenes	890

Notes:

(1) Soil gas samples were collected at depths of 3 and 5 feet below ground surface (bgs) in 1999 and 2008, respectively.

(2) Concentration units are micrograms per cubic meter ($\mu g/m^3$).

(3) Representative concentration is the mean of all samples collected in 1999 and 2008. For purposes of this averaging, non-detect results are assumed equal to one-half the reporting limit.

Table D-2. Johnson and Ettinger Model Inputs – Low-end Estimate

Parameter	Symbol	Value	Units	Reference
Building Properties				
Depth below grade to bottom of enclosed space floor	L_F	15	cm	DTSC/HERD default (Cal/EPA, 2005a; 2005b)
Area of enclosed space below grade	$A_{b,sg}$	1.00E+06	cm^2	DTSC default (Cal/EPA, 2005b)
Building air exchange rate	AXR_b	4	hr^{-1}	DTSC default (Cal/EPA, 2005b)
Building height	Bh	503	cm	DTSC default (Cal/EPA, 2005b)
Building ventilation rate	Q_b	5.59E+05	cm^3/s	Calculated: $A_{b,sg}$ x AXR_b x B_h
Vapor flow rate into building	Q_{soil}	5	L/min	Calculated (Cal/EPA, 2005b)
Vapor flow rate into building	Q_{soil}	83	cm^3/s	Calculated via units conversion
Soil Properties				
Average soil temperature	T_s	17	^oC	Site-specific (USEPA, 2004)
SCS soil type	–	Site-specific	–	Site-specific
Dry bulk density	ρ_b	1.79	g/cm^3	Site-specific average
Total porosity	n	0.339	cm^3/cm^3	Site-specific average
Water-filled porosity	θ_w	0.236	cm^3/cm^3	Site-specific average
Air-filled porosity	θ_a	0.103	cm^3/cm^3	Site-specific average

Table D-3. Exposure Point Concentrations of Chemicals of Potential Concern in the Indoor Air of the Onsite Building – Low-end Estimate

	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
Chemical of Potential Concern	C_{SG} (µg/m^3)	Depth (cm)	α	C_{IA} (µg/m^3)
Acetone	180	91	2.5E-05	4.4E-03
Benzene	2,900	91	8.7E-06	2.5E-02
1,3-Butadiene	51	91	2.2E-05	1.1E-03
2-Butanone (methyl ethyl ketone)	70	91	1.7E-05	1.2E-03
Carbon disulfide	62	91	1.0E-05	6.3E-04
Chlorobenzene	20	91	7.4E-06	1.5E-04
Chloroform	35	91	1.0E-05	3.6E-04
Chloromethane (methyl chloride)	9.9	91	1.2E-05	1.2E-04
Cyclohexane	72	91	7.9E-06	5.7E-04
1,2-Dichlorobenzene	210	91	7.1E-06	1.5E-03
1,3-Dichlorobenzene	27	91	7.0E-06	1.9E-04
1,4-Dichlorobenzene	45	91	7.1E-06	3.2E-04
Dichlorodifluoromethane (Freon 12)	940	91	6.6E-06	6.2E-03
1,1-Dichloroethane	32	91	7.4E-06	2.4E-04
1,2-Dichloroethane	32	91	1.1E-05	3.4E-04
1,1-Dichloroethene (1,1-DCE)	32	91	8.8E-06	2.8E-04
cis-1,2-Dichloroethene (cis-1,2-DCE)	32	91	7.4E-06	2.4E-04
1,4-Dioxane	71	91	6.0E-05	4.3E-03
Ethanol	350	91	6.5E-05	2.3E-02
Ethylbenzene	330	91	7.5E-06	2.5E-03
4-Ethyltoluene	290	91	6.8E-06	2.0E-03
Heptane	72	91	7.0E-06	5.0E-04
Hexane	4,400	91	1.8E-05	8.0E-02
Methyl tertiary butyl ether (MTBE)	64	91	1.1E-05	6.9E-04
Methylene chloride	77	91	1.0E-05	7.8E-04
4-Methyl-2-pentanone (methyl isobutyl ketone)	77	91	1.1E-05	8.1E-04
2-Propanol	52	91	4.4E-05	2.3E-03
Styrene	20	91	7.2E-06	1.4E-04
Tetrachloroethene (PCE)	80	91	7.2E-06	5.7E-04
Tetrahydrofuran	63	91	1.5E-05	9.4E-04

Table D-3. Exposure Point Concentrations of Chemicals of Potential Concern in the Indoor Air of the Onsite Building – Low-end Estimate

	Modeled Soil Gas Source		Results of Vapor Intrusion Modeling	
Chemical of Potential Concern	C_{SG} (µg/m^3)	Depth (cm)	α	C_{IA} (µg/m^3)
Toluene	1,300	91	8.6E-06	1.1E-02
1,1,1-Trichloroethane	39	91	7.7E-06	3.0E-04
Trichloroethene (TCE)	36	91	7.9E-06	2.8E-04
Trichlorofluoromethane (Freon 11)	39	91	8.6E-06	3.3E-04
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	50	91	7.7E-06	3.9E-04
1,2,4-Trimethylbenzene	210	91	6.1E-06	1.3E-03
1,3,5-Trimethylbenzene	250	91	6.1E-06	1.5E-03
Xylenes	890	91	8.4E-06	7.5E-03

Notes:

(1) This vapor intrusion transport analysis is based on average concentrations of volatile organic compounds (VOCs) in soil gas from the August 1999 and May 2008 site investigations (see Table 1). Chemicals of potential concern (COPCs) with respect to vapor intrusion are those VOCs detected above reporting limits in at least one soil gas sample. For the purpose of calculating average concentrations, non-detect results are assumed equal to one-half the laboratory reporting limit.

(2) The shallower sampling depth between the 1999 and 2008 sampling events, 3 feet below ground surface, is used in the model because it is a more conservative assumption, *i.e.* , it produces higher indoor air concentrations.

(3) Non source-related inputs to the Johnson and Ettinger Model are documented in Table D-1. Shown here are the results of the Johnson and Ettinger Model, consisting of, for each chemical of potential concern, the predicted attenuation factor (α) and the predicted concentration of the chemical in indoor air (C_{IA}).

Table D-4. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air – Low-end Estimate

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Acetone	2.8E-04
Benzene	1.7E-03
1,3-Butadiene	8.2E-05
2-Butanone (methyl ethyl ketone)	6.7E-05
Carbon disulfide	4.2E-05
Chlorobenzene	9.5E-06
Chloroform	2.4E-05
Chloromethane (methyl chloride)	8.0E-06
Cyclohexane	3.7E-05
1,2-Dichlorobenzene	9.5E-05
1,3-Dichlorobenzene	1.2E-05
1,4-Dichlorobenzene	2.0E-05
Dichlorodifluoromethane (Freon 12)	4.0E-04
1,1-Dichloroethane	1.5E-05
1,2-Dichloroethane	2.2E-05
1,1-Dichloroethene (1,1-DCE)	1.9E-05
cis-1,2-Dichloroethene (cis-1,2-DCE)	1.5E-05
1,4-Dioxane	4.4E-04
Ethanol	2.6E-03
Ethylbenzene	1.6E-04
4-Ethyltoluene	1.3E-04
Heptane	3.3E-05
Hexane	5.7E-03
Methyl tertiary butyl ether (MTBE)	4.5E-05
Methylene chloride	5.1E-05
4-Methyl-2-pentanone (methyl isobutyl ketone)	4.8E-05
2-Propanol	2.0E-04
Styrene	9.3E-06
Tetrachloroethene (PCE)	3.7E-05
Tetrahydrofuran	6.5E-05
Toluene	7.3E-04
1,1,1-Trichloroethane	2.0E-05

Table D-4. Exposure Point Concentrations of Chemicals of Potential Concern in Onsite Outdoor Air and in Offsite Air – Low-end Estimate

Chemical of Potential Concern	Concentration ($\mu g/m^3$)
Trichloroethene (TCE)	1.8E-05
Trichlorofluoromethane (Freon 11)	2.2E-05
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	2.5E-05
1,2,4-Trimethylbenzene	8.3E-05
1,3,5-Trimethylbenzene	9.8E-05
Xylenes	4.9E-04

Table D-5. Summary of Estimated Cancer Risks – Low-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	NC	NC	–	–	–	–	NC
Benzene	1.2E-07	3.7E-11	5.2E-08	7.1E-08	7.5E-05	7.5E-05	2.5E-08
Bromodichloromethane	–	–	–	–	2.6E-10	2.6E-10	–
1,3-Butadiene	3.3E-08	1.1E-11	–	–	–	1.1E-11	7.3E-09
2-Butanone (methyl ethyl ketone)	NC	NC	–	–	–	–	NC
Carbon disulfide	NC	NC	–	–	–	–	NC
Chlorobenzene	NC	NC	NC	NC	NC	–	NC
Chloroethane (ethyl chloride)	–	–	–	–	NC	–	–
Chloroform	3.3E-10	1.0E-13	–	–	5.1E-10	5.1E-10	6.7E-11
Chloromethane (methyl chloride)	3.7E-11	1.1E-14	–	–	2.8E-10	2.8E-10	7.5E-12
Cyclohexane	NC	NC	–	–	–	–	NC
1,2-Dichlorobenzene	NC	NC	NC	NC	NC	–	NC
1,3-Dichlorobenzene	NC	NC	NC	NC	–	–	NC
1,4-Dichlorobenzene	6.2E-10	1.8E-13	6.6E-12	9.1E-12	–	1.6E-11	1.2E-10
Dichlorodifluoromethane (Freon 12)	NC	NC	–	–	NC	–	NC
1,1-Dichloroethane	6.6E-11	2.0E-14	–	–	4.7E-09	4.7E-09	1.3E-11
1,2-Dichloroethane	1.2E-09	3.6E-13	7.5E-11	1.0E-10	2.2E-07	2.2E-07	2.4E-10
1,1-Dichloroethene (1,1-DCE)	NC	NC	–	–	NC	–	NC
cis-1,2-Dichloroethene (cis-1,2-DCE)	NC	NC	–	–	NC	–	NC
1,4-Dioxane	5.6E-09	2.7E-12	–	–	–	2.7E-12	1.8E-09
Ethanol	NC	NC	–	–	–	–	NC
Ethylbenzene	1.1E-09	3.1E-13	6.9E-09	9.5E-09	2.2E-05	2.2E-05	2.1E-10
4-Ethyltoluene	NC	NC	–	–	–	–	NC
Heptane	NC	NC	–	–	–	–	NC
Hexane	NC	NC	–	–	–	–	NC
Methyl tertiary butyl ether (MTBE)	3.1E-11	9.1E-15	5.6E-13	7.7E-13	9.0E-09	9.0E-09	6.1E-12
Methylene chloride	1.3E-10	4.0E-14	–	–	2.0E-10	2.0E-10	2.7E-11
4-Methyl-2-pentanone (methyl isobutyl ketone)	NC	NC	–	–	–	–	NC

Table D-5. Summary of Estimated Cancer Risks – Low-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Age-adjusted Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
2-Propanol	NC	NC	–	–	–	–	NC
Styrene	NC	NC	–	–	–	–	NC
1,1,2,2-Tetrachloroethane	–	–	–	–	4.8E-10	4.8E-10	–
Tetrachloroethene (PCE)	5.9E-10	1.7E-13	–	–	–	1.7E-13	1.2E-10
Tetrahydrofuran	3.2E-10	1.0E-13	–	–	–	1.0E-13	6.8E-11
Toluene	NC	NC	NC	NC	NC	–	NC
1,1,1-Trichloroethane	NC	NC	–	–	NC	–	NC
Trichloroethene (TCE)	9.7E-11	2.9E-14	–	–	2.9E-10	2.9E-10	1.9E-11
Trichlorofluoromethane (Freon 11)	NC	NC	–	–	–	–	NC
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	NC	–	–	–	–	NC
1,2,4-Trimethylbenzene	NC	NC	–	–	–	–	NC
1,3,5-Trimethylbenzene	NC	NC	–	–	–	–	NC
Xylenes	NC	NC	NC	NC	NC	–	NC
Cumulative Risk	1.7E-07	5.2E-11	5.9E-08	8.1E-08	9.7E-05	9.8E-05	3.5E-08

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

(2) "NC" indicates chemical is classified as a noncarcinogen.

Table D-6. Summary of Estimated Noncancer Hazard Indices – Low-end Estimate

	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
Acetone	6.9E-08	4.9E-10	–	–	–	4.9E-10	2.0E-08
Benzene	4.0E-04	3.0E-06	9.0E-03	1.2E-02	1.3E+01	1.3E+01	1.2E-04
Bromodichloromethane	–	–	–	–	6.9E-06	6.9E-06	–
1,3-Butadiene	2.7E-04	2.2E-06	–	–	–	2.2E-06	9.1E-05
2-Butanone (methyl ethyl ketone)	1.1E-07	7.4E-10	–	–	–	7.4E-10	3.0E-08
Carbon disulfide	4.3E-07	3.3E-09	–	–	–	3.3E-09	1.3E-07
Chlorobenzene	7.1E-08	5.2E-10	2.2E-08	3.0E-08	4.5E-05	4.5E-05	2.1E-08
Chloroethane (ethyl chloride)	–	–	–	–	2.5E-05	2.5E-05	–
Chloroform	5.7E-07	4.3E-09	–	–	1.1E-04	1.1E-04	1.8E-07
Chloromethane (methyl chloride)	6.4E-07	4.9E-09	–	–	5.9E-05	5.9E-05	2.0E-07
Cyclohexane	4.5E-08	3.4E-10	–	–	–	3.4E-10	1.4E-08
1,2-Dichlorobenzene	3.6E-06	2.6E-08	8.9E-06	1.2E-05	8.2E-06	2.9E-05	1.1E-06
1,3-Dichlorobenzene	8.7E-07	6.4E-09	3.3E-07	4.5E-07	–	7.9E-07	2.6E-07
1,4-Dichlorobenzene	1.9E-07	1.4E-09	2.8E-06	3.9E-06	–	6.8E-06	5.7E-08
Dichlorodifluoromethane (Freon 12)	1.5E-05	1.1E-07	–	–	6.1E-06	6.2E-06	4.5E-06
1,1-Dichloroethane	2.3E-07	1.7E-09	–	–	2.9E-04	2.9E-04	7.0E-08
1,2-Dichloroethane	4.1E-07	3.0E-09	5.6E-06	7.7E-06	1.6E-02	1.6E-02	1.2E-07
1,1-Dichloroethene (1,1-DCE)	1.9E-06	1.5E-08	–	–	2.6E-04	2.6E-04	5.9E-07
cis-1,2-Dichloroethene (cis-1,2-DCE)	3.3E-06	2.4E-08	–	–	2.0E-04	2.0E-04	9.8E-07
1,4-Dioxane	6.8E-07	8.1E-09	–	–	–	8.1E-09	3.3E-07
Ethanol	1.0E-05	1.3E-07	–	–	–	1.3E-07	5.5E-06
Ethylbenzene	1.2E-06	8.8E-09	4.4E-04	6.1E-04	1.4E+00	1.4E+00	3.6E-07
4-Ethyltoluene	9.5E-06	7.0E-08	–	–	–	7.0E-08	2.9E-06
Heptane	3.4E-07	2.6E-09	–	–	–	2.6E-09	1.0E-07
Hexane	5.5E-05	4.4E-07	–	–	–	4.4E-07	1.8E-05
Methyl tertiary butyl ether (MTBE)	1.1E-07	8.2E-10	2.5E-08	3.5E-08	4.1E-04	4.1E-04	3.3E-08
Methylene chloride	9.3E-07	7.0E-09	–	–	1.7E-05	1.7E-05	2.9E-07

Table D-6. Summary of Estimated Noncancer Hazard Indices – Low-end Estimate

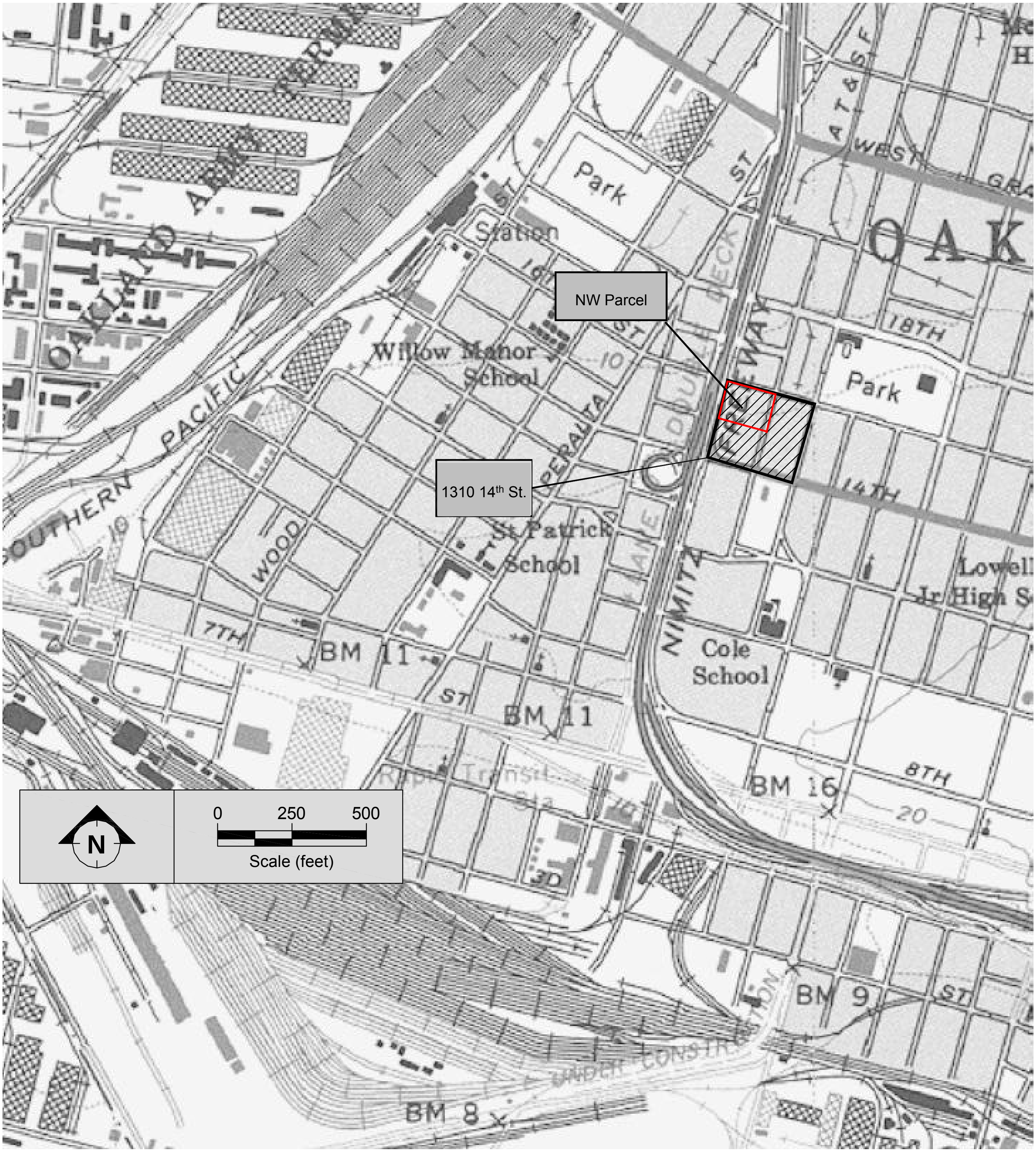
	Onsite Commercial Worker	Onsite Intrusive Construction Worker					Child Offsite Resident
	Indoor Air	Outdoor Air	Soil		Groundwater	Total	Indoor/Outdoor Air
Chemical of Potential Concern	Inhalation	Inhalation	Ingestion	Dermal Contact	Dermal Contact		Inhalation
4-Methyl-2-pentanone (methyl isobutyl ketone)	1.3E-07	8.8E-10	–	–	–	8.8E-10	3.6E-08
2-Propanol	1.6E-07	1.6E-09	–	–	–	1.6E-09	6.5E-08
Styrene	7.7E-08	5.7E-10	–	–	–	5.7E-10	2.3E-08
1,1,2,2-Tetrachloroethane	–	–	–	–	3.1E-05	3.1E-05	–
Tetrachloroethene (PCE)	7.9E-06	5.8E-08	–	–	–	5.8E-08	2.4E-06
Tetrahydrofuran	1.5E-07	1.2E-09	–	–	–	1.2E-09	4.9E-08
Toluene	1.8E-05	1.3E-07	1.9E-03	2.6E-03	1.5E+00	1.5E+00	5.5E-06
1,1,1-Trichloroethane	1.4E-07	1.1E-09	–	–	2.3E-07	2.3E-07	4.4E-08
Trichloroethene (TCE)	2.3E-07	1.7E-09	–	–	5.3E-03	5.3E-03	6.9E-08
Trichlorofluoromethane (Freon 11)	2.3E-07	1.7E-09	–	–	–	1.7E-09	7.0E-08
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	6.2E-09	4.6E-11	–	–	–	4.6E-11	1.9E-09
1,2,4-Trimethylbenzene	8.8E-05	6.5E-07	–	–	–	6.5E-07	2.6E-05
1,3,5-Trimethylbenzene	1.2E-04	8.9E-07	–	–	–	8.9E-07	3.6E-05
Xylenes	3.6E-05	2.7E-07	1.3E-03	1.8E-03	4.7E+00	4.7E+00	1.1E-05
Cumulative Hazard	1.1E-03	8.1E-06	1.3E-02	1.7E-02	2.1E+01	2.1E+01	3.3E-04

Notes:

(1) "–" indicates chemical was not determined to be a COPC for the respective pathway.

Appendix B: Site Conceptual Model Figures

File Path: Ecmsrver\Nestle\OakReports\Fig1 Topo
Drafter: S. Gandhi
Chkd by:
Date drafted: 10/01/03
Proj. Manager B. Acharya
Project: Nestle-Oakland



ENVIRONMENTAL COST MANAGEMENT

Managing Cost and Liability

660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model
November 2008
Site Location Map

Figure

1

Project: Former Nestle Oakland Facility

Proj. Manager B. Acharya

Date drafted: 10/28/08

Chkd by: B. Searcy

Drafter: J. Plummer

File Path:

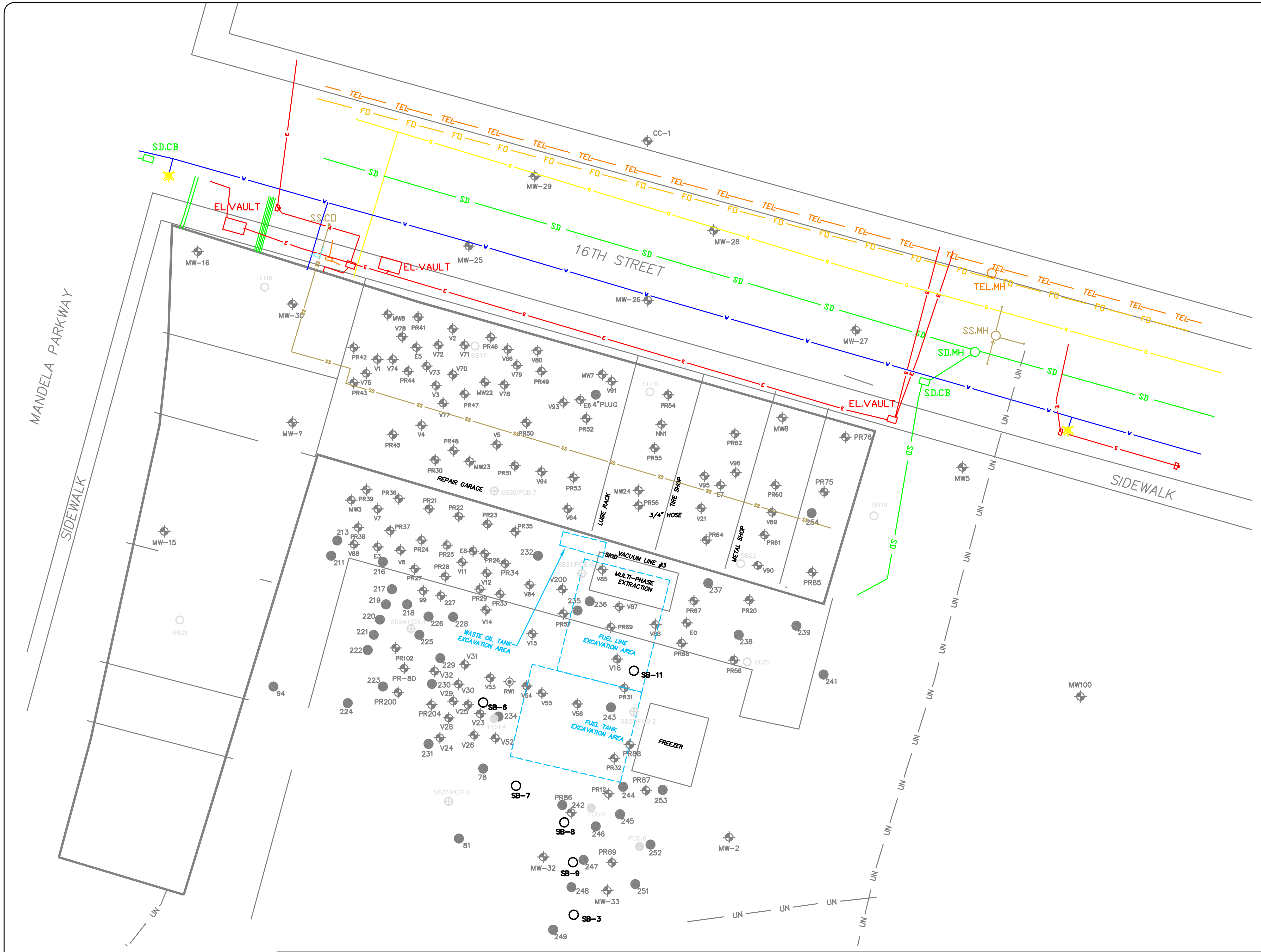
Former Nestle Oakland Facility
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model
November 2008
Primary Site Features

Figure
2

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/24/08
Chkd by: B. Searcy
Drafter: hat
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport



LEGEND:

○ HYDROCARBON SOIL BORING LOCATION
SB23

⊕ HYDROCARBON/ PCB SOIL BORING LOCATION
SB24/PCB-1

● PCB SOIL BORING LOCATION
PCB-4

⊕ GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS

○ HISTORICAL SOIL BORING LOCATION (INSTALLED AND SAMPLED JULY 1991)

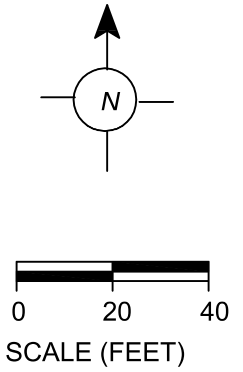
● WELL OF UNKNOWN CONSTRUCTION
239

UTILITIES

— TEL — TEL — TELEPHONE
— FO — FO — FIBER OPTICS
— G — GAS LINE
— SD — STORM DRAIN MAIN
— V — WATER MAIN
— E — ELECTRICAL
— UN — UN — UNKNOWN

NOTES:

1. SURVEY CONDUCTED BY SUBTRONIC CORPORATION IN NOVEMBER 2007.
2. NOT ALL UTILITIES MAY BE SHOWN. SOME LATERALS WERE NOT ACCESSIBLE AND WERE NOT LOCATED DURING SURVEY.
3. MOST UTILITIES ON THE PROPERTY ARE ABANDONED.



Former Nestlé Oakland Facility
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

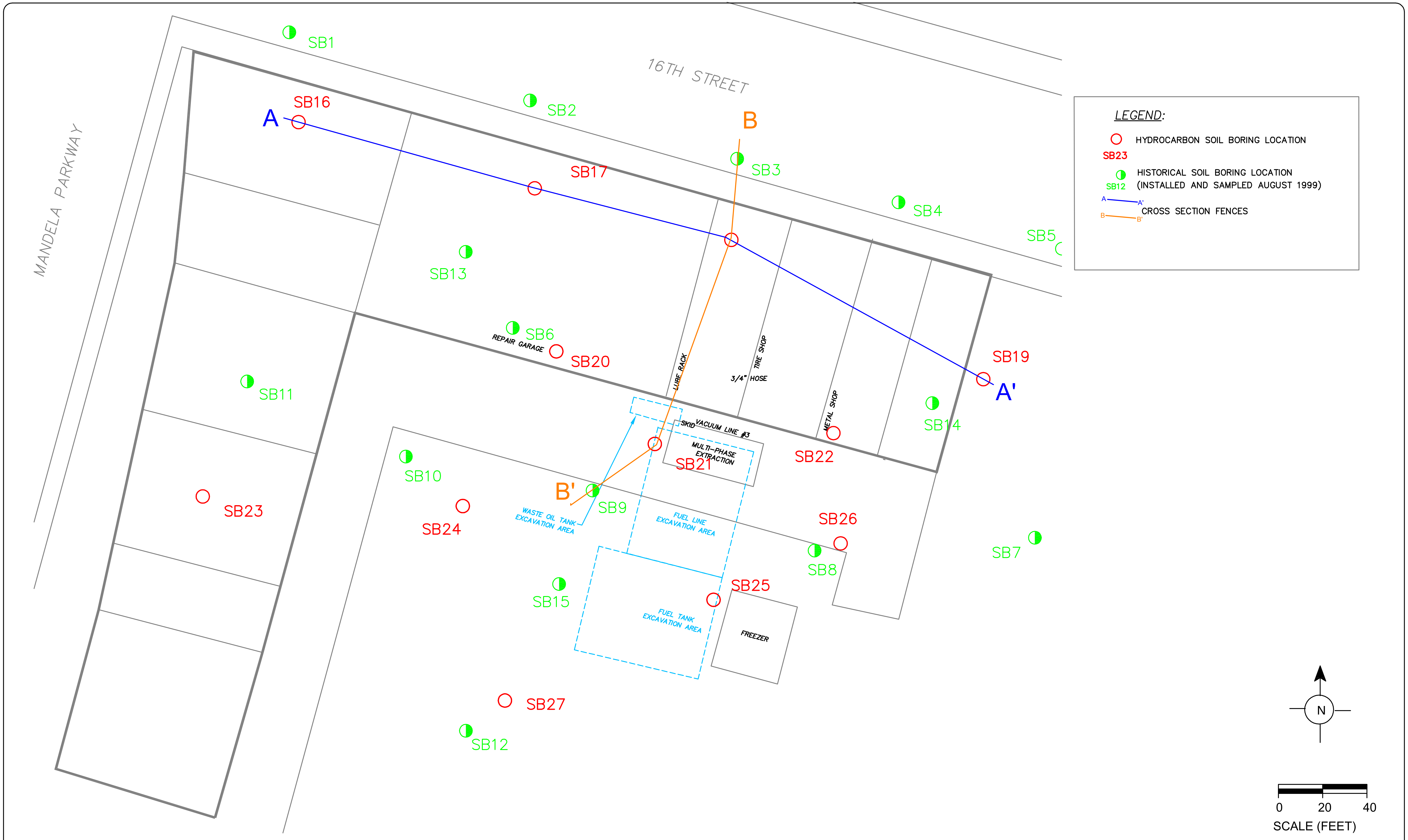
Revised Site Conceptual Model - Nov. 2008

Subsurface Utility Survey

Figure

3

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/29/08
Chkd by: B. Searcy
Drafter: TOL
File Path:



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1310 14th Street
Oakland, California - 94607

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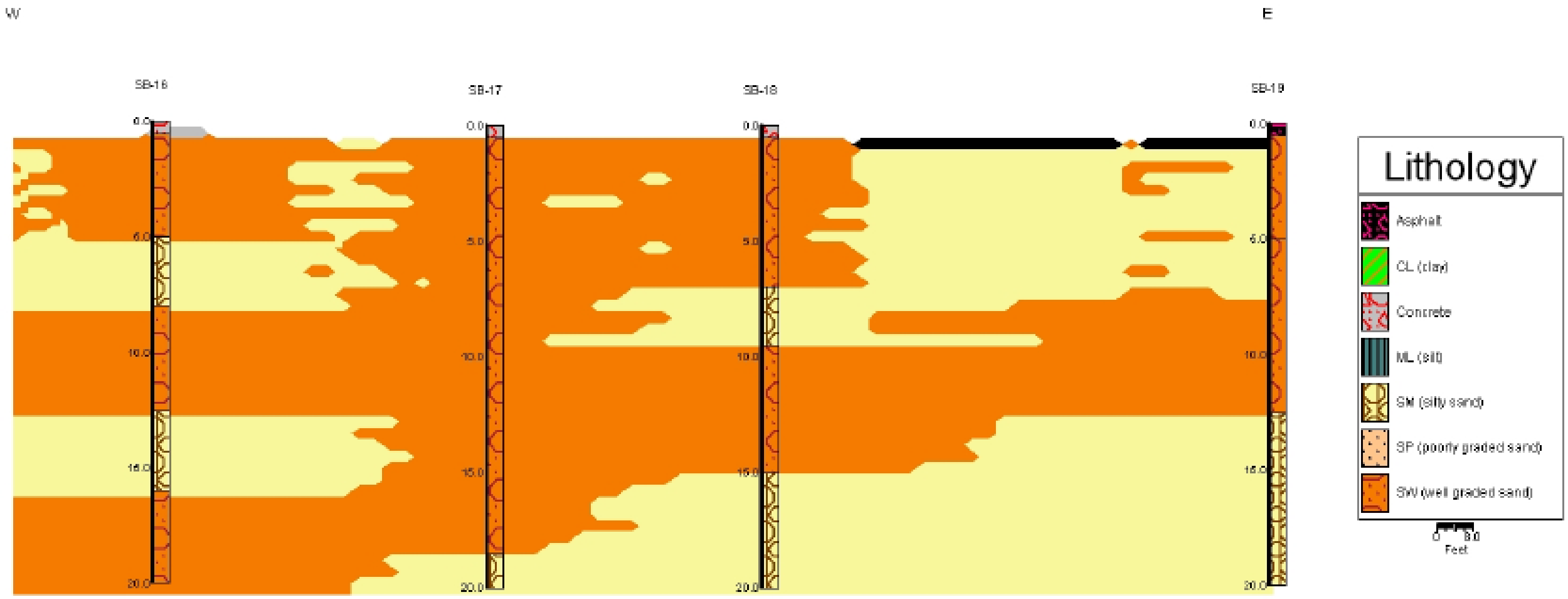
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model - Nov. 2008
Cross Section Locations

Figure
4



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1310 14th Street
Oakland, California 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
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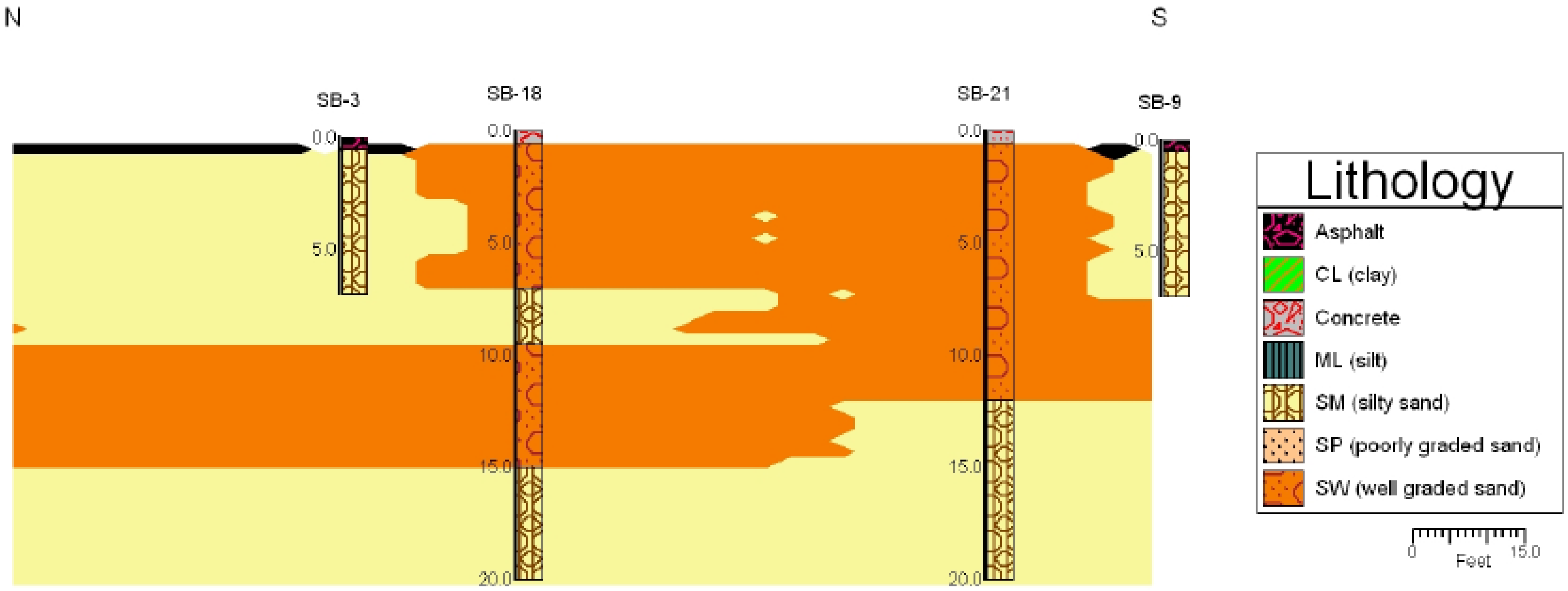
Revised Site Conceptual Model –
Nov. 2008
E-W Cross Section

Figure

5



Former Nestle USA, Inc. Facility
1310 14th Street
Oakland, California 94607

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Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model –
Nov. 2008
N-S Cross Section

Figure

6

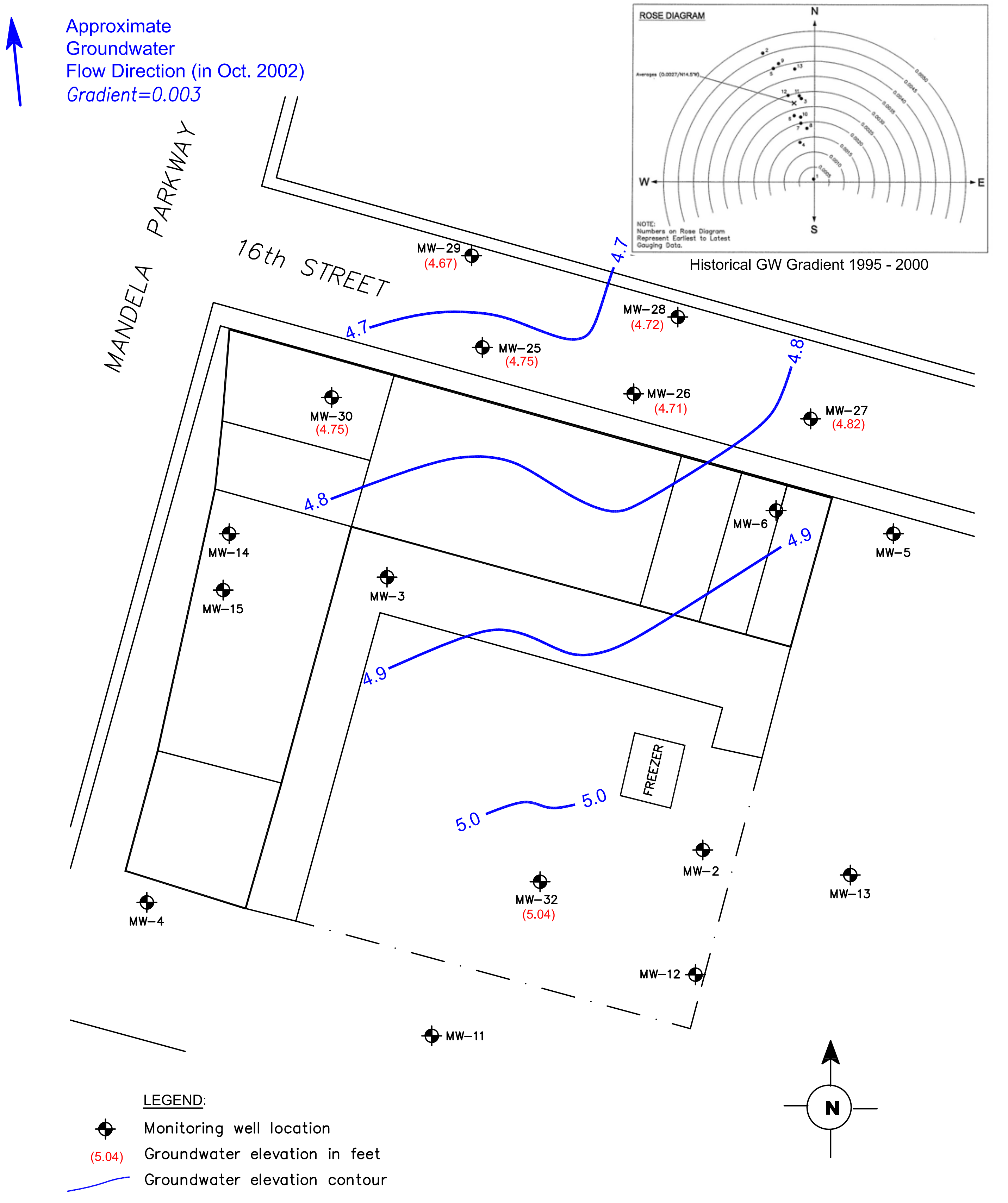
Project: Nestle-Oakland

Proj. Manager B. Acharya

Date drafted: 10/26/08

Chkd by:

Drafter: B. Searcy



File Path:

ENVIRONMENTAL COST MANAGEMENT

Managing Cost and Liability

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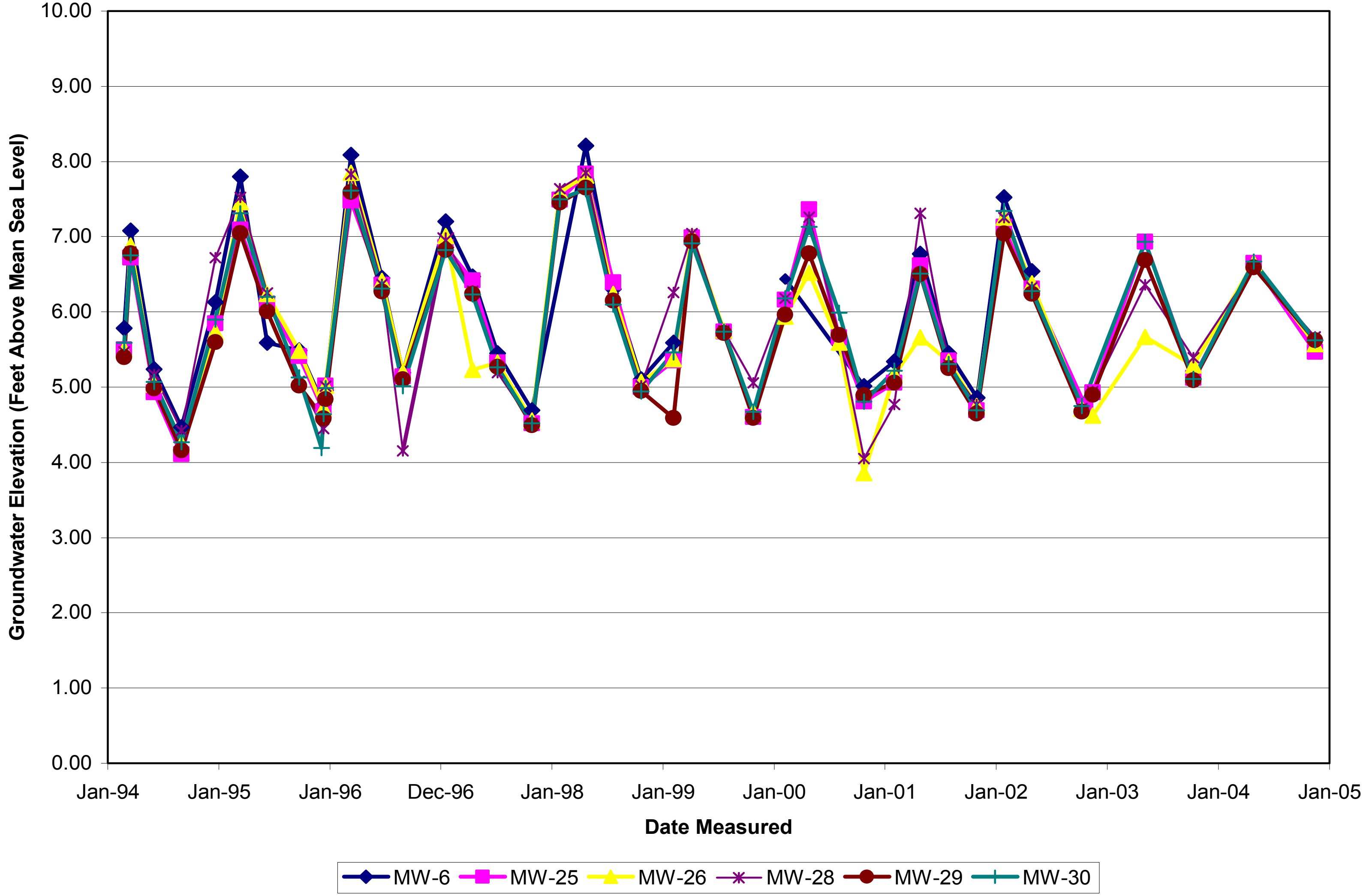
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model

November 2008
Historical Groundwater Gradient

Figure

7



Former Nestlé Oakland Facility
1310 14th Street
Oakland, California - 94607

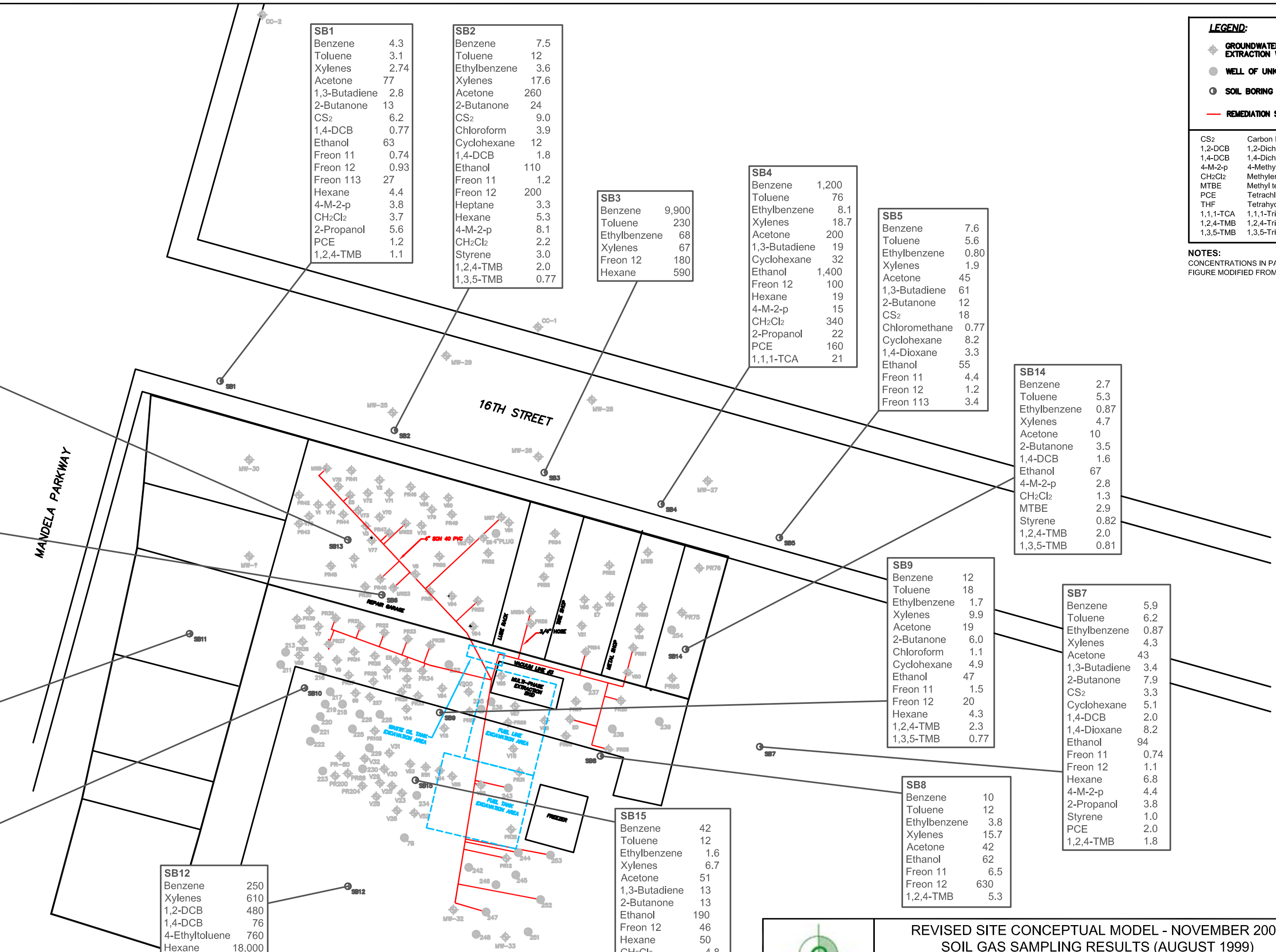
ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model – Nov. 2008

Groundwater Elevation Trends

Figure

8



SB1

Benzene	4.3
Toluene	3.1
Xylenes	2.74
Acetone	77
1,3-Butadiene	2.8
2-Butanone	13
CS2	6.2
1,4-DCB	0.77
Ethanol	63
Freon 11	0.74
Freon 12	0.93
Freon 113	27
Hexane	4.4
4-M-2-p	3.8
CH2Cl2	3.7
2-Propanol	5.6
PCE	1.2
1,2,4-TMB	1.1

SB2

Benzene	7.5
Toluene	12
Ethylbenzene	3.6
Xylenes	17.6
Acetone	260
2-Butanone	24
CS2	9.0
Chloroform	3.9
Cyclohexane	12
1,4-DCB	1.8
Ethanol	110
Freon 11	1.2
Freon 12	200
Heptane	3.3
Hexane	5.3
4-M-2-p	8.1
CH2Cl2	2.2
Styrene	3.0
1,2,4-TMB	2.0
1,3,5-TMB	0.77

SB3

Benzene	9,900
Toluene	230
Ethylbenzene	68
Xylenes	67
Freon 12	180
Hexane	590

SB4

Benzene	1,200
Toluene	76
Ethylbenzene	8.1
Xylenes	18.7
Acetone	200
1,3-Butadiene	19
Cyclohexane	32
Ethanol	1,400
Freon 12	100
Hexane	19
4-M-2-p	15
CH2Cl2	340
2-Propanol	22
PCE	160
1,1,1-TCA	21

SB5

Benzene	7.6
Toluene	5.6
Ethylbenzene	0.80
Xylenes	1.9
Acetone	45
1,3-Butadiene	61
2-Butanone	12
CS2	18
Chloromethane	0.77
Cyclohexane	8.2
1,4-Dioxane	3.3
Ethanol	55
Freon 11	4.4
Freon 12	1.2
Freon 113	3.4

SB13

Benzene	0.91
Toluene	8.5
Xylenes	1.3
Acetone	49
2-Butanone	5.5
CS2	6.4
1,4-Dioxane	4.3
Ethanol	410
Heptane	3.4
CH2Cl2	5.6
2-Propanol	26
THF	58
1,2,4-TMB	1.1

SB6

Benzene	3.0
Toluene	4.2
Xylenes	2.52
Acetone	11
2-Butanone	4.0
Ethanol	35
1,2,4-TMB	1.1

SB14

Benzene	2.7
Toluene	5.3
Ethylbenzene	0.87
Xylenes	4.7
Acetone	10
2-Butanone	3.5
1,4-DCB	1.6
Ethanol	67
4-M-2-p	2.8
CH2Cl2	1.3
MTBE	2.9
Styrene	0.82
1,2,4-TMB	2.0
1,3,5-TMB	0.81

SB11

Benzene	2.7
Toluene	1.9
Xylenes	0.91
Acetone	38
2-Butanone	9.9
Chloromethane	3.7
1,4-Dioxane	22
Ethanol	23
Freon 11	4.6
CH2Cl2	1.2
1,2,4-TMB	0.85

SB9

Benzene	12
Toluene	18
Ethylbenzene	1.7
Xylenes	9.9
Acetone	19
2-Butanone	6.0
Chloroform	1.1
Cyclohexane	4.9
Ethanol	47
Freon 11	1.5
Freon 12	20
Hexane	4.3
1,2,4-TMB	2.3
1,3,5-TMB	0.77

SB7

Benzene	5.9
Toluene	6.2
Ethylbenzene	0.87
Xylenes	4.3
Acetone	43
1,3-Butadiene	3.4
2-Butanone	7.9
CS2	3.3
Cyclohexane	5.1
1,4-DCB	2.0
1,4-Dioxane	8.2
Ethanol	94
Freon 11	0.74
Freon 12	1.1
Hexane	6.8
4-M-2-p	4.4
2-Propanol	3.8
Styrene	1.0
PCE	2.0
1,2,4-TMB	1.8

SB10

Benzene	3.5
Toluene	2.8
Xylenes	1.7
Acetone	39
2-Butanone	9.7
Chloroform	1.6
Ethanol	40
Freon 12	1.4
Hexane	3.9
1,2,4-TMB	1.2

SB12

Benzene	250
Xylenes	610
1,2-DCB	480
1,4-DCB	76
4-Ethyltoluene	760
Hexane	18,000
1,2,4-TMB	580
1,3,5-TMB	740

SB15

Benzene	42
Toluene	12
Ethylbenzene	1.6
Xylenes	6.7
Acetone	51
1,3-Butadiene	13
2-Butanone	13
Ethanol	190
Freon 12	46
Hexane	50
CH2Cl2	4.8
PCE	2.1
1,2,4-TMB	1.8

SB8

Benzene	10
Toluene	12
Ethylbenzene	3.8
Xylenes	15.7
Acetone	42
Ethanol	62
Freon 11	6.5
Freon 12	630
1,2,4-TMB	5.3

LEGEND:

✧	GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS
●	WELL OF UNKNOWN CONSTRUCTION
◑	SOIL BORING LOCATION
—	REMEDIATION SYSTEM VACUUM PIPING

CS2	Carbon Disulfide
1,2-DCB	1,2-Dichlorobenzene
1,4-DCB	1,4-Dichlorobenzene
4-M-2-p	4-Methyl-2-pentanone
CH2Cl2	Methylene Chloride
MTBE	Methyl tert-Butyl Ether
PCE	Tetrachloroethene
THF	Tetrahydrofuran
1,1,1-TCA	1,1,1-Trichloroethane
1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene

NOTES:

CONCENTRATIONS IN PARTS PER BILLION VOLUMETRIC (ppbv)

FIGURE MODIFIED FROM (ETIC, 2001)

N

0 20 40

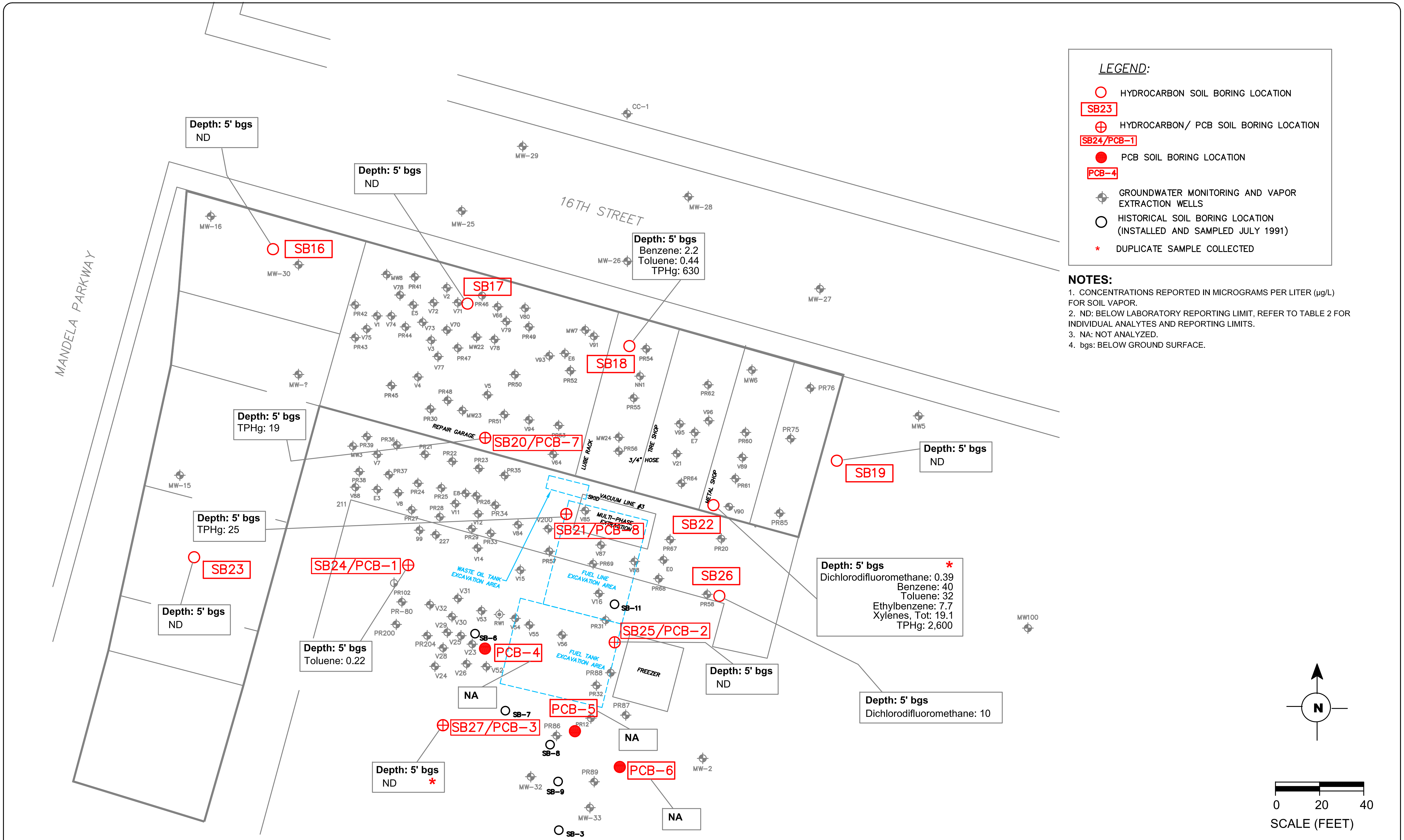
Scale (feet)

REVISED SITE CONCEPTUAL MODEL - NOVEMBER 2008
SOIL GAS SAMPLING RESULTS (AUGUST 1999)
NESTLE OAKLAND FACILITY
1310 14th STREET, OAKLAND, CALIFORNIA

FIGURE:
9

FILENAME: SG_DATA.DWG 09/20/99

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/28/08
Chkd by: B. Searcy
Drafter: J. Plummer
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport



LEGEND:

○ HYDROCARBON SOIL BORING LOCATION
SB23
⊕ HYDROCARBON/ PCB SOIL BORING LOCATION
SB24/PCB–1
● PCB SOIL BORING LOCATION
PCB–4
⌖ GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS
○ HISTORICAL SOIL BORING LOCATION (INSTALLED AND SAMPLED JULY 1991)
* DUPLICATE SAMPLE COLLECTED

NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) FOR SOIL VAPOR.
2. ND: BELOW LABORATORY REPORTING LIMIT, REFER TO TABLE 2 FOR INDIVIDUAL ANALYTES AND REPORTING LIMITS.
3. NA: NOT ANALYZED.
4. bgs: BELOW GROUND SURFACE.

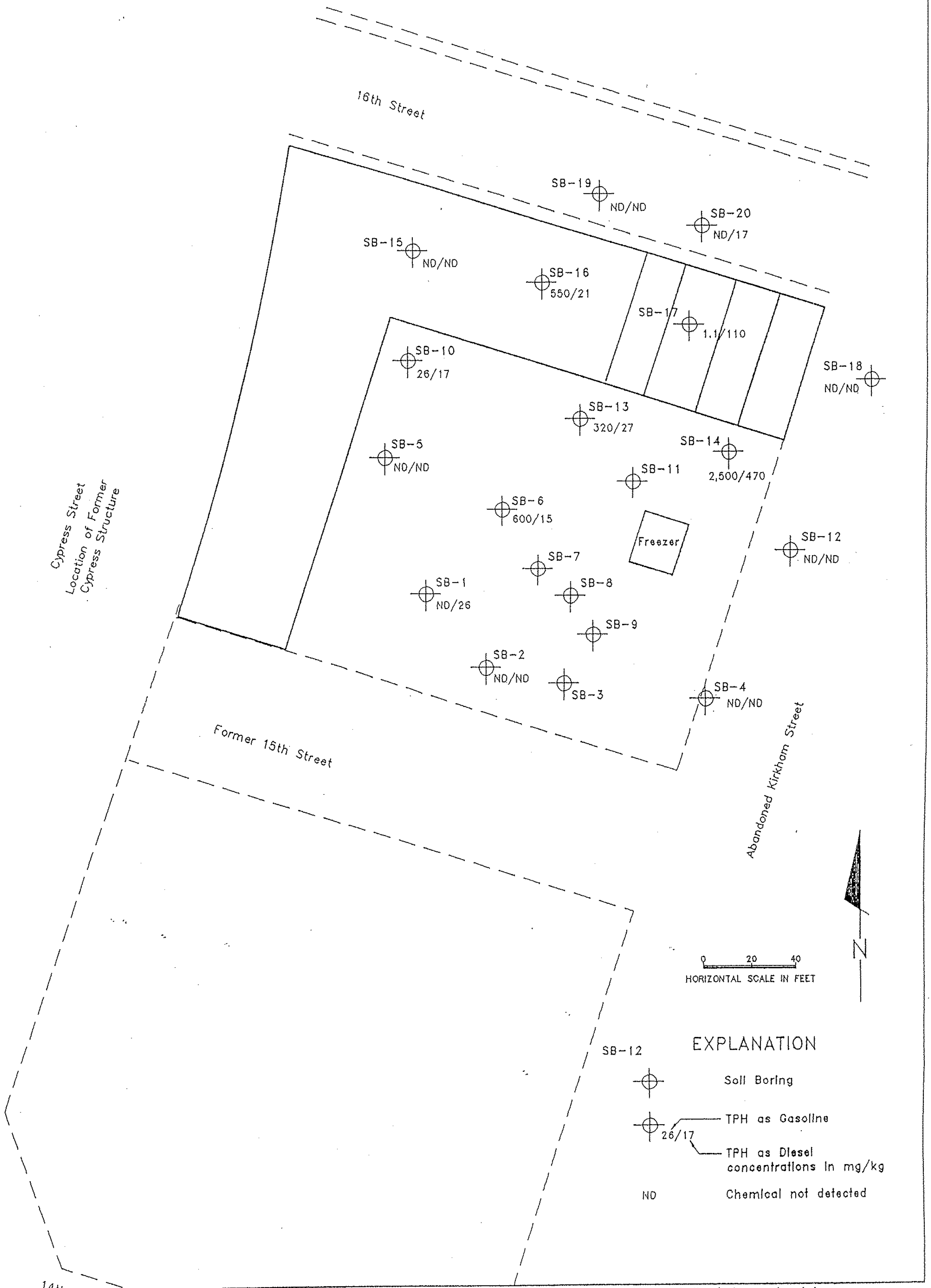
Former Nestle Oakland Facility
1310 14th Street
Oakland, California - 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model - November 2008
Soil Gas Sampling Results (ug/L) (May 2008)

Figure
10

23169



Harding Lawson Associates
Engineering and Environmental Services

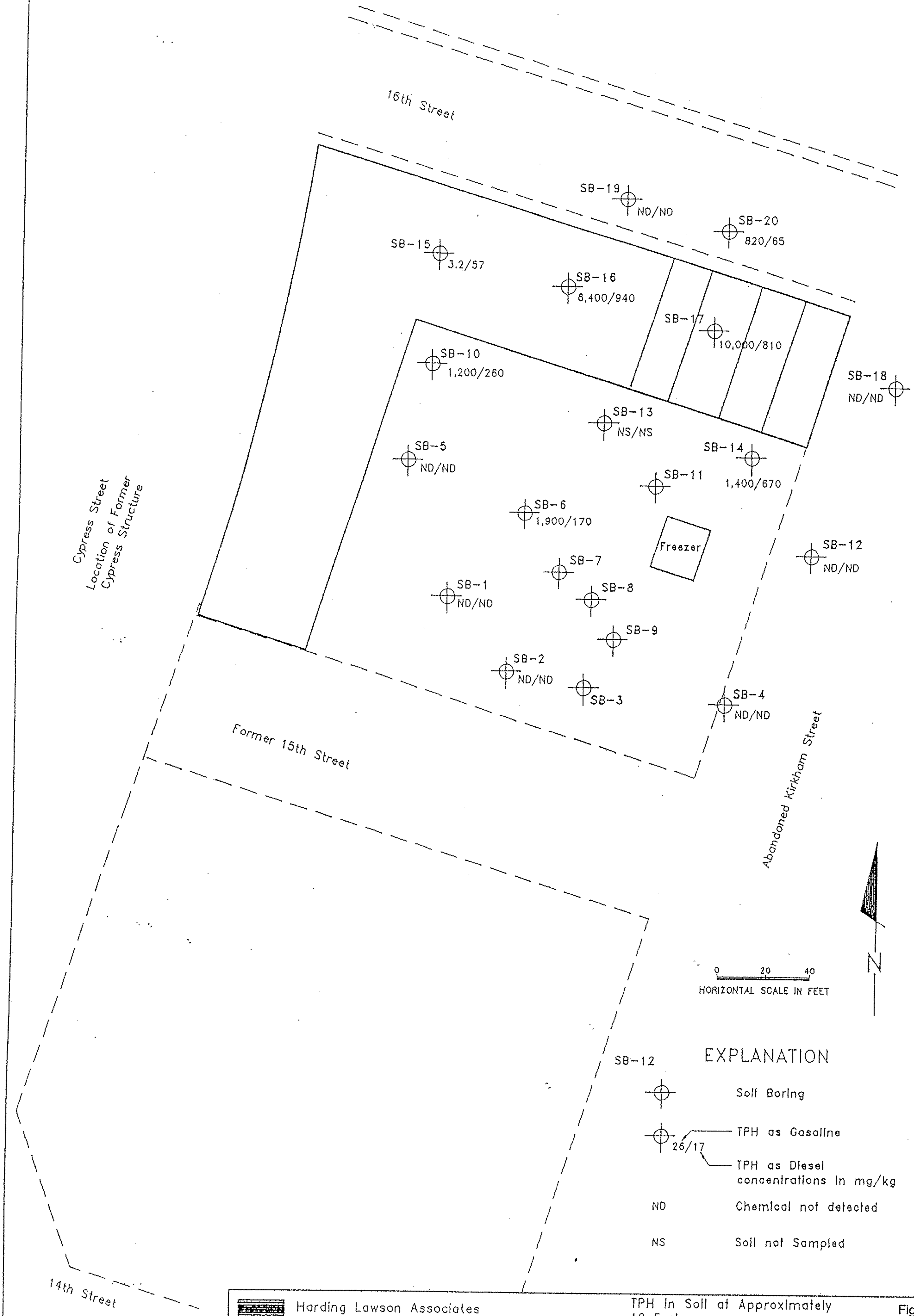
TPH in Soil at Approximately 5 Feet
Carnation Facility
Oakland, California

Figure 11

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,011.02	D.J. Craig	8/91	

CARNSB.DWG

23170



HLA Harding Lawson Associates
Engineering and
Environmental Services

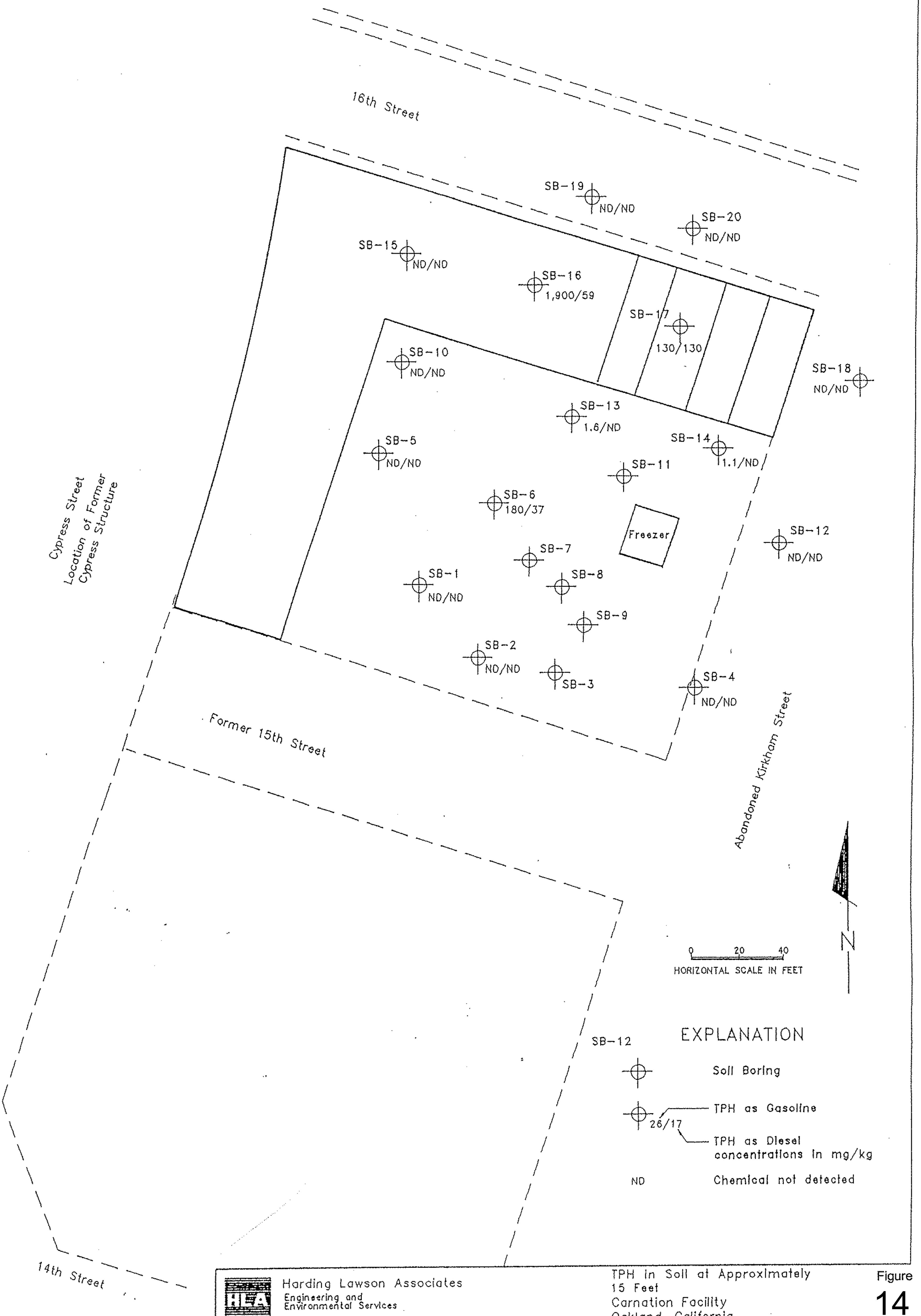
TPH in Soil at Approximately
10 Feet
Carnation Facility
Oakland, California

Figure
12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,011.02	D. J. Craig	8/91	

CARNSB.DWG

23172



Harding Lawson Associates
Engineering and
Environmental Services

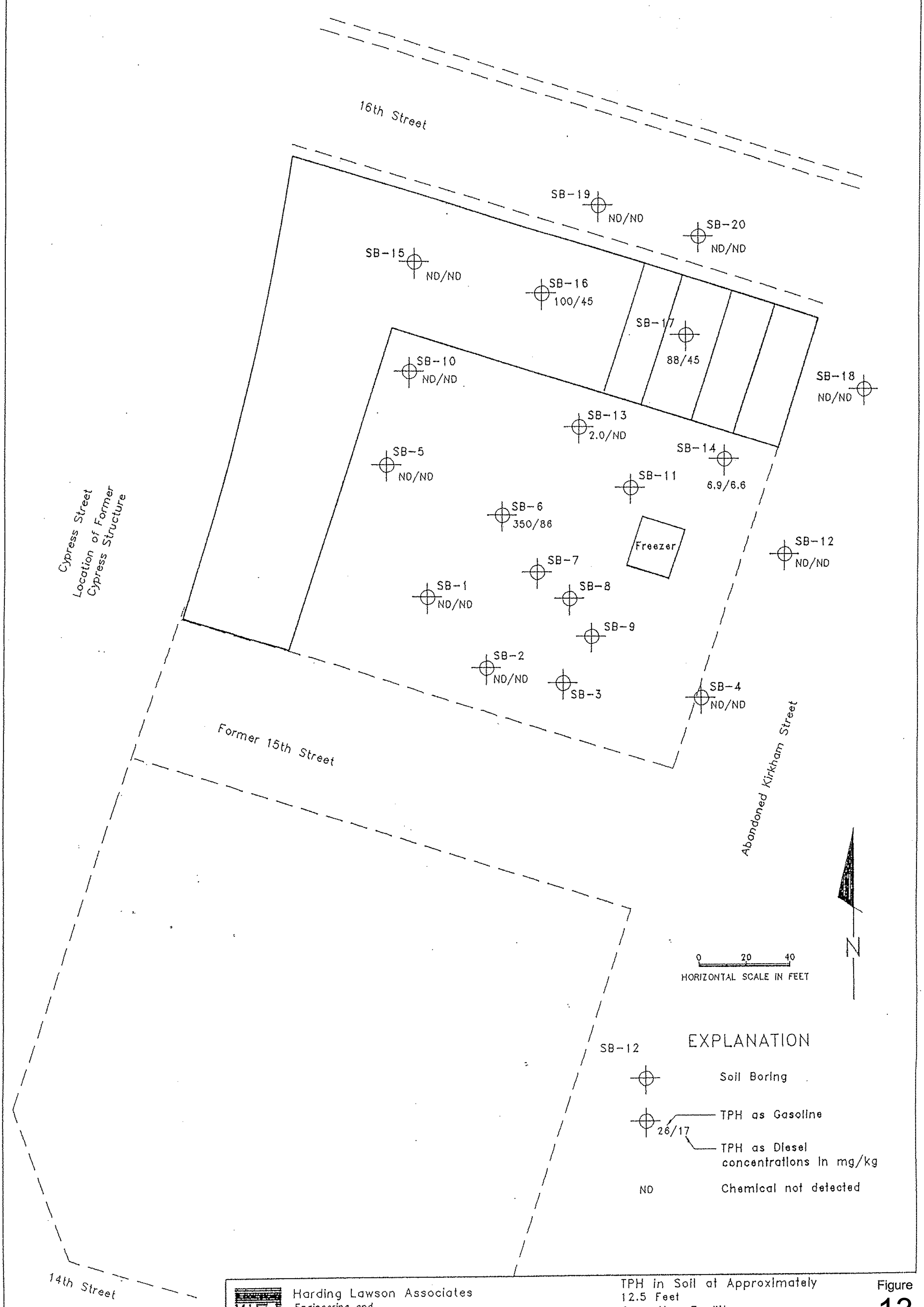
TPH in Soil at Approximately
15 Feet
Carnation Facility
Oakland, California

Figure
14

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,011.02	D.A. Cung	8/91	

CARNSB.DWG

23171



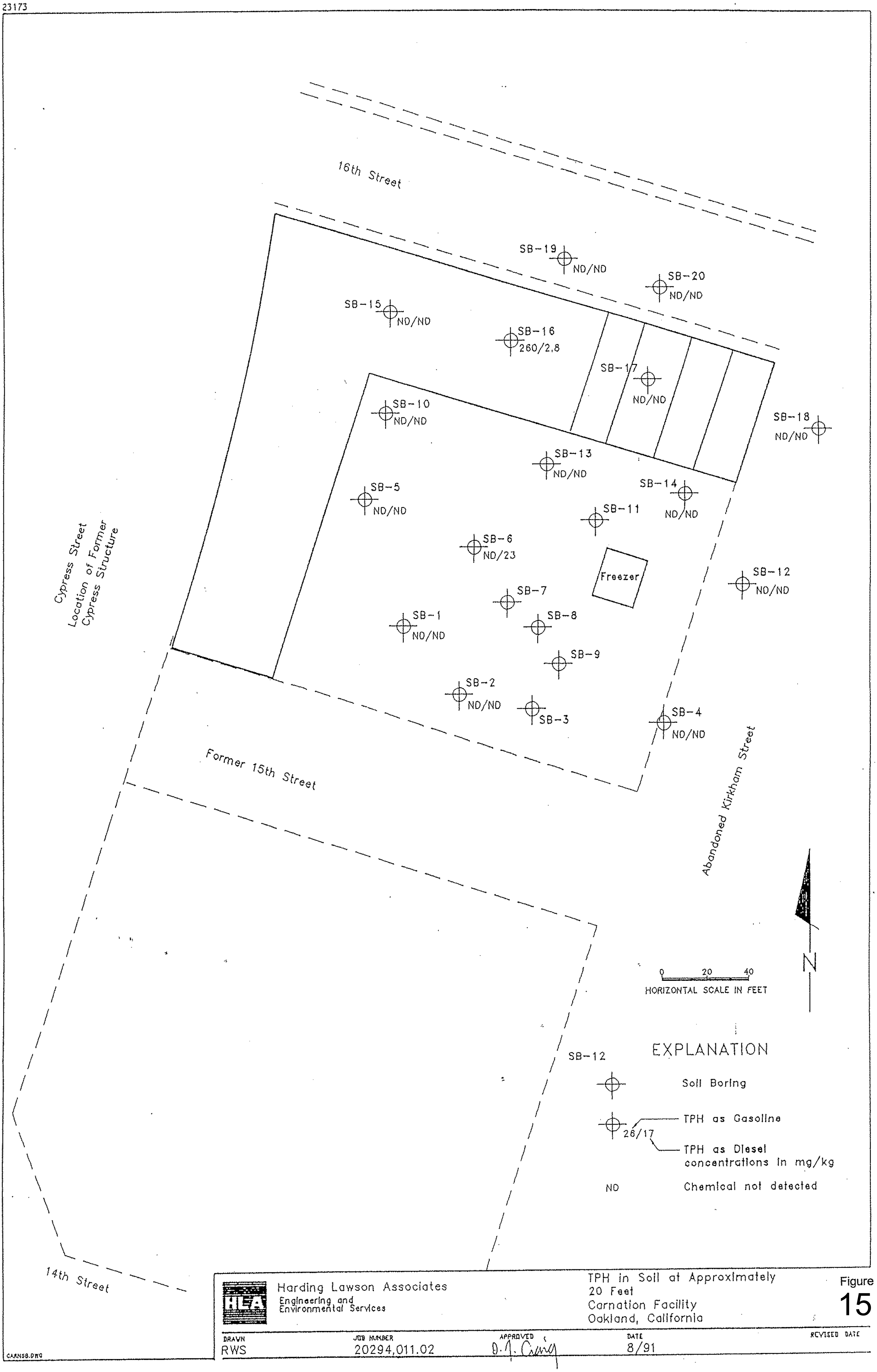
Harding Lawson Associates
Engineering and
Environmental Services

TPH in Soil at Approximately
12.5 Feet
Carnation Facility
Oakland, California

Figure
13

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,011.02	D.J. Craig	8/91	

CARNS6.DWG

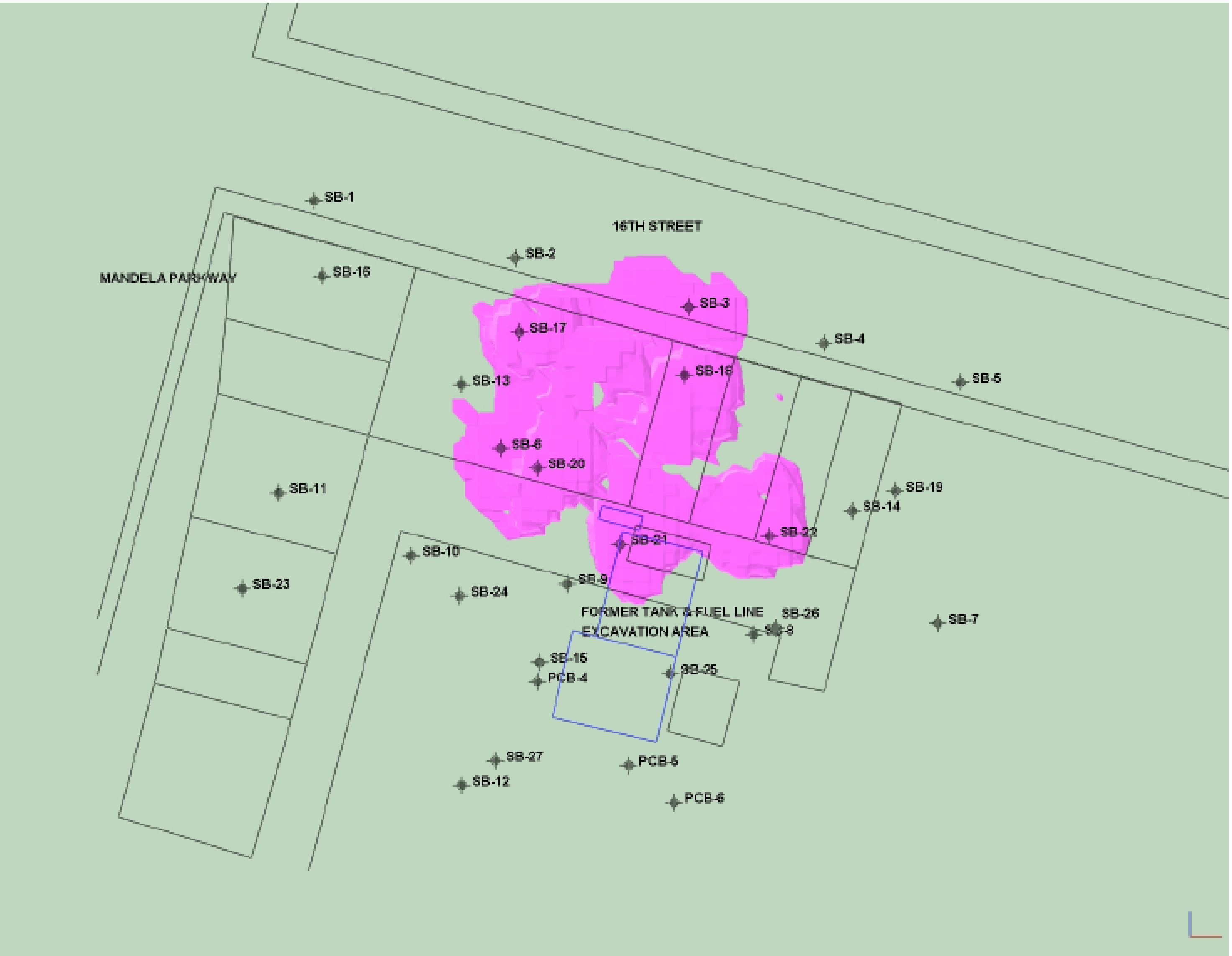


HLA Harding Lawson Associates
Engineering and Environmental Services

TPH in Soil at Approximately
20 Feet
Carnation Facility
Oakland, California

Figure
15

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RWS	20294,011.02		8/91	

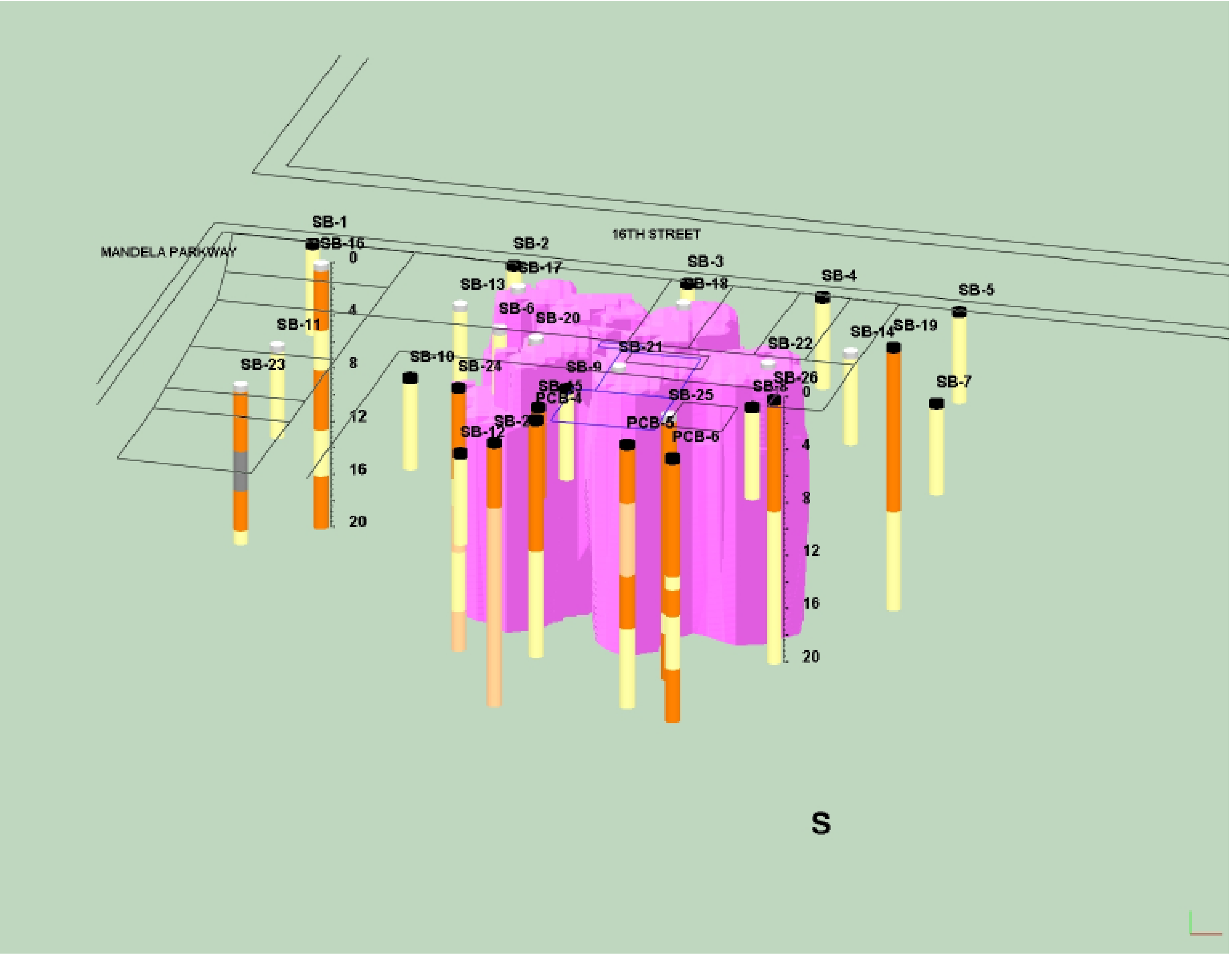


Former Nestle USA, Inc. Facility
1310 14th Street
Oakland, California 94607

ENVIRONMENTAL COST MANAGEMENT, INC.
Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
TPHg Soil Sample Results
> 500 mg/kg – Plan View
(August 1999 and May 2008 Data)

Figure
16



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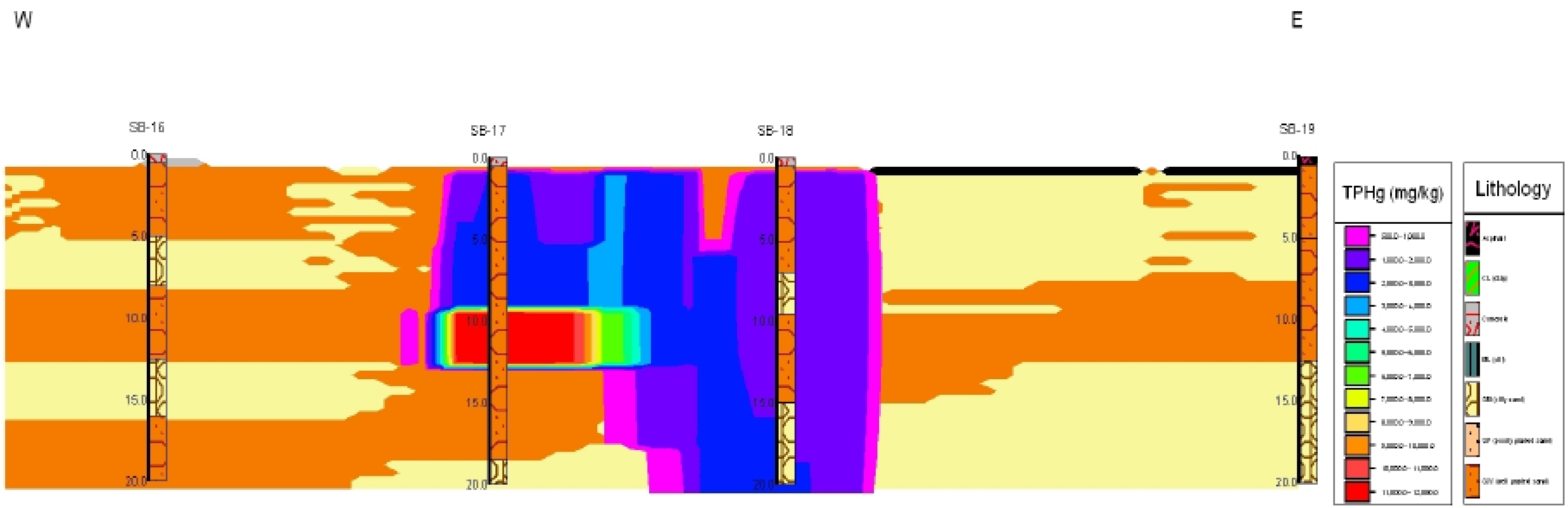
Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
TPHg Soil Sample Results
> 500 mg/kg – South View
(August 1999 and May 2008 Data)

Figure

17



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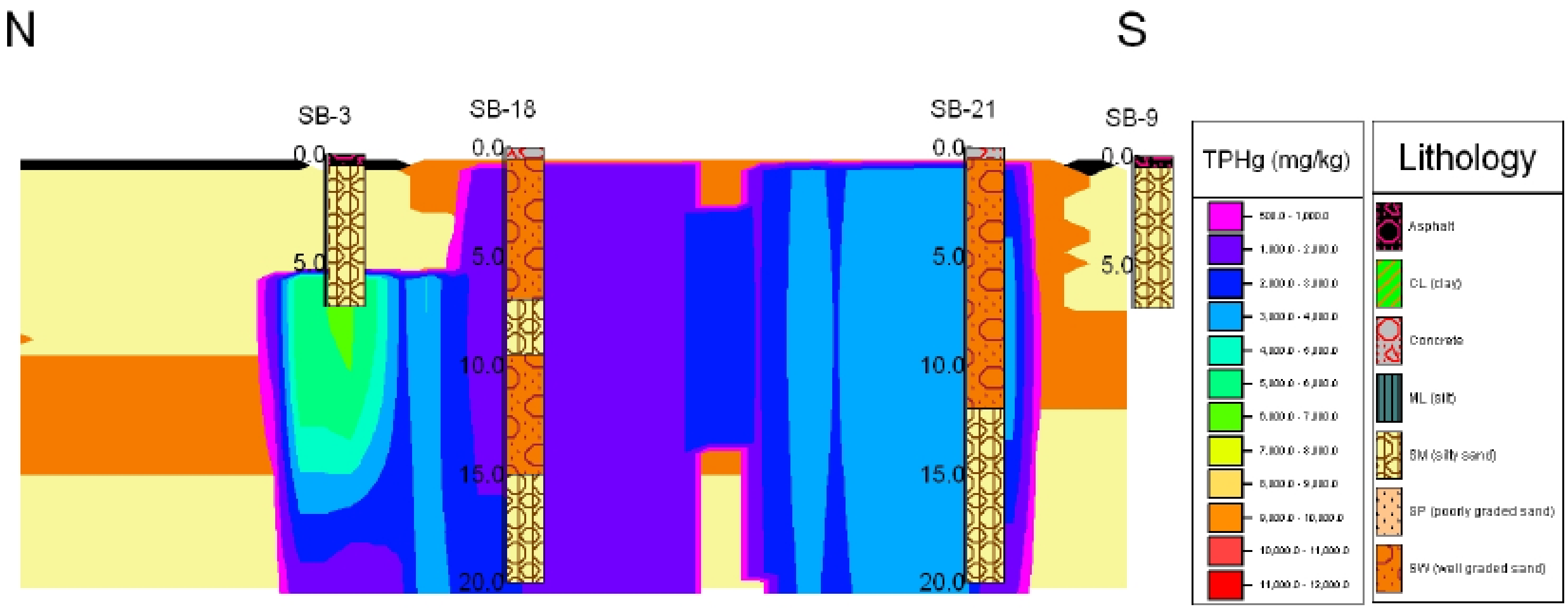
Revised Site Conceptual Model – Nov. 2008
E-W Cross Section
TPHg Soil Sample Results
(August 1999 and May 2008 Data)

Figure
18



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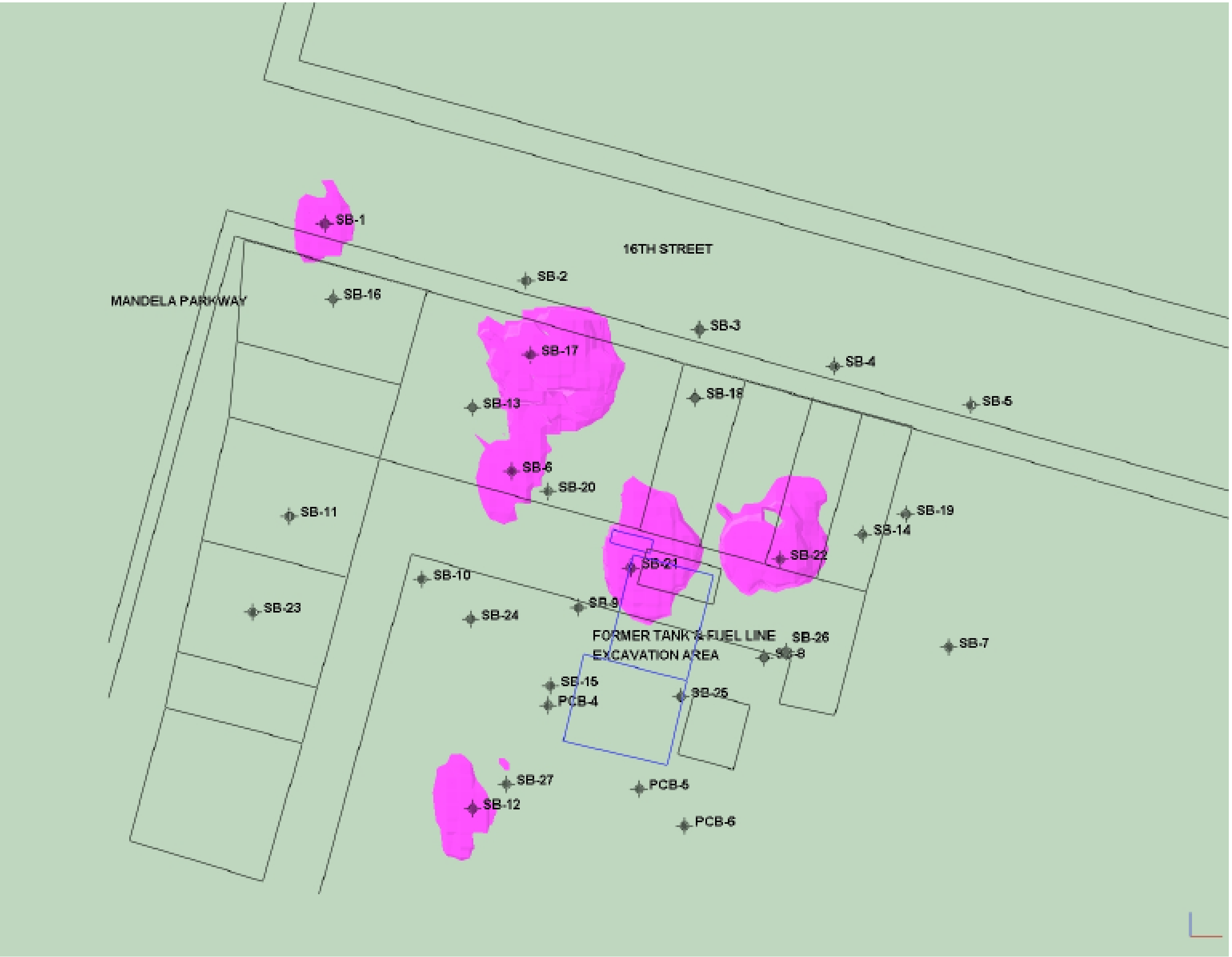
Revised Site Conceptual Model – Nov. 2008
N-S Cross Section
TPHg Soil Sample Results
(August 1999 and May 2008 Data)

Figure
19



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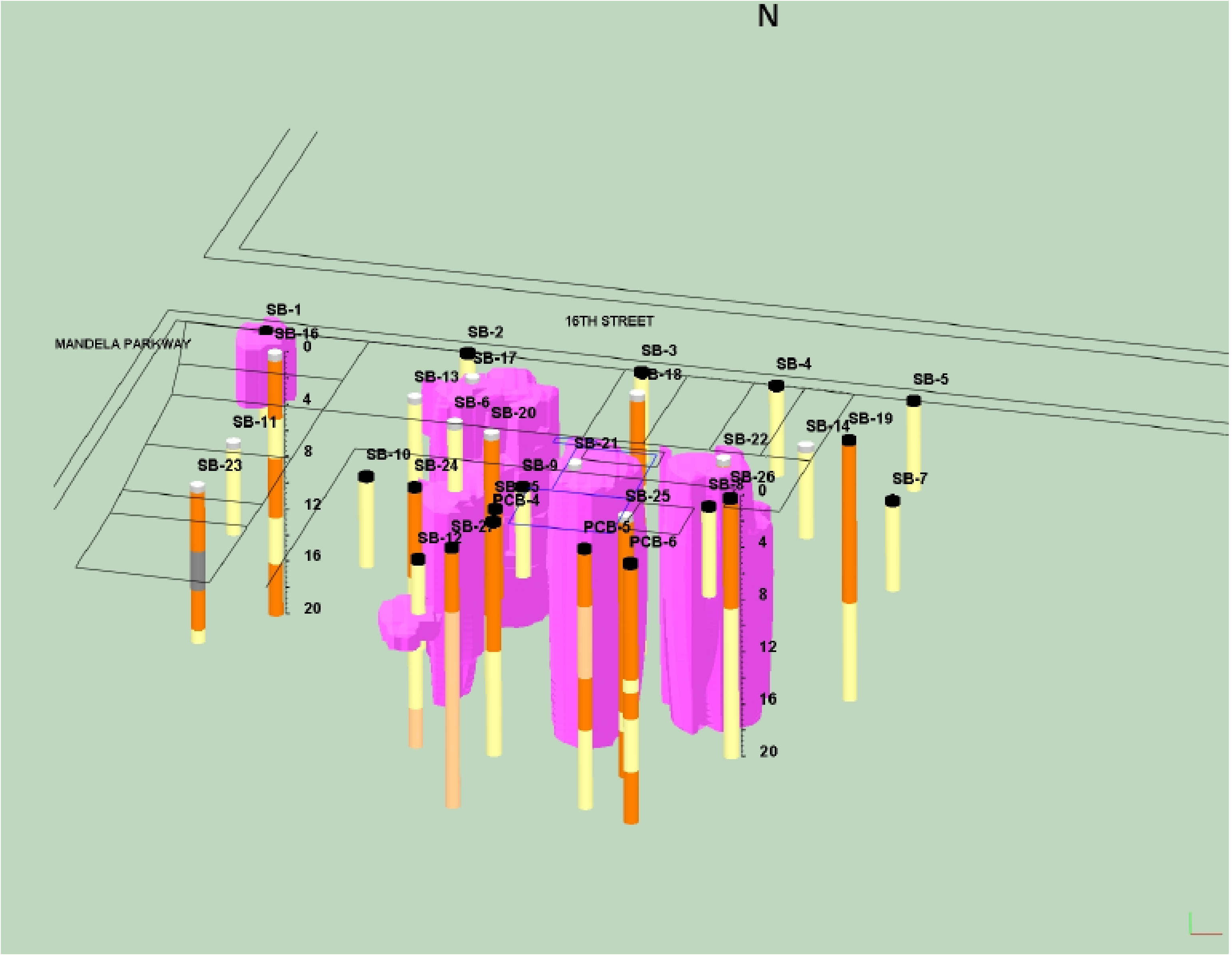
Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
TPHd Soil Sample Results
> 500 mg/kg - Plan View
(August 1999 and May 2008 Data)

Figure
20



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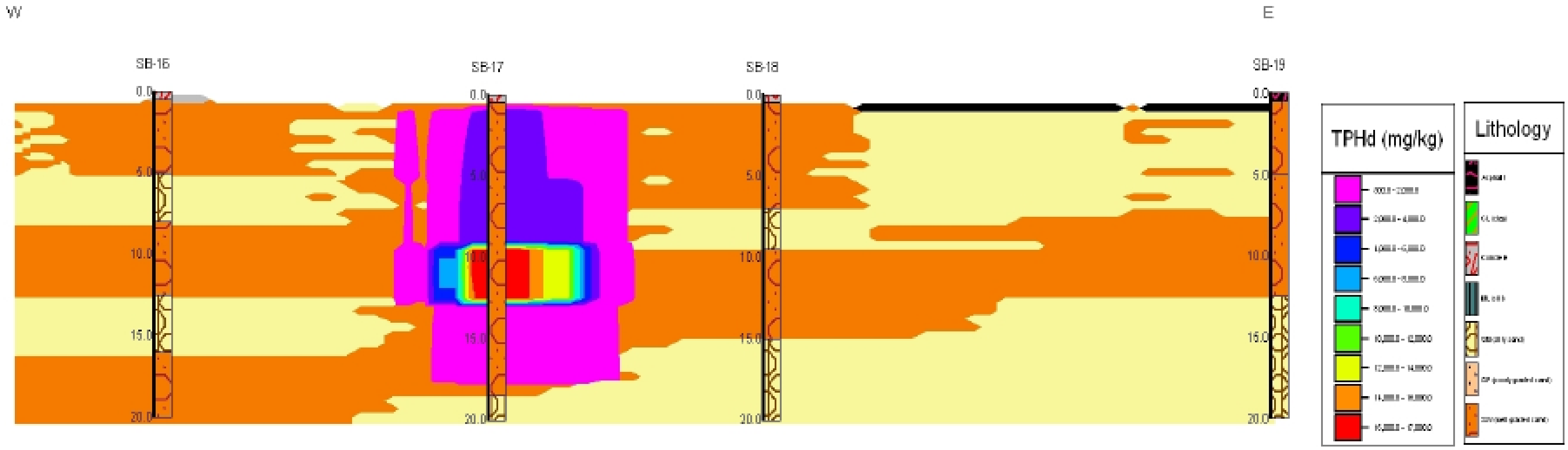
Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
TPHd Soil Sample Results
> 500 mg/kg – South View
(August 1999 and May 2008 Data)

Figure
21



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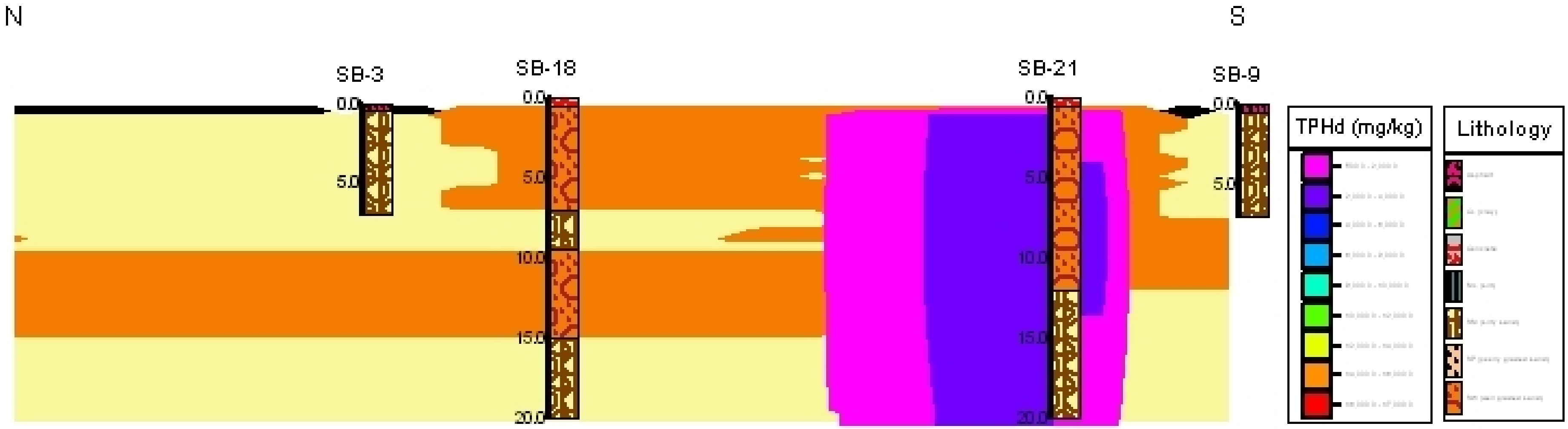
Revised Site Conceptual Model – Nov. 2008
E-W Cross Section
TPHd Soil Sample Results
(August 1999 and May 2008 Data)

Figure
22



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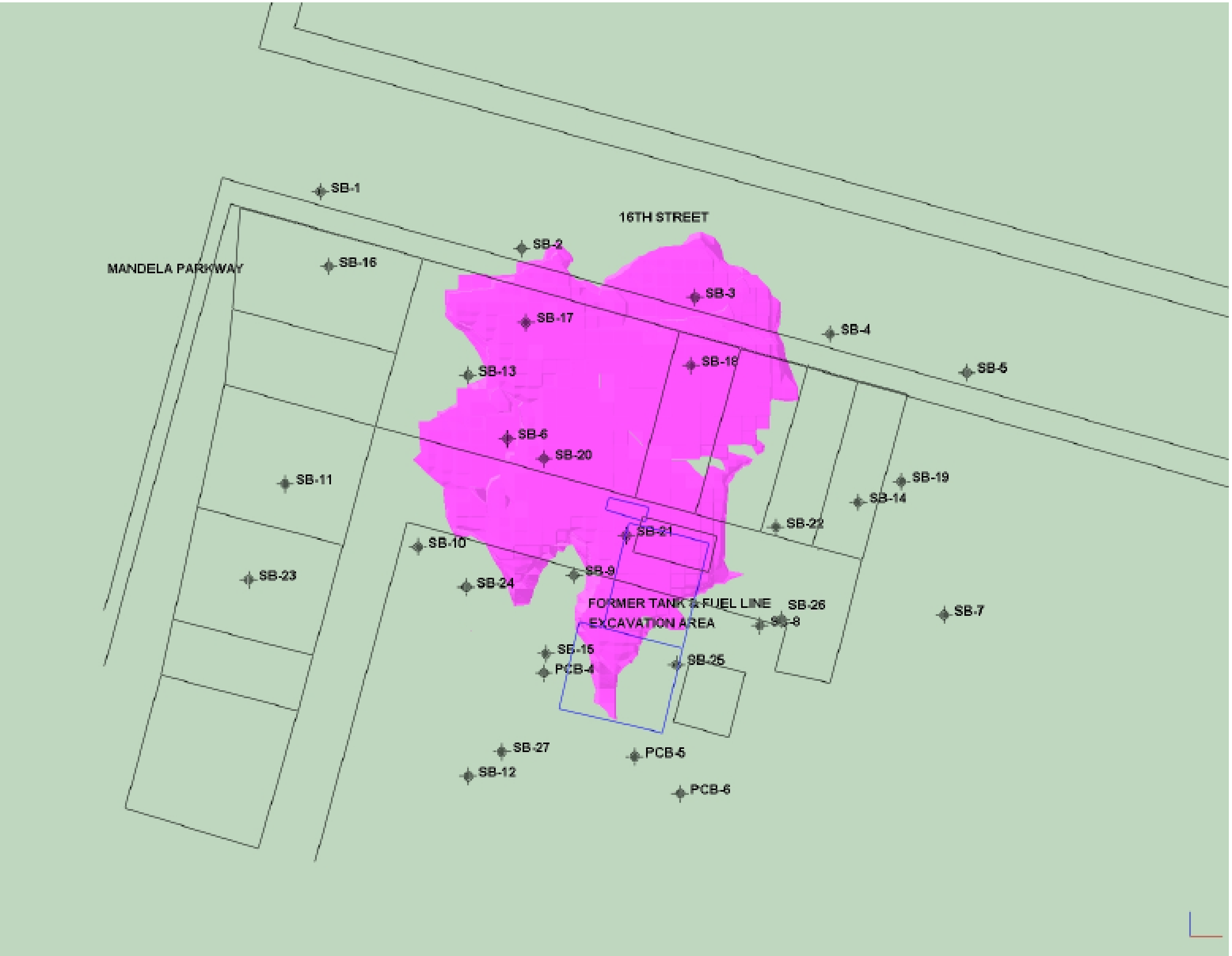
Revised Site Conceptual Model – Nov. 2008
N-S Cross Section
TPHd Soil Sample Results (August 1999 and May 2008 Data)

Figure

23



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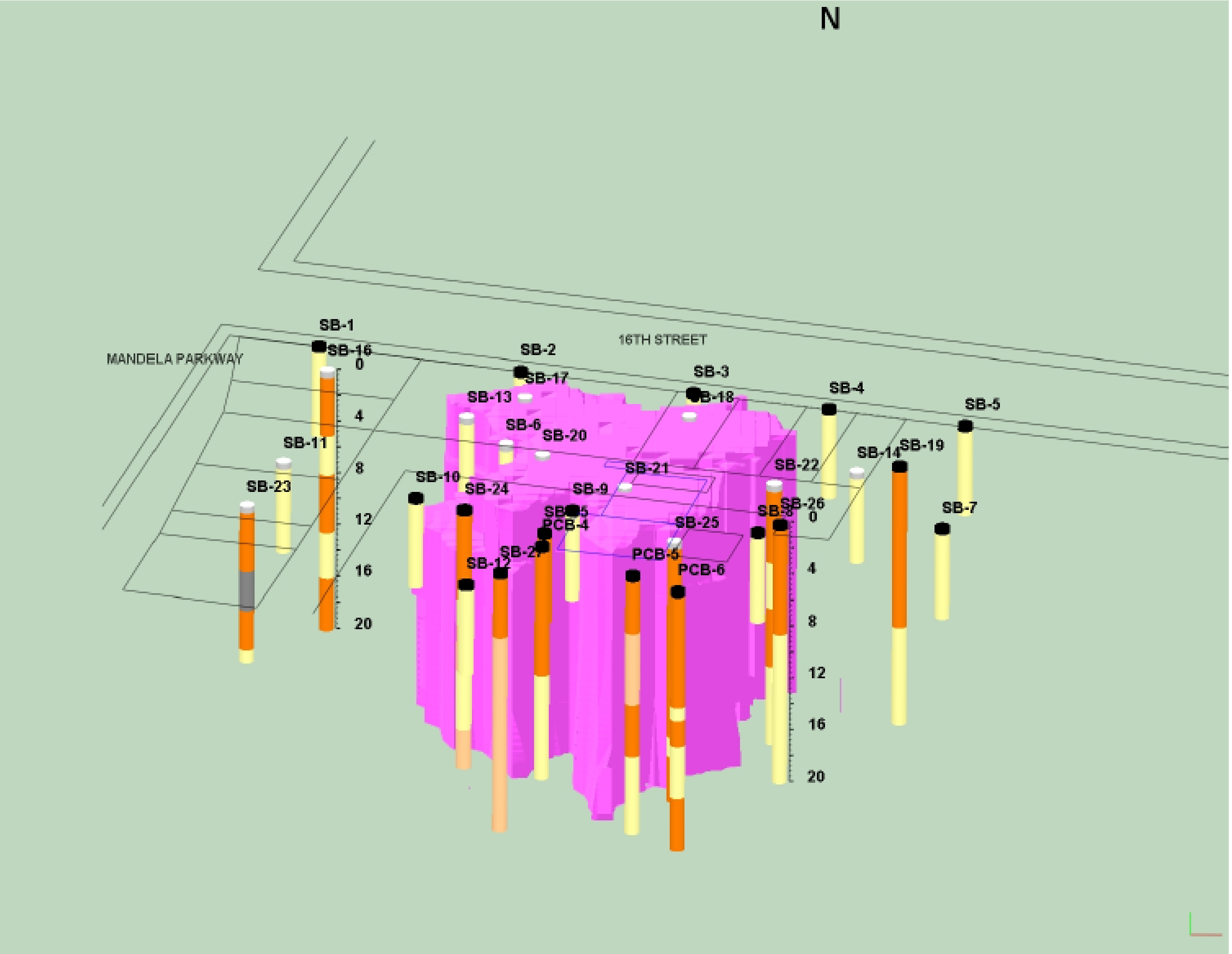
Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
Benzene Soil Sample Results
> 0.5 mg/kg – Plan View
(August 1999 and May 2008 Data)

Figure

24



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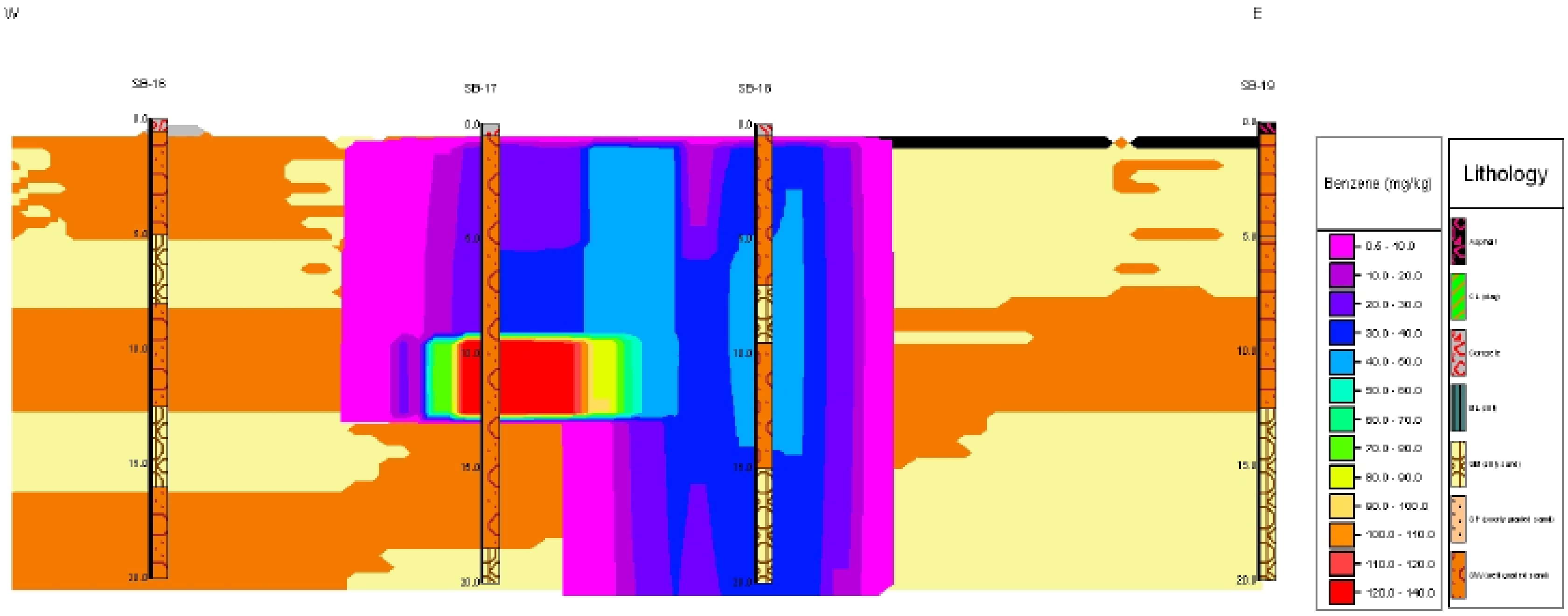
Revised Site Conceptual Model – Nov. 2008
3D Interpolation of
Benzene Soil Sample Results
> 0.5 mg/kg – South View
(August 1999 and May 2008 Data)

Figure
25



Former Nestle USA, Inc. Facility
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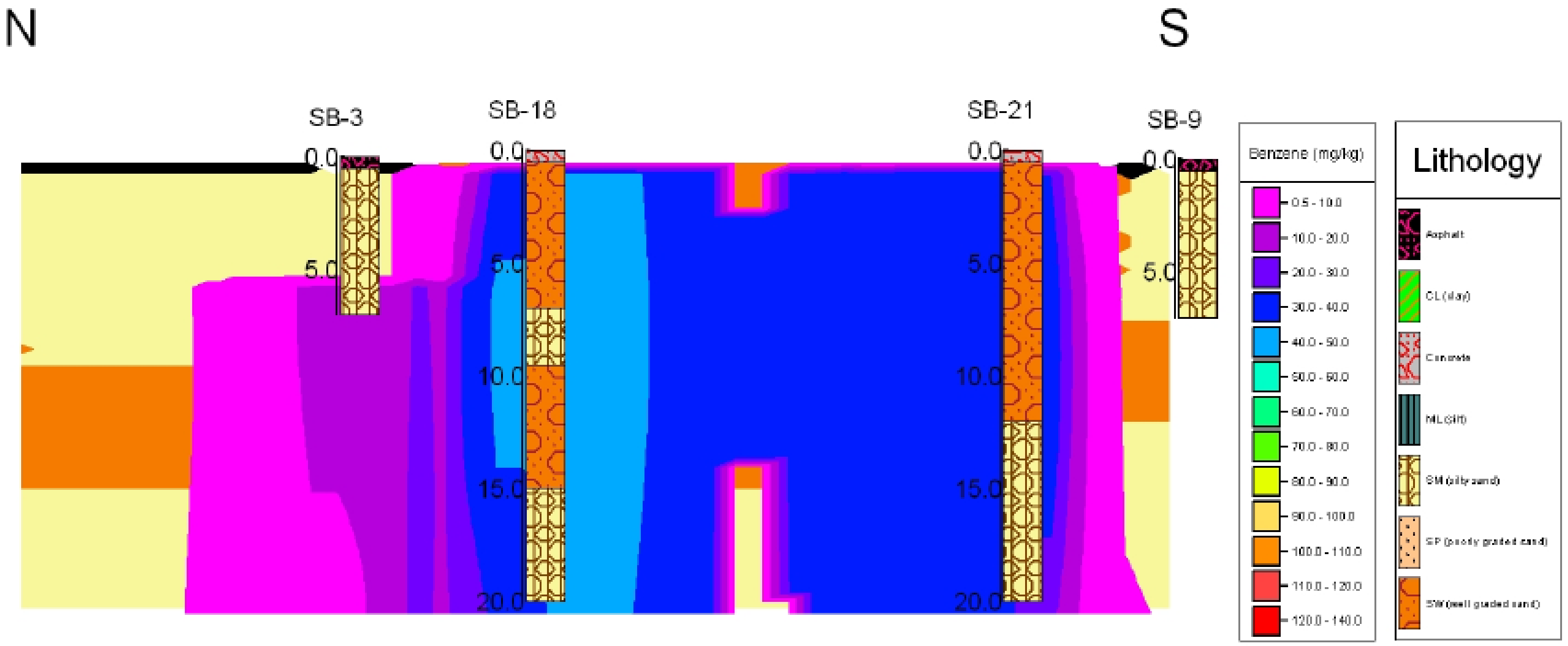
Revised Site Conceptual Model – Nov. 2008
E-W Cross Section
Benzene Soil Sample Results
(August 1999 and May 2008 Data)

Figure

26



Former Nestle USA, Inc. Facility
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Revised Site Conceptual Model – Nov. 2008
N-S Cross Section
Benzene Soil Sample Results
(August 1999 and May 2008 Data)

Figure

27

File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport

Drafter: hat

Chkd by: B. Searcy

Date drafted: 10/16/08

Proj. Manager B. Acharya

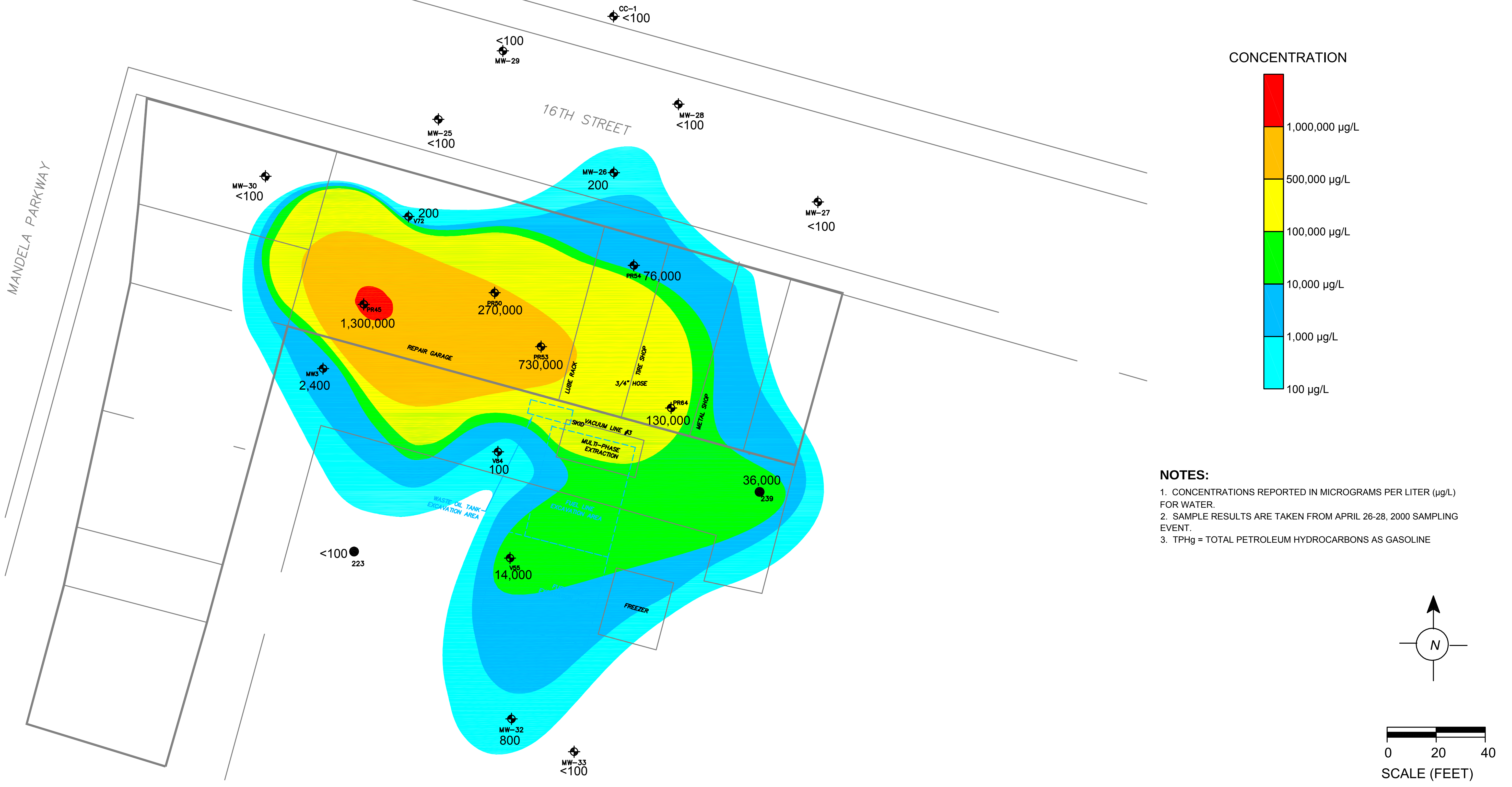
Project: Nestle-Oakland

LEGEND:

MW-30 GROUNDWATER MONITORING AND VAPOR EXTRACTION WELLS

● 223 WELL OF UNKNOWN CONSTRUCTION

<100 TPHg CONCENTRATION IN μg/L



NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (μg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM APRIL 26-28, 2000 SAMPLING EVENT.
3. TPHg = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

Former Nestlé Oakland Facility
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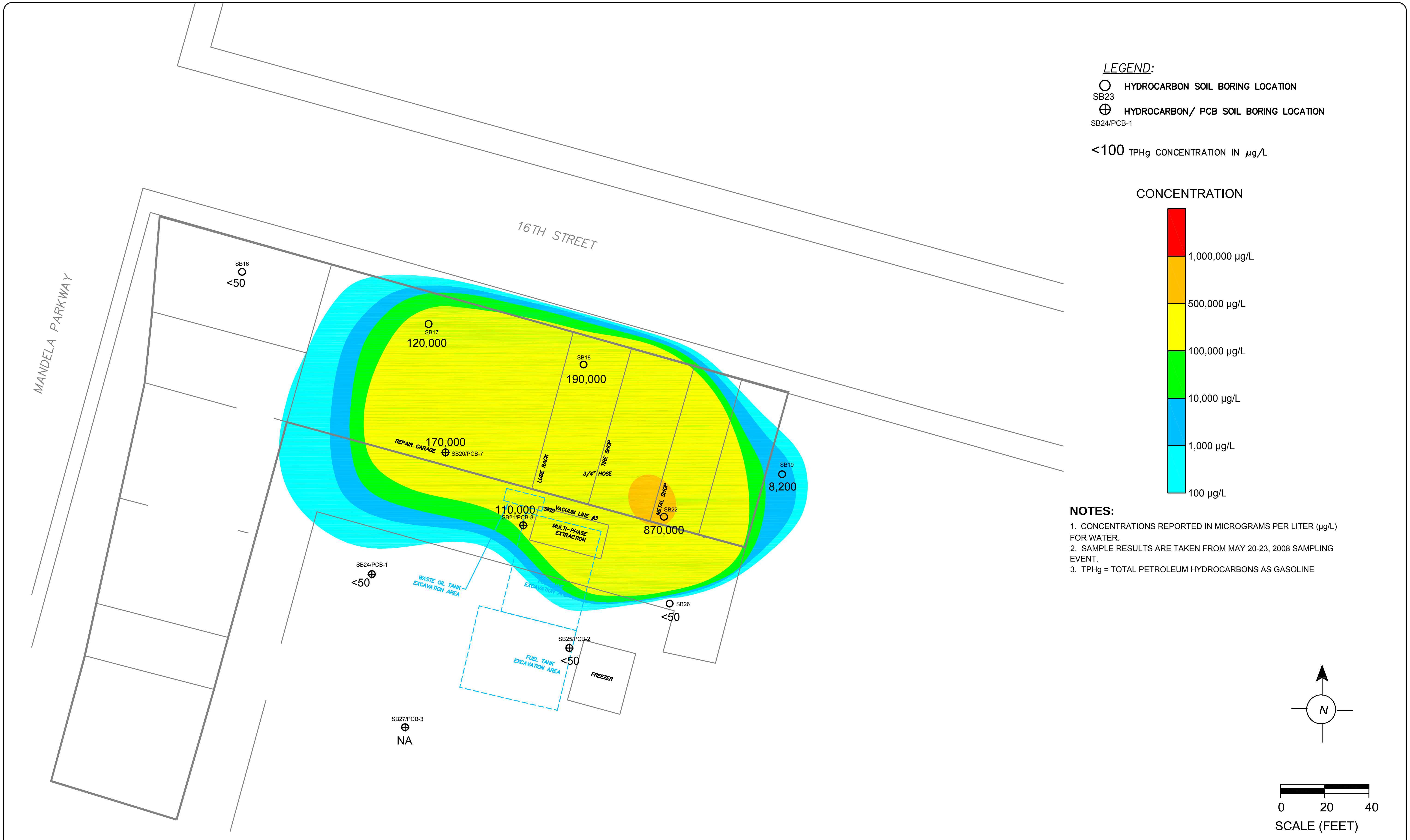
Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations,TPHg (April 2000)

Figure

28

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/20/08
Chkd by: B. Searcy
Drafter: hat
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport



LEGEND:

○ SB23	HYDROCARBON SOIL BORING LOCATION
⊕ SB24/PCB-1	HYDROCARBON/ PCB SOIL BORING LOCATION
<100	TPHg CONCENTRATION IN μg/L

NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (μg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM MAY 20-23, 2008 SAMPLING EVENT.
3. TPHg = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

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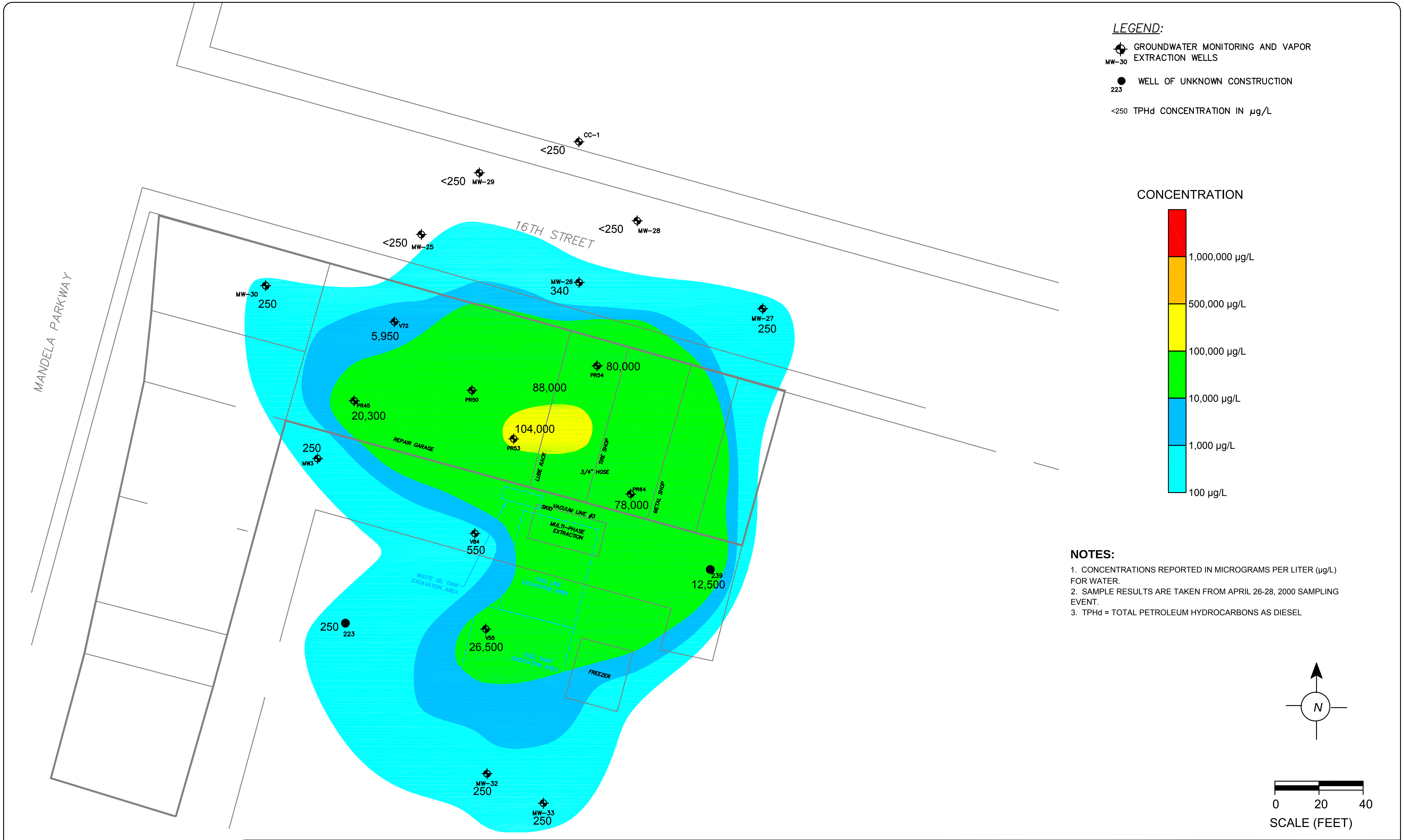
Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations,TPHg (May 2008)

Figure
29



NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (μg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM APRIL 26-28, 2000 SAMPLING EVENT.
3. TPHd = TOTAL PETROLEUM HYDROCARBONS AS DIESEL

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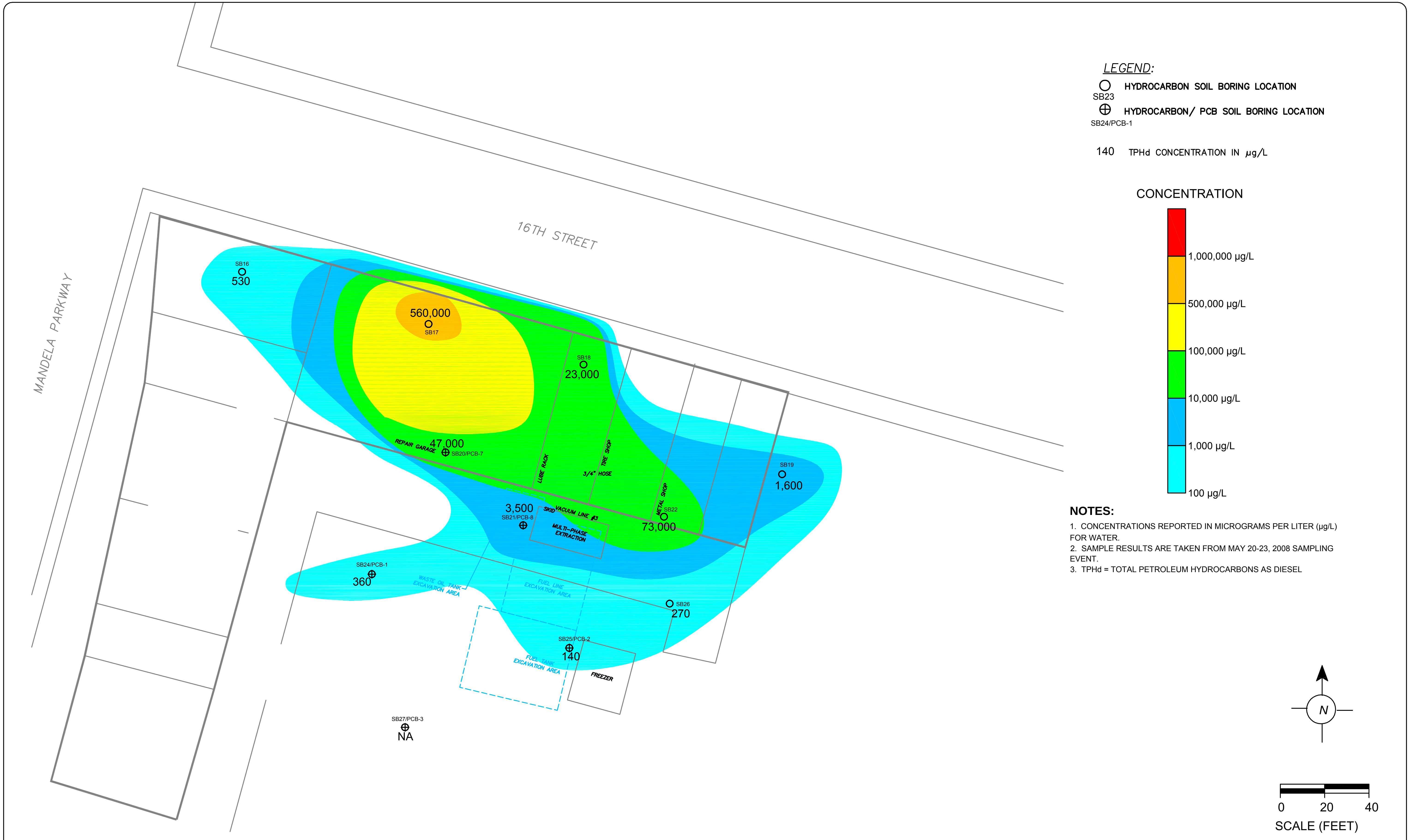
Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations, TPHd (April 2000)

Figure

30



NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM MAY 20-23, 2008 SAMPLING EVENT.
3. TPHd = TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/28/08
Chkd by: B. Searcy
Drafter: hat
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport

Former Nestlé Oakland Facility
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Oakland, California - 94607

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Managing Cost and Liability
660 Baker Street, Suite 253 ● Costa Mesa, CA 92626
Tel: (714) 662-2759 ● Fax: (714) 662-2758

Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations, TPHd (May 2008)

Figure
31

File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport

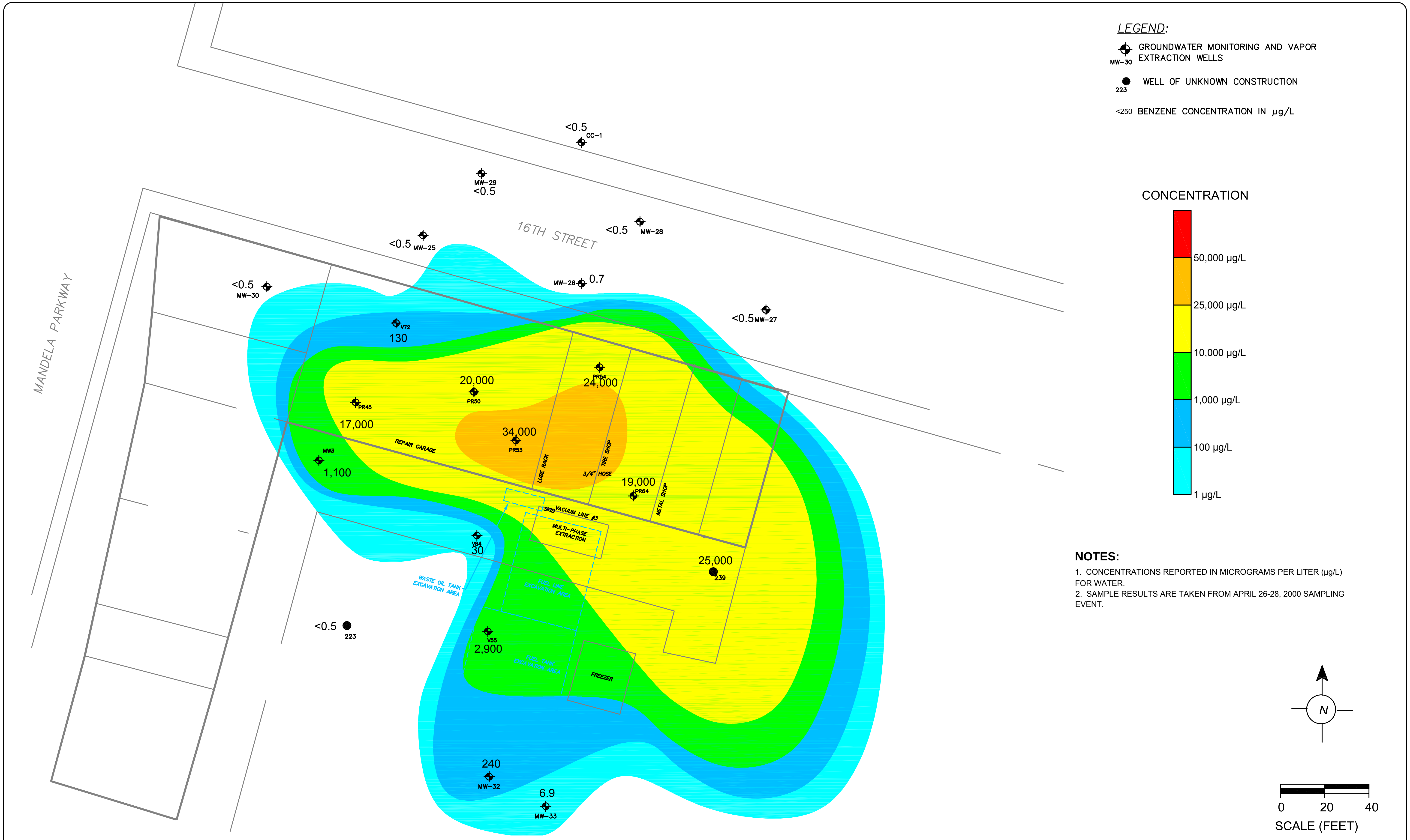
Drafter: hat

Chkd by: B. Searcy

Date drafted: 10/28/08

Proj. Manager B. Acharya

Project: Nestle-Oakland



NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM APRIL 26-28, 2000 SAMPLING EVENT.

Former Nestlé Oakland Facility
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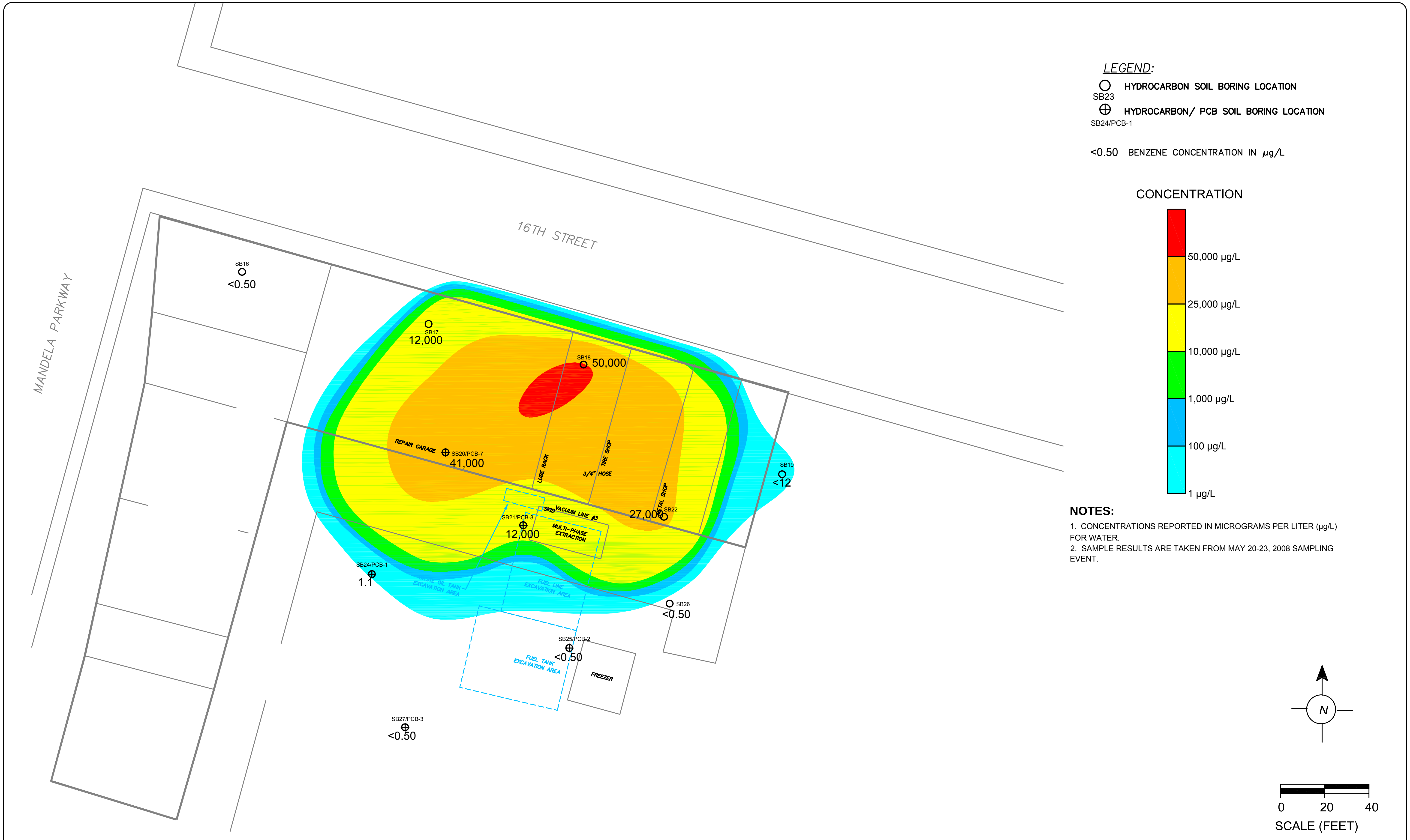
Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations, Benzene (April 2000)

Figure

32

Project: Nestle-Oakland
Proj. Manager B. Acharya
Date drafted: 10/28/08
Chkd by: B. Searcy
Drafter: hat
File Path: Nestle/Ripon/2006/ 2Q06SiteStatusReport



NOTES:

1. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) FOR WATER.
2. SAMPLE RESULTS ARE TAKEN FROM MAY 20-23, 2008 SAMPLING EVENT.

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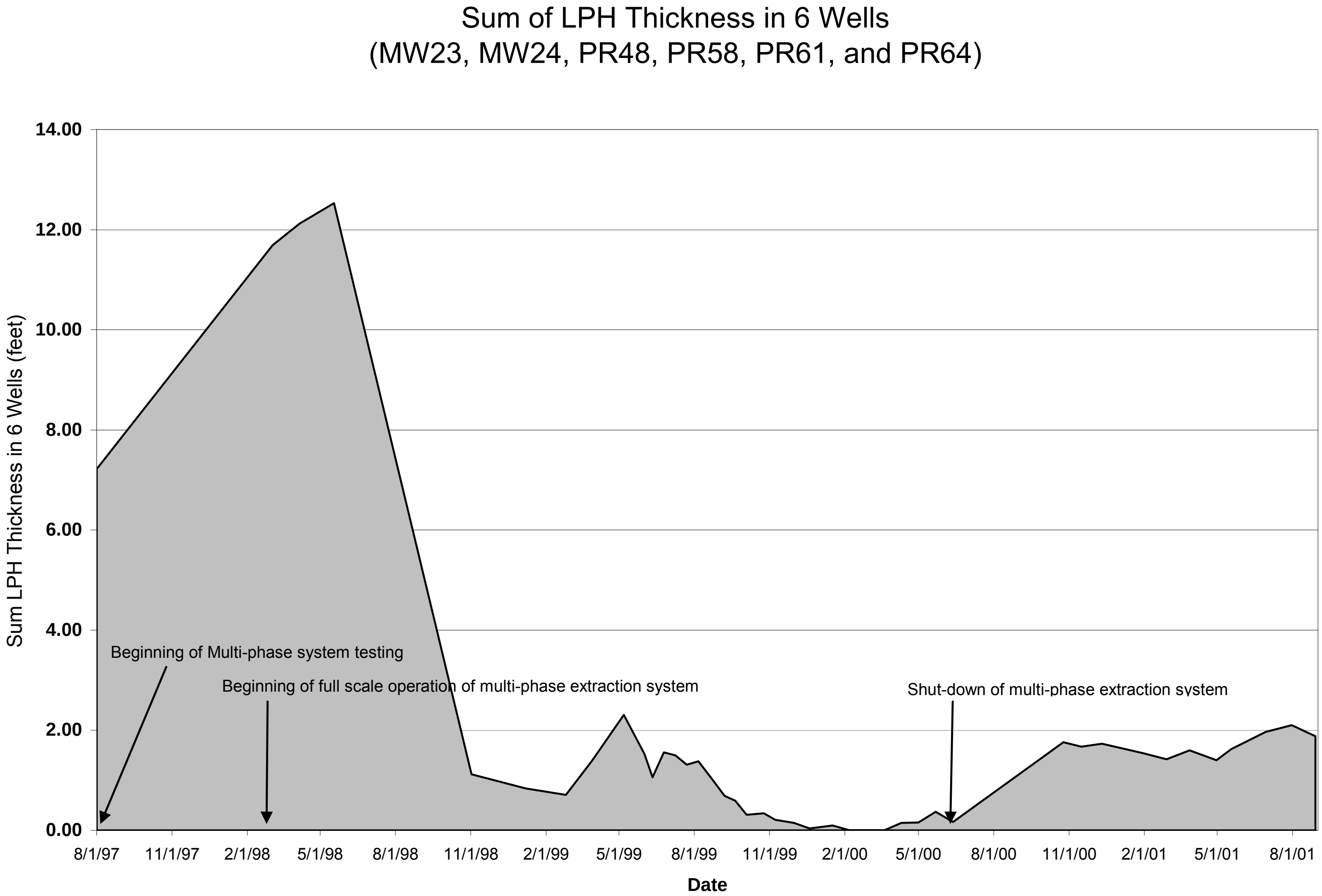
Revised Site Conceptual Model - Nov. 2008

Groundwater Isoconcentrations, Benzene (May 2008)

Figure

33



Sum of LPH Thickness in 6 Wells
(MW23, MW24, PR48, PR58, PR61, and PR64)

Beginning of Multi-phase system testing

Beginning of full scale operation of multi-phase extraction system

Shut-down of multi-phase extraction system

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Revised Site Conceptual Model
November 2008
Historical LPH Thickness at 6 wells

Figure
34

Appendix C: Covenant and Environmental Restriction (Deed Restriction)

Nestlé USA

800 NORTH BRAND BLVD
GLENDALE, CA 91203

TEL (818) 549-6000
FAX (818) 549-5840

ENVIRONMENTAL
PROTECTION

00 JUN 27 AM 11:19

Nestlé

LEGAL DEPARTMENT

June 23, 2000

Larry Seto
Sr. Hazardous Materials Specialist
ENVIRONMENTAL HEALTH SERVICES
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Covenant and Environmental Restriction on
Nestlé USA, Inc. – Oakland Property

Dear Mr. Seto:

Enclosed please find a copy of the recorded deed restriction on the above property for your records. Please let me know if you need anything else from us at this time. Thanks again for your cooperation on this matter.

Sincerely yours,

Noelia M. Colón

Noelia Martí-Colon
Senior Counsel

Enclosure

RECORDING REQUESTED BY
FIRST AMERICAN TITLE
158658

file Oakland

This is to certify that this is a true and correct copy ______ ______ recorded in the Office of the Recorder of Alamed County, California, as Instrument No. 2000175664 on the 12th day of June, 2000
FIRST AMERICAN TITLE GUARANTY COMPANY
By: ______

Recording Requested By:

Nestle USA Inc.
800 North Brand Blvd.
Glendale, California 91203

When Recorded, Mail To:
Leroy Griffin
Hazardous Materials Program Supervisor
City of Oakland Fire Services
1605 Martin Luther King Jr. Way
Oakland, California 94612

COVENANT AND ENVIRONMENTAL RESTRICTION ON PROPERTY

Northeast Portion of the Former Carnation Dairy Facility which Occupies 1315-1372 14th Street and 1315-1385 16th Street

This Covenant and Environmental Restriction on Property (this "Covenant") is made as of the 8th day of JUNE, 2000 by Nestle USA ("Covenantor") who is the Owner of record of that certain property situated at 1315-1372 14th Street and 1315-1385 16th Street, in the City of Oakland, County of Alameda, State of California, which contains a contaminated area which is more particularly described in Exhibit A attached hereto and incorporated herein by this reference (such contaminated area hereinafter referred to as the "Burdened Property"), for the benefit of the City of Oakland Fire Services (COFS), with reference to the following facts:

A. The Burdened Property and groundwater underlying the property contains hazardous materials.

B. Contamination of the Burdened Property. Soil at the Burdened Property was contaminated by releases from petroleum underground storage tanks. These releases resulted in contamination of soil and groundwater with organic chemicals including benzene, toluene, ethylbenzene, xylenes, and 1,2 –dichloroethane, which are hazardous materials as that term is defined in Health & Safety Code Section 25260. Removal of underground storage tanks and remediation of the petroleum hydrocarbons was initiated in January 1988 and is summarized below:

Tank, Line, and Dispenser Removal

Four (4) underground fuel storage tanks and associated piping were removed in December 1988. One (1) 1,000 gallon used-oil tank was removed in January 1989.

Remedial Actions

Soil Excavation: Between January and March 1989, 1,200 cubic yards of soil were removed in the area of the former underground storage tanks and associated piping. This soil was treated on-site and replaced back in the excavated area.

Liquid Petroleum Hydrocarbon Removal: Liquid petroleum hydrocarbons were removed using a product skimming system from the subsurface during January through March 1989. Approximately 1,800 gallons were removed during this time period.

Soil Vapor Extraction: A soil vapor extraction system operated from January 1994 to December 1995 and removed an estimated 5,200 gallons of hydrocarbon.

Multi-phase Extraction: A multi-phase extraction system has been operating at the site since August 1997. Approximately 10,500 pounds of hydrocarbons have been removed using this system. Thickness of petroleum hydrocarbons decreased since August 1997.

C. Exposure Pathways. The contaminants addressed in this Covenant are present in soil and groundwater on the Burdened Property. Without the mitigation measures which have been performed on the Burdened Property, exposure to these contaminants could take place via the following pathways (onsite workers only):

- Ingestion and dermal contact with surface soils;
- Inhalation of volatile emissions from subsurface soils and groundwater

The risk of public exposure to the contaminants has been substantially lessened by the remediation and controls described in part B.

D. Adjacent Land Uses and Population Potentially Affected. The Burdened Property is currently an unused industrial facility and is adjacent to industrial, commercial, and residential land uses.

E. Full and voluntary disclosure to the COFS of the presence of hazardous materials on the Burdened Property has been made and extensive sampling of the Burdened Property has been conducted.

F. Covenantor desires and intends that in order to benefit the COFS, and to protect the present and future public health and safety, the Burdened Property shall be used in such a manner as to avoid potential harm to persons or property that may result from hazardous materials that may have been deposited on portions of the Burdened Property.

ARTICLE I
GENERAL PROVISIONS

1.1 Provisions to Run with the Land. This Covenant sets forth protective provisions, covenants, conditions and restrictions (collectively referred to as "Restrictions") upon and subject to which the Burdened Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. The restrictions set forth in Article III are reasonably necessary to protect present and future human health and safety or the environment as a result of the presence of hazardous materials in the subsurface below the Burdened Property. Each and all of the Restrictions shall run with the land, and pass with each and every portion of the Burdened Property, and shall apply to, inure to the benefit of, and bind the respective successors in interest thereof, for the benefit of the COFS and all Owners and Occupants. Each and all of the Restrictions are imposed upon the entire Burdened Property. Each and all of the Restrictions run with the land pursuant to section 1471 of the Civil Code. Each and all of the Restrictions are enforceable by the California Regional Water Quality Control Board for the San Francisco Bay Region (the "Board").

1.2 Concurrence of Owners and Lessees Presumed. All purchasers, lessees, or possessors of any portion of the Burdened Property shall be deemed by their purchase, leasing, or possession of such Burdened Property, to be in accord with the foregoing and to agree for and among themselves, their heirs, successors, and assignees, and the agents, employees, and lessees of such owners, heirs, successors, and assignees, that the Restrictions as herein established must be adhered to for the benefit of the COFS and the Owners and Occupants of the Burdened Property and that the interest of the Owners and Occupants of the Burdened Property shall be subject to the Restrictions contained herein.

1.3 Apportionment of Burden Among Multiple Owners. Where ownership of the Burdened Property is held by multiple persons, holding by several titles, the burdens imposed by this Covenant shall be apportioned between them proportionate to the value of the property held by each owner, if such value can be ascertained, and if not, then according to their respective interests in point of quantity. (Cal. Civ. Code, § 1467.)

1.4 Incorporation into Deeds and Leases. Covenantor desires and covenants that the Restrictions set out herein shall be incorporated in and attached to each and all deeds and leases of any portion of the Burdened Property. Recordation of this Covenant shall be deemed binding on all successors, assigns, and lessees, regardless of whether a copy of this Covenant and Agreement has been attached to or incorporated into any given deed or lease.

1.5 Purpose. It is the purpose of this instrument to convey to the COFS real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to residual hazardous materials.

ARTICLE II
DEFINITIONS

2.1 COFS. "COFS" shall mean the City of Oakland Fire Services and shall include its successor agencies, if any.

2.2 Board. "Board" shall mean the California Regional Water Quality Control Board for the San Francisco Bay Region and shall include its successor agencies, if any.

2.3 Improvements. "Improvements" shall mean all buildings, roads, driveways, regradings, and paved parking areas, constructed or placed upon any portion of the Burdened Property.

2.4 Occupants. "Occupants" shall mean Owners and those persons entitled by ownership, leasehold, or other legal relationship to the exclusive right to use and/or occupy all or any portion of the Burdened Property.

2.5 Owner or Owners. "Owner" or "Owners" shall mean the Covenantor and/or its successors in interest, who hold title to all or any portion of the Burdened Property.

ARTICLE III
DEVELOPMENT, USE AND CONVEYANCE OF THE BURDENED PROPERTY

3.1 Restrictions on Development and Use. Covenantor promises to restrict the use of the Burdened Property as follows:

a. Development of the Burdened Property shall be restricted to industrial, commercial or office space;

b. No residence for human habitation shall be permitted on the Burdened Property;

c. No hospitals shall be permitted on the Burdened Property;

d. No schools for persons under 21 years of age shall be permitted on the Burdened Property;

e. No day care centers for children or day care centers for Senior Citizens shall be permitted on the Burdened Property;

f. No Owners or Occupants of the Burdened Property or any portion thereof shall conduct any excavation work on the Burdened Property, unless expressly permitted in writing by the COFS. Any contaminated soils brought to the surface by grading, excavation, trenching, or backfilling shall be managed by Covenantor or his agent in accordance with all applicable provisions of local, state and federal law;

g. All uses and development of the Burdened Property shall be consistent with any applicable Board Order or Risk Management Plan, each of which is hereby incorporated by reference including future amendments thereto. All uses and development shall preserve the integrity of any cap, any remedial measures taken or remedial equipment installed, and any groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the COFS, unless otherwise expressly permitted in writing by the COFS. Any development of the Burdened Property will maintain a surface cap of the soil, exclusive of minor landscape areas, by buildings or paved surfaces.

h. No Owners or Occupants of the Property or any portion thereof shall drill, bore, otherwise construct, or use a well for the purpose of extracting water for any use, including but not limited to, domestic, potable, or industrial uses, unless expressly permitted in writing by the Board.

3.1.1 Notifications/Access/Non Aggravation

a. The Owner shall notify the COFS of each of the following: (1) The type, cause, location and date of any disturbance to any cap, any remedial measures taken or remedial equipment installed, and of the groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the COFS, which could affect the ability of such cap or remedial measures, remedial equipment, or monitoring system to perform their respective functions and (2) the type and date of repair of such disturbance. Notification to the COFS shall be made by registered mail within ten (10) working days of both the discovery of such disturbance and the completion of repairs;

b. The Covenantor agrees that the COFS, and/or any persons acting pursuant to COFS orders, shall have reasonable access to the Burdened Property for the purposes of inspection, surveillance, maintenance, or monitoring, as provided for in Division 7 of the Water Code.

c. No Owner or Occupant of the Burdened Property shall act in any manner that will aggravate or contribute to the existing environmental conditions of the Burdened Property. All use and development of the Burdened Property shall preserve the integrity of any capped areas.

3.2 Enforcement. Failure of an Owner or Occupant to comply with any of the restrictions, as set forth in paragraph 3.1, shall be grounds for the COFS, by reason of this Covenant, to have the authority to require that the Owner modify or remove any Improvements constructed in violation of that paragraph. Violation of the Covenant shall be grounds for the COFS to file civil actions against the Owner as provided by law.

3.3 Notice in Agreements. After the date of recordation hereof, all Owners and Occupants shall execute a written instrument which shall accompany all purchase agreements or leases relating to the property. Any such instrument shall contain the following statement:

The land described herein contains hazardous materials in soils and in the ground water under the property, and is subject to a deed restriction dated as of June 8, 2000, and recorded ~~on~~ Concurrently herewith~~200~~, in the Official Records of Alameda County, California, [redacted] which Covenant and Restriction imposes certain covenants, conditions, and restrictions on usage of the property described herein. This statement is not a declaration that a hazard exists.

ARTICLE IV
VARIANCE AND TERMINATION

4.1 Variance. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or any portion thereof may apply to the COFS for a written variance from the provisions of this Covenant.

4.2 Termination. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or a portion thereof may apply to the COFS for a termination of the Restrictions as they apply to all or any portion of the Burdened Property which consent to termination shall not be unreasonably withheld.

4.3 Term. Unless terminated in accordance with paragraph 4.2 above, by law or otherwise, this Covenant shall continue in effect in perpetuity.

ARTICLE V
MISCELLANEOUS

5.1 No Dedication Intended. Nothing set forth herein shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Burdened Property or any portion thereof to the general public.

5.2 Notices. Whenever any person gives or serves any notice, demand, or other communication with respect to this Covenant, each such notice, demand, or other communication shall be in writing and shall be deemed effective (1) when delivered, if personally delivered to the person being served or official of a government agency being served, or (2) three (3) business days after deposit in the mail if mailed by United States mail, postage paid certified, return receipt requested:

If To: "Covenantor"
Nestlé USA, Inc.
Legal Department
800 North Brand Boulevard
Glendale, Ca. 91203

If To: "COFS"
City of Oakland Fire Services
Attention: Hazardous Materials Program Supervisor
1605 Martin Luther King Jr. Way
Oakland, California 94612

5.3 Partial Invalidity. If any portion of the Restrictions or terms set forth herein is determined to be invalid for any reason, the remaining portion shall remain in full force and effect as if such portion had not been included herein.

5.4 Article Headings. Headings at the beginning of each numbered article of this Covenant are solely for the convenience of the parties and are not a part of the Covenant.

5.5 Recordation. This instrument shall be executed by the Hazardous Materials Program Supervisor of the COFS. This instrument shall be recorded by the Covenantor in the County of Alameda within ten (10) days of the date of execution.

5.6 References. All references to Code sections include successor provisions.

5.7 Construction. Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the Covenant to effect the purpose of this instrument and the policy and purpose of the Water Code. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

Covenantor: NESTLE USA, INC.

By: Robert H. Sanders
Title: V.P.
Date: 6.8.00

Agency: City of Oakland Fire Services

By: LeRoy Griffin
Title: Hazardous Materials Program Supervisor

APPENDIX A

LEGAL DESCRIPTION
DEED RESTRICTION AREA

ROB[illegible] BEIN, WILLIAM FROST & ASSOCIAT[illegible]
1981 N. Broadway, Suite 235
Walnut Creek, California 94596

LEGAL DESCRIPTION
DEED RESTRICTION AREA

That certain parcel of land situated in the City of Oakland, County of Alameda, State of California described as follows:

Being a portion of Lots 4 through 23 and a portion Kirkham Street of the Scotchler Tract and Vicinity, Oakland, as shown on a map thereof filed in Book 7 of Maps at Page 21 on December 10, 1874 in the Office of the County Recorder of Alameda County more particularly described as follows:

BEGINNING at the intersection of said Kirkam Street and the northwest corner of lot 17, in block 584, as shown on the map of "Re-division of Blocks 584, 585, 601, 153 and 580-A, City of Oakland, County of Alameda, California", filed May 1, 1885, in Book 4 of Maps, at Page 25, in said office of the County Recorder;

Thence, along the northerly line of said Kirkham Street and said lots 13, 12, 11, 10, 9, 8, 7, 6 and 5, North 72°53'28" West 292.25 feet to the northwest corner of said lot 5, said point also being the northeasterly corner of that certain parcel of land described in the deed to the State of California, recorded May 12, 1955 in Volume 7658, of Official Records at Page 299, in said office of the County Recorder;

Thence, continuing along said northerly line of Kirkham Street, North 72°53'28" West 8.64 feet;

Thence, along said State of California parcel, along a non-tangent 1240 foot radius curve to the right, through a central angle of 2°59'04" to the easterly line of the parcel of land described in the deed to the State of California, recorded August 12, 1955 in Book 7749, of Official Records at Page 447, as Instrument Number AK-86901, in said office of the County Recorder;

Thence, along last said State of California parcel (7749 OR 447), along a non-tangent 1240 foot radius curve to the right from a tangent that bears South 10°54'36" West to the south line of said lot 22, said southerly line also being the north line of 15th Street, as shown on said map of the Scotchler Tract (7 M 21);

Thence, along said northerly line of 15th Street and the easterly prolongation of said north line, South 74°03'30" East 285.05 feet to the easterly line of said Kirkham Street;

Thence, along said easterly line, North 15°56'30" West 209.50 feet to the **POINT OF BEGINNING.**

EXHIBIT attached and by this reference made a part hereof.

LICENSED LAND SURVEYOR
PATRICK JAMES TAMI
No. 5816
Exp. 6-30-2000
STATE OF CALIFORNIA

Patrick J. Tami
Patrick J. Tami, L.S. 5816

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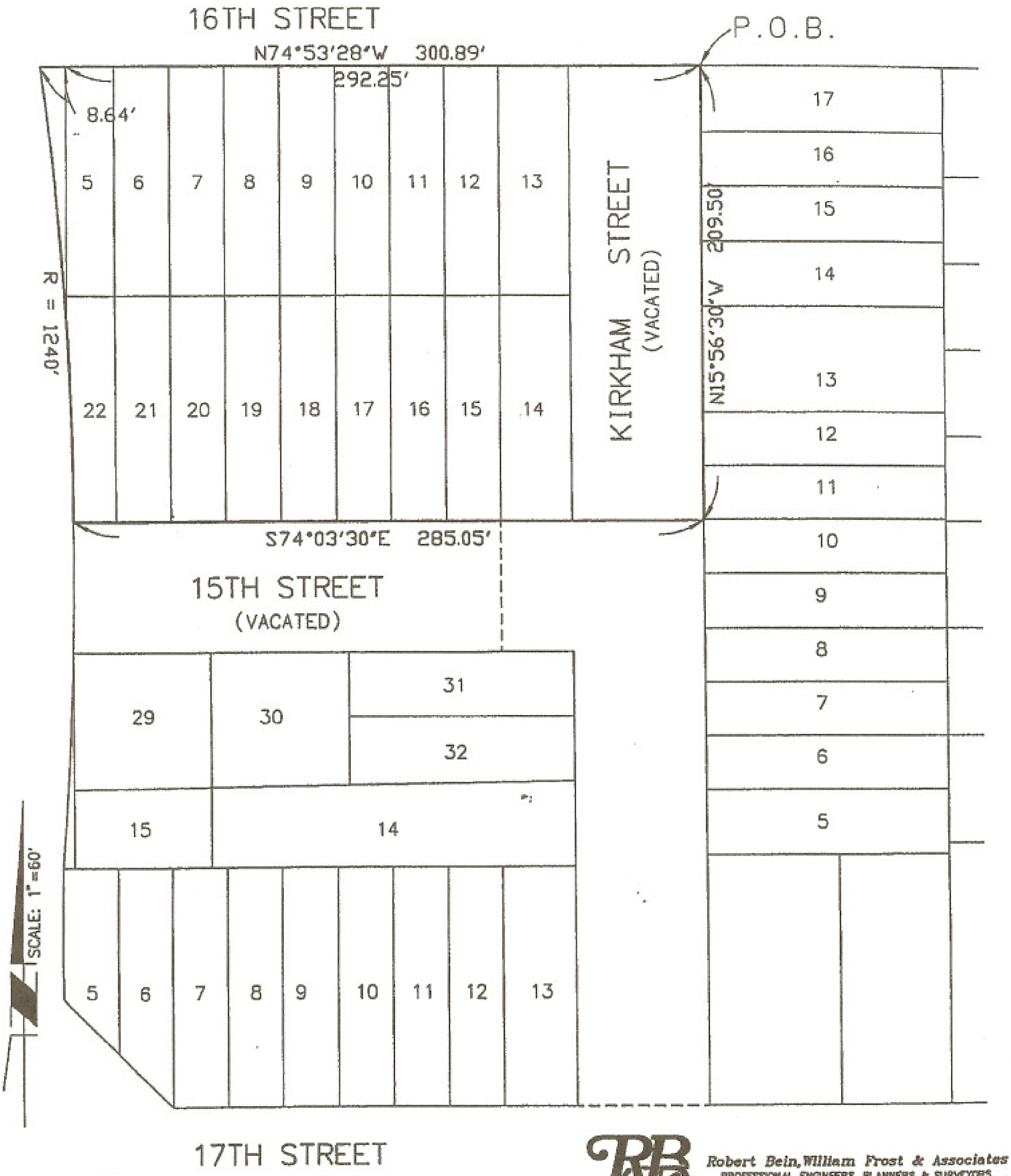
April 19, 2000 (4:28PM)

DEED RESTRICTION AREA



Robert Bein, William Frost & Associates
PROFESSIONAL ENGINEERS, PLANNERS & SURVEYORS
1981 NORTH BROADWAY SUITE 235, WALNUT CREEK, CALIFORNIA 94596
(925) 906-1460 FAX (925) 906-1465 WWW.RBF.COM

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of Alameda

On 6-7-00 (Date) before me, Ellen N. Dolese (Name and Title of Officer (e.g., "Jane Doe, Notary Public")),

personally appeared LeRoy Griffin (Name(s) of Signer(s)),

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ELLEN N. DOLESE
Commission # 1171028
Notary Public - California
Alameda County
My Comm. Expires Jan 28, 2002

WITNESS my hand and official seal.

Ellen N. Dolese
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Covenant & Environmental Restriction on Property

Document Date: 5-25-00 Number of Pages: 12

Signer(s) Other Than Named Above: —

Capacity(ies) Claimed by Signer(s)

Signer's Name: LeRoy Griffin

☒ Individual
☐ Corporate Officer
Title(s):
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer Is Representing:

Signer's Name:

☐ Individual
☐ Corporate Officer
Title(s):
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer Is Representing:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of LOS ANGELES } ss.

On JUNE 8, 2000 (Date), before me, MARIA HAZEL PERRI, NOTARY PUBLIC (Name and Title of Officer (e.g., "Jane Doe, Notary Public"))

personally appeared ROBERT H. SANDERS, (Name(s) of Signer(s))

☑ personally known to me
☐ ~~proved to me on the basis of satisfactory evidence~~

to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity~~(ies),~~ and that by his/~~her/their~~ signature~~(s) on~~ the instrument the person~~(s), or~~ the entity upon behalf of which the person(s) acted, executed the instrument.

MARIA HAZEL PERRI
Commission # 1113713
Notary Public — California
Los Angeles County
My Comm. Expires Oct 13, 2000

Place Notary Seal Above

WITNESS my hand and official seal.

Maria Hazel Perri
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: COVENANT & ENVIRONMENTAL RESTRICTION ON PROPERTY

Document Date: MAY 25, 2000 Number of Pages: TWELVE (12)

Signer(s) Other Than Named Above: LEROY GRIFFIN

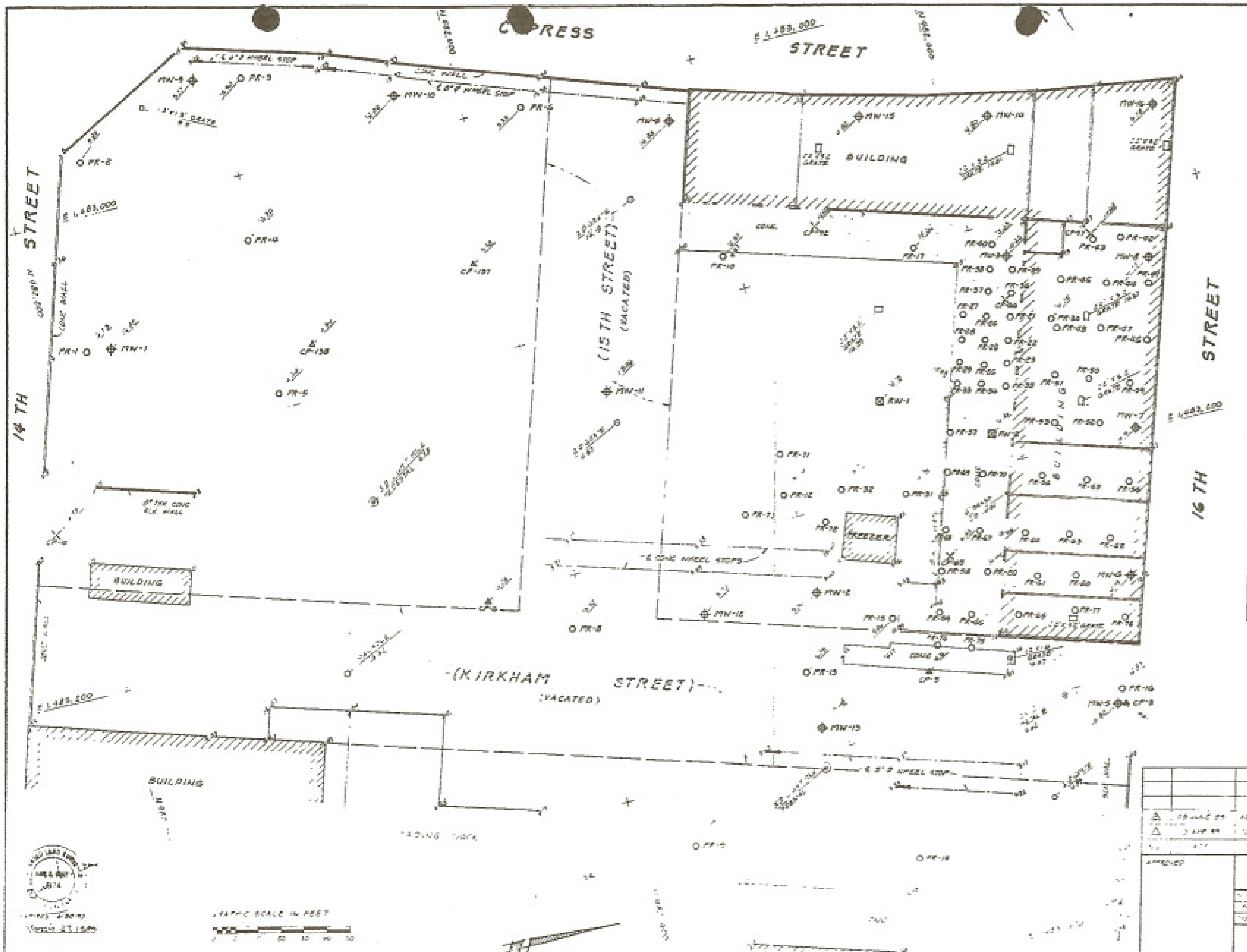
Capacity(ies) Claimed by Signer

Signer's Name: ROBERT H SANDERS

HH ☑ Individual
☑ Corporate Officer — Title(s): VICE PRESIDENT
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Signer Is Representing: NESTLE USA, INC.

RIGHT THUMBPRINT OF SIGNER
Top of thumb here



LEGEND:

⊕	MW-1	MONITORING WELL
○	PR-6	PRODUCT RECOVERY POINT
■	RW-2	RECOVERY WELL
▲	CP-3	CONTROL POINT, SET NAIL & SHINER
╳	CP-97	CONTROL POINT, SET CROSS "+" CUT IN CONCRETE
	14.9	SPOT / RIM ELEVATIONS

BENCHMARK (BASED ON NGVD 1929)

CITY OF OAKLAND BM NO. 3606 EL 13.76 CITY DATUM + 3.00' = 16.76 NGVD 1929, CONC. CURB WEST SIDE KIRKHAM ST. 15 FT. SOUTHERLY OF SOUTHERLY PROP. LINE, 14TH ST.

BASIS OF BEARINGS (CITY OF OAKLAND DATA)

MONUMENT LINE ON POPLAR ST BETWEEN MONUMENTS 85W50 (@ 16TH ST) & 85W 16-R (@ 14TH ST) TAKEN AS N 17°06'38" E, 960.06' AND BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE III, 1927 N.A.D

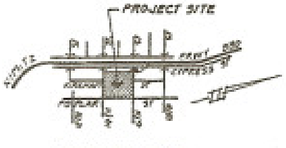
BASIS OF COORDINATES (CITY OF OAKLAND DATA)

CITY MONUMENT ON POPLAR ST. @ 16TH ST (85W-50) N 482,990.10 & E 1,483,597.34 AND BASED ON CALIFORNIA COORDINATE SYSTEM, ZONE III, 1927 N.A.D GROUND TO GRID FACTOR = 0.9999294.

SCHEDULE OF CONTROL POINTS

NO.	COORDINATES *		ELEV
	NORTH	EAST	
CP-3	2,619.92	3,311.56	14.81
CP-4	2,186.39	3,159.92	16.85
CP-5	2,540.58	3,278.08	14.76
CP-6	2,391.26	3,202.50	16.08
CP-46	2,560.46	3,233.18	14.93
CP-64	2,608.78	3,132.92	14.95
CP-96	2,336.07	3,082.92	14.96
CP-97	2,650.62	3,114.22	14.68
CP-137	2,568.89	3,060.95	15.98
CP-138	2,319.60	3,076.68	16.94

* TO GET GRID COORDINATES, ADD 480,000 TO NORTH COORDINATES AND ADD 1,480,000 TO EAST COORDINATES



VICINITY MAP
N T S

△	08 MAR 89	ADDED PR-46 THRU PR-77 (AB 30/72-79)	PRC	[illegible]
△	3 APR 89	CORRECTED STREET NAMES [illegible]	[illegible]	[illegible]

APPROVED

CARNATION DAIRIES

310 14TH ST. @ POPLAR ST. OAKLAND CALIFORNIA

PROJECT NO. 200-88-059

AGE ANANIA GEOLOGIC ENGINEERING

11330 SUNRISE PARK DR., SUITE C, RANCHO CORDOVA, CA. 95742

PROJECT BORING LOCATIONS

DRAWING NO.

EARL L. GRAY
3974

March 27, 1989

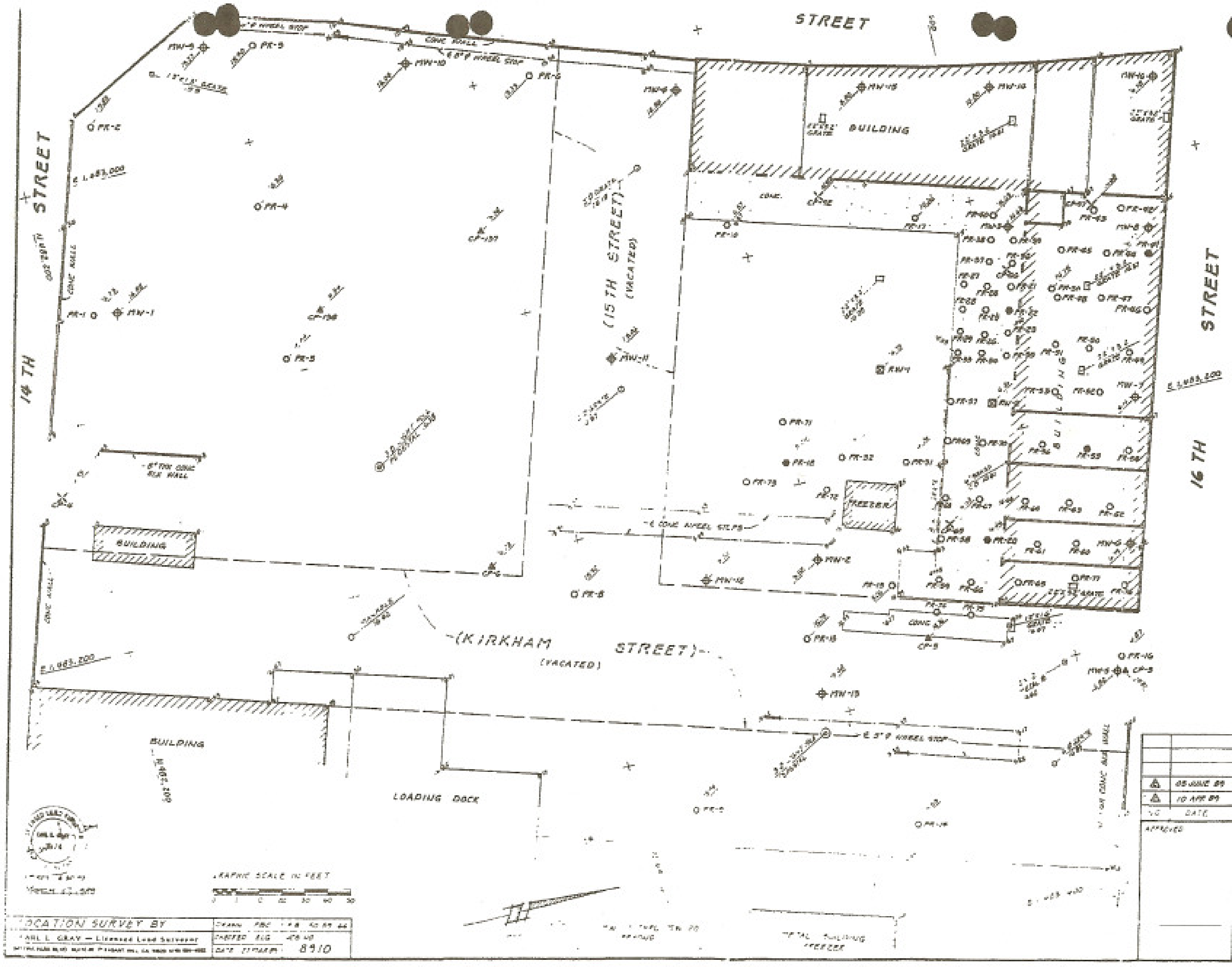
LOCATION SURVEY BY

EARL L. GRAY — Licensed Land Surveyor

DRAWN PRC | F.B. 50-59 66

CHECKED ELG | JOB NO. 8910

DATE



LEGEND

MW-1	MONITORING WELL
○ PR-6	PRODUCT RECOVERY POINT
▣ RW-2	RECOVERY WELL
▲ CP-3	CONTROL POINT, SET NAIL & SHINER
X CP-57	CONTROL POINT, SET CROSS "+" CUT IN CONCRETE
15.78	SPOT/RIM ELEVATIONS

BENCHMARK (BASED ON NGVD 1929)

CITY OF OAKLAND BM NO. 3806 EL. 15.76 CITY DATUM + 3.00' = 16.76 NGVD 1929, CONC. CURB WEST SIDE KIRKHAM ST. 15 FT. SOUTHERLY OF SOUTHERLY PROP. LINE, 14TH ST.

BASIS OF BEARINGS (CITY OF OAKLAND DATA)

MONUMENT LINE ON POPLAR ST. BETWEEN MONUMENTS 85W50 (@ 16TH ST.) & 85W 16-R (@ 14TH ST.) TAKEN AS N 17°06'38" E, 560.06 AND BASED ON THE CALIFORNIA COORDINATE SYSTEM ZONE III, 1927 N.A.D.

BASIS OF COORDINATES (CITY OF OAKLAND DA

CITY MONUMENT ON POPLAR ST. @ 16TH ST. (85W-50) N 482,590.10 & E 1,483,597.39 AND BASED ON CALIFORNIA COORDINATE SYSTEM, ZONE III, 1927 N.A.D GROUND TO GRID FACTOR = 0.9999296

SCHEDULE OF CONTROL POINTS

NO.	COORDINATES *		ELEV.
	NORTH	EAST	
CP-3	2,619.52	3,311.56	14.81
CP-4	2,186.39	3,188.92	16.85
CP-5	2,540.38	3,278.08	14.76
CP-6	2,341.26	3,202.30	16.08
CP-65	2,560.08	3,233.18	14.93
CP-64	2,608.78	3,192.92	14.56
CP-42	2,396.07	3,082.52	14.96
CP-97	2,650.52	3,114.22	14.68
CP-137	2,388.84	3,068.93	15.38
CP-138	2,313.60	3,076.48	14.94

* TO GET GRID COORDINATES, ADD 480,000 TO NORTH COORDINATES AND ADD 1,480,000 TO EAST COORDINATES

VICINITY MAP
N T S

NO	DATE	REVISION	BY	APP
2	05 JUNE 89	ADDED PR-41 THRU PR-77 (FB 90/72-79)	FBC	ELG
1	10 APR 89	CORRECTED STREET NAMES (16TH & 14TH ST.)	FBC	ELG

APPROVED

CARNATION DAIRIES
1310 14TH ST @ POPLAR ST OAKLAND CALIFOR

SCALE 1"=30'
PROJECT NO.
006-FB-051

AGE ANANIA GEOLOGIC ENGINEERING
1230 SUNRISE PARK DR., SUITE C, RANCHO CORDOVA, CA.

PROJECT BORING LOCATIONS

LOCATION SURVEY BY
EARL L. GRAY — Licensed Land Surveyor

DRAWN FBC	F.B. 90/69-66	
CHECKED ELG	JOB NO.	
DATE 27 MAR 89		8910

Appendix D: Risk Management Plan

ETIC
Engineering, Inc.

Risk Management Plan for Deed Restricted Portion of Former Nestlé USA Facility

1310 14th Street
Oakland, California

Prepared for

Nestlé USA, Inc.
800 North Brand Boulevard
Glendale, California 91203

Prepared by

ETIC Engineering, Inc.
2285 Morello Avenue
Pleasant Hill, California 94523
(925) 602-4710

Brent Searcy 01/24/01
Brent Searcy Date
Project Engineer

24 Jan 2001
Douglas E. Oram, Ph.D. Date
Project Manager

Heidi Dieffenbach-Carle January 24, 2000
Heidi Dieffenbach-Carle, R.G. #6793 Date
Senior Geologist

REGISTERED GEOLOGIST
HEIDI L. DIEFFENBACH-CARLE
No. 6793
ex03/31/02
STATE OF CALIFORNIA

January 2001

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Risk Management Plan

Former Nestle Facility, 1310 14th Street, Oakland, California

LIST OF APPENDIXES

Risk Management Plan

Former Nestle Facility, 1310 14th Street, Oakland, California

Appendix	Description
A	Covenant and Environmental Restriction Document
B	Construction Worker Risk/Hazard Calculation Summary

1. INTRODUCTION

ETIC Engineering, Inc. (ETIC) was contracted by Nestle USA, Inc. (Nestle) to prepare this Risk Management Plan (RMP) for the former Nestle property in Oakland, California. The property is located at 1310 14th Street, as shown in Figure 1. Figure 2 outlines the area for which a Deed Restriction has been recorded (Appendix A) and to which the restrictions and risk management protocols discussed in this document apply. This area will be referred to as the "subject facility" throughout this RMP. The RMP was prepared to fulfill property transfer requirements for the former Nestle property. The RMP presents the decision framework and the specific protocols for managing potential human health risks associated with the subsurface presence of chemicals and proposed future land use at the "subject facility". Potential health risks associated with daily occupants at the "subject facility" have been documented in a risk-based corrective action (RBCA) analysis for the "subject facility" (JCI 2000, as reported in ETIC 2001). This RBCA analysis was originally submitted to the Alameda County Health Agency (ACHA) and the California Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) on 21 March 2000. Following discussions amongst ETIC, Nestle, ACHA, and RWQCB, comments on the RBCA analysis were addressed in a 27 June 2000 letter from ETIC to ACHA and RWQCB. A copy of the final RBCA analysis for the "subject facility" is included in ETIC Engineering's Comprehensive Site Characterization Report for the site dated January 2001. The risk to construction workers is evaluated in this RMP (see Appendix B).

The RMP delineates the specific risk management measures that will be implemented prior to, during, and after development of the "subject facility". It was prepared solely for use within the "subject facility" and is not intended for management of risks outside of this area. Although this RMP sets forth the requirements to appropriately manage the chemicals in soil and groundwater, the RMP is not intended to catalog all other legal requirements that may apply to the project or to activities conducted within the "subject facility" area.

Current and future owners and lessees, occupants and managers, or contractors delegated or authorized to perform property maintenance or construction are required to comply with the measures identified in the RMP when engaging in the relevant activities discussed. A Deed Restriction for the "subject facility" portion of the former Nestle property was recorded on 12 June 2000 at the Office of the Recorder of Alameda County (see Appendix A). Figure 2 shows the northwestern portion of the site, referred to as the "subject facility" in this RMP report, for which the deed restriction measures apply. The Deed Restriction requires Owner and/or Lessee compliance with the RMP measures. Specifically, the Deed Restriction places responsibility for compliance with the Owner and/or Lessee of the "subject facility" at the time the activity is conducted, even when such Owner or Lessee has contracted with another party to perform those measures. The term "Owner" or "Owners", as used in this RMP, shall mean those persons (whether individuals, corporations, or other legal entities) who, at such time when activities regulated by this RMP are conducted, hold title to the "subject facility". The term "Lessee" or 'Lessees" as used in this RMP shall mean those persons who are entitled by ownership, leasehold, license, permit, or other legal relationship with the Owner, to enter and exclusively occupy the "subject facility" and to engage in activities that are regulated by this RMP. A former Owner or former Lessee, licensee, permittee, or other former holder of a property or contract right who, at such time when activities regulated by this RMP are conducted, no longer holds an interest in title to a parcel or no longer has a property or contract interest in a parcel will not be considered an Owner or Lessee for the purposes of this RMP.

The California Environmental Protection Agency (Cal/EPA) has designated the ACHA as the "Administering Agency" under Assembly Bill (AB) 2061, in December 1998. As the Administering Agency, the ACHA is responsible for overseeing completion of the comprehensive site characterization study, the RBCA analysis, and the closure requirements of the "subject facility". The comprehensive site characterization study and RBCA analysis included the following tasks:

- Compilation and evaluation of historical soil and groundwater quality data;
- Field investigation (including collection of soil vapor, soil matrix, and groundwater quality data); and
- Preparation of comprehensive site characterization and RBCA reports.

The RBCA analysis concluded that the chemicals of potential concern (COPCs) observed at the "subject facility" do not pose a significant risk to daily site occupants following proposed redevelopment and commercial/industrial land use at the site. Accordingly, additional remediation at the site is not warranted, provided that future development will maintain a surface cap of the soil, exclusive of minor landscape areas, by buildings or paved surfaces. In addition, implementation of risk management practices, as described in this RMP, is recommended to address potential health risks associated with direct exposure of construction workers to chemicals beneath the site during redevelopment. To aid in development and implementation of risk management practices, the risk to construction workers was quantitatively evaluated and is summarized in Appendix B.

2. SITE BACKGROUND

2.1 SITE LOCATION

The former Nestle property is located at 1310 14th Street, Oakland, California. The property covers two city blocks and is bounded by 14th Street, 16th Street, Poplar Street, and Mandela Parkway (Figure 1). The entire site is covered with buildings and concrete or asphalt paving. The "subject facility" area of the property to which the environmental restrictions discussed in this document apply is located in the northwest portion of the property (Figure 2). This "subject facility" portion of the site contains an "L" shaped building which formerly housed warehouse and service bay facilities. The Cypress Structure of Interstate 880 (I-880), a former elevated freeway structure, existed west of the "subject facility" until it sustained extensive damage during the October 1989 Loma Prieta earthquake. This portion of I-880 was subsequently demolished and redeveloped as Mandela Parkway.

The topography slopes gently to the west, toward San Francisco Bay. Land use in the immediate area is primarily light industrial, with some commercial property and residences located east and west of the property.

2.1.1 Climate

Climatic conditions in the region are moderate, with mild, wet winters and warm, dry summers. Representative mean high/low temperatures and wind conditions are presented below:

	January	April	July	October	Annual
1990 Average temperature (degrees F)	52.3	61.5	66.0	65.5	60.9
Average wind speed (mph, long term average)	7.4	9.7	9.7	7.3	8.6
Average wind direction (long term average)	SE	W	NW	W	W
1990 Rainfall (inches)	4.41	0.24	0.00	0.35	14.27

Temperature, rainfall from NOAA for Oakland Museum station (1990)
Wind data from California Air Resources Board for Oakland International Airport (1984)

2.2 SITE HISTORY

The former facility was used to manufacture ice cream and packaged milk. The facility was also used for the distribution of ice cream and packaged fresh milk by trucks. A maintenance yard for vehicles used in the distribution of dairy products operated at the facility and included underground fuel and waste oil storage tanks.

Facilities at the property were originally constructed by American Creamery in 1915. Carnation purchased the property in 1929 and made additions and improvements to the buildings between 1946 and 1973 for dairy product processing and distribution. Nestle USA, Inc. assumed operation of the property following its purchase of Carnation in 1985. Nestle ceased operations at the property in 1991 (HLA 1991).

2.2.1 Adjacent Land Use

Land use surrounding the site is light industrial and residential. Facilities to the north and south of the site are primarily light industrial. Immediately east of the site are light industrial facilities, with residential land use extending from approximately one block east of the site to Interstate 980 (I-980). West of the site is a mixed light industrial and residential area.

ETIC has conducted database searches and door-to-door well surveys for areas surrounding the site. No active water supply wells were identified during these efforts. Documentation of the surrounding area well surveys and database searches is provided in the Comprehensive Site Characterization Report (ETIC 2001).

2.3 SUMMARY OF SITE INVESTIGATIONS AND CURRENT ENVIRONMENTAL CONDITIONS

Previous environmental investigations conducted at the former Nestle property are briefly summarized below. More complete and detailed documentation of previous investigations and remediation activities is provided in the Comprehensive Site Characterization Report (ETIC 2001).

Four fuel underground storage tanks (USTs) were removed from the site in 1989. During removal of the USTs, gasoline and diesel fuel was observed as floating product in the tank cavity. Approximately 1,200 cubic yards of soil was excavated from the tank cavity and stockpiled onsite. Nutrients were applied to the soil stockpile in an attempt to bioremediate the soil. No further information regarding soil removal or disposal was available at the time this report was written.

Anania Geological Engineering (AGE) was retained by Carnation in 1989 to conduct a preliminary site characterization and to implement several interim remedial measures designed to contain and eliminate the presence of petroleum hydrocarbons in the soil and groundwater. A number of interim remedial actions were implemented, including installation of product recovery wells and removal of floating product, installation and operation of groundwater extraction and vapor extraction systems, and ex-situ bioremediation of soil. Thirty-three groundwater monitoring wells and 103 product recovery wells were installed at the site. Approximately 1.5 million gallons of groundwater were pumped and treated by carbon adsorption, resulting in the removal of approximately 5,000 gallons of gasoline and diesel fuel from soil and groundwater (HLA 1991).

In December 1990, Harding Lawson Associates was retained to review the preliminary site characterization and remediation data and to conduct additional site investigations. Between April and August 1991, HLA oversaw the installation of 20 soil borings. A soil vapor extraction (SVE) system was operated from January 1994 to December 1995 and removed an estimated 5,200 gallons of hydrocarbon equivalent (Park 1994; EA 1996).

At the end of 1995 the SVE system had removed most of the hydrocarbons that this technology is capable of removing, but floating product, or liquid-phase hydrocarbons (LPH), was still present in a number of wells. A multi-phase extraction system was installed and operated from August 1997 through June 2000. The system was installed to remove LPH trapped in the soil and floating on the groundwater. A total of 10,875 pounds of hydrocarbons have been removed since August 1997. Product levels have decreased since August 1997, and the hydrocarbon recovery rate has reached an asymptotic level. Figure 3 shows the area beneath which groundwater has historically been impacted by hydrocarbons.

A RBCA analysis for the site is included in the January 2001 Comprehensive Site Characterization Report. The RBCA analysis (JCI 2000) concluded that the chemicals of potential concern (COPCs) observed at the "subject facility" do not pose a significant risk to daily site occupants following proposed redevelopment and commercial/industrial land use at the site. Accordingly, additional remediation at the site is not warranted, provided that future development will maintain a surface cap of the soil, exclusive of minor landscape areas, by buildings or paved surfaces. In order to protect the health and safety of construction workers that may come into direct contact with chemicals beneath the site during future property redevelopment, the implementation of risk management practices, as outlined in Section 5 of this RMP document, is recommended.

2.4 FUTURE SITE DEVELOPMENT

As of January 2001, specific future development and/or construction plans for this site have not been presented. This document, in conjunction with the January 2001 Comprehensive Site Characterization Report for the site, identifies and outlines the risk management procedures which must be followed during any future development of the "subject facility". This RMP provides the specific protocols to be followed in order to mitigate risks to human health and the environment that were identified in the risk assessment portion of the Comprehensive Site Characterization Report.

Sections 5 and 6 of this report provide the risk management protocols which must be followed during and after any future site development activities. Appendix B presents the results of risk analysis efforts performed specifically for the purposes of developing a health and safety plan for protection of construction workers who may be involved in any future development activities at the site.

2.5 DEED RESTRICTION

The entire property was sold by Nestle to Encinal 14th Street, LLC in July 2000. Prior to the sale of the property, Covenants and Environmental Restrictions were developed for the "subject facility" area (northwest portion) of the property. The restrictions were reviewed by the ACHA and the RWQCB, and were signed by the City of Oakland Fire Services (COFS) in June 2000. These restrictions were recorded against the deed for the former Nestle property on 12 June 2000. Figure 2 shows a map of the entire property; the "subject facility" area (northwest portion), to which the environmental restrictions apply, is outlined and identified. A complete copy of the environmental restrictions is included as Appendix A.

3. SUMMARY OF HEALTH RISKS

A RBCA analysis was performed in support of comprehensive site characterization and the low risk designation requirement for the "subject facility" (JCI 2000). The RBCA analysis focused on potential health risks to construction workers and future daily occupants at and in the vicinity of the "subject facility", accounting for potential future development and land use at the "subject facility".

A conceptual site model (CSM) of contaminant occurrence, fate, transport, and potential exposure was developed as the basis for the RBCA analysis. A graphical representation of the CSM is depicted in Figure 4. As indicated on Figure 4, complete exposure pathways associated with daily onsite and offsite occupants include:

- Ingestion, inhalation, and dermal contact with surface soils (onsite industrial/commercial workers);
- Inhalation of volatile emissions and/or particulates from subsurface soils and groundwater to indoor air (onsite industrial/commercial workers);
- Inhalation of volatile emissions and/or particulates from subsurface soils and groundwater to outdoor air (onsite industrial/commercial workers);
- Inhalation of volatile emissions and/or particulates from groundwater to indoor air (offsite residents); and
- Inhalation of volatile emissions and/or particulates from groundwater to outdoor air (offsite residents).

The RBCA analysis did not include an evaluation of health risks to potential intermittent receptors such as site visitors and/or trespassers; however, the risks to daily site occupants may be used as a conservative estimate of risks to intermittent receptors.

Details of the RBCA analysis are documented by JCI (2000), included as an appendix to the Comprehensive Site Characterization report for the property (ETIC 2001). Conclusions of the RBCA analysis for daily onsite and offsite receptors included:

- Risks/hazards associated with direct exposure of daily site (commercial/industrial) occupants to observed levels of chemicals in surface soils are protective of USEPA-defined target risk/hazard levels;
- Risks/hazards associated with onsite (commercial/industrial) indoor and outdoor air inhalation of volatiles detected in shallow soil vapor samples are protective of USEPA-defined target risk/hazard levels;
- Risks/hazards associated with offsite (residential) indoor and outdoor air inhalation of volatiles detected in groundwater at offsite locations are protective of USEPA-defined target risk/hazard levels; and
- An RMP outlining appropriate risk management practices, health and safety measures, and deed restrictions should be developed prior to initiation of construction activities and redevelopment at the "subject facility".

To aid in development of this RMP and a health and safety plan for protection of construction workers, risks to construction workers were also quantified, as summarized in Appendix B. The construction worker risk analysis indicates that without protective measures, the carcinogenic risk associated with exposure of construction workers to subsurface chemicals is within the target risk range adopted by the USEPA, while the non-carcinogenic hazard marginally exceeds the target hazard level. Therefore, to prevent construction workers from potentially hazardous exposure levels at the "subject facility", the recommendations in this RMP document should be implemented.

4. RISK MANAGEMENT MEASURES PRIOR TO SITE DEVELOPMENT

Potential exposure prior to development of the "subject facility" is limited to intermittent visitors or trespassers. As indicated in Section 3, the risk to intermittent receptors is considered insignificant. Moreover, due to the presence of a fence around the property and a paved surface throughout much of the property, additional risk management measures prior to development of the "subject facility" are not warranted.

5. RISK MANAGEMENT MEASURES DURING SITE DEVELOPMENT

The Deed Restriction for the "subject facility" indicates that no owners or occupants of the "subject facility" or any portion thereof shall conduct any excavation work on the "subject facility", unless expressly permitted in writing by the COFS. Should excavation be permitted as part of redevelopment, the primary exposure to chemicals at the "subject facility" will be limited to that associated with construction workers. As indicated in Section 3, risk management measures are recommended for protection of construction workers. To this end, risk management measures were developed to provide adequate protection to human health for onsite construction workers during development of the "subject facility".

Development activities at the facilities may include various site preparation activities such as, but not limited to, excavation, stockpiling, trenching, site grading, backfilling, and dewatering that may disturb the native soils and/or groundwater beneath the "subject facility". Specifically, potential events or activities associated with development of the "subject facility" that may result in potential health impacts to onsite construction workers during development include:

- Dust generation associated with soil excavation and trenching, grading, loading activities, backfilling, movement of construction and transportation equipment, and fugitive dust generation from winds traversing an exposed soil stockpile; and

- Potential contact with subsurface chemicals during trenching and excavation.

The risk management measures that will control potential impacts associated with each of these activities are described below. Management measures that are recommended to control potential impacts on construction workers, contractors, and short-term intrusive workers who may be engaged in limited excavation activities, such as utility repair, are also described below.

5.1 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS AND SAFETY PLAN

The construction contractor shall assume full responsibility and liability for the compliance with provisions of the Work Hours and Safety Standard Act (40 U.S.C. 327 et seq.). The construction contractor shall comply with all applicable safety regulations and other requirements, including, but not limited to, the following:

- Code of Federal Regulations (CFR), Title 29-Labor
- State of California, California Code of Regulations (CCR), Industrial Relations
- Medical Surveillance Programs (e.g., OSHA, 29 CFR 1200)
- Injury and Illness Prevention Programs (e.g., SB 198, 8 CCR, CAL/OSHA, GISO 3203, Section 5192 and 1509)
- Implementation of mitigation measures under California Environmental Quality Act (CEQA), if any
- The Construction Standard (29 CFR 1926)
- Workers' Right to Know (29 CFR 1910.120)
- Section 6360-99 of the California Labor Code (Hazard Communication)

During construction and site development activities, workers that may directly contact contaminated soil or groundwater at the "subject facility" must perform their activities in accordance with a hazardous operations site-specific health and safety plan (HASP). The construction contractor will be responsible for development and implementation of the HASP in compliance with all applicable federal, state, and local regulations and requirements. The HASP shall be prepared by a Certified Industrial Hygienist. If needed, the construction contractor will submit the HASP to the RWQCB or ACHA for review. Preparation of a HASP will be required for, but not limited to, site preparation work including grading, utility installation, foundation construction, service pit construction, and other activities where workers might directly contact impacted soil or groundwater beneath the "subject facility". The HASP shall include, but not be limited to, the following elements:

- Identification and description of the responsibility of those individuals who control each phase of operations and are responsible for employee and public safety. The plan shall set forth in writing the policies and procedures to be followed by all personnel. This shall include designation of an overall project site safety representative with authority to stop any construction/demolition activity or modify work practices if the site safety plan is being violated, or if such action is necessary to protect workers, property, and the surrounding community during the contract period. This requirement shall apply continuously and not be limited to normal working hours.

- Information identifying and delineating all workplace hazards that have been identified or are generally associated with the proposed work phases, and how this information is communicated to employees (e.g., tailgate safety meetings). Hazardous material communication standards can be found in 29 CFR 1910.120 and 8 OCR 5194. Hazardous waste information can be found in 29 CFR 1910.1200 and 8 CCR 5192.

- Engineering controls, specific work practices, and measures to be used to monitor and control worker and general public exposure to any identified hazard with special emphasis to demolition debris, dust, petroleum impacted soils, LPH, and other hazardous materials. The monitoring of site personnel for contaminant exposure shall be conducted so as to maintain the proper level of personal protection, including action level of protection.

- Level of training required for all specified contractor(s) or subcontractor personnel, possibly, but not limited to, asbestos, lead and hazardous materials awareness training; and the 40-hour Hazardous Waste Operations and Emergency Response Training Program and the associated 8-hour refresher training in accordance with Title 29, Code of Federal Regulations 1910.120, and 8 CCR 5192 for all personnel who will come in direct contact with surface and subsurface contaminated materials when performing their work. Contractors shall maintain and provide all training records to the Resident Engineer.

- Provision of sufficient personnel properly trained to handle, excavate, and dispose of hazardous waste and other contaminated waste that is expected in this project. The training shall be in accordance with 29 CFR 1910.120, 29 CFR 1910.134, 8 CCR 5144, and 8 CCR 5192.

- Requirements of contractors and subcontractors for any applicable medical surveillance programs and Injury and Illness Prevention Program (IIPP) (e.g., SB 198, 8 CCR and CAL/OSHA, GISO 3203, Sections 5192 and 1509); implementation of mitigation measures under CEQA (AB 3180); the Construction Standard (29 CFR 1926); Workers Right to Know (29 CFR 1910.120); Section 6360-99 of the California Labor Code (Hazard Communication); the San Francisco Health Code, Article 21 addressing Hazardous Materials, and the Americans with Disabilities Act (ADA).

- Methods to be used to decontaminate equipment.

- Sanitation facilities to be provided for personal hygiene. Portable toilets and discharge of their waste products into sanitary sewers shall comply with local codes.

- Contingency Plan for emergency including fire, spillage of hazardous/toxic wastes and liquids (with special emphasis to clean up spillage due to fuel/oil from contractors' equipment), traffic accident, personal accident, power failure, or any event that may require modification or abridgment of site control and decontamination procedures. This plan shall also include procedures to be followed in the event of a large-scale spill of contaminated material on a public roadway in accordance with the hazardous Substance Highway Spill Containment and Abatement Act (California Vehicle Code, Section 2450 et seq.), and the Emergency Service Act (California Government Code Section 8571.4 et seq.)

5.2 CONSTRUCTION IMPACT MITIGATION MEASURES

Measures must also be implemented to mitigate potential health impacts on construction workers, should they be exposed directly to chemicals in soil and groundwater underlying the "subject facility". Potential exposure pathways associated with onsite construction workers include inhalation, incidental ingestion, and dermal contact with chemicals in soils and groundwater.

Specifically, measures that must be implemented to mitigate potential impacts during construction include the following:

- Each contractor will prepare and implement a site-specific HASP to address the potential exposure to contaminated soils and groundwater during construction;

- Dust control through spraying of water and other techniques to minimize mobility of impacted soils toward offsite locations;

- Minimize soil and groundwater contact by onsite construction worker.

Details of these mitigation measures, except the site-specific health and safety plan, are described below.

5.2.1 Dust Control

Dust controls must be implemented to prevent offsite dispersion and accumulation of impacted soils and to comply with applicable regulations pertaining to air quality and nuisance control. Potential construction activities that could generate dust and warrant risk management measures include: (1) excavation and stockpile control; (2) onsite construction vehicle traffic, and (3) windblown soil.

Alameda County may require monitoring of dust generation during site construction at the "subject facility". Results of the monitoring will be used by the construction contractor for determining the needs and appropriate dust control practices in accordance with the regulations for excavating and restoring streets in Alameda County.

Dust generation will be minimized by all appropriate measures, which may include, but not be limited to, the following:

- Wetting of surface soils and spoil piles during excavation, trenching, compaction, and site grading and paving;

- Control of excavation techniques to minimize dust generation such as minimizing drop distances; and

- Covering of stockpiles, if present, with visqueen or other suitable membrane covers.

Additional measures, if required, may be utilized at the discretion of the construction contractor.

5.2.2 Minimizing Soil and Groundwater Contact by Construction Worker

Existing data indicate the subsurface presence of chemicals in both unsaturated soils, saturated soils, and groundwater beneath the "subject facility". Shallow groundwater beneath the site occurs at depths ranging from 5.0 to 10.0 feet below ground surface. Details of the hydrogeological characterization are presented in the Comprehensive Site Characterization Report (ETIC 2001).

Future construction work at the site may involve excavation and/or direct contact with chemicals above and below the water table. To mitigate risks associated with this exposure, the construction contractor shall develop and implement a site-specific HASP. Examples of health and safety measures are the use of protective clothing, protective gloves and boots, and suitable respirators with cartridges during construction activities.

6. RISK MANAGEMENT MEASURES AFTER SITE DEVELOPMENT

The post-construction portion of this RMP addresses the precautions that must be undertaken to mitigate the long-term health risks associated with the "subject facility" after all redevelopment activities are complete. Any future reuse of the "subject facility" involving disturbance of soil, pavements, or building foundations must be accomplished in a manner consistent with the objectives of this RMP.

Components of the post-construction portion of this RMP include the following:

- Prevention of the exposure of daily site occupants or visitors to impacted soil by maintaining cover materials in appropriate conditions;
- Establishment of protocols to protect onsite workers engaged in subsurface excavation activities such as buried utility repair, work on buried foundations, or pavement requiring exposure to soil and/or groundwater;
- Prevention of use of groundwater beneath the facility;
- Agency (COFS , ACHA, and RWQCB) notification on change in property use.

6.1 COVERING OF THE SITE

As indicated in the Deed Restriction for the former Nestle property, all uses and development of the "subject facility" shall maintain a surface cap of the soil, exclusive of minor landscape areas, by buildings or paved surfaces. The Maintenance and Operations Facility Manager or their designated representative must annually conduct a visual inspection of the cover to ensure that the cover materials remain in adequate shape. Damage to the integrity of the cover materials, such as major cracks, must be promptly repaired.

Upon completion of the inspection and any necessary repairs, the Maintenance and Operations Facility Manager or their designated representative will prepare a report documenting the inspection and repairs. The report will contain, at a minimum, the following information:

- Date of inspection
- Personnel conducting the inspection
- Results of the inspection
- Repairs completed to maintain the integrity of the cover

Reports must be signed by the Maintenance and Operations Facility Manager or their designated representative. Reports must be filed by the site occupant at the Maintenance and Operations Facility. The reports will be available for review by the COFS, ACHA, and RWQCB.

6.2 PROTOCOLS FOR FUTURE SUBSURFACE DEVELOPMENT

If excavation is permitted by the COFS, health and safety procedures must be followed, as previously described, for all individuals engaged in subsurface excavation activities in which covered soil and groundwater may be exposed. The likely scenarios are buried utility repairs, work on buried foundations, or repairs and alterations to pavements. At a minimum, a site-specific HASP must be prepared and employed in concert with any such work.

If minor soil disturbance is undertaken in the future, the work must follow the guidelines presented herein. Any impacted soil subject to excavation and brought to the surface by grading, excavation, trenching, or backfilling shall be managed in accordance with all applicable provisions of local, state, and federal laws. Excavated soil may be reused as backfill in the excavation area, provided that the excavation will be properly covered with asphalt, concrete, or clean material. Excess material must be disposed of offsite at an appropriate waste facility.

If future activities at the "subject facility" are planned involving a significant reduction in the extent or effectiveness of the cap over the soil, then an addendum to this RMP must be prepared and submitted to the ACHA and RWQCB.

6.3 USE OF GROUNDWATER

As indicated in the Deed Restriction for the former Nestle property, no owner or occupants of the "subject facility" shall drill, bore, otherwise construct, or use a well for the purpose of extracting groundwater for any use, including, but not limited to, domestic, potable, or industrial uses, unless expressly permitted in writing by the ACHA and RWQCB.

6.4 AGENCY NOTIFICATION ON CHANGE OF PROPERTY USE

As indicated in the Deed Restriction for the former Nestle property, land use at the "subject facility" will be restricted to industrial, commercial, or office space. Use of the "subject facility" as a residence for human habitation, hospital, school for persons under 21 years of age, and/or day care center is also prohibited by the Deed Restriction.

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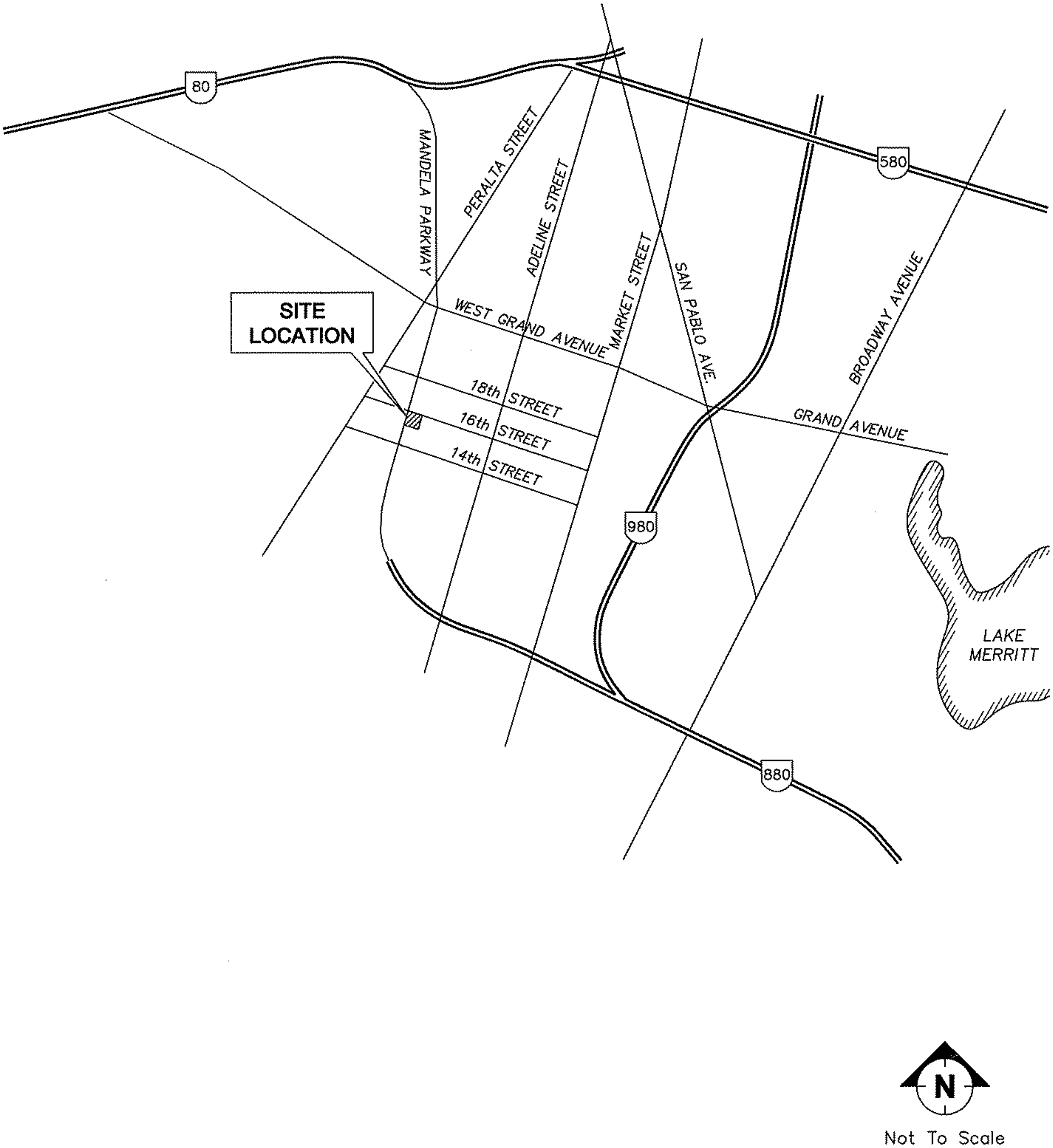
JCI (Javaherian Consulting, Inc.). 2000. Technical Memorandum: Risk-Based Corrective Action Analysis, Nestle USA, Inc. Facility, 1310 14th Street, Oakland, California. JCI, San Francisco, California. 22 August.

Park (Park Environmental). 1994. Vapor Extraction Remediation Update, October 1993 through April 1994, Carnation Company Facility, 1310 14th Street, Oakland, California. Park, Rocklin, California. 19 May.

Figures



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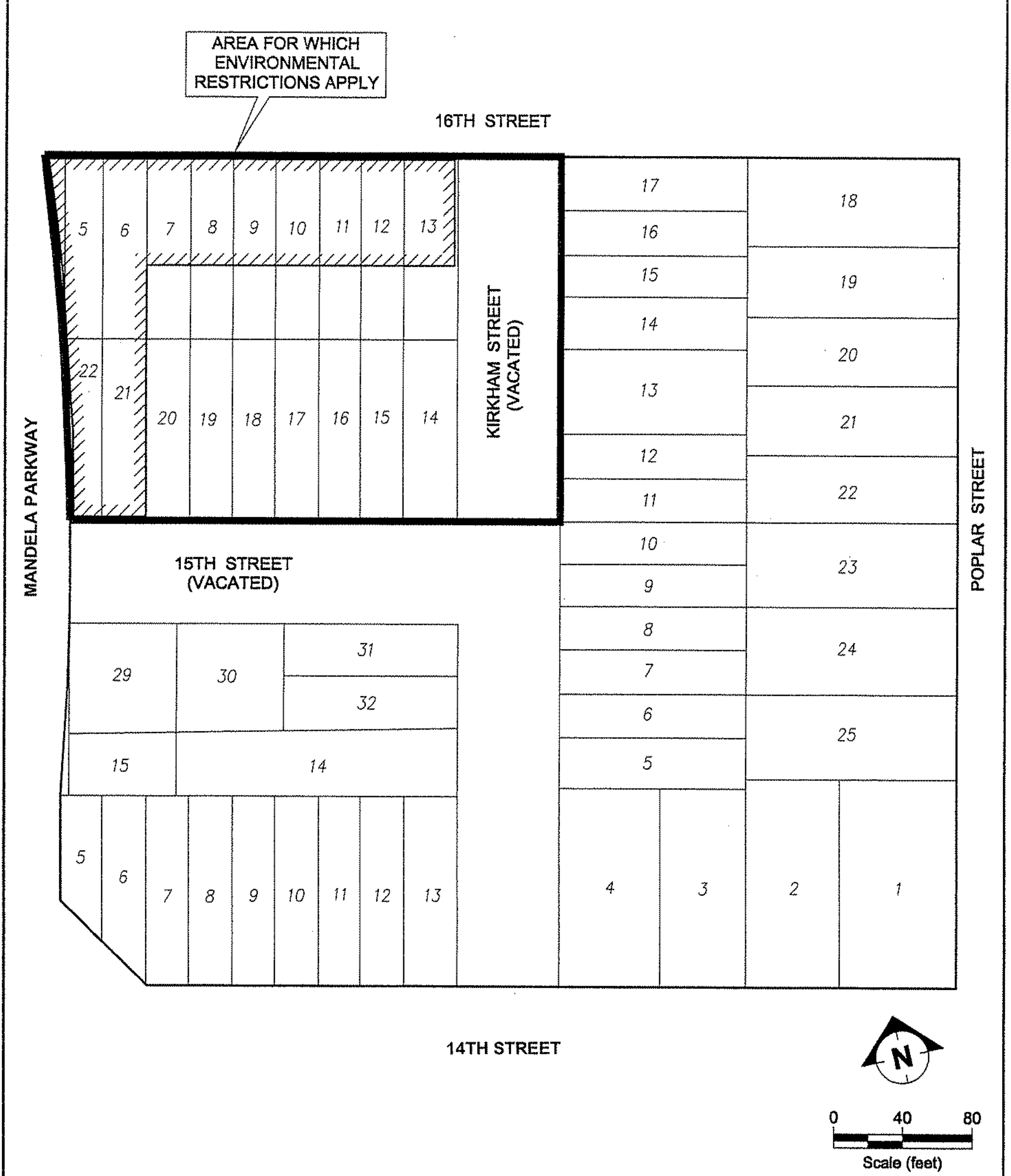
ETIC
Engineering, Inc.

SITE LOCATION MAP
NESTLE OAKLAND FACILITY
1310 14th STREET, OAKLAND, CALIFORNIA

FIGURE:
1

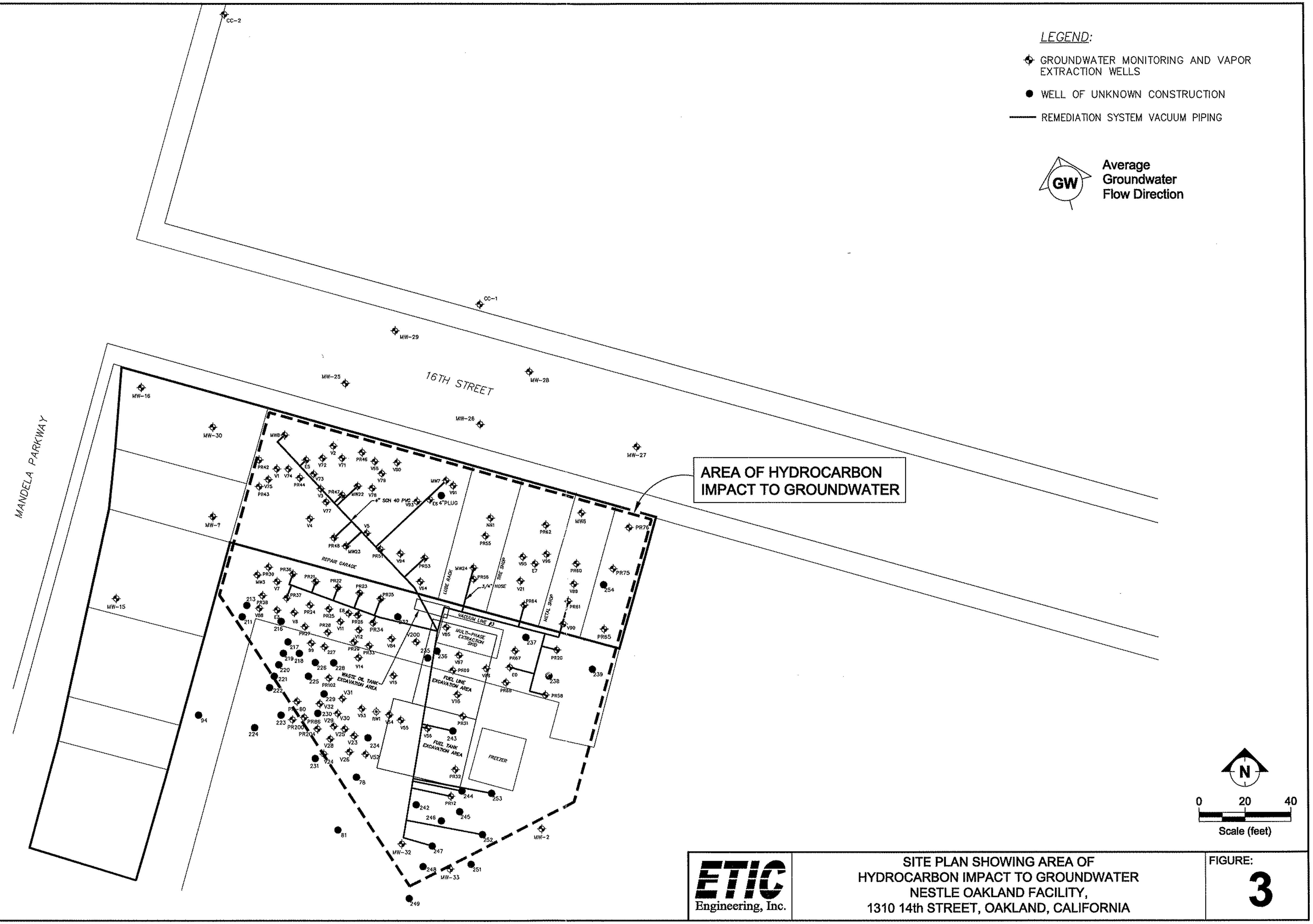


FILENAME: BLOCKPLN.DWG 10/13/00

ETIC Engineering, Inc.

FORMER NESTLE FACILITY (CARNATION DAIRY FACILITY) SHOWING NORTHWEST SECTION FOR WHICH ENVIRONMENTAL RESTRICTIONS APPLY, NESTLE OAKLAND FACILITY, 1310 14th STREET, OAKLAND, CALIFORNIA

FIGURE: 2

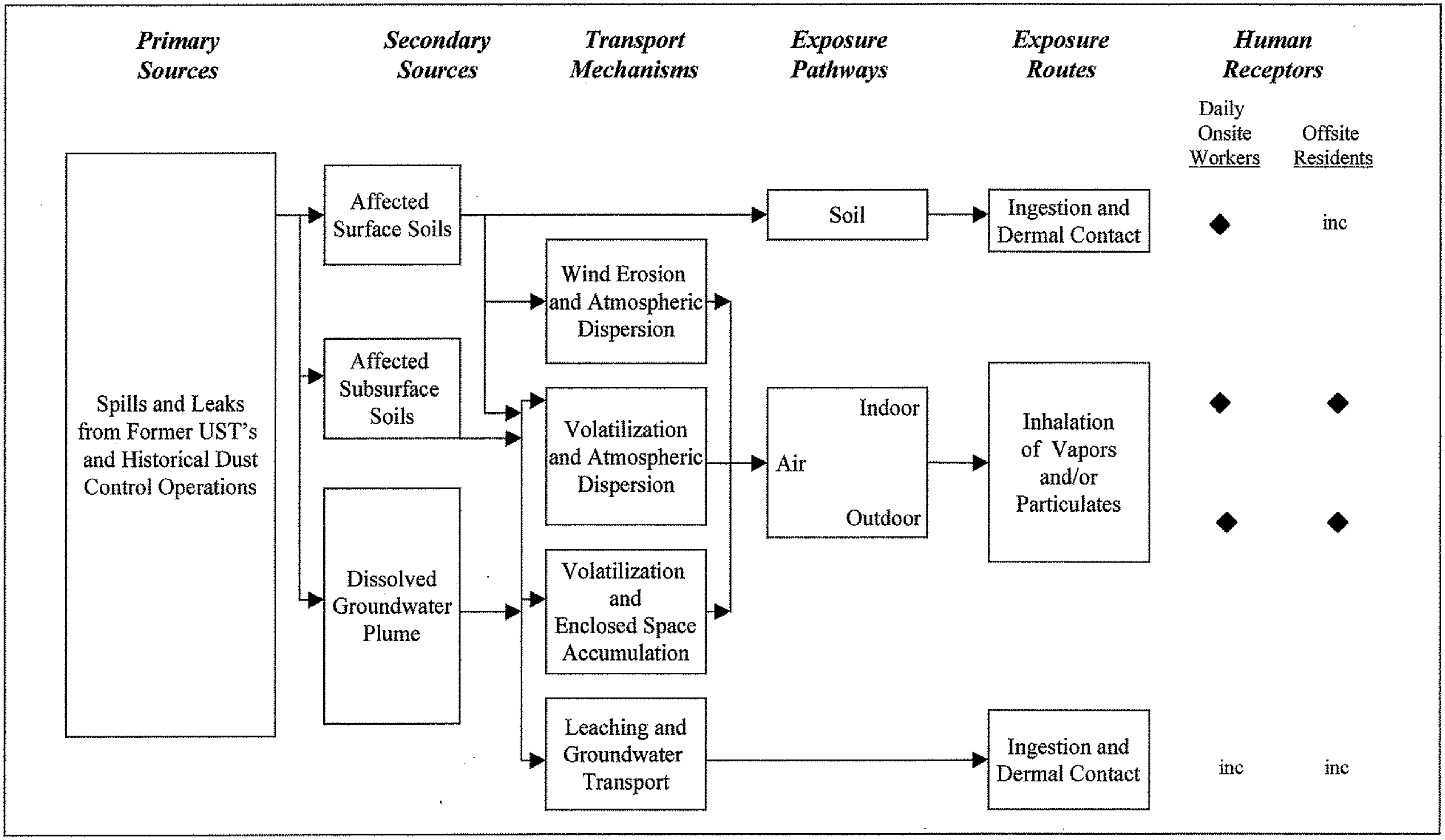


FILENAME: DATA0101.DWG 01/25/01

ETIC Engineering, Inc.

SITE PLAN SHOWING AREA OF
HYDROCARBON IMPACT TO GROUNDWATER
NESTLE OAKLAND FACILITY,
1310 14th STREET, OAKLAND, CALIFORNIA

FIGURE:
3



◆	Complete pathway
inc	Incomplete pathway

Conceptual Site Model
Nestle Oakland Facility
1310 14th Street, Oakland, California

Figure
4
August 2000

JAVAHERIAN CONSULTING, INC.

Appendix A

Covenant and Environmental Restriction Document

RECORDING REQUESTED BY
FIRST AMERICAN TITLE
158558

Recording Requested By:

Nestle USA Inc.
800 North Brand Blvd.
Glendale, California 91203

When Recorded, Mail To:
Leroy Griffin
Hazardous Materials Program Supervisor
City of Oakland Fire Services
1605 Martin Luther King Jr. Way
Oakland, California 94612

This is to certify that this is a true and correct copy ______ recorded in the Office of the Recorder of Alamed County, California, as Instrument No. 2000175664 on the 12th day of June, 2000
FIRST AMERICAN TITLE GUARANTY COMPANY
By:

COVENANT AND ENVIRONMENTAL RESTRICTION ON PROPERTY

Northeast Portion of the Former Carnation Dairy Facility which Occupies 1315-1372 14th Street and 1315-1385 16th Street

This Covenant and Environmental Restriction on Property (this "Covenant") is made as of the 8th day of June, 2000 by Nestle USA ("Covenantor") who is the Owner of record of that certain property situated at 1315-1372 14th Street and 1315-1385 16th Street, in the City of Oakland, County of Alameda, State of California, which contains a contaminated area which is more particularly described in Exhibit A attached hereto and incorporated herein by this reference (such contaminated area hereinafter referred to as the "Burdened Property"), for the benefit of the City of Oakland Fire Services (COFS), with reference to the following facts:

A. The Burdened Property and groundwater underlying the property contains hazardous materials.

B. Contamination of the Burdened Property. Soil at the Burdened Property was contaminated by releases from petroleum underground storage tanks. These releases resulted in contamination of soil and groundwater with organic chemicals including benzene, toluene, ethylbenzene, xylenes, and 1,2 –dichloroethane, which are hazardous materials as that term is defined in Health & Safety Code Section 25260. Removal of underground storage tanks and remediation of the petroleum hydrocarbons was initiated in January 1988 and is summarized below:

Tank, Line, and Dispenser Removal

Four (4) underground fuel storage tanks and associated piping were removed in December 1988. One (1) 1,000 gallon used-oil tank was removed in January 1989.

Remedial Actions

Soil Excavation: Between January and March 1989, 1,200 cubic yards of soil were removed in the area of the former underground storage tanks and associated piping. This soil was treated on-site and replaced back in the excavated area.

Liquid Petroleum Hydrocarbon Removal: Liquid petroleum hydrocarbons were removed using a product skimming system from the subsurface during January through March 1989. Approximately 1,800 gallons were removed during this time period.

Soil Vapor Extraction: A soil vapor extraction system operated from January 1994 to December 1995 and removed an estimated 5,200 gallons of hydrocarbon.

Multi-phase Extraction: A multi-phase extraction system has been operating at the site since August 1997. Approximately 10,500 pounds of hydrocarbons have been removed using this system. Thickness of petroleum hydrocarbons decreased since August 1997.

C. Exposure Pathways. The contaminants addressed in this Covenant are present in soil and groundwater on the Burdened Property. Without the mitigation measures which have been performed on the Burdened Property, exposure to these contaminants could take place via the following pathways (onsite workers only):

- Ingestion and dermal contact with surface soils;
- Inhalation of volatile emissions from subsurface soils and groundwater

The risk of public exposure to the contaminants has been substantially lessened by the remediation and controls described in part B.

D. Adjacent Land Uses and Population Potentially Affected. The Burdened Property is currently an unused industrial facility and is adjacent to industrial, commercial, and residential land uses.

E. Full and voluntary disclosure to the COFS of the presence of hazardous materials on the Burdened Property has been made and extensive sampling of the Burdened Property has been conducted.

F. Covenantor desires and intends that in order to benefit the COFS, and to protect the present and future public health and safety, the Burdened Property shall be used in such a manner as to avoid potential harm to persons or property that may result from hazardous materials that may have been deposited on portions of the Burdened Property.

ARTICLE I
GENERAL PROVISIONS

1.1 Provisions to Run with the Land. This Covenant sets forth protective provisions, covenants, conditions and restrictions (collectively referred to as "Restrictions") upon and subject to which the Burdened Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. The restrictions set forth in Article III are reasonably necessary to protect present and future human health and safety or the environment as a result of the presence of hazardous materials in the subsurface below the Burdened Property. Each and all of the Restrictions shall run with the land, and pass with each and every portion of the Burdened Property, and shall apply to, inure to the benefit of, and bind the respective successors in interest thereof, for the benefit of the COFS and all Owners and Occupants. Each and all of the Restrictions are imposed upon the entire Burdened Property. Each and all of the Restrictions run with the land pursuant to section 1471 of the Civil Code. Each and all of the Restrictions are enforceable by the California Regional Water Quality Control Board for the San Francisco Bay Region (the "Board").

1.2 Concurrence of Owners and Lessees Presumed. All purchasers, lessees, or possessors of any portion of the Burdened Property shall be deemed by their purchase, leasing, or possession of such Burdened Property, to be in accord with the foregoing and to agree for and among themselves, their heirs, successors, and assignees, and the agents, employees, and lessees of such owners, heirs, successors, and assignees, that the Restrictions as herein established must be adhered to for the benefit of the COFS and the Owners and Occupants of the Burdened Property and that the interest of the Owners and Occupants of the Burdened Property shall be subject to the Restrictions contained herein.

1.3 Apportionment of Burden Among Multiple Owners. Where ownership of the Burdened Property is held by multiple persons, holding by several titles, the burdens imposed by this Covenant shall be apportioned between them proportionate to the value of the property held by each owner, if such value can be ascertained, and if not, then according to their respective interests in point of quantity. (Cal. Civ. Code, § 1467.)

1.4 Incorporation into Deeds and Leases. Covenantor desires and covenants that the Restrictions set out herein shall be incorporated in and attached to each and all deeds and leases of any portion of the Burdened Property. Recordation of this Covenant shall be deemed binding on all successors, assigns, and lessees, regardless of whether a copy of this Covenant and Agreement has been attached to or incorporated into any given deed or lease.

1.5 Purpose. It is the purpose of this instrument to convey to the COFS real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to residual hazardous materials.

ARTICLE II
DEFINITIONS

2.1 COFS. "COFS" shall mean the City of Oakland Fire Services and shall include its successor agencies, if any.

2.2 Board. "Board" shall mean the California Regional Water Quality Control Board for the San Francisco Bay Region and shall include its successor agencies, if any.

2.3 Improvements. "Improvements" shall mean all buildings, roads, driveways, regradings, and paved parking areas, constructed or placed upon any portion of the Burdened Property.

2.4 Occupants. "Occupants" shall mean Owners and those persons entitled by ownership, leasehold, or other legal relationship to the exclusive right to use and/or occupy all or any portion of the Burdened Property.

2.5 Owner or Owners. "Owner" or "Owners" shall mean the Covenantor and/or its successors in interest, who hold title to all or any portion of the Burdened Property.

ARTICLE III
DEVELOPMENT, USE AND CONVEYANCE OF THE BURDENED PROPERTY

3.1 Restrictions on Development and Use. Covenantor promises to restrict the use of the Burdened Property as follows:

a. Development of the Burdened Property shall be restricted to industrial, commercial or office space;

b. No residence for human habitation shall be permitted on the Burdened Property;

c. No hospitals shall be permitted on the Burdened Property;

d. No schools for persons under 21 years of age shall be permitted on the Burdened Property;

e. No day care centers for children or day care centers for Senior Citizens shall be permitted on the Burdened Property;

f. No Owners or Occupants of the Burdened Property or any portion thereof shall conduct any excavation work on the Burdened Property, unless expressly permitted in writing by the COFS. Any contaminated soils brought to the surface by grading, excavation, trenching, or backfilling shall be managed by Covenantor or his agent in accordance with all applicable provisions of local, state and federal law;

g. All uses and development of the Burdened Property shall be consistent with any applicable Board Order or Risk Management Plan, each of which is hereby incorporated by reference including future amendments thereto. All uses and development shall preserve the integrity of any cap, any remedial measures taken or remedial equipment installed, and any groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the COFS, unless otherwise expressly permitted in writing by the COFS. Any development of the Burdened Property will maintain a surface cap of the soil, exclusive of minor landscape areas, by buildings or paved surfaces.

h. No Owners or Occupants of the Property or any portion thereof shall drill, bore, otherwise construct, or use a well for the purpose of extracting water for any use, including but not limited to, domestic, potable, or industrial uses, unless expressly permitted in writing by the Board.

3.1.1 Notifications/Access/Non Aggravation

a. The Owner shall notify the COFS of each of the following: (1) The type, cause, location and date of any disturbance to any cap, any remedial measures taken or remedial equipment installed, and of the groundwater monitoring system installed on the Burdened Property pursuant to the requirements of the COFS, which could affect the ability of such cap or remedial measures, remedial equipment, or monitoring system to perform their respective functions and (2) the type and date of repair of such disturbance. Notification to the COFS shall be made by registered mail within ten (10) working days of both the discovery of such disturbance and the completion of repairs;

b. The Covenantor agrees that the COFS, and/or any persons acting pursuant to COFS orders, shall have reasonable access to the Burdened Property for the purposes of inspection, surveillance, maintenance, or monitoring, as provided for in Division 7 of the Water Code.

c. No Owner or Occupant of the Burdened Property shall act in any manner that will aggravate or contribute to the existing environmental conditions of the Burdened Property. All use and development of the Burdened Property shall preserve the integrity of any capped areas.

3.2 Enforcement. Failure of an Owner or Occupant to comply with any of the restrictions, as set forth in paragraph 3.1, shall be grounds for the COFS, by reason of this Covenant, to have the authority to require that the Owner modify or remove any Improvements constructed in violation of that paragraph. Violation of the Covenant shall be grounds for the COFS to file civil actions against the Owner as provided by law.

3.3 Notice in Agreements. After the date of recordation hereof, all Owners and Occupants shall execute a written instrument which shall accompany all purchase agreements or leases relating to the property. Any such instrument shall contain the following statement:

The land described herein contains hazardous materials in soils and in the ground water under the property, and is subject to a deed restriction dated as of June 8, 2000, and recorded ~~on~~ Concurrently herewith ~~200~~, in the Official Records of Alameda County, California, [redacted], which Covenant and Restriction imposes certain covenants, conditions, and restrictions on usage of the property described herein. This statement is not a declaration that a hazard exists.

ARTICLE IV
VARIANCE AND TERMINATION

4.1 Variance. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or any portion thereof may apply to the COFS for a written variance from the provisions of this Covenant.

4.2 Termination. Any Owner or, with the Owner's consent, any Occupant of the Burdened Property or a portion thereof may apply to the COFS for a termination of the Restrictions as they apply to all or any portion of the Burdened Property which consent to termination shall not be unreasonably withheld.

4.3 Term. Unless terminated in accordance with paragraph 4.2 above, by law or otherwise, this Covenant shall continue in effect in perpetuity.

ARTICLE V
MISCELLANEOUS

5.1 No Dedication Intended. Nothing set forth herein shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Burdened Property or any portion thereof to the general public.

5.2 Notices. Whenever any person gives or serves any notice, demand, or other communication with respect to this Covenant, each such notice, demand, or other communication shall be in writing and shall be deemed effective (1) when delivered, if personally delivered to the person being served or official of a government agency being served, or (2) three (3) business days after deposit in the mail if mailed by United States mail, postage paid certified, return receipt requested:

If To: "Covenantor"
Nestlé USA, Inc.
Legal Department
800 North Brand Boulevard
Glendale, Ca. 91203

If To: "COFS"
City of Oakland Fire Services
Attention: Hazardous Materials Program Supervisor
1605 Martin Luther King Jr. Way
Oakland, California 94612

5.3 Partial Invalidity. If any portion of the Restrictions or terms set forth herein is determined to be invalid for any reason, the remaining portion shall remain in full force and effect as if such portion had not been included herein.

5.4 Article Headings. Headings at the beginning of each numbered article of this Covenant are solely for the convenience of the parties and are not a part of the Covenant.

5.5 Recordation. This instrument shall be executed by the Hazardous Materials Program Supervisor of the COFS. This instrument shall be recorded by the Covenantor in the County of Alameda within ten (10) days of the date of execution.

5.6 References. All references to Code sections include successor provisions.

5.7 Construction. Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the Covenant to effect the purpose of this instrument and the policy and purpose of the Water Code. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

Covenantor: NESTLE USA, INC.
By: Robert H. Sanders
Title: V.P.
Date: 6.8.00

Agency: City of Oakland Fire Services

By: LeRoy Griffin
Title: Hazardous Materials Program Supervisor

APPENDIX A

LEGAL DESCRIPTION
DEED RESTRICTION AREA

ROBERT BEIN, WILLIAM FROST & ASSOCIATES
1981 N. Broadway, Suite 235
Walnut Creek, California 94596

LEGAL DESCRIPTION
DEED RESTRICTION AREA

That certain parcel of land situated in the City of Oakland, County of Alameda, State of California described as follows:

Being a portion of Lots 4 through 23 and a portion Kirkham Street of the Scotchler Tract and Vicinity, Oakland, as shown on a map thereof filed in Book 7 of Maps at Page 21 on December 10, 1874 in the Office of the County Recorder of Alameda County more particularly described as follows:

BEGINNING at the intersection of said Kirkam Street and the northwest corner of lot 17, in block 584, as shown on the map of "Re-division of Blocks 584, 585, 601, 153 and 580-A, City of Oakland, County of Alameda, California", filed May 1, 1885, in Book 4 of Maps, at Page 25, in said office of the County Recorder;

Thence, along the northerly line of said Kirkham Street and said lots 13, 12, 11, 10, 9, 8, 7, 6 and 5, North 72°53'28" West 292.25 feet to the northwest corner of said lot 5, said point also being the northeasterly corner of that certain parcel of land described in the deed to the State of California, recorded May 12, 1955 in Volume 7658, of Official Records at Page 299, in said office of the County Recorder;

Thence, continuing along said northerly line of Kirkham Street, North 72°53'28" West 8.64 feet;

Thence, along said State of California parcel, along a non-tangent 1240 foot radius curve to the right, through a central angle of 2°59'04" to the easterly line of the parcel of land described in the deed to the State of California, recorded August 12, 1955 in Book 7749, of Official Records at Page 447, as Instrument Number AK-86901, in said office of the County Recorder;

Thence, along last said State of California parcel (7749 OR 447), along a non-tangent 1240 foot radius curve to the right from a tangent that bears South 10°54'36" West to the south line of said lot 22, said southerly line also being the north line of 15th Street, as shown on said map of the Scotchler Tract (7 M 21);

Thence, along said northerly line of 15th Street and the easterly prolongation of said north line, South 74°03'30" East 285.05 feet to the easterly line of said Kirkham Street;

Thence, along said easterly line, North 15°56'30" West 209.50 feet to the **POINT OF BEGINNING.**

EXHIBIT attached and by this reference made a part hereof.

Patrick J. Tami

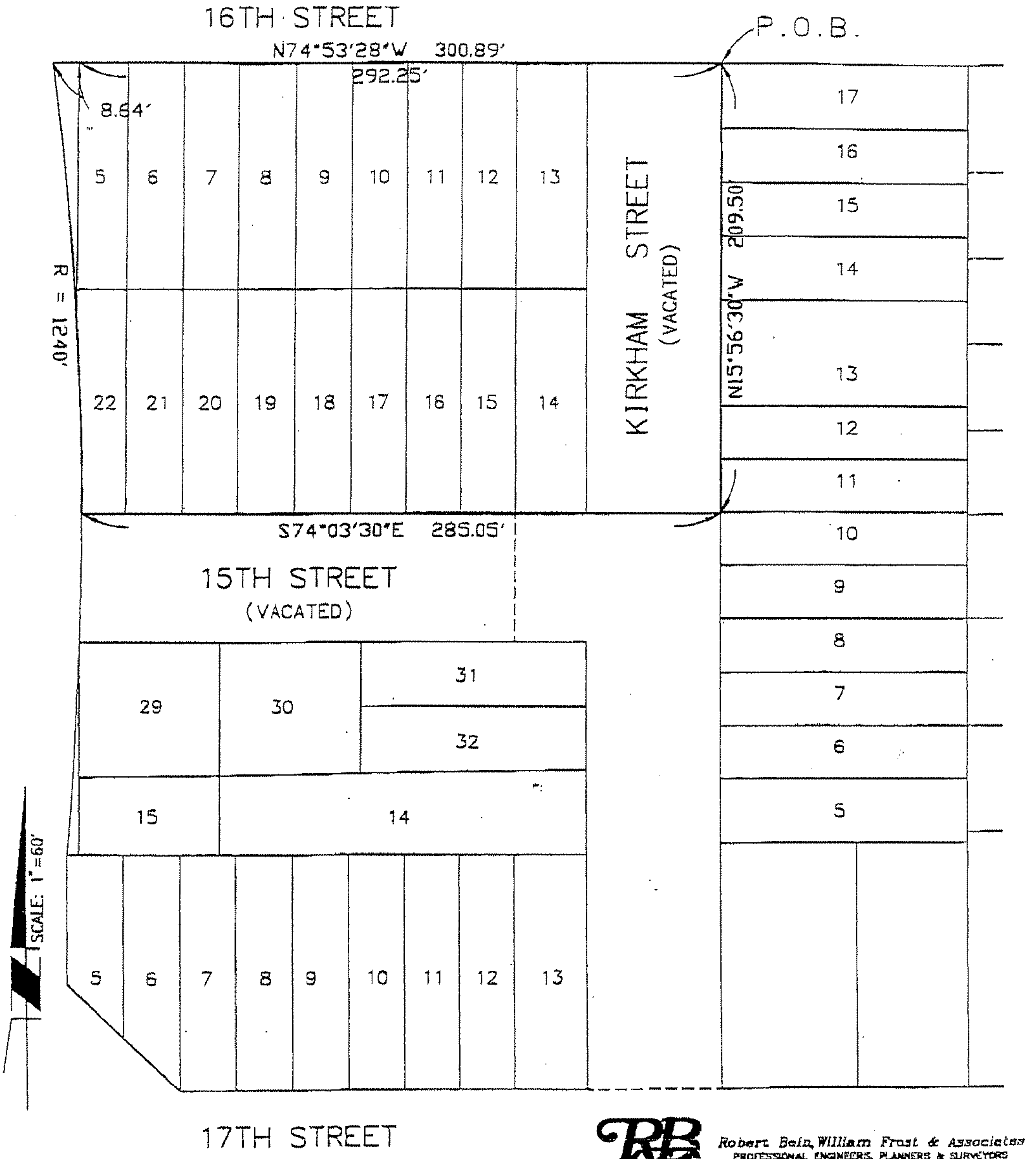
Patrick J. Tami, L.S. 5816

PATRICK JAMES TAMI
No. 5816
Exp. 6-30-2000

C:\MyFiles\Office\Wpwin\legal2.wpd

April 19, 2000 (4:28PM)

DEED RESTRICTION AREA



Robert Bein, William Frost & Associates
PROFESSIONAL ENGINEERS, PLANNERS & SURVEYORS
1981 NORTH BROADWAY SUITE 335, WALNUT CREEK, CALIFORNIA 94596
(925) 906-1460 FAX (925) 906-1480 WWW.RBF.COM

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of Alameda

On 6-7-00 before me, Ellen N. Dolese,
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared LeRoy Griffin,
Name(s) of Signer(s)

☒ personally known to me ←
☐ proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ELLEN N. DOLESE
Commission # 1171028
Notary Public - California
Alameda County
My Comm. Expires Jan 28, 2002

WITNESS my hand and official seal.

Ellen N. Dolese
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Covenant + Environmental Restriction on Property

Document Date: 5-25-00 Number of Pages: 12

Signer(s) Other Than Named Above: ———

Capacity(ies) Claimed by Signer(s)

Signer's Name: LeRoy Griffin
☒ Individual
☐ Corporate Officer
Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer Is Representing: ______

Signer's Name: ______
☐ Individual
☐ Corporate Officer
Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer Is Representing: ______

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of LOS ANGELES } ss.

On JUNE 8, 2000 (Date), before me, MARIA HAZEL PERRI, NOTARY PUBLIC (Name and Title of Officer (e.g., "Jane Doe, Notary Public"))

personally appeared ROBERT H. SANDERS (Name(s) of Signer(s))

☑ personally known to me
☐ ~~proved to me on the basis of satisfactory evidence~~

to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity~~(ies)~~, and that by his/~~her/their~~ signature~~(s) on~~ the instrument the person~~(s), or~~ the entity upon behalf of which the person(s) acted, executed the instrument.

MARIA HAZEL PERRI
Commission # 1113713
Notary Public — California
Los Angeles County
My Comm. Expires Oct 13, 2000

Place Notary Seal Above

WITNESS my hand and official seal.

Maria Hazel Perri
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: COVENANT & ENVIRONMENTAL RESTRICTION ON PROPERTY

Document Date: MAY 25, 2000 Number of Pages: TWELVE (12)

Signer(s) Other Than Named Above: LEROY GRIFFIN

Capacity(ies) Claimed by Signer

Signer's Name: ROBERT H SANDERS

RH ☑ Individual
☑ Corporate Officer — Title(s): VICE PRESIDEN
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Signer Is Representing: NESTLE USA, INC.

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Appendix B

Construction Worker Risk/Hazard Calculation Summary

APPENDIX B
CONSTRUCTION WORKER RISK/HAZARD CALCULATION SUMMARY

This appendix summarizes estimates of carcinogenic risk and noncarcinogenic hazards associated with exposure of construction workers to chemicals underlying the deed restricted portion of the former Nestle property. This portion of the former Nestle property is referred to as the "subject facility" in this document. The approach to estimating risks to construction workers followed the methodology outlined by the California Environmental Protection Agency Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) guidelines for Application of Risk-Based Screening Levels to Sites with Impacted Soil and Groundwater (RWQCB 2000), wherein potential health risks to construction workers are assessed based on evaluation of direct exposure to chemicals of potential concern (COPCs) in soils. This methodology is similar to that adopted by the American Society for Testing and Materials ([ASTM] 1995 and 1998).

Details and assumptions behind RWQCB's approach to evaluation of risks to construction workers are documented in Appendix 1 of RWQCB (2000). A brief summary is provided below. Conservative exposure assumptions by RWQCB (2000) for evaluation of direct exposure of construction workers to COPCs are based on guidance presented in the USEPA Exposure Handbook (USEPA 1997), trench-worker risk-assessment guidance developed by the Massachusetts Department of Environmental Protection (MADEP 1994), and general direct-exposure assumptions included in the USEPA Region IX Preliminary Remediation Goals document (USEPA 1999), focusing on direct contact via ingestion, dermal, and inhalation routes of exposure. Key among these assumptions is the use of an exposure duration of 7 years, an exposure frequency of 20 days per year, a soil ingestion rate of 480 mg/day, and a particulate emission factor corresponding to a concentration of air-born dust of approximately 700 ug/m^3. Based on these conservative assumptions, risks to construction workers are generally lower than those to commercial/industrial receptors, which in turn are lower than those to residential receptors. This pattern is primarily due to the assumed shorter exposure duration and frequency associated with the construction worker exposure, in comparison with the other two exposure scenarios. Exceptions to this pattern may occur for chemicals with high oral toxicity such as various heavy metals, none of which are considered COPCs at the "subject facility". Direct exposure to COPCs in onsite soils for commercial/industrial receptors was previously evaluated in the risk-based corrective action (RBCA) analysis for the "subject facility" portion of the former Nestle site (JCI 2000, as reported in ETIC 2001).

To estimate potential health risks to future construction workers at the Nestle facility, all chemicals detected in recent sampling of surface (<3 ft below ground surface [bgs]) and subsurface (>3 ft bgs), including saturated soils, were included as COPCs (see Table B.1). For each COPC, construction/trench worker risk-based screening levels (RBSLs) corresponding to a target carcinogenic risk level of 1 x 10^{-6} and a target hazard level of 1.0 were identified from the RWQCB guidance (see Table K-3 of Appendix 1 to RWQCB 2000). Based on these RBSLs, individual and cumulative carcinogenic risks and noncarcinogenic hazards for the COPCs were back-calculated using the site maximum COPC concentrations and the following formula:

$$\text{CW Risk/Hazard} = \frac{\text{Cmax} \ * \ \text{Target R/H Level}}{\text{RBSL}}$$

Where:

CW Risk/Hazard = Carcinogenic risk or hazard to construction worker
Cmax = Site maximum soil concentration
Target R/H Level = Target risk (i.e., 1 x 10^{-6}) or target hazard (i.e., 1.0) level
RBSL = Construction worker RBSL (RWQCB 2000)

The results of this calculation for each COPC are summarized in Table B.1. As indicated in the table, the cumulative pathway risk associated with exposure of construction workers to COPCs in saturated and unsaturated soils approximates 4.76 x 10^{-6}, which is within the target risk range of 1 x 10^{-4} to 1 x 10^{-6} adopted by the USEPA. The risk associated with exposure to benzene corresponds to more than 99 percent of the total cumulative risk to construction workers.

As indicated in Table B.1, the cumulative pathway hazard associated with exposure of construction workers to the COPCs approximates 1.005, slightly exceeding the target hazard of 1.0 adopted by the USEPA. Approximately 63 percent of this hazard corresponds to exposure to TPH-g in soils.

The above estimates of carcinogenic risks and noncarcinogenic hazards should be used in support of developing a site-specific health and safety plan for future construction workers, as suggested by the risk management plan for the "subject facility" portion of the former Nestle site.

REFERENCES

ASTM (American Society for Testing and Materials). 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E 1739-95.

ASTM (American Society for Testing and Materials). 1998. Standard Provisional Guide for Risk-Based Corrective Action, PS 104-98.

ETIC (ETIC Engineering, Inc.). 2001. Comprehensive Site Characterization Report, Support for the Site as a Low-Risk Soil and Groundwater Case, Former Nestle USA, Inc. Facility, 1310 14th Street, Oakland, California. ETIC, Pleasant Hill, California. January.

JCI (Javaherian Consulting, Inc.). 2000. Technical Memorandum: Risk-Based Corrective Action Analysis, Nestle USA, Inc. Facility, 1310 14th Street, Oakland, California. JCI, San Francisco, California. 22 August.

MADEP (Massachusetts Department of Environmental Protection). 1994. Interim Final Petroleum Report: Development of Health-Based Alternative to the Total Petroleum Hydrocarbon Parameter, August.

RWQCB (Regional Water Quality Control Board, San Francisco Bay Region). 2000. Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater, Interim Final, August.

USEPA (U.S. Environmental Protection Agency). 1997. Health Effects Assessment Summary Tables (HEAST).

USEPA (U.S. Environmental Protection Agency). 1999. Region 9 Preliminary Remediation Goals Chemical Toxicity Database, on-line @ www.epa.gov/region09/waste/sfund/prg/.

Table B.1. Construction Worker Risk/Hazard Calculation

COPC	Site Maximum Concentration mg/kg	RBSL Cancer Endpoint*	RBSL Non-Cancer Endpoint**	Carcinogenic Risk	Noncarcinogenic Hazard
benzene	76	16	290	4.75E-06	0.262
toluene	490	NA	2.40E+04	NA	0.020
ethylbenzene	170	NA	5.90E+04	NA	0.003
xylenes	990	NA	5.50E+04	NA	0.018
TPH-g	10100	NA	16000	NA	0.631
TPH-d	1100	NA	16000	NA	0.069
MTBE	0.084	8.60E+03	2.40E+04	9.77E-12	0.000004
chlorobenzene	0.0017	NA	6.00E+03	NA	0.00000028
1,2-dichlorobenzene	3.1	NA	3.60E+04	NA	0.000086
1,3-dichlorobenzezne	0.038	NA	520	NA	0.000073
1,4-dichlorobenzene	0.33	160	1.90E+04	2.06E-09	0.000017
1,2-dichloroethane	0.43	40	430	1.08E-08	0.001
		Cumulative Pathway Risk/Hazard:		**4.76E-06**	**1.005**

* Cancer endpoint based on target risk level of 1 x 10-6

** Non-cancer endpoint based on target hazard of 1.0

Appendix E: CAP Alternatives Cost Estimates

CAP Alternatives Cost Estimate Summary

former Nestlé Oakland

Alternative Costs:		low	high
Alternative 1	Targeted Excavation	$ 478,642	$ 573,994
Alternative 2*	ESL Excavation	$ 1,203,395	$ 1,452,826
Alternative 3	SVE/Biovent	$ 593,669	$ 711,557
Alternative 4	In-situ Oxidation	$ 917,627	$ 1,101,506
Alternative 5	Institutional Controls	$ 165,180	$ 235,100

*excludes
$1,653,164
to
$1,963,798
in building demo and reconstruction costs

Alternative 1: Targeted Excavation of Impacted Soils (to 4,200mg/kg)

former Nestlé Oakland facility

Task No.	Task Description	Rate/ Unit	Units	Minimum Days	Max Days	Cost Code Vlkup	Units/ Day	Mult.	Cost low	Cost high
1	**Permitting and Planning**									
	Program Manager	$ 110	hr	2	2.95	L	8	1.00	$ 1,760	$ 2,596
	Senior Engineer/Geologist	$ 100	hr	2	2.95	L	8	1.00	$ 1,600	$ 2,360
	Project Engineer/Geologist	$ 90	hr	6	8.85	L	8	1.00	$ 4,320	$ 6,372
	Truck	$ 75	day	1	1.475	L	1	1.00	$ 75	$ 111
	Mileage	$ 0.55	mile	1	1.475	L	220	1.00	$ 121	$ 178
	Permitting Fees	$ 2,500	LS	1	1.475	O	1	1.15	$ 2,875	$ 4,241
								Task Subtotal	**$ 10,751**	**$ 15,858**
2	**Health and Safety Plan**									
	Project Engineer/Geologist	$ 90	hr	1	1.475	L	8	1.00	$ 720	$ 1,062
	Senior Engineer/Geologist	$ 110	hr	1	1.475	L	5	1.00	$ 550	$ 811
								Task Subtotal	**$ 1,270**	**$ 1,873**
3	**Excavation Planning / Workplan**									
	Remedial Action Planning	$ 50,000	LS	1	1.475	O	1	1.00	$ 50,000	$ 73,750
								Task Subtotal	**$ 50,000**	**$ 73,750**
4	**Building Floor Demolition and Rebuild Floor at Hot-Spot Area**									
	ECM Demolition Planning, Sampling and Over	$ 46,878	hr	0.5	0.7375	L	1	1.00	$ 23,439	$ 34,572
	Land Survey/Utilities Locator	$ 4,000	LS	1	1.475	O	1	1.15	$ 4,600	$ 6,785
	Demolition Contractor including Disposal	$ 6	Sqft	1	1	M	17800	1.00	$ 106,800	$ 106,800
								Task Subtotal	**$ 134,839**	**$ 148,157**
5	**Remedial Action Implementation: Mobilization**									
	Program Manager	$ 110	hr	1	1.475	L	8	1.00	$ 880	$ 1,298
	Senior Engineer/Geologist	$ 100	hr	1	1.475	L	8	1.00	$ 800	$ 1,180
	Project Engineer/Geologist	$ 90	hr	1	1.475	L	10	1.00	$ 900	$ 1,328
	Site Superintendent	$ 85	hr	1	1.475	L	10	1.00	$ 850	$ 1,254
	Equipment Operator	$ 85	hr	1	1.475	L	10	1.00	$ 850	$ 1,254
	Laborer	$ 65	hr	1	1.475	L	10	1.00	$ 650	$ 959
	Truck	$ 75	day	1	1.475	L	1	1.00	$ 75	$ 111
	Mileage	$ 0.55	mile	1	1.475	L	100	1.00	$ 55	$ 81
	Field Supplies	$ 500	LS	1	1.475	O	1	1.00	$ 500	$ 738
	Airfare	$ 400	LS	1	1.475	O	1	1.15	$ 460	$ 679
	Mob/Demob Equip	$ 500	day	1	1.475	L	1	1.15	$ 575	$ 848
	Temporary Barricades	$ 500	ea	12	12	M	1	1.15	$ 6,900	$ 6,900
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.475	O	1	1.15	$ 575	$ 848
								Task Subtotal	**$ 14,202**	**$ 17,608**

Alternative 1: Targeted Excavation of Impacted Soils (to 4,200mg/kg)

former Nestlé Oakland facility

Task No.	Task Description	Rate/ Unit	Units	Minimum Days	Max Days	Cost Code Vlkup	Units/ Day	Mult.	Cost low	Cost high
6	**Remedial Action Implementation: Excavate, Load & Transport for Disposal**									
	Project Engineer/Geologist	$ 90	hr	3	4.425	L	10	1.00	$ 2,700	$ 3,983
	Site Superintendent	$ 85	hr	3	4.425	L	10	1.00	$ 2,550	$ 3,761
	Equipment Operator	$ 85	hr	3	4.425	L	10	1.00	$ 2,550	$ 3,761
	Laborer	$ 65	hr	3	4.425	L	10	1.00	$ 1,950	$ 2,876
	Truck	$ 75	day	3	4.425	L	1	1.00	$ 225	$ 332
	Mileage	$ 0.55	mile	1	1.475	L	100	1.00	$ 55	$ 81
	Field Supplies	$ 500	LS	1	1.475	O	1	1.00	$ 500	$ 738
	Room	$ 125	LS	3	4.425	O	1	1.15	$ 431	$ 636
	Utility Clearance (Subcontractor)	$ 500	ea	1	1.475	O	1	1.15	$ 575	$ 848
	Site Superintendent - Oversee geophysical utility screenings (1 mobilization)	$ 85	day	1	1.475	L	4	1.00	$ 340	$ 502
	Truck - Utility Clearance Oversight	$ 75	day	1	1.475	L	1	1.00	$ 75	$ 111
	Mileage	$ 0.55	mile	1	1.475	L	100	1.00	$ 55	$ 81
	Saw-Cut 18" Concrete: Cut, Break, Remove	$ 2,500	ea	1	1	M	1	1.15	$ 2,875	$ 2,875
	Excavator/21-24 Metric Ton/Crawler/DSL	$ 623	day	1	1.475	L	1	1.15	$ 717	$ 1,058
	Wheel Loader/3 1/2YD/MP BKT/DSL	$ 427	day	1	1.475	L	1	1.15	$ 492	$ 725
	Shoring	$ 5,000	ea	1	1.475	O	1	1.15	$ 5,750	$ 8,481
	Temporary Barricades	$ 500	ea	1	1	M	1	1.15	$ 575	$ 575
	Misc. Hand Tools	$ 196	day	1	1.475	L	1	1.15	$ 225	$ 333
	Contractor Pump & Hoses	$ 65	day	1	1.475	L	1	1.15	$ 75	$ 111
	Pressure Washer	$ 138	day	1	1.475	L	1	1.15	$ 159	$ 234
	Analytical Services	$ 139	each	5	7.375	O	1	1.15	$ 797	$ 1,176
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.475	O	1	1.15	$ 575	$ 848
								Task Subtotal	**$ 24,378**	**$ 34,257**
7	**Remedial Action Implementation: T&D Non Hazardous Direct**									
	Transportation & disposal as Non-Hazardous	$ 75	ton	877.5	877.5	M	1	1.15	$ 75,684	$ 75,684
								Task Subtotal	**$ 75,684**	**$ 75,684**
8	**Remedial Action Implementation: Import, Place, Compact Backfill & Pour Concrete**									
	Project Engineer/Geologist	$ 110	ea	1	1.475	L	2	1.00	$ 220	$ 325
	Site Superintendent	$ 85	hr	2	2.95	L	10	1.00	$ 1,700	$ 2,508
	Truck	$ 75	day	2	2.95	L	1	1.00	$ 150	$ 221
	Mileage	$ 0.49	mile	1	1.475	L	220	1.00	$ 107	$ 157
	Field Supplies	$ 500	LS	1	1.475	O	1	1.00	$ 500	$ 738
	Room	$ 125	LS	1	1.475	O	1	1.15	$ 144	$ 212
	Equipment Operator	$ 85	hr	1	1.475	L	10	1.00	$ 850	$ 1,254
	Laborer	$ 65	hr	1	1.475	L	10	1.00	$ 650	$ 959
	Pea gravel backfill delivered onsite	$ 120	CY	1	1	M	540	1.15	$ 74,520	$ 74,520
	Concrete	$ 120	CY	1	1	M	8	1.15	$ 1,104	$ 1,104
	Concrete Pouring Crew of 3	$ 65	hr	3	4.425	L	8	1.15	$ 1,794	$ 2,646
	Misc. Hand Tools	$ 196	day	1	1.475	L	1	1.15	$ 225	$ 333
	Geotech Concrete Analysis	$ 1,000	ea	1	1.475	O	1	1.15	$ 1,150	$ 1,696
	Crew of 2 with machinery - Dowels	$ 200	hr	1	1.475	L	8	1.00	$ 1,600	$ 2,360
	Geo-textile Fabric	$ 1,250	ea	1	1	M	1	1.15	$ 1,438	$ 1,438
	Power	$ 188	day	1	1.475	L	1	1.15	$ 216	$ 318
	Excavator/21-24 Metric Ton/Crawler/DSL	$ 623	day	1	1.475	L	1	1.15	$ 717	$ 1,058
	Wheel Loader/3 1/2YD/MP BKT/DSL	$ 427	day	1	1.475	L	1	1.15	$ 492	$ 725
	Truck/Water/3700 Gallon/DSL/Duel Axle	$ 336	day	1	1.475	L	1	1.15	$ 386	$ 570
	Roller/Ride/8-Ton/Vibra/Padfoot/SnglDrum	$ 333	day	1	1.475	L	1	1.15	$ 383	$ 565
	Contractor Pump & Hoses	$ 65	day	1	1.475	L	1	1.15	$ 75	$ 111
	Nuc Gauge	$ 163	day	5	7.375	L	1	1.15	$ 939	$ 1,386
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal	$ 500	bin	1	1	M	1	1.15	$ 575	$ 575
								Task Subtotal	**$ 90,068**	**$ 95,909**

Alternative 1: Targeted Excavation of Impacted Soils (to 4,200mg/kg)

former Nestlé Oakland facility

Task No.	Task Description	Rate/ Unit	Units	Minimum Days	Max Days	Cost Code Vlkup	Units/ Day	Mult.	Cost low	Cost high
9	**Remedial Action Implementation: Demobilization**									
	Program Manager	$ 110	hr	1	1.475	L	8	1.00	$ 880	$ 1,298
	Senior Engineer/Geologist	$ 100	hr	1	1.475	L	8	1.00	$ 800	$ 1,180
	Project Engineer/Geologist	$ 90	hr	1	1.475	L	10	1.00	$ 900	$ 1,328
	Site Superintendent	$ 85	hr	1	1.475	L	10	1.00	$ 850	$ 1,254
	Equipment Operator	$ 85	hr	1	1.475	L	10	1.00	$ 850	$ 1,254
	Laborer	$ 65	hr	1	1.475	L	10	1.00	$ 650	$ 959
	Truck	$ 75	day	1	1.475	L	1	1.00	$ 75	$ 111
	Mileage	$ 0.49	mile	1	1.475	L	220	1.00	$ 107	$ 157
	Field Supplies	$ 500	LS	1	1.475	O	1	1.00	$ 500	$ 738
	Mob/Demob Equip	$ 500	day	1	1.475	L	1	1.15	$ 575	$ 848
	Temporary Barricades	$ 500	ea	12	12	M	1	1.15	$ 6,900	$ 6,900
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.475	O	1	1.15	$ 575	$ 848
								Task Subtotal	**$ 13,794**	**$ 17,006**
10	**End of Action Report (Assumes one round of review by client)**									
	Environmental Oversite, Est. 10% Construction Costs	$ 21,813	LS	1	1.475	O	1	1.00	$ 21,813	$ 32,174
	Program Manager	$ 110	ea	5	7.375	L	6	1.00	$ 3,300	$ 4,868
								Task Subtotal	**$ 25,113**	**$ 37,041**
11	**Document Production**									
	Administrative Assistant	$ 50	hr	1	1.475	L	3	1.00	$ 150	$ 221
	Program Manager	$ 110	hr	1	1.475	L	2	1.00	$ 220	$ 325
	photocopying/transmittal	$ 150	lump	1	1.475	O	1	1.15	$ 173	$ 254
								Task Subtotal	**$ 543**	**$ 800**
12	**Risk Assessment, Deed Restriction and Closure Request**									
	Outside Risk Assessor	$ 38,000	LS	1	1.475	O	1	1.00	$ 38,000	$ 56,050
								Task Subtotal	**$ 38,000**	**$ 56,050**
						TOTAL PROJECT COST:			**$ 478,642**	**$ 573,994**

Alternative 2: Excavation of all Soils Above TPH Tier 1 ESLs (to 180mg/kg)

former Nestlé Oakland facility

Task No.	Task Description	Rate/ Unit	Units	Min Days	Max Days	Cost Code	Units/ Day	Mult.	Cost low	Cost high
1	**Permitting and Planning**									
	Program Manager	$ 110	hr	2	3.64	L	8	1.00	$ 1,760	$ 3,203
	Senior Engineer/Geologist	$ 100	hr	2	3.64	L	8	1.00	$ 1,600	$ 2,912
	Project Engineer/Geologist	$ 90	hr	6	10.92	L	8	1.00	$ 4,320	$ 7,862
	Truck	$ 75	day	1	1.82	L	1	1.00	$ 75	$ 137
	Mileage	$ 0.55	mile	1	1.82	L	220	1.00	$ 121	$ 220
	Permitting Fees	$ 2,500	LS	1	1.82	O	1	1.15	$ 2,875	$ 5,233
							Task Subtotal		**$ 10,751**	**$ 19,567**
2	**Health and Safety Plan**									
	Project Engineer/Geologist	$ 90	hr	1	1.82	L	8	1.00	$ 720	$ 1,310
	Senior Engineer/Geologist	$ 110	hr	1	1.82	L	5	1.00	$ 550	$ 1,001
							Task Subtotal		**$ 1,270**	**$ 2,311**
3	**Excavation Planning**									
	Remedial Action Planning	$ 50,000	LS	1	1.82	O	1	1.00	$ 50,000	$ 91,000
							Task Subtotal		**$ 50,000**	**$ 91,000**
4	**Building Demolition**									
	ECM Demolition Planning, Sampling and Ove	$ 46,878	LS	0.5	0.91	L	1	1.00	$ 23,439	$ 42,659
	Land Survey/Utilities Locator	$ 1,500	LS	1	1.82	O	1	1.15	$ 1,725	$ 3,140
	Demolition Contractor including Disposal	$ 5	Sqft	1	1	M	35600	1.00	$ 178,000	$ 178,000
							Task Subtotal		**$ 203,164**	**$ 223,798**
5	**Remedial Action Implementation: Mobilization**									
	Program Manager	$ 110	hr	1	1.82	L	8	1.00	$ 880	$ 1,602
	Senior Engineer/Geologist	$ 100	hr	1	1.82	L	8	1.00	$ 800	$ 1,456
	Project Engineer/Geologist	$ 90	hr	1	1.82	L	10	1.00	$ 900	$ 1,638
	Site Superintendent	$ 85	hr	1	1.82	L	10	1.00	$ 850	$ 1,547
	Equipment Operator	$ 85	hr	1	1.82	L	10	1.00	$ 850	$ 1,547
	Laborer	$ 65	hr	1	1.82	L	10	1.00	$ 650	$ 1,183
	Truck	$ 75	day	1	1.82	L	1	1.00	$ 75	$ 137
	Mileage	$ 0.55	mile	1	1.82	L	100	1.00	$ 55	$ 100
	Field Supplies	$ 500	LS	1	1.82	O	1	1.00	$ 500	$ 910
	Airfare	$ 400	LS	1	1.82	O	1	1.15	$ 460	$ 837
	Mob/Demob Equip	$ 500	day	1	1.82	L	1	1.15	$ 575	$ 1,047
	Temporary Barricades	$ 500	ea	12	12	M	1	1.15	$ 6,900	$ 6,900
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.82	O	1	1.15	$ 575	$ 1,047
							Task Subtotal		**$ 14,202**	**$ 20,082**
6	**Remedial Action Implementation: Excavate, Load & Transport for Disposal**									
	Project Engineer/Geologist	$ 90	hr	3	5.46	L	10	1.00	$ 2,700	$ 4,914
	Site Superintendent	$ 85	hr	3	5.46	L	10	1.00	$ 2,550	$ 4,641
	Equipment Operator	$ 85	hr	3	5.46	L	10	1.00	$ 2,550	$ 4,641
	Laborer	$ 65	hr	3	5.46	L	10	1.00	$ 1,950	$ 3,549
	Truck	$ 75	day	3	5.46	L	1	1.00	$ 225	$ 410
	Mileage	$ 0.55	mile	1	1.82	L	100	1.00	$ 55	$ 100
	Field Supplies	$ 500	LS	1	1.82	O	1	1.00	$ 500	$ 910
	Room	$ 125	LS	3	5.46	O	1	1.15	$ 431	$ 785
	Utility Clearance (Subcontractor)	$ 500	ea	1	1.82	O	1	1.15	$ 575	$ 1,047
	Site Superintendent - Oversee geophysical utility screenings (1 mobilization)	$ 85	day	1	1.82	L	4	1.00	$ 340	$ 619
	Truck - Utility Clearance Oversight	$ 75	day	1	1.82	L	1	1.00	$ 75	$ 137
	Mileage	$ 0.55	mile	1	1.82	L	100	1.00	$ 55	$ 100
	Saw-Cut 18" Concrete: Cut, Break, Remove	$ 2,500	ea	1	1	M	1	1.15	$ 2,875	$ 2,875
	Excavator/21-24 Metric Ton/Crawler/DSL	$ 623	day	1	1.82	L	1	1.15	$ 717	$ 1,305
	Wheel Loader/3 1/2YD/MP BKT/DSL	$ 427	day	1	1.82	L	1	1.15	$ 492	$ 895
	Shoring	$ 5,000	ea	1	1.82	O	1	1.15	$ 5,750	$ 10,465
	Temporary Barricades	$ 500	ea	1	1	M	1	1.15	$ 575	$ 575
	Misc. Hand Tools	$ 196	day	1	1.82	L	1	1.15	$ 225	$ 410
	Contractor Pump & Hoses	$ 65	day	1	1.82	L	1	1.15	$ 75	$ 137
	Pressure Washer	$ 138	day	1	1.82	L	1	1.15	$ 159	$ 289
	Analytical Services	$ 139	each	5	9.1	O	1	1.15	$ 797	$ 1,450
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.82	O	1	1.15	$ 575	$ 1,047
							Task Subtotal		**$ 24,378**	**$ 41,431**

Alternative 2: Excavation of all Soils Above TPH Tier 1 ESLs (to 180mg/kg)

former Nestlé Oakland facility

Task No.	Task Description	Rate/ Unit	Units	Min Days	Max Days	Cost Code	Units/ Day	Mult.	Cost low	Cost high
7	**Remedial Action Implementation: T&D Non-Hazardous Direct**									
	Transportation & disposal as Non-Hazardous	$ 48	ton	6627.75	6627.75	M	1	1.15	$ 365,852	$ 365,852
								Task Subtotal	**$ 365,852**	**$ 365,852**
8	**Remedial Action Implementation: Import, Place, Compact Backfill & Pour Concrete**									
	Project Engineer/Geologist	$ 110	ea	1	1.82	L	2	1.00	$ 220	$ 400
	Site Superintendent	$ 85	hr	2	3.64	L	10	1.00	$ 1,700	$ 3,094
	Truck	$ 75	day	2	3.64	L	1	1.00	$ 150	$ 273
	Mileage	$ 0.49	mile	1	1.82	L	220	1.00	$ 107	$ 194
	Field Supplies	$ 500	LS	1	1.82	O	1	1.00	$ 500	$ 910
	Room	$ 125	LS	1	1.82	O	1	1.15	$ 144	$ 262
	Equipment Operator	$ 85	hr	1	1.82	L	10	1.00	$ 850	$ 1,547
	Laborer	$ 65	hr	1	1.82	L	10	1.00	$ 650	$ 1,183
	Pea gravel backfill delivered onsite	$ 120	CY	1	1	M	4100	1.15	$ 565,800	$ 565,800
	Concrete	$ 120	CY	1		M	8	1.15	$ 1,104	$ -
	Concrete Pouring Crew of 3	$ 65	hr	3	5.46	L	8	1.15	$ 1,794	$ 3,265
	Misc. Hand Tools	$ 196	day	1	1.82	L	1	1.15	$ 225	$ 410
	Geotech Concrete Analysis	$ 1,000	ea	1	1.82	O	1	1.15	$ 1,150	$ 2,093
	Crew of 2 with machinery - Dowels	$ 200	hr	1	1.82	L	8	1.00	$ 1,600	$ 2,912
	Geo-textile Fabric	$ 1,250	ea	1	1	M	1	1.15	$ 1,438	$ 1,438
	Power	$ 188	day	1	1.82	L	1	1.15	$ 216	$ 393
	Excavator/21-24 Metric Ton/Crawler/DSL	$ 623	day	1	1.82	L	1	1.15	$ 717	$ 1,305
	Wheel Loader/3 1/2YD/MP BKT/DSL	$ 427	day	1	1.82	L	1	1.15	$ 492	$ 895
	Truck/Water/3700 Gallon/DSL/Duel Axle	$ 336	day	1	1.82	L	1	1.15	$ 386	$ 703
	Roller/Ride/8-Ton/Vibra/Padfoot/SnglDrum	$ 333	day	1	1.82	L	1	1.15	$ 383	$ 698
	Contractor Pump & Hoses	$ 65	day	1	1.82	L	1	1.15	$ 75	$ 137
	Nuc Gauge	$ 163	day	5	9.1	L	1	1.15	$ 939	$ 1,710
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal	$ 500	bin	1	1	M	1	1.15	$ 575	$ 575
								Task Subtotal	**$ 581,348**	**$ 590,328**
9	**Remedial Action Implementation: Demobilization**									
	Program Manager	$ 110	hr	1	1.82	L	8	1.00	$ 880	$ 1,602
	Senior Engineer/Geologist	$ 100	hr	1	1.82	L	8	1.00	$ 800	$ 1,456
	Project Engineer/Geologist	$ 90	hr	1	1.82	L	10	1.00	$ 900	$ 1,638
	Site Superintendent	$ 85	hr	1	1.82	L	10	1.00	$ 850	$ 1,547
	Equipment Operator	$ 85	hr	1	1.82	L	10	1.00	$ 850	$ 1,547
	Laborer	$ 65	hr	1	1.82	L	10	1.00	$ 650	$ 1,183
	Truck	$ 75	day	1	1.82	L	1	1.00	$ 75	$ 137
	Mileage	$ 0.49	mile	1	1.82	L	220	1.00	$ 107	$ 194
	Field Supplies	$ 500	LS	1	1.82	O	1	1.00	$ 500	$ 910
	Mob/Demob Equip	$ 500	day	1	1.82	L	1	1.15	$ 575	$ 1,047
	Temporary Barricades	$ 500	ea	12	12	M	1	1.15	$ 6,900	$ 6,900
	Portable Toilets	$ 115	LS	1	1	M	1	1.15	$ 132	$ 132
	Trash Disposal & Cleanup	$ 500	LS	1	1.82	O	1	1.15	$ 575	$ 1,047
								Task Subtotal	**$ 13,794**	**$ 19,339**
10	**End of Action Report (Assumes one round of review by client)**									
	Environmental Oversite, Est. 10% Construction Costs	$ 99,957	LS	1	1.82	O	1	1.00	$ 99,957	$ 181,922
	Program Manager	$ 110	ea	5	9.1	L	6	1.00	$ 3,300	$ 6,006
								Task Subtotal	**$ 103,257**	**$ 187,928**
11	**Document Production**									
	Administrative Assistant	$ 50	hr	1	1.82	L	3	1.00	$ 150	$ 273
	Program Manager	$ 110	hr	1	1.82	L	2	1.00	$ 220	$ 400
	photocopying/transmittal	$ 150	lump	1	1.82	O	1	1.15	$ 173	$ 314
								Task Subtotal	**$ 543**	**$ 987**
12	**Risk Assessment, Deed Restriction and Closure Request**									
	Outside Risk Assessor	$ 38,000	LS	1	3	O	1	1.00	$ 38,000	$ 114,000
								Task Subtotal	**$ 38,000**	**$ 114,000**
13	**Risk Assessment, Deed Restriction and Closure Request**									
	Replacement Building Construction	$50 to $60	sq ft	29000	29000	M	1	1.00	$ 1,450,000	$ 1,740,000
								Task Subtotal	**$ 1,450,000**	**$ 1,740,000**
						TOTAL PROJECT COST:			**$ 2,856,559**	**$ 3,416,624**

Alternative 3: Soil Vapor Extraction/Bioventing

former Nestlé Oakland facility
Does not include O&M and monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Day Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
1	**Air Permitting**									
	Program Manager	$ 140	hr	2	2.61	L	2	1.00	$ 560	$ 731
	Senior Engineer/Geologist	$ 110	hr	5	6.525	L	6	1.00	$ 3,300	$ 4,307
	Project Engineer/Geologist	$ 90	hr	3	3.915	L	4	1.00	$ 1,080	$ 1,409
	Senior Engineer/Geologist-Monthly Reports	$ 110	hr	12	15.66	L	1	1.00	$ 1,320	$ 1,723
	Project Engineer/Geologist-Monthly Reports	$ 90	hr	12	15.66	L	2	1.00	$ 2,160	$ 2,819
	Annual Air Permitting Fees	$ 2,500	LS	1	1.305	O	1	1.15	$ 2,875	$ 3,752
								Task Subtotal	**$ 11,295**	**$ 14,740**
2	**Health and Safety Plan**									
	Project Engineer/Geologist	$ 90	hr	1	1.305	L	8	1.00	$ 720	$ 940
	Senior Engineer/Geologist	$ 110	hr	1	1.305	L	5	1.00	$ 550	$ 718
								Task Subtotal	**$ 1,270**	**$ 1,657**
3	**Continue Interaction with RWQCB**									
	Sr. Engineer/Project Manager	$ 110	hr	5	6.525	L	4	1.00	$ 2,200	$ 2,871
	Program Manager	$ 140	hr	4	5.22	L	2	1.00	$ 1,120	$ 1,462
								Task Subtotal	**$ 3,320**	**$ 4,333**
4	**Building Demolition**									
	ECM Demolition Planning, Sampling and Ove	$ 46,878	hr	1	1.305	L	1	1.00	$ 46,878	$ 61,176
	Land Survey/Utilities Locator	$ 1,500	LS	1	1.305	O	1	1.15	$ 1,725	$ 2,251
	Demolition Contractor including Disposal	$ 5	Sqft	1	1	M	35600	1.00	$ 178,000	$ 178,000
								Task Subtotal	**$ 226,603**	**$ 241,427**

Alternative 3: Soil Vapor Extraction/Bioventing

former Nestlé Oakland facility
Does not include O&M and monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Day Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
5	**Well Installation (7 Wells)**									
	Planning (7 Wells)									
	Senior Geologist (RG)	$ 110	Hours	3	3.915	L	8	1.00	$ 2,640	$ 3,445
	Field Tech	$ 85	Hours	2	2.61	L	3	1.00	$ 510	$ 666
	Permit Fees, wells and utilities	$ 150	Each	1	1.305	O	7	1.00	$ 1,050	$ 1,370
	Utility Trench Work Planning									
	Senior Engineer (PE)	$ 110	Hours	5	6.525	L	8	1.00	$ 4,400	$ 5,742
	Staff Engineer	$ 90	Hours	5	6.525	L	8	1.00	$ 3,600	$ 4,698
	Field Tech	$ 85	Hours	1	1.305	L	16	1.00	$ 1,360	$ 1,775
	Permit Fees, wells and utilities	$ 750	Each	1	1.305	O	1	1.00	$ 750	$ 979
	Copy/Reproduction/Plotting	$ 300	LS	1	1.305	O	1	1.00	$ 300	$ 392
	Work plan									
	Proj. eng/geo - prepare work plan	$ 100	hr	5	6.525	L	8	1.00	$ 4,000	$ 5,220
	Proj. Mgr - review	$ 110	hr	1	1.305	L	6	1.00	$ 660	$ 861
	Proj. eng/geo - prepare & submit well permit application	$ 100	hr	1	1.305	L	8	1.00	$ 800	$ 1,044
	Proj. Mgr - review	$ 110	hr	2	2.61	L	4	1.00	$ 880	$ 1,148
	Proj. eng/geo - attend precon mtg	$ 110	hr	1	1.305	L	8	1.00	$ 880	$ 1,148
	Utility Clearance									
	Sr. Project Hydro Geologist	$ 105	hr	1	1.305	L	6	1.00	$ 630	$ 822
	Field Technician - Mark boring locations in the field	$ 75	day	1	1.305	L	8	1.00	$ 600	$ 783
	Field Technician - Oversee geophysical utility screenings	$ 75	day	1	1.305	L	8	1.00	$ 600	$ 783
	Truck Rental	$ 100	day	2	2.61	L	1	1.15	$ 230	$ 300
	Private Utility Screening Services - Field Survey	$ 950	ea	1	1.305	O	1	1.15	$ 1,093	$ 1,426
	Air Knife Utility Clearance (7 holes)									
	Proj. Manager	$ 110	hr	1	1.305	L	3	1.00	$ 330	$ 431
	Field Technician - Oversee air vac digging	$ 75	day	1	1.305	L	10	1.00	$ 750	$ 979
	Truck Rental	$ 100	day	1	1.305	L	1	1.15	$ 115	$ 150
	Gregg Drilling air vac	$ 210	hr	1	1.305	L	10	1.15	$ 2,415	$ 3,152
	Boreholes and Sampling									
	Sr. Project Hydro Geologist	$ 105	hr	3	3.915	L	4	1.00	$ 1,260	$ 1,644
	Field Technician - Oversee coring	$ 75	day	2	2.61	L	10	1.00	$ 1,500	$ 1,958
	Truck	$ 75	day	3	3.915	L	1	1.15	$ 259	$ 338
	Subcontractor - Concrete Coring	$ 350	ea	1	1.305	O	7	1.15	$ 2,818	$ 3,677
	Field Technician - Prep	$ 75	day	1	1.305	L	8	1.00	$ 600	$ 783
	Project Engineer/Geologist	$ 90	hour	3	3.915	L	10	1.00	$ 2,700	$ 3,524
	Truck Rental	$ 100	day	3	3.915	L	1	1.15	$ 345	$ 450
	Lodging	$ 100	day	3	3.915	O	1	1.15	$ 345	$ 450
	PID Meter	$ 75	day	3	3.915	O	1	1.15	$ 259	$ 338
	Misc. Field Supplies	$ 200	ea	3	3.915	O	1	1.15	$ 690	$ 900
	55 Gallon Drum	$ 75	ea	10	10	M	1	1.15	$ 863	$ 863
	Forklift	$ 643	ea	1	1.305	O	1	1.15	$ 739	$ 965
	Interface Sounder	$50.00	Day	1	1.305	O	1	1.00	$50.00	$ 65
	BTEX 8260B	$92.00	Each	7	7	M	3	1.00	$303.60	$303.60
	Fuels 8015M	$60.00	Each	7	7	M	3	1.00	$198.00	$198.00
	PAHs	$140.00	Each	7	7	M	3	1.00	$462.00	$462.00
	Metals	$92.00	Each	1	1	M	1	1.00	$92.00	$ 92
	Composite Fee	$ 23	ea	2	2	M	1	1.15	$ 53	$ 53
	Environmental management fee	$ 100	ea	2	2	M	1	1.15	$ 230	$ 230
	Drilling 7 holes 15' ea	$ 2,800	day	3	3.915	L	1	1.15	$ 9,660	$ 12,606
	Sr. Project Hydro Geologist	$ 105	hr	1	1.305	L	6	1.00	$ 630	$ 822
	Field Geologist	$ 85	hr	2	2.61	L	4	1.00	$ 680	$ 887
	Project Engineer/Geologist	$ 90	hr	6	7.83	L	8	1.00	$ 4,320	$ 5,638
	Administrative Support	$ 45	lump	2	2.61	O	8	1.00	$ 720	$ 940
	As-Builts Copies and Plots	$1,500.00	LS	1	1.305	O	1	1.00	$1,500.00	$ 1,958
	Soil Disposal (7 holes)									
	Proj. Manager	$ 110	hr	1	1.305	L	1	1.00	$ 110	$ 144
	Project Engineer/Geologist	$ 100	hr	1	1.305	L	2	1.00	$ 200	$ 261
	Field Technician - Oversee shipping	$ 85	day	1	1.305	L	6	1.00	$ 510	$ 666
	Truck Rental	$ 100	day	1	1.305	L	1	1.15	$ 115	$ 150
	Soil Transport & Disposal	$ 150	drum	10	10	M	1	1.15	$ 1,725	$ 1,725
							Task Subtotal		**$ 62,528**	**$ 80,402**

Alternative 3: Soil Vapor Extraction/Bioventing

former Nestlé Oakland facility
Does not include O&M and monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Day Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
6	**Pilot Test - 1 Month**									
	Senior Engineer/Manager	$ 110	Hours	2	2.61	L	6	1.00	$ 1,320	$ 1,723
	Project Engineer/Geologist	$ 80	Hours	10	13.05	L	4	1.00	$ 3,200	$ 4,176
	Field Technician	$ 70	Hours	8	10.44	L	10	1.00	$ 5,600	$ 7,308
	Mileage	$ 0.55	mi.	8	10.44	O	100	1.00	$ 440	$ 574
	Vehicles	$ 75	Day	8	10.44	L	1	1.00	$ 600	$ 783
	PID, MiniRAE 2000	$ 776	Month	1	1.305	O	1	1.15	$ 893	$ 1,165
	Landtec GA90	$ 1,139	Month	1	1.305	O	1	1.15	$ 1,309	$ 1,709
	Mag Gauge-purchase	$ 75	Each	1	1	M	1	1.15	$ 86	$ 86
	Laboratory Supplied Sample Pump	$ 259	Month	1	1.305	O	1	1.15	$ 298	$ 388
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	2	2	M	2	1.15	$ 444	$ 444
	EPA Method TO-15 (TPHg)	$ 121	Each	2	2	M	2	1.15	$ 555	$ 555
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	2	2	M	2	1.15	$ 926	$ 926
	NIOSH Method 1550 (TPHj)	$ 48	Each	2	2	M	2	1.15	$ 222	$ 222
	Charcoal Filters	$ 35	Each	1	1	M	5	1.15	$ 198	$ 198
	Water traps for PID	$ 40	Pk of 10	1	1	M	1	1.15	$ 46	$ 46
	Misc. expendables (ice, batteries, etc.)	$ 20	Day	8	10.44	O	2	1.15	$ 368	$ 480
	Program Manager	$ 140	hr	1	1.305	L	2	1.00	$ 280	$ 365
							Task Subtotal		**$ 16,786**	**$ 21,150**
7	**System Design and Construction**									
	Design									
	Senior Geologist (RG)	$ 110	Hours	4	5.22	L	4	1.00	$ 1,760	$ 2,297
	Senior Engineer (PE)	$ 110	Hours	5	6.525	L	4	1.00	$ 2,200	$ 2,871
	Staff Engineer	$ 90	Hours	4	5.22	L	8	1.00	$ 2,880	$ 3,758
	Clerical	$ 55	Hours	1	1.305	L	8	1.00	$ 440	$ 574
	Copy/Reproduction/Plotting	$ 110	LS	1	1.305	O	1	1.00	$ 110	$ 144
	Construction									
	Senior Project Hydro Geologist	$ 110	Hours	1	1.305	L	8	1.00	$ 880	$ 1,148
	Senior Engineer	$ 110	Hours	3	3.915	L	8	1.00	$ 2,640	$ 3,445
	Airfare & Lodging	$ 545	Hours	1	1.305	L	1	1.00	$ 545	$ 711
	Senior Engineer	$ 110	Hours	2	2.61	L	8	1.00	$ 1,760	$ 2,297
	Sr. Field Tech	$ 85	Hours	3	3.915	L	8	1.00	$ 2,040	$ 2,662
	Contracted Construction - Electrician	$ 2,000	Hours	1	1.305	L	1	1.15	$ 2,300	$ 3,002
	Senior Engineer	$ 110	Hours	2	2.61	L	4	1.00	$ 880	$ 1,148
	Senior Project Hydro Geologist	$ 110	Hours	1	1.305	L	4	1.00	$ 440	$ 574
	Sr. Field Tech	$ 85	Hours	10	13.05	L	8	1.00	$ 6,800	$ 8,874
	Vehicle (daily rate)	$ 75	Hours	6	7.83	L	4	1.00	$ 1,800	$ 2,349
	Barricade or Similar	$ 250	Hours	1	1.305	L	4	1.00	$ 1,000	$ 1,305
	Blowers and Misc. Equipment and Supplies	$ 2,500	Hours	1	1.305	L	4	1.00	$ 10,000	$ 13,050
	Senior Engineer/Manager	$ 110	Hours	10	13.05	L	4	1.00	$ 4,400	$ 5,742
	Cat/Ox Contracted Construction	$ 20,000	LS	1	1.305	O	1	1.15	$ 23,000	$ 30,015
	Contracted Construction	$ 25,000	LS	1	1.305	O	1	1.15	$ 28,750	$ 37,519
	Construction/Remediation Manager	$ 85	hr	10	13.05	L	1	1.00	$ 850	$ 1,109
	Mileage	$ 0.55	mi.	10	13.05	O	100	1.00	$ 550	$ 718
	Vehicle (daily rate)	$ 75	Day	10	13.05	L	1	1.00	$ 750	$ 979
	Program Manager	$ 140	hr	5	6.525	L	2	1.00	$ 1,400	$ 1,827
							Task Subtotal		**$ 98,175**	**$ 128,118**
8	**Start-Up Monitoring (1 Quarter - 4 Events)**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.22	L	4	1.00	$ 1,760	$ 2,297
	Senior Engineer/Manager	$ 100	Hours	4	5.22	L	4	1.00	$ 1,600	$ 2,088
	Project Engineer/Geologist	$ 80	Hours	4	5.22	L	8	1.00	$ 2,560	$ 3,341
	Field Technician	$ 70	Hours	4	5.22	L	16	1.00	$ 4,480	$ 5,846
	Per Diem	$ 100	Day	4	5.22	L	2	1.00	$ 800	$ 1,044
	Vehicles	$ 100	Day	4	5.22	L	2	1.00	$ 800	$ 1,044
	PID, MiniRAE 2000	$ 350	Week	4	5.22	O	1	1.15	$ 1,610	$ 2,101
	Landtec GA90	$ 450	Week	4	5.22	O	1	1.15	$ 2,070	$ 2,701
	Mag Gauge-purchase	$ 75	Each	4	4	M	0	1.00	$ -	$ -
	Laboratory Supplied Sample Pump	$ 173	Days	4	5.22	O	2	1.00	$ 1,380	$ 1,801
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	4	4	M	4	1.00	$ 1,546	$ 1,546
	EPA Method TO-15 (TPHg)	$ 121	Each	4	4	M	4	1.00	$ 1,932	$ 1,932
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	4	4	M	4	1.00	$ 3,220	$ 3,220
	NIOSH Method 1550 (TPHj)	$ 48	Each	4	4	M	4	1.00	$ 773	$ 773
	Charcoal Filters	$ 35	Each	4	4	M	1	1.00	$ 138	$ 138
	Water traps for PID	$ 40	Pk of 10	4	4	M	0.5	1.00	$ 81	$ 81
	Misc. expendables (ice, batteries, etc.)	$ 20	Day	4	5.22	O	1	1.00	$ 80	$ 104
	Program Manager	$ 140	hr	4	5.22	L	2	1.00	$ 1,120	$ 1,462
							Task Subtotal		**$ 25,949**	**$ 31,518**

Alternative 3: Soil Vapor Extraction/Bioventing

former Nestlé Oakland facility
Does not include O&M and monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Day Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
9	**On-Going Quarterly Performance Monitoring (3 Quarters)**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.22	L	4	1.00	$ 1,760	$ 2,297
	Program Manager	$ 140	hr	4	5.22	L	2	1.00	$ 1,120	$ 1,462
	Monitoring									
	Senior Project Hydro Geologist	$ 120	Hours	4	5.22	L	2	1.00	$ 960	$ 1,253
	Project Engineer	$ 100	Hours	4	5.22	L	8	1.00	$ 3,200	$ 4,176
	Field Tech	$ 70	Hours	4	5.22	L	40	1.00	$ 11,200	$ 14,616
	Sr. Field Tech	$ 85	Hours	4	5.22	L	29	1.00	$ 9,860	$ 12,867
	Vehicles	$ 75	Day	4	5.22	L	10	1.00	$ 3,000	$ 3,915
	PID, MiniRAE 2000	$ 248	Week	4	5.22	O	1	1.00	$ 990	$ 1,292
	Landtec GA90	$ 363	Week	4	5.22	O	1	1.00	$ 1,452	$ 1,895
	Mag Gauge-purchase	$ 75	Each	4	4	M	0	1.00	$ -	$ -
	Laboratory Supplied Sample Pump	$ 86	Week	4	4	O	1	1.00	$ 345	$ 345
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	4	4	M	7	1.00	$ 2,705	$ 2,705
	EPA Method TO-15 (TPHg)	$ 121	Each	4	4	M	7	1.00	$ 3,381	$ 3,381
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	4	4	M	7	1.00	$ 5,635	$ 5,635
	NIOSH Method 1550 (TPHj)	$ 48	Each	4	4	M	7	1.00	$ 1,352	$ 1,352
	Charcoal Filters	$ 35	Each	4	4	M	5	1.00	$ 690	$ 690
	Water traps for PID	$ 40	Pk of 10	4	4	M	0.5	1.00	$ 81	$ 81
	Misc. expendables (ice, batteries, etc.)	$ 50	Day	4	5.22	O	1	1.00	$ 200	$ 261
	Quarterly report									
	Senior Project Hydro Geologist	$ 120	Hours	4	5.22	L	2	1.00	$ 960	$ 1,253
	Senior Engineer	$ 110	Hours	4	5.22	L	2	1.00	$ 880	$ 1,148
	Project Engineer	$ 100	Hours	4	5.22	L	48	1.00	$ 19,200	$ 25,056
	Project Engineer	$ 100	Hours	4	5.22	L	16	1.00	$ 6,400	$ 8,352
	Clerical	$ 55	Hours	4	5.22	L	2	1.00	$ 440	$ 574
	Copy/Reproduction/Plotting	$ 50	LS	4	5.22	O	1	1.00	$ 200	$ 261
	Annual Respiration Test?									
	Senior Project Hydro Geologist	$ 120	Hours	1	1.305	L	16	1.00	$ 1,920	$ 2,506
	Project Engineer	$ 100	Hours	1	1.305	L	40	1.00	$ 4,000	$ 5,220
	Field Tech	$ 70	Hours	1	1.305	L	64	1.00	$ 4,480	$ 5,846
	Sr. Field Tech	$ 85	Hours	1	1.305	L	64	1.00	$ 5,440	$ 7,099
	Vehicles	$ 75	Day	1	1.305	L	10	1.00	$ 750	$ 979
	PID, MiniRAE 2000	$ 248	Week	1	1.305	O	1	1.00	$ 248	$ 323
	Landtec GA90	$ 363	Week	1	1.305	O	1	1.00	$ 363	$ 474
	Laboratory Supplied Sample Pump	$ 86	Week	1	1.305	O	1	1.00	$ 86	$ 113
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	1	1	M	7	1.00	$ 676	$ 676
	Charcoal Filters	$ 35	Each	1	1	M	5	1.00	$ 173	$ 173
	Water traps for PID	$ 40	Pk of 10	1	1	M	0.5	1.00	$ 20	$ 20
	Misc. expendables (ice, batteries, etc.)	$ 50	Day	1	1.305	O	1	1.00	$ 50	$ 65
							Task Subtotal		**$ 94,216**	**$ 118,360**
10	**Operations and Maintenance**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.22	L	4	1.00	$ 1,760	$ 2,297
	Construction/Remediation Manager	$ 85	Hours	4	5.22	L	8	1.00	$ 2,720	$ 3,550
	Vehicle (daily rate)	$ 75	Day	4	5.22	L	1	1.00	$ 300	$ 392
	Misc. Expendables	$ 11	Day	4	5.22	O	1	1.00	$ 44	$ 57
	Program Manager	$ 140	hr	4	5.22	L	2	1.00	$ 1,120	$ 1,462
							Task Subtotal		**$ 5,944**	**$ 7,757**
11	**Database Management**									
	Proj. Engineer/Geologist	$ 100	hr	4	5.22	L	8	1.00	$ 3,200	$ 4,176
	Sr. Engineer/Project Manager Review	$ 110	hr	4	5.22	L	2	1.00	$ 880	$ 1,148
							Task Subtotal		**$ 4,080**	**$ 5,324**
12	**Other (Presentations, Conference Calls, etc.)**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.22	L	8	1.00	$ 3,520	$ 4,594
	Additional Laboratory Analysis Suite (Sub)	$ 750	lump	1	1.305	O	1	1.15	$ 863	$ 1,126
	Program Manager	$ 140	hr	4	5.22	L	2	1.00	$ 1,120	$ 1,462
							Task Subtotal		**$ 5,503**	**$ 7,181**
13	**Risk Assessment, Deed Restriction and Closure Request**									
	Outside Risk Assessor	$ 38,000	LS	1	1.305	O	1	1.00	$ 38,000	$ 49,590
							Task Subtotal		**$ 38,000**	**$ 49,590**
	*Assumes No Inflation and No Rate Increases Per Year									
					TOTAL PROJECT COST:				**$ 593,669**	**$ 711,557**

Alternative 4: In-Situ Chemical Oxidation

former Nestlé Oakland facility
Does not include O&M and Monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Days Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
1	**Air Permitting**									
	Program Manager	$ 140	hr	2	2.68	L	3	1.00	$ 840	$ 1,126
	Senior Engineer/Geologist	$ 110	hr	6	8.04	L	8	1.00	$ 5,280	$ 7,075
	Project Engineer/Geologist	$ 90	hr	3	4.02	L	4	1.00	$ 1,080	$ 1,447
	Senior Engineer/Geologist-Monthly Reports	$ 110	hr	12	16.08	L	1	1.00	$ 1,320	$ 1,769
	Project Engineer/Geologist-Monthly Reports	$ 90	hr	12	16.08	L	2	1.00	$ 2,160	$ 2,894
	Annual Air Permitting Fees	$ 3,500	LS	1	1.34	O	1	1.15	$ 4,025	$ 5,394
								Task Subtotal	**$ 14,705**	**$ 19,705**
2	**Health and Safety Plan**									
	Project Engineer/Geologist	$ 90	hr	1	1.34	L	8	1.00	$ 720	$ 965
	Senior Engineer/Geologist	$ 110	hr	1	1.34	L	5	1.00	$ 550	$ 737
								Task Subtotal	**$ 1,270**	**$ 1,702**
3	**Continue Interaction with RWQCB**									
	Sr. Engineer/Project Manager	$ 110	hr	8	10.72	L	4	1.00	$ 3,520	$ 4,717
	Program Manager	$ 140	hr	4	5.36	L	2	1.00	$ 1,120	$ 1,501
								Task Subtotal	**$ 4,640**	**$ 6,218**
4	**Building Demolition**									
	ECM Demolition Planning, Sampling and Oversight	$ 46,878	hr	1	1.34	L	1	1.00	$ 46,878	$ 62,816
	Land Survey/Utilities Locator	$ 1,500	LS	1	1.34	O	1	1.15	$ 1,725	$ 2,312
	Demolition Contractor including Disposal	$ 5	Sqft	1	1	M	35600	1.00	$ 178,000	$ 178,000
								Task Subtotal	**$ 226,603**	**$ 243,128**
5	**Well Installation (7 Wells)**									
	Planning (7 Wells)									
	Senior Geologist (RG)	$ 110	Hours	4	5.36	L	8	1.00	$ 3,520	$ 4,717
	Field Tech	$ 85	Hours	2	2.68	L	3	1.00	$ 510	$ 683
	Permit Fees, wells and utilities	$ 300	Each	1	1.34	O	7	1.00	$ 2,100	$ 2,814
	Utility Trench Work Planning									
	Senior Engineer (PE)	$ 110	Hours	5	6.7	L	8	1.00	$ 4,400	$ 5,896
	Staff Engineer	$ 90	Hours	5	6.7	L	8	1.00	$ 3,600	$ 4,824
	Field Tech	$ 85	Hours	1	1.34	L	16	1.00	$ 1,360	$ 1,822
	Permit Fees, wells and utilities	$ 750	Each	1	1.34	O	1	1.00	$ 750	$ 1,005
	Copy/Reproduction/Plotting	$ 300	LS	1	1.34	O	1	1.00	$ 300	$ 402
	Work plan									
	Proj. eng/geo - prepare work plan	$ 100	hr	5	6.7	L	8	1.00	$ 4,000	$ 5,360
	Proj. Mgr - review	$ 110	hr	1	1.34	L	6	1.00	$ 660	$ 884
	Proj. eng/geo - prepare & submit well permit application	$ 100	hr	1	1.34	L	8	1.00	$ 800	$ 1,072
	Proj. Mgr - review	$ 110	hr	2	2.68	L	4	1.00	$ 880	$ 1,179
	Proj. eng/geo - attend precon mtg	$ 110	hr	1	1.34	L	8	1.00	$ 880	$ 1,179
	Utility Clearance									
	Sr. Project Hydro Geologist	$ 105	hr	1	1.34	L	6	1.00	$ 630	$ 844
	Field Technician - Mark boring locations in the field	$ 75	day	1	1.34	L	8	1.00	$ 600	$ 804
	Field Technician - Oversee geophysical utility screenings	$ 75	day	1	1.34	L	8	1.00	$ 600	$ 804
	Truck Rental	$ 100	day	2	2.68	L	1	1.15	$ 230	$ 308
	Private Utility Screening Services - Field Survey	$ 950	ea	1	1.34	O	1	1.15	$ 1,093	$ 1,464
	Air Knife Utility Clearance (7 holes)									
	Proj. Manager	$ 110	hr	1	1.34	L	3	1.00	$ 330	$ 442
	Field Technician - Oversee air vac digging	$ 75	day	1	1.34	L	10	1.00	$ 750	$ 1,005
	Truck Rental	$ 100	day	1	1.34	L	1	1.15	$ 115	$ 154
	Gregg Drilling air vac	$ 210	hr	1	1.34	L	10	1.15	$ 2,415	$ 3,236
	Boreholes and Sampling									
	Sr. Project Hydro Geologist	$ 105	hr	3	4.02	L	4	1.00	$ 1,260	$ 1,688
	Field Technician - Oversee coring	$ 75	day	2	2.68	L	10	1.00	$ 1,500	$ 2,010
	Truck	$ 75	day	3	4.02	L	1	1.15	$ 259	$ 347
	Subcontractor - Concrete Coring	$ 350	ea	1	1.34	O	7	1.15	$ 2,818	$ 3,775
	Field Technician - Prep	$ 75	day	1	1.34	L	8	1.00	$ 600	$ 804
	Project Engineer/Geologist	$ 90	hour	3	4.02	L	10	1.00	$ 2,700	$ 3,618
	Truck Rental	$ 100	day	3	4.02	L	1	1.15	$ 345	$ 462
	Lodging	$ 100	day	3	4.02	O	1	1.15	$ 345	$ 462
	PID Meter	$ 75	day	3	4.02	O	1	1.15	$ 259	$ 347
	Misc. Field Supplies	$ 200	ea	3	4.02	O	1	1.15	$ 690	$ 925
	55 Gallon Drum	$ 75	ea	10	10	M	1	1.15	$ 863	$ 863
	Forklift	$ 643	ea	1	1.34	O	1	1.15	$ 739	$ 991
	Interface Sounder	$50.00	Day	1	1.34	O	1	1.00	$50.00	$ 67
	BTEX 8260B	$92.00	Each	7	7	M	3	1.00	$303.60	$303.60
	Fuels 8015M	$60.00	Each	7	7	M	3	1.00	$198.00	$198.00
	PAHs	$140.00	Each	7	7	M	3	1.00	$462.00	$462.00
	Metals	$92.00	Each	1	1	M	1	1.00	$92.00	$ 92
	Composite Fee	$ 23	ea	2	2	M	1	1.15	$ 53	$ 53
	Environmental management fee	$ 100	ea	2	2	M	1	1.15	$ 230	$ 230
	Drilling 7 holes 15' ea	$ 2,800	day	3	4.02	L	1	1.15	$ 9,660	$ 12,944
	Sr. Project Hydro Geologist	$ 105	hr	1	1.34	L	6	1.00	$ 630	$ 844
	Field Geologist	$ 85	hr	2	2.68	L	4	1.00	$ 680	$ 911
	Project Engineer/Geologist	$ 90	hr	6	8.04	L	8	1.00	$ 4,320	$ 5,789
	Administrative Support	$ 45	lump	2	2.68	O	8	1.00	$ 720	$ 965
	As-Builts Copies and Plots	$1,500.00	LS	1	1.34	O	1	1.00	$1,500.00	$ 2,010
	Soil Disposal (7 holes)									
	Proj. Manager	$ 110	hr	1	1.34	L	1	1.00	$ 110	$ 147
	Project Engineer/Geologist	$ 100	hr	1	1.34	L	2	1.00	$ 200	$ 268
	Field Technician - Oversee shipping	$ 85	day	1	1.34	L	6	1.00	$ 510	$ 683
	Truck Rental	$ 100	day	1	1.34	L	1	1.15	$ 115	$ 154
	Soil Transport & Disposal	$ 150	drum	10	10	M	1	1.15	$ 1,725	$ 1,725
								Task Subtotal	**$ 64,458**	**$ 85,039**

Alternative 4: In-Situ Chemical Oxidation

former Nestlé Oakland facility
Does not include O&M and Monitoring Past Year 1

Task No.	Task Description	Rate/ Unit	Units	Days Min	Days Max	Cost Code	Units/ Day	Mult.	Cost low	Cost high
6	**Pilot Test - 1 Month**									
	Ozone generator onsite - Rental	$ 3,000	week	4	5.36	O	1	1.00	$ 12,000	$ 16,080
	Ozone generator - electrical installation	$ 1,500	LS	1	1	M	1	1.00	$ 1,500	$ 1,500
	Ozone generator piping and installation	$ 6,000	LS	1	1	M	1	1.00	$ 6,000	$ 6,000
	Field Technician	$ 70	Hours	8	10.72	L	10	1.00	$ 5,600	$ 7,504
	Senior Engineer/Manager	$ 110	Hours	4	5.36	L	6	1.00	$ 2,640	$ 3,538
	Project Engineer/Geologist	$ 80	Hours	10	13.4	L	6	1.00	$ 4,800	$ 6,432
	Field Technician	$ 70	Hours	10	13.4	L	10	1.00	$ 7,000	$ 9,380
	Mileage	$ 0.55	mi.	8	10.72	O	100	1.00	$ 440	$ 590
	Vehicles	$ 75	Day	8	10.72	L	1	1.00	$ 600	$ 804
	PID, MiniRAE 2000	$ 776	Month	1	1.34	O	1	1.15	$ 893	$ 1,196
	Landtec GA90	$ 1,139	Month	1	1.34	O	1	1.15	$ 1,309	$ 1,754
	Mag Gauge-purchase	$ 75	Each	1	1	M	1	1.15	$ 86	$ 86
	Laboratory Supplied Sample Pump	$ 259	Month	1	1.34	O	1	1.15	$ 298	$ 399
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	2	2	M	2	1.15	$ 444	$ 444
	EPA Method TO-15 (TPHg)	$ 121	Each	2	2	M	2	1.15	$ 555	$ 555
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	2	2	M	2	1.15	$ 926	$ 926
	NIOSH Method 1550 (TPHj)	$ 48	Each	2	2	M	2	1.15	$ 222	$ 222
	Charcoal Filters	$ 35	Each	1	1	M	5	1.15	$ 198	$ 198
	Water traps for PID	$ 40	Pk of 10	1	1	M	1	1.15	$ 46	$ 46
	Misc. expendables (ice, batteries, etc.)	$ 20	Day	8	10.72	O	2	1.15	$ 368	$ 493
	Program Manager	$ 140	hr	1	1.34	L	2	1.00	$ 280	$ 375
							Task Subtotal		**$ 46,206**	**$ 58,524**
7	**System Design and Construction**									
	Design									
	Senior Geologist (RG)	$ 110	Hours	10	13.4	L	4	1.00	$ 4,400	$ 5,896
	Senior Engineer (PE)	$ 110	Hours	10	13.4	L	4	1.00	$ 4,400	$ 5,896
	Staff Engineer	$ 90	Hours	8	10.72	L	8	1.00	$ 5,760	$ 7,718
	Clerical	$ 55	Hours	1	1.34	L	8	1.00	$ 440	$ 590
	Copy/Reproduction/Plotting	$ 110	LS	1	1.34	O	1	1.00	$ 110	$ 147
	Construction									
	oxygen feed to ozone generator and ozone injection sys	$ 130,000	LS	1	1.34	O	1	1.00	$ 130,000	$ 174,200
	Ozone generator onsite - purchase	$ 65,000	LS	1	1	M	1	1.00	$ 65,000	$ 65,000
	Support utilities and site preparation for system	$ 97,500	LS	1	1	M	1	1.00	$ 97,500	$ 97,500
	Field Technician	$ 70	Hours	20	26.8	L	10	1.00	$ 14,000	$ 18,760
	Vehicle (daily rate)	$ 75	day	20	26.8	L	1	1.00	$ 1,500	$ 2,010
	Senior Engineer/Manager	$ 110	Hours	2	2.68	L	6	1.00	$ 1,320	$ 1,769
	Senior Project Hydro Geologist	$ 110	Hours	1	1.34	L	8	1.00	$ 880	$ 1,179
	Senior Engineer	$ 110	Hours	3	4.02	L	8	1.00	$ 2,640	$ 3,538
	Airfare & Lodging	$ 545	Hours	1	1.34	L	1	1.00	$ 545	$ 730
	Senior Engineer	$ 110	Hours	2	2.68	L	8	1.00	$ 1,760	$ 2,358
	Sr. Field Tech	$ 85	Hours	3	4.02	L	8	1.00	$ 2,040	$ 2,734
	Contracted Construction - Electrician	$ 2,000	Hours	0	0	L	1	1.15	$ -	$ -
	Senior Engineer	$ 110	Hours	0	0	L	4	1.00	$ -	$ -
	Senior Project Hydro Geologist	$ 110	Hours	0	0	L	4	1.00	$ -	$ -
	Sr. Field Tech	$ 85	Hours	0	0	L	8	1.00	$ -	$ -
	Barricade or Similar	$ 250	Hours	1	1.34	L	4	1.00	$ 1,000	$ 1,340
	Blowers and Misc. Equipment and Supplies	$ 2,500	Hours	0	0	L	4	1.00	$ -	$ -
	Senior Engineer/Manager	$ 110	Hours	0	0	L	4	1.00	$ -	$ -
	Cat/Ox Contracted Construction	$ 20,000	LS	0		O	1	1.15	$ -	$ -
	Contracted Construction	$ 25,000	LS	0		O	1	1.15	$ -	$ -
	Construction/Remediation Manager	$ 85	5	10	13.4	L	1	1.00	$ 850	$ 1,139
	Mileage	$ 0.55	mi.	10	13.4	O	100	1.00	$ 550	$ 737
	Vehicle (daily rate)	$ 75	5	10	13.4	L	1	1.00	$ 750	$ 1,005
	Program Manager	$ 140	hr	5	6.7	L	2	1.00	$ 1,400	$ 1,876
							Task Subtotal		**$ 336,845**	**$ 396,122**

Alternative 4: In-Situ Chemical Oxidation

former Nestlé Oakland facility
Does not include O&M and Monitoring Past Year 1

Task No.	**Task Description**	**Rate/ Unit**	**Units**	**Days Min**	**Days Max**	**Cost Code**	**Units/ Day**	**Mult.**	**Cost low**	**Cost high**
8	**Start-Up Monitoring (1 Quarter - 4 Events)**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.36	L	4	1.00	$ 1,760	$ 2,358
	Senior Engineer/Manager	$ 100	Hours	4	5.36	L	8	1.00	$ 3,200	$ 4,288
	Project Engineer/Geologist	$ 80	Hours	4	5.36	L	8	1.00	$ 2,560	$ 3,430
	Field Technician	$ 70	Hours	4	5.36	L	16	1.00	$ 4,480	$ 6,003
	Per Diem	$ 100	Day	4	5.36	L	2	1.00	$ 800	$ 1,072
	Vehicles	$ 100	Day	4	5.36	L	2	1.00	$ 800	$ 1,072
	PID, MiniRAE 2000	$ 350	Week	4	5.36	O	1	1.15	$ 1,610	$ 2,157
	Landtec GA90	$ 450	Week	4	5.36	O	1	1.15	$ 2,070	$ 2,774
	Mag Gauge-purchase	$ 75	Each	4	4	M	0	1.00	$ -	$ -
	Laboratory Supplied Sample Pump	$ 173	Days	4	5.36	O	2	1.00	$ 1,380	$ 1,849
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	4	4	M	4	1.00	$ 1,546	$ 1,546
	EPA Method TO-15 (TPHg)	$ 121	Each	4	4	M	4	1.00	$ 1,932	$ 1,932
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	4	4	M	4	1.00	$ 3,220	$ 3,220
	NIOSH Method 1550 (TPHj)	$ 48	Each	4	4	M	4	1.00	$ 773	$ 773
	Charcoal Filters	$ 35	Each	4	4	M	1	1.00	$ 138	$ 138
	Water traps for PID	$ 40	Pk of 10	4	4	M	0.5	1.00	$ 81	$ 81
	Misc. expendables (ice, batteries, etc.)	$ 20	Day	4	5.36	O	1	1.00	$ 80	$ 107
	Program Manager	$ 140	hr	4	5.36	L	2	1.00	$ 1,120	$ 1,501
							Task Subtotal		**$ 27,549**	**$ 34,301**
9	**On-Going Quarterly Performance Monitoring (3 Quarters)**									
	Sr. Engineer/Project Manager	$ 110	hr	4	5.36	L	4	1.00	$ 1,760	$ 2,358
	Program Manager	$ 140	hr	4	5.36	L	2	1.00	$ 1,120	$ 1,501
	Monitoring									
	Senior Project Hydro Geologist	$ 120	Hours	4	5.36	L	2	1.00	$ 960	$ 1,286
	Project Engineer	$ 100	Hours	4	5.36	L	8	1.00	$ 3,200	$ 4,288
	Field Tech	$ 70	Hours	4	5.36	L	40	1.00	$ 11,200	$ 15,008
	Sr. Field Tech	$ 85	Hours	4	5.36	L	29	1.00	$ 9,860	$ 13,212
	Vehicles	$ 75	Day	4	5.36	L	10	1.00	$ 3,000	$ 4,020
	PID, MiniRAE 2000	$ 248	Week	4	5.36	O	1	1.00	$ 990	$ 1,327
	Landtec GA90	$ 363	Week	4	5.36	O	1	1.00	$ 1,452	$ 1,946
	Mag Gauge-purchase	$ 75	Each	4	4	M	0	1.00	$ -	$ -
	Laboratory Supplied Sample Pump	$ 86	Week	4	5.36	O	1	1.00	$ 345	$ 462
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	4	4	M	7	1.00	$ 2,705	$ 2,705
	EPA Method TO-15 (TPHg)	$ 121	Each	4	4	M	7	1.00	$ 3,381	$ 3,381
	EPA Method TO-15 (VOCs, et. al.)	$ 201	Each	4	4	M	7	1.00	$ 5,635	$ 5,635
	NIOSH Method 1550 (TPHj)	$ 48	Each	4	4	M	7	1.00	$ 1,352	$ 1,352
	Charcoal Filters	$ 35	Each	4	4	M	5	1.00	$ 690	$ 690
	Water traps for PID	$ 40	Pk of 10	4	4	M	0.5	1.00	$ 81	$ 81
	Misc. expendables (ice, batteries, etc.)	$ 50	Day	4	5.36	O	1	1.00	$ 200	$ 268
	Quarterly report									
	Senior Project Hydro Geologist	$ 120	Hours	4	5.36	L	2	1.00	$ 960	$ 1,286
	Senior Engineer	$ 110	Hours	4	5.36	L	2	1.00	$ 880	$ 1,179
	Project Engineer	$ 100	Hours	4	5.36	L	48	1.00	$ 19,200	$ 25,728
	Project Engineer	$ 100	Hours	4	5.36	L	16	1.00	$ 6,400	$ 8,576
	Clerical	$ 55	Hours	4	5.36	L	2	1.00	$ 440	$ 590
	Copy/Reproduction/Plotting	$ 50	LS	4	5.36	O	1	1.00	$ 200	$ 268
	Annual Respiration Test?									
	Senior Project Hydro Geologist	$ 120	Hours	1	1.34	L	16	1.00	$ 1,920	$ 2,573
	Project Engineer	$ 100	Hours	1	1.34	L	40	1.00	$ 4,000	$ 5,360
	Field Tech	$ 70	Hours	1	1.34	L	64	1.00	$ 4,480	$ 6,003
	Sr. Field Tech	$ 85	Hours	1	1.34	L	64	1.00	$ 5,440	$ 7,290
	Vehicles	$ 75	Day	1	1.34	L	10	1.00	$ 750	$ 1,005
	PID, MiniRAE 2000	$ 248	Week	1	1.34	O	1	1.00	$ 248	$ 332
	Landtec GA90	$ 363	Week	1	1.34	O	1	1.00	$ 363	$ 486
	Laboratory Supplied Sample Pump	$ 86	Week	1	1.34	O	1	1.00	$ 86	$ 116
	ASTM Method 1946 (Fixed Gases)	$ 97	Each	1	1	M	7	1.00	$ 676	$ 676
	Charcoal Filters	$ 35	Each	1	1	M	5	1.00	$ 173	$ 173
	Water traps for PID	$ 40	Pk of 10	1	1	M	0.5	1.00	$ 20	$ 20
	Misc. expendables (ice, batteries, etc.)	$ 50	Day	1	1.34	O	1	1.00	$ 50	$ 67
							Task Subtotal		**$ 94,216**	**$ 121,248**
10	**Operations and Maintenance**									
	Sr. Engineer/Project Manager	$ 110	hr	52	69.68	L	1	1.00	$ 5,720	$ 7,665
	Construction/Remediation Manager	$ 85	Hours	52	69.68	L	4	1.00	$ 17,680	$ 23,691
	Vehicle (daily rate)	$ 75	Day	52	69.68	L	1	1.00	$ 3,900	$ 5,226
	Misc. Expendables	$ 11	Day	52	69.68	O	1	1.00	$ 572	$ 766
	Program Manager	$ 140	hr	52	69.68	L	2	1.00	$ 14,560	$ 19,510
							Task Subtotal		**$ 42,432**	**$ 56,859**
11	**Database Management**									
	Proj. Engineer/Geologist	$ 100	hr	8	10.72	L	8	1.00	$ 6,400	$ 8,576
	Sr. Engineer/Project Manager Review	$ 110	hr	8	10.72	L	2	1.00	$ 1,760	$ 2,358
							Task Subtotal		**$ 8,160**	**$ 10,934**
12	**Other (Presentations, Conference Calls, etc.)**									
	Sr. Engineer/Project Manager	$ 110	hr	12	16.08	L	8	1.00	$ 10,560	$ 14,150
	Additional Laboratory Analysis Suite (Sub)	$ 750	lump	1	1.34	O	1	1.15	$ 863	$ 1,156
	Program Manager	$ 140	hr	4	5.36	L	2	1.00	$ 1,120	$ 1,501
							Task Subtotal		**$ 12,543**	**$ 16,807**
13	**Risk Assessment, Deed Restriction and Closure Request**									
	Outside Risk Assessor	$ 38,000	LS	1	1.34	O	1	1.00	$ 38,000	$ 50,920
							Task Subtotal		**$ 38,000**	**$ 50,920**
*Assumes No Inflation and No Rate Increases Per Year										
						TOTAL PROJECT COST:			**$ 917,627**	**$ 1,101,506**

Alternative 5: Institutional Controls

former Nestlé Oakland

Task Number	Task Description	Cost Estimates *Low*	Cost Estimates *High*
1	Ongoing Coordination/Meetings with Existing Property Owners	$7,640	$14,200
2	Meetings and Correspondence with ACHS	$16,900	$21,800
3	Response to Comments on Revised CAP	$17,800	$37,300
4	Review and resubmittal of Final CAP	$38,000	$45,600
5	Submittal of RAP/Public review process	$19,240	$25,400
6	Formal closure request to ACHC	$27,600	$38,300
7	On-going inspections and maintenannce of institutional controls (up to 5 years)	$38,000	$52,500
TOTAL PROJECT COST:		$165,180	$235,100

Appendix F: Regulatory Correspondence

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

November 14, 2002

Mr. Binayak Acharya
Nestle' USA
800 North Brand Blvd.
Glendale, CA 91203

Dear Mr. Acharya:

Subject: Fuel Leak Case RO0000018, 1310 14th St., Oakland CA 94607

Alameda County Environmental Health, Local Oversight Program (LOP), has discussed the current and future status of the referenced site with Mr. Roger Brewer of the SFRWQCB. As you are aware, we have concurred with the destruction of all but eleven (11) wells required to monitor the stability of the petroleum plume. These wells should be monitored semi-annually for a period of two years. Should the plume be verified as not migrating, with concentrations of contaminants not migrating off-site above MCLs, you may request site closure after completing the requested monitoring. The City of Oakland will be required to ensure that the requirements of the deed restriction on this property are maintained in the future.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, files
  Mr. B. Searcy, ETIC Engineering, 2285 Morello Ave., Pleasant Hill, CA 94523
  Mr. R. Brewer, SFRWQCB

Stat1310 14thSt