SITE INVESTIGATION WORK PLAN
FORMER GROVE STREET WASH RACK SITE
3884 MARTIN LUTHER KING JUNIOR WAY
OAKLAND, CALIFORNIA

Prepared for:

Cotter and Coyle LLC
2847 Arguello Drive
Burlingame, California 94010

Prepared by:

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July 2013

IDENTIFICATION FORM

Document Title: **SITE INVESTIGATION WORK PLAN**
FORMER GROVE STREET WASH RACK SITE
3884 Martin Luther King Junior Way
Oakland, California 94609

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Mr. Neil and Mrs. Mary Cotter
2847 Arguello Drive
Burlingame, CA 94010

July, 2014

Ms. Karel Detterman
Alameda County Environmental Health Services
1131 Harbor Bay Parkway

Subject: Responsible Party Perjury Statement for Site Investigation Workplan, Former Grove Street Wash Rack Site, 3884 Martin Luther King Jr. Way Oakland, California (Fuel Leak Case RO000027 and Global ID # T0600102106)

Dear Ms. Detterman:

Attached for your review please find the URS 2nd Quarterly Monitoring and Sampling Report with the results of the soil and groundwater investigation at the above referenced site.

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.

Sincerely,

Neil and Mary Cotter

APPROVAL FORM

Prepared for: Cotter and Coyle LLC
2847 Arguello Drive
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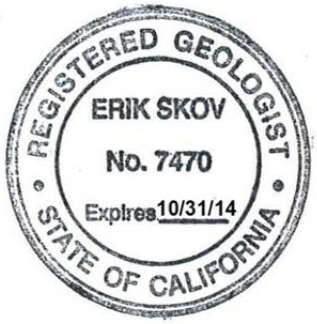
Signature: _____ Date: July 5, 2013
Name: Des Garner
Title: Senior Project Manager

Signature: _____ Date: July 5, 2013
Name: Erik Skov, PG, CHG
Title: Senior Project Geologist



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1.0 INTRODUCTION

URS Corporation (URS) has prepared this work plan on behalf of Cotter and Coyle LLC (Cotter) to conduct a site investigation and pilot study for in situ remediation at the Former Grove Street Wash Rack Site, located at 3884 Martin Luther King, Jr. Way (MLK Jr. Way) in Oakland, California (Figure 1).

This work plan presents the approach for the site investigation to better understand the horizontal and vertical extent of petroleum hydrocarbon contamination in shallow soil and groundwater at the Site. The site is to be redeveloped for residential and commercial use, and will have an underground garage that occupies the entire footprint of the Site. Soil will be excavated for off-site disposal to a depth of approximately 12 feet below existing grade level across the entire site in order for the garage to be constructed. Consequently, this investigation will focus on soil remaining on site after excavation (at depths greater than 12 feet bgs). The fieldwork will be implemented upon approval of the work plan. This work plan is based on previous investigations conducted at the Site by John Carver Consulting (JCC) and URS.

The objective of this work plan is to provide the necessary data to address existing data gaps at the site so that Alameda County Health Agency can advance the site towards closure under the State Water Resources Control Board (SWRCB) Low Threat Closure Policy. This requires the necessary data to complete the County's Data Gaps Identification Tool (DGIT).

In addition to this Introduction, this work plan contains:

- Section 2, Site Background, including Site Use History, and current Site Land Conditions and Use;
- Section 3, Site Characterization, including geology;
- Section 4, Current Site Conditions, including contaminant distribution in the subsurface;
- Section 5, Project Objectives and Organization;
- Section 6, Project Implementation;
- Section 7, Quality Assurance Project Plan; and
- Section 8, Reporting.

Supporting data are included on figures, in tables, in Appendices A through D.

2.0 SITE BACKGROUND

2.1 SITE LOCATION AND HISTORICAL USES

The Site is in a mixed commercial and residential area in the City of Oakland, California. It occupies approximately 10,250 square feet, and is identified as Assessor's Parcel Number (APN) 012-0968-31. The property is zoned for residential use.

The Site is bordered by the following:

- North: 39th Street, followed by a retail business;
- East: the Highway 24 right-of-way, followed by the MacArthur BART station;
- South: a multi-story residential/commercial building; and
- West: MLK Jr. Way, followed by residential and vacant properties.

The Site is the former location of the Grove Street Wash Rack and Lucky's Auto. Known historical Site uses include the following:

- A gas station operated on the Site in the 1950s and 1960s. Three underground storage tanks (USTs) from the gas station were removed on January 5, 1995.
- An auto body shop operated on the eastern portion of the Site until at least 2004.

A fuel and feed store and fuel yard operated at the adjacent parcel to the south (3860 MLK Jr. Way) from the 1930s to the 1950s. A lumber store and warehouse operated on the parcel in the 1960s, but the business closed and the buildings were demolished in 1971. The City of Oakland purchased the adjacent parcel in 1989, and it was redeveloped into a multi-story residential and commercial building in 2006.

2.2 CURRENT SITE CONDITIONS AND USE

The Site is currently not in use. The former Site buildings have been removed, and only concrete pads and paved areas remain on the Site, with the exception of a large advertising billboard along the southern edge of the parcel.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

2.3.1 Summary of Site Historical Investigations

The following timeline summarizes the environmental investigations and removal activities at the Site:

- 01/05/95: Tanks #1, #2, and #3 were removed from Site. Soil samples were collected under Alameda County Environmental Health Department (ACEHD) observation.
- 01/17/95: Tank Removal Report prepared by Scott Environmental.
- 05/10/95: ACEHD issues a letter requiring additional work to be carried out at the Site to define the extent of contamination.
- 07/17/96: Letter by H_2O GEOL presents laboratory results of a stockpile sample.
- 09/10/02: State Water Resources Control Board (SWRCB) publishes a letter of Notice of Removal from the UST Clean-up Fund. No subsequent data in ACEHD files.
- 9/17/2004: URS issues an Environmental Investigation Report for the Site.
- 10/12/05: JCC prepares a Work Plan for additional investigation.
- 02/02/06: ACEHD approved the JCC Work Plan with technical comments.
- 03/10/06: JCC issues a Report of Soil and Groundwater Investigation summarizing the soil and grab groundwater results from 8 boreholes.
- 11/12/2006: JCC Issues a Work Plan for Additional Investigation and Remediation at the Site.
- 4/2/2007: ACDEH issues a letter with technical comments on the JCC Work Plan.

No further site investigations have been performed since 2006. The key environmental reports and agency correspondence are summarized in Sections 2.3.2 to 2.3.7.

2.3.2 Scott Environmental, UST Removal Report, January 1995

A limited soil sampling was conducted by Scott Environmental during the removal of three USTs from the H&L Luckett property (Lucky's Auto Body Site) at 3884 MLK Jr. Way in Oakland. Tanks #1 and #2, both gasoline tanks with 650-gallon capacity, were located beneath the City sidewalk along MLK Jr. Way; and Tank #3 (a 500-gallon gasoline tank), was located within the subject property along 39th Street (Figure 2). Tanks #2 and #3 were found to have one or more holes caused by corrosion. Tank #1 split into two pieces at the welded seam during removal, but no holes were noted.

One soil sample was collected from each of the excavated UST pits, and analytical results indicated detectable concentrations of total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX), and lead. The soil sample collected beneath the excavation of Tank #1 contained TPH-g (35 milligrams per kilogram [mg/kg]), benzene (590 micrograms per kilogram [µg/kg]), toluene (570 µg/kg), ethylbenzene (1,300 µg/kg), xylenes (5,400 µg/kg), and lead (2.6 mg/kg). The soil sample collected beneath the excavation of Tank #2 contained TPH-g (140 mg/kg), benzene (610 µg/kg), toluene (960 µg/kg), ethylbenzene (580 µg/kg), xylenes (9,700 µg/kg), and lead (7.9 mg/kg). The soil sample collected beneath the excavation of Tank #3 contained TPH-g (18 mg/kg), benzene (340 µg/kg), toluene (400 µg/kg), ethylbenzene (850 µg/kg), xylenes (4,600 µg/kg), and lead (3.4 mg/kg). The excavated soil was returned to the pits after tank removal; no contaminated soil was off-hauled for disposal.

2.3.3 H_2O GEOL, 1996, Soil Stockpile Sampling

In August 1996, H_2O GEOL collected one random sample from a soil stockpile on the Site, and reported that no TPH-g or BTEX were detected in the sample. H_2O GEOL reported the findings to the Alameda County Health Care Services in a letter dated September 17, 1996 (H_2O GEOL, 1996). The nature or origin of the soil stockpile was not discussed in the letter.

2.3.4 URS, 2004, Environmental Investigation

In 2004, URS performed a soil and grab groundwater investigation at the Site. The investigation also included a geophysical survey to detect potential USTs and identify utility lines. No USTs were detected by the geophysical survey. The investigation included 19 surface soil samples, 57 subsurface soil samples, 10 grab groundwater samples, 3 offsite background surface soil samples, 6 duplicate soil samples, and 1 duplicate grab groundwater sample. URS submitted samples for analysis for volatile organic compounds (VOCs), TPH-g, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), herbicides, pesticides, asbestos (in soil), lead (in water), TPH as motor oil (TPH-mo [in water]), and pH. Relevant soil and groundwater analytical results are summarized in Tables 2-1 and 2-2, and the results for all analyses are included in Appendix C and are discussed further below. Figures 3 and 4 show soil and groundwater results and sample locations.

Petroleum Hydrocarbons

In general, the soil analytical results indicate soil beneath the former USTs has been impacted with TPH in the gasoline range (C6-C12), diesel range (C9-C25), and motor-oil range (C24-C40); however, there are low levels of TPH concentrations throughout the Lucky's Auto Body site. Elevated concentrations of TPH–g were detected in the following locations:

- Former location of UST #3, adjacent to the office along 39th Street, at boring location S-2. TPH-g was detected in sample S2-168 at a concentration of 170 mg/kg.
- Former location of UST #1, on the sidewalk along MLK Jr. Way, at boring location S-11. TPH-g was detected in sample S11-120 at a concentration of 220 mg/kg.

TPH-g was analyzed from nine grab groundwater locations, and TPH-mo was analyzed from one location (G-19). TPH-g was present in every grab groundwater sample from the Site, with the highest detection of 22,000 µg/L at location G2 (prior UST #3). Groundwater samples collected from the lot south of the Site did not contain TPH-g above the reporting limit. TPH-mo was not detected above the laboratory reporting limits. Sample results exceeding California MCLs are summarized in Table 2-3.

VOCs

The analytical laboratory results for relevant VOCs in groundwater are summarized in Table 2-2 and shown on Figure 4; and the results for all analyses are included in Appendix C. VOCs were analyzed from subsurface soil samples at 1, 3.5, and 14 feet below ground surface (bgs) at all boring locations. Elevated concentrations of benzene were detected in the following soil samples:

- Former location of UST #3, adjacent to the office along 39th Street, at boring location S2. Benzene was detected in sample S2-168 at a concentration of 3,200 µg/kg.
- Former location of UST #2, on the sidewalk along MLK Jr. Way, at boring location S-9. Benzene was detected in sample S9-168 at a concentration of 1,500 µg/kg.
- Former location of UST #1, on the sidewalk along MLK Jr. Way, at boring location S-11. Benzene was detected in sample S11-120 at a concentration of 940 µg/kg.

VOCs were present in every grab groundwater sample collected from the Site, and one sample (G12) collected from the lot adjacent to the south. The groundwater samples exceeding the California Department of Public Health Maximum Contaminant Level (MCL) are included in Table 2-3.

The highest concentration of VOC contamination is in the area of former UST #3 (G2). Lower concentrations of benzene are associated with former UST #2 (G9), and extremely low Concentrations are associated with former UST #1 (G11). Elevated concentrations of benzene are present in the central portion of the Site (G4), and the southeastern portion of the Site (G7). The source of contamination in the vicinity of G4 and G7 is unknown.

Metals

The analytical laboratory results for metals are included in Appendix C. Metals were analyzed from the surface soil interval at all of the boring locations, and at multiple depths at six locations. Results indicated relatively low concentrations in most locations, and are likely indicative of background concentrations.

Other Analytes

No SVOCs, herbicides, pesticides, PCBs, or asbestos were detected in soil samples collected by URS.

2.3.5 John Carver Consulting, 2006a, Report of Soil and Groundwater Investigation

JCC advanced eight additional boreholes at the Site in 2006 to collect soil and grab groundwater samples. Soil samples were collected at 5, 10, and 14 feet bgs. Groundwater was encountered between 10.83 and 15.44 feet bgs; however, these are not considered stabilized groundwater levels. Samples were analyzed for TPH-g, fuel oxygenates, and BTEX; and the tabulated results for relevant analytes are included in Tables 2-1 and 2-2, with the results for all analyses included in Appendix C. The JCC investigation results were generally consistent with the URS investigation results: elevated concentrations of TPH-g and benzene were present primarily on the northwestern portion of the Site adjacent to the former USTs; and lower concentrations were present in a heterogeneous distribution across the western portion of the Site. The grab groundwater concentrations of TPH-g ranged from not detected to 79,800 µg/L. The benzene concentrations were generally consistent with the TPH-g concentrations, and ranged from not detected to 17,600 µg/L. TPH-g concentrations in soil ranged from not detected to 176 mg/kg in GP5 at 8 feet bgs. Other elevated TPH-g concentrations in soil were detected at GP2 (up to 23.6 mg/kg) and GP7 (up to 30.7 mg/kg) at 10 feet bgs. This depth is consistent with the approximate groundwater depth, and may represent a smear zone with elevated petroleum hydrocarbons. Figures 5 and 6 present soil and groundwater results and show sample locations. Analytical data is summarized in Tables 2-1 and 2-2 and included as Appendix C.

2.3.6 John Carver Consulting, 2006b, Corrective Action Plan Work Plan for Subsurface Investigation

The Corrective Action Plan (CAP) proposed an excavation remedial alternative to address petroleum hydrocarbon contamination found at the Site. The excavation option was selected because the Site was slated for excavation in order to build an underground garage at a proposed development. In addition, the CAP proposed installation of three offsite groundwater monitoring wells to assess offsite groundwater migration. This CAP was not implemented, and the property was not developed.

2.4 REGULATORY INVOLVEMENT

2.4.1 California Environmental Protection Agency, Department of Toxic Substances Control

The California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC) commissioned URS to perform a site investigation in 2004 using funds from the U.S. EPA Brownfields program. The URS site investigation is described in Section 2.3.3. Following the investigation, the DTSC referred the Site to the City of Oakland for environmental oversight.

2.4.2 State Water Resources Control Board

The Cal-EPA SWRCB, Division of Clean Water Programs, issued a *Notice of Intended Removal from Underground Storage Tank Cleanup Fund Priority List* on July 30, 2002, to the owners of the property at 3884 MLK Jr. Way (Lucky's Auto Body). On October 10, 2002, the SWRCB issued a *Notice of Removal from the Priority List* to the same property owners.

2.4.3 Regional Water Quality Control Board

The San Francisco Bay RWQCB lists the property at 3884 MLK Jr. Way in their Leaking Underground Storage Tank (LUST) Program database as having had a release of gasoline reported on January 5, 1995. The LUST database lists no records of enforcement or remedial history; the business at the property is listed as the Grove Street Wash Rack.

2.4.4 Alameda County Environmental Health Services Department

The ACEHSD (County) oversaw the removal of three USTs at the Lucky's Auto Body property on January 5, 1995. Two of the tanks had capacities of 650 gallons, and the third tank had a capacity of 500 gallons. All three were thought to have stored gasoline. One of the 650-gallon tanks (Tank #1) split in two along the welded seam during the removal process. Holes were

noted in the other two tanks, but none were observed in the split tank. The soil surrounding the tanks was stained green and had strong petroleum odors. Sampling of the surrounding soil detected TPH-g and BTEX. No groundwater sampling was performed.

In September 1996, the County received a letter from H_2O GEOL consultancy reporting that a random sample of a soil stockpile near the southern corner of the Lucky's property (in August 1996) did not detect TPH-g or BTEX above their respective reporting limits. The origins of the stockpile are unknown, because the excavated soil from the tank removal was reportedly placed back into the tank pits.

3.0 GEOLOGY AND HYDROGEOLOGY

As described by URS (2004), the lithology encountered in the subsurface beneath the Site during drilling activities consisted predominantly of a brown to greenish-gray silty clay with sand and gravel. The primary stratigraphic units at the Site are listed below, with the approximate ranges of depth (bgs) each unit was encountered across the Site. In addition, two cross sections are provided (Figures 7 and 8) using data generated by URS (2004) and John Carver Consulting (2006). These cross sections present the interpreted subsurface lithology based upon available boring logs and also include relevant soil data.

- 0 to 5 feet bgs: the surface soil typically consisted of very dark-brown clay to dark-gray gravel fill, depending on whether the boring was in the vacant vegetated parcel (dark-brown clay), at 3860 MLK Jr. Way; or beneath the asphalt and concrete surfaces at the Lucky's Auto Body parcel at 3884 MLK Jr. Way (gravel fill).

- 5 to 20 feet bgs: very dark-brown silty clay grades to a greenish-gray silty clay and brown silty clay and gravelly clay.

Groundwater was encountered in direct-push boreholes at an average depth of 17.2 feet bgs, with depths ranging from 16.2 to 19.6 feet bgs. This groundwater depth is not considered a stabilized groundwater depth, because it was not measured from appropriately constructed monitoring wells.

URS reviewed groundwater investigation reports from the ARCO #4931 station at 731 West MacArthur Boulevard, approximately 1,000 feet southwest of the Site (Arcadis, 2012). The depth to water in the groundwater monitoring wells at the ARCO site ranged from approximately 3.2 to 10.8 feet bgs (approximately 52.2 to 43 feet elevation).

Regional groundwater in the Oakland area generally follows topography, from areas of higher elevation in the east toward lower elevation in the west and southwest. The groundwater flow direction in the vicinity of the Site is to the west towards San Francisco Bay (Arcadis, 2012).

4.0 PRELIMINARY CONCEPTUAL SITE MODEL

This section presents a preliminary Conceptual Site Model (CSM) based on the available soil and groundwater analytical data to date. The CSM is summarized in Table 4-1.

4.1 RELEASE SOURCE AND VOLUME

The USTs are considered the main source of the release of fuel hydrocarbons that have been detected in soil and groundwater beneath the Site. Tanks #1 and #2 were both observed to have one or more holes from corrosion at the time of removal. Although no holes were observed in Tank #3 during removal, the integrity of the tank was questionable as it split into two pieces along the weld during removal. Soil surrounding the tanks was stained green and was noted to have strong petroleum hydrocarbon odors. The release from the Tanks at the Site was discovered on January 5, 1995 during tank removal activities. The volume of the release is not known.

4.2 LIGHT NON-AQUEOUS PHASE LIQUID

There is currently no groundwater monitoring wells located at the Site. Although light non-aqueous phase liquids were not observed during grab groundwater sampling activities, concentrations of TPH-g in sample G2 (22,000 µg/L), located near former Tank #3, and sample GP3 (79,800 µg/L), located adjacent to former Tank #1 may indicate the potential for the presence of light non-aqueous phase liquid (LNAPL) to be present. These boring locations are shown on Figure 6.

4.3 SOURCE REMOVAL ACTIVITIES

Soil that was excavated from the UST pits during tank removal activities was returned to the excavation after the collection of soil samples for chemical analysis. There is no information regarding the quality of the soil that was placed back in the UST excavations. As such, with the exception of the removal of the USTs themselves, there have been no other source removal activities conducted at the Site.

4.4 CONTAMINANT DISTRIBUTION IN GROUNDWATER

Based on the historical investigations conducted at the Site, BTEX, cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA) and TPH-g are present in groundwater above their respective MCLs. However, based on correspondence from the ACEHSD, the contaminants of concern (COCs) for the site are BTEX, and TPH-g. These COCs are present above the screening levels primarily in the northern corner of the Site, near the location of the former USTs.

Benzene and TPH-g are also present in groundwater above their MCLs in the southern portion of the Site in the vicinity of the truck ramp and pit adjacent to the former shop building, and in the northwestern area of the Site.

4.5 PETROLEUM HYDROCARBONS IN SOIL

The initial soil sampling at the Site was conducted after removal of the USTs in January 1995. One soil sample was collected from beneath each of the USTs and analyzed for petroleum hydrocarbons and related constituents. The results of the analyses are listed below and are shown graphically on Figure 2.

Tank #1		**Tank #2**		**Tank #3**	
TPH-g	35 mg/kg	TPH-g	140 mg/kg	TPH-g	18 mg/kg
Benzene	590 µg/kg	Benzene	610 µg/kg	Benzene	340 µg/kg
Toluene	570 µg/kg	Toluene	960 µg/kg	Toluene	400 µg/kg
Ethylbenzene	1,300 µg/kg	Ethylbenzene	580 µg/kg	Ethylbenzene	850 µg/kg
Xylenes	5,400 µg/kg	Xylenes	9,700 µg/kg	Xylenes	4,600 µg/kg
Lead	2.6 mg/kg	Lead	7.9 mg/kg	Lead	3.4 mg/kg

Since 2004 a total of 18 soil borings have been drilled at the Site. Eleven direct push borings (S-1 through S-11) were advanced in 2004 as part of the URS investigation of the Lucky's Auto Body site for the DTSC. An additional eight soil borings (GP1 through GP8) were advanced in 2006 by John Carver Consulting as indicated previously. With the exception of one boring (GP6), three soil samples from each of the boring, ranging in depth from 1.0 to 15.0 feet bgs, were submitted for analysis of TPH-g, BTEX, and fuel oxygenates. A fourth shallow sample from 1.5 feet bgs in GP6 was submitted for chemical analysis for the same suite of analytes. The results of the analyses are summarized in Table 2-1.

Of the 58 samples analyzed from the two investigations, eight samples from seven borings exceeded their respective screening criteria. These samples were typically the deepest sample from the boring, ranging from 8.0 to 14.0 feet bgs. This is consistent with releases from a UST as opposed to a surface spill or release. Based on the historical investigation data, BTEX and TPH-g are the contaminants present in soil at concentrations exceeding their respective screening criteria. The contaminants are present mainly in soil at the location of former Tanks #1 through #3, and to a lesser extent, near the former fuel pump island in the northern corner of the Site.

The lateral extent of contamination exceeding the screening criteria appears to be limited to the area around the former USTs. Soil concentrations in all the samples from boring GP3 and S10, located in the sidewalk by Martin Luther King, Jr. Way near former Tank #1 and Tank #2 are below their respective screening criteria. There is no additional data from around former Tank #3. Given the nature of the petroleum hydrocarbon (mainly light fraction gasoline), the vertical extent of contamination beneath and in close proximity to the former tanks is likely limited to the lowest level of groundwater fluctuation.

4.6 PETROLEUM HYDROCARBONS IN GROUNDWATER

During the two subsurface investigations conducted at the Site, a total of 15 grab groundwater samples were collected and analyzed for TPH-g and BTEX. The results of the analyses are summarized in Table 2-2 and are shown graphically on Figures 4 and 6. In addition, concentration of TPH-g and/or BTEX exceeded their respective screening criteria in ten of the 15 samples analyzed. Similar to the soil sampling results, the highest concentrations were detected beneath or in close proximity to the former USTs. However, TPH-g and benzene were detected in one Site boring (G7) exceeding their respective screening criteria near the southern corner of the Site. There are no permanent monitoring wells located at the Site. As such, the groundwater flow direction across the Site cannot be evaluated. This has been defined as a significant data gap. The scope of work presented in this work plan includes the installation of five groundwater monitoring wells at the Site.

4.7 RISK EVALUATION

The Site is a former auto body and car wash facility. The Site is currently vacant, and with the exception of a billboard located in the northwest corner of the Site, has no structures and is covered with either asphalt or concrete foundations from former buildings located at the Site. The Site is zoned for residential and current plans are to redevelop the Site for residential use. The site will be developed into a residential/commercial building with underground parking across the entire site footprint. The construction of the underground parking garage will require the excavation and removal of the first 12 feet of soil below the existing ground surface. Consequently, most of the existing source area will be removed during construction. Because of the source removal, site-wide underground parking garage and commercial/parking use of the ground floor with residential above, vapor intrusion is not expected to be a significant issue.

5.0 PROJECT OBJECTIVES AND ORGANIZATION

5.1 PROJECT OBJECTIVES

Specific project objectives include:

- Filling the data gaps regarding the vertical and horizontal extent of contamination at the Site;
- Comparing the historical and new contamination data against applicable screening levels;
- Collecting data to be used to design remedial actions at the Site; and
- Presenting a revised Corrective Action Plan to the Alameda County Health Agency that mets the County's requirements for closure under the SWRCB Low Threat Closure Policy.

The data gaps identified and the proposed actions required to address them are presented in Table 5-1.

5.2 PROJECT ORGANIZATION

URS will execute this work plan using its own staff of qualified geologists, chemists, and field personnel, and by subcontracting selected firms. Key personnel involved in this project are:

- Project Manager: Des Garner
- Project Geologist/Hydrogeologist: Erik Skov, P.G., C.H.G
- Project Field Scientists: Kali Futnani/Peter Healy
- Site Safety and Health Officer: Kali Futnani

Health and safety roles and responsibilities are presented in the Health and Safety Plan (HSP) in Appendix A.

6.0 PROJECT IMPLEMENTATION

Implementation of the site investigation will include: (1) planning and permitting; (2) borehole and well installation and baseline sampling; (3) reviewing investigation data; and (4) reporting.

6.1 Planning and Permitting

Pre-field work activities will include the following:

- Preparing this work plan and a Site-specific HSP (Appendix A);
- Procuring subcontractors;
- Obtaining drilling permits from the Alameda County Public Works Agency (ACPWA);
- Obtaining encroachment permits from the City of Oakland Public Works Agency;
- Contacting Underground Services Alert (USA) concerning all drilling activities;
- Coordinating Site access and resident notification with the owner.

The drilling permits have been obtained from the ACPWAA City of Oakland encroachment permit has been obtained for the groundwater monitoring well to be installed in the sidewalk.

6.2 Groundwater Monitoring Well Installation, Grab Groundwater Sampling, and Soil Borings

The Data Gaps Table (Table 5-1) presents the data gaps identified for the site, based on the review of prior reports and analytical data. The primary data gaps are:

1. The absence of on-site monitoring wells for groundwater gradient assessment and the generation of reliable groundwater analytical data. All existing groundwater data is derived from grab sampling and is considered qualitative or screening level data.

2. The absence of sufficient soil data at depths below 12 feet bgs. Further characterization of shallower soil is not considered necessary as this soil will be removed during construction.

Five groundwater monitoring wells will be installed at the locations shown on Figure 11. Rationale for well placement is given in the Data Gaps Table (Table 5-1 of this work plan). Wells will be constructed of 2-inch-diameter Schedule 40 PVC well casing, total depth up to 25 feet bgs; the screened interval will be determined based on observations of groundwater levels during field work. The well screen will consist of 5 to 10 feet of 0.010-inch well screen.

Ten soil borings will be advanced to a depth of 20 feet bgs at locations shown on Figure 11. The rationale for soil sample locations is given in the Data Gaps Table (Table 5-1). Soil samples will be collected at approximate depths of 12 feet, 15 feet, and 20 feet bgs from seven of the soil borings (SB-4 through SB-10). Additional samples may be collected based on professional judgment. Samples will be analyzed as summarized in Table 6-1. Analytical methods and sample preservation requirements are summarized in Table 6-2.

Borings will be logged using the Unified Soil Classification System.

Grab groundwater samples will be collected from the first encountered groundwater at each soil boring. Field parameters and field instrument calibration are summarized in Table 6-3.

The northernmost soil borings (SB-1, SB-2, and SB-3) will be advanced to first groundwater for grab groundwater sample collection. These borings will not be sampled for soil as there is no reason to expect an off-site soil source across MLK.

URS field personnel will oversee the drilling activities and log each soil boring. Drilling work will be conducted under the supervision of a California Professional Geologist (PG). Soil borings will be continuously cored and logged in accordance with the Unified Soil Classification System. Soil cores will be screened in the field for the presence of volatile petroleum hydrocarbons using a photoionization detector (PID) with a 10.6-electron-volt (eV) lamp, and examined for staining and odor. The subsurface soil samples from each boring with the highest PID reading or other evidence of contamination will be submitted for laboratory analysis.

Non-dedicated sampling equipment (i.e., drill tooling) will be decontaminated between boring locations by either a three-stage wash and rinse, or through steam cleaning. Equipment rinsate samples will be collected for analysis as indicated in the QA/QC table (Table 6-4).

6.3 Soil Sampling

Soil samples will be analyzed for TPH-g, BTEX, Napthalene, 1,2-DCA and cis-1,2-DCE as shown in Table 6-1. Samples will be collected and preserved in accordance with Unites States Environmental Protection Agency (U.S. EPA) Method 5035 (TerraCore samplers) to prevent loss of volatiles. The soil samples will be collected using standard environmental protocols, and stored in coolers on ice. A chain-of-custody form will be used as the sample custody and analyses specification document for all samples from the time of collection until laboratory analysis. Field duplicates will be collected at a rate of 10 percent. Soil samples will be submitted to a California Department of Public Health (DPH)-licensed laboratory for analysis.

6.4 Groundwater Monitoring Well Installation

Well construction will follow specifications consistent with DTSC's Monitoring Well Design and Construction for Hydrogeologic Characterization Guidance Manual (July 1995). The monitoring wells will be constructed of 2-inch Schedule 40 polyvinyl chloride (PVC) well casing and screen. It is anticipated the well screens will be set between approximately 10 to 20 feet bgs, with 5 to 10 feet of 0.010-inch machine-slotted well screen. The field geologist will determine the actual depth of completion and screened interval based on the lithologic log of the borehole. Final monitoring-well installation details will be recorded on a Monitoring Well Installation Record form.

During installation, the well casings will remain suspended until the filter pack is placed. Filter-pack material and bentonite seal depths will be monitored frequently during placement. A small amount of potable water will be added (if necessary) to facilitate efficient placement of the filter pack. Filter pack material will be brought to approximately 0.5 foot above the screened interval. A 1-foot-thick bentonite seal will be placed on top of the filter pack. The bentonite will be 1/4-inch bentonite pellets or chips. The bentonite will be allowed to hydrate a minimum of 30 minutes prior to placement of the cement grout seal. The remaining borehole annulus will be sealed with neat cement grout. The neat cement grout will consist of approximately 5 gallons of water per 94-pound sack of Portland cement. The grout will be placed following Alameda County Public Works Agency and City of Oakland requirements. The wells will be completed with flush-mounted vault boxes.

Non-dedicated sampling equipment (i.e., drill tooling) will be decontaminated between boring locations by either a three-stage wash and rinse, or through steam cleaning. Equipment rinsate samples will be collected for analysis.

After the well installation is completed, the elevation of the top of the monitoring well casing will be surveyed to the nearest 0.01 foot in order to establish top-of-casing elevation. This information will allow depth-to-groundwater measurements to be used to generate groundwater elevation data in order to establish groundwater flow direction at the Site.

The monitoring wells will be developed no earlier than 72 hours after completion of installation. The wells will be developed by a combination of surging and bailing, or pumping until the well produces clean, relatively sediment-free water. URS field personnel will maintain well development records.

6.5 Grab Groundwater Sampling

Grab groundwater samples will be collected from soil borings SB-1 through SB-10 using temporary PVC casing with machine-slotted screens. Based on previous investigations at the Site, groundwater is expected at approximately 16.2 to 19.6 feet bgs; therefore, the temporary screens will be set at approximately 10 to 20 feet bgs, with the exception of SB-2, where it will be set at approximately 30 to 40 feet bgs. Grab groundwater samples will be collected with a peristaltic pump and placed directly into laboratory-provided containers with the appropriate preservative, and stored in coolers on ice.

The temporary casing will be removed from the soil borings following sample collection, and the borings will be tremie-grouted with a cement grout. Upon final completion of field activities, URS will restore boring locations to pre-existing conditions.

Grab groundwater samples will be analyzed for: TPH-g, BTEX, Napthalene, 1,2-DCA and cis-1,2-DCE. Sample analyses are summarized in Table 6-1.

6.6 Groundwater Monitoring Well Sampling

Groundwater samples from monitoring wells MW-1 to MW-5 will be collected with a peristaltic pump using a low-flow sampling protocol and continuous physical parameter monitoring through a flow cell. The field parameters and calibration procedures are included in Table 6-3. After physical parameters have stabilized, groundwater samples will be collected and placed directly into laboratory-provided containers with the appropriate preservative, and stored in coolers on ice. Groundwater samples will be analyzed for TPH-g, BTEX, Napthalene, 1,2-DCA and cis-1,2-DCE. A sub-set of groundwater samples will be analyzed for natural attenuation parameters: total organic carbon (TOC), ferrous iron, sulfate, sulfite, nitrate, nitrite and sulfide. A chain-of-custody will be completed in the field during sample collection, and will accompany the samples until delivery to the analytical laboratory. Field duplicates will be collected at a rate of 10 percent. Laboratory-supplied trip blank samples will accompany the sampling containers throughout the sampling event, and will be submitted for analysis. Samples will be submitted to a California DPH-licensed laboratory for analysis. Sample analyses are summarized in Table 6-1.

6.7 Material Disposal and Site Restoration

All potentially contaminated drilling equipment decontamination fluids and purge water will be contained in 55-gallon steel Department of Transportation (DOT)-approved 55-gallon drums. Drill cuttings from the borings will be contained in 55-gallon DOT-approved drums, and will be sampled for profiling and disposal. The 55-gallon drums will be staged at the Site pending disposal. Other solid waste and personal protective equipment from the project will be recycled, or disposed of, as non-hazardous waste, as appropriate.

7.0 QUALITY ASSURANCE PROJECT PLAN

7.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) serves as the primary guide for the integration of Quality Assurance/Quality Control (QA/QC) functions into field activities at the Former Grove Street Wash Rack Site in Oakland, California. This QAPP identifies the procedures, objectives, and specific QA/QC activities designed to achieve data quality goals established for this project. This QAPP provides guidelines for all quality-related field sampling and laboratory analysis activities that will be implemented for the Statement of Work.

This QAPP was prepared in accordance with the California Department of Health Services Hazardous Materials Laboratory (HML) User's Manual, December 1996; and the U.S. EPA Region 9 guidance document entitled U.S. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5 (U.S. EPA, 1998).

Environmental measurements will be conducted throughout the course of the project to produce data that are scientifically valid, are of known and acceptable quality, that meet established project objectives, and that are legally defensible. URS recognizes the responsibility to implement an appropriate sampling design, including procedures to evaluate the precision, accuracy, completeness, comparability, and representativeness of all data generated against the specified Data Quality Objectives (DQOs), and to provide the documentation necessary to support the investigation.

Specific procedural guidance is provided throughout this QAPP. These procedures and their associated data collection and data tracking forms will be used to ensure consistency and thoroughness of data generation and data integrity.

7.2 PROJECT DESIGN

The Site is at 3884 MLK Jr. Way in Oakland, California. The primary objectives of this investigation are:

- Filling the data gaps regarding the vertical and horizontal extent of contamination at the site;
- Comparing the historical and new contamination data against applicable screening levels;
- Collecting data to be used to design remedial actions at the site; and

- Presenting a revised Corrective Action Plan to the Alameda County Health Agency that mets the County's requirements for closure under the SWRCB Low Threat Closure Policy.

7.3 DATA QUALITY OBJECTIVES

All analytical data will be evaluated to achieve an acceptable level of confidence in the decisions derived from the data. The methods and procedures used to implement and accomplish the following objectives are described throughout this QAPP. In order to meet the DQOs established for this project, procedures for field sampling, sample custody, equipment operation and calibration, laboratory sample analysis, equipment decontamination, and data reporting that ensure the consistency and completeness of data generation must be implemented. These protocols are discussed in detail within this section.

7.3.1 Statistical Parameter Objectives

Specific DQOs will be established for each of the data assessment parameters identified previously. These DQOs are expressed as quantitative and qualitative statements concerning the type of data needed to support a decision, based upon a specified level of uncertainty. Further discussion of each parameter, and rationale for its use, are presented below.

Accuracy is a measure of bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. This will be expressed as the percent recovery of a surrogate or matrix spike analyte sample, or a standard reference sample. These samples, having known constituent concentrations, will be analyzed as unknowns in the analytical laboratory for comparison. Accuracy will be determined using no less than one matrix spike/matrix spike duplicate (MS/MSD) sample in 20 of a similar matrix for soil samples.

Precision is a measure of mutual agreement among duplicate or collocated sample measurements of the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte will be expressed as a percentage of the difference between results of field duplicate samples or matrix spike duplicates. Precision will be determined using no less than 1 sample in 10 for field duplicates, and 1 in 10 for laboratory spike duplicates. In addition, precision will be maintained by conducting routine instrument checks to demonstrate that operating characteristics are within predetermined limits.

Completeness is a comparison of the number of valid data obtained from a measurement effort to the total number needed to meet the project goals. The closer the numbers are, the more complete the measurement process. Completeness will be expressed as the percentage of valid

to planned measurements. An objective of the sampling program is to establish the quantity of data needed to support the investigation. This will be achieved by obtaining:

- Samples for all scheduled analyses for collection at each location.
- A sufficient volume of sample material to complete the analyses.
- Samples that represent possible contaminant situations under investigation.
- Samples at critical data locations, such as control samples. Completeness will take into consideration environmental conditions and the potential for change with respect to time and location.

7.4 SAMPLE COLLECTION AND QUALITY CONTROL

The quality of data collected in an environmental study is critically dependent upon the quality and thoroughness of field sampling activities. Because of the sensitivity of analytical methods and the levels of detection specified for contaminant analysis, the sampling process is vital to the integrity of data ultimately generated. Therefore, general field operations, practices, specific sample collection, and inventory procedures must be carefully planned and implemented. The following subsections discuss the implementation of these practices and procedures.

7.4.1 Sampling Design

Groundwater samples will be collected from:

- Ten soil borings; and
- Five groundwater monitoring wells.
- Soil samples will be collected from seven soil borings and all monitoring well borings, during well installation. The northernmost soil borings (SB-1, SB-2, and SB-3) will be advanced to first groundwater for grab groundwater sample collection. These borings will not be sampled for soil as there is no reason to expect an off-site soil source across MLK.

The sampling protocol is described in Section 6 of this work plan.

7.4.2 Equipment Decontamination

All non-dedicated soil sampling equipment will be decontaminated with either a three-stage wash and rinse (e.g., wash equipment with a non-phosphate detergent solution, a tap-water rinse,

and finally a distilled or deionized water rinse), or through steam cleaning. Non-dedicated soil gas sampling equipment will be decontaminated by the laboratory following their standard decontamination and quality control protocols. All equipment decontamination performed will be recorded on the Site personnel field logs. Equipment rinsate samples will be collected as specified in Section 7.

7.4.3 Disposal of IDW

Soil cuttings will be stored in sealed DOT-approved 55-gallon drums located at the Site, pending sampling for profiling and disposal. A composite sample will be submitted for analysis according to the requirements of the disposal facility.

Decontamination water and water from well development will be stored in DOT-approved 55-gallon drums, and will be disposed of after completion of the field activities.

7.4.4 Sample Containers, Volumes, and Preservation

Sample preservation is required in some instances to maintain the integrity of the samples from the time of collection until the analyses are performed; therefore, such samples will be placed in pre-preserved containers to retard degradation or modification of the compounds in the samples. The proposed sample names are included in Table 6-1; and the sample containers, sample volumes, preservation methods, and holding times for proposed sampling are summarized in Table 6-2.

7.4.5 Field Data and Sample Collection Procedures

Field data collection forms for all sampling and related data-gathering activities are provided in Appendix B. Procedures that will be used for field and sampling activities are either referenced or described below.

Sample Identification, Packaging, and Shipping

On-site measurements will be recorded on field logbooks or data forms with identifying information (project number, station numbers, station location, date, time, and samplers), field observations, and remarks. All documentation will be maintained as project records by the PM.

Each sample must be identified by a unique code that identifies the sample station type, sample point, and sequential number. Each sample will be securely labeled with a plastic-coated self-adhesive label at the sampling site. These labels must be of a type that retains waterproof ink markings when wet. All labels will be completed in legibly printed lettering. Field QA/QC

samples will be submitted blind to the laboratory. Environmental and QA sample nomenclature are shown in Table 6-1.

Samples will be couriered to the laboratory under proper chain-of-custody procedures. A copy of the chain-of-custody will accompany the samples at all times. In the event the samples are required to be shipped to the laboratories using a common carrier, DOT regulations will be followed. The person responsible for packaging, labeling, and shipping the samples will receive training commensurate with his/her duties.

Field Logbook Completion

Field personnel are responsible for the use and maintenance of field logbooks when conducting project-related fieldwork. Field logbooks provide a means for recording all data collection activities performed at a site. Entries must be as factual, detailed, and descriptive as possible so that a particular situation can be reconstructed without relying on the collector's memory. Field logbooks will possess or be completed with consecutively numbered pages. Logbooks will be permanently assigned to field personnel, but will be stored in Site project files when not in use.

The cover of each logbook will contain the following information:

- Person or organization to whom the book is assigned;
- Project number; and
- Site name and number.

Entries into the logbook may contain a variety of information. At a minimum, logbook entries must include the following information at the beginning of each day:

- Date;
- Start time;
- Weather;
- Site address (including county and state);
- All field personnel present and directly involved; and
- Level of personal protection being used on site.

In addition, the field logbook should include the following information, at a minimum:

- Detailed description of the station location;
- Information on field QC samples (i.e., duplicates);

- Observations about Site and samples (odors, appearance, etc.);
- Information about any miscellaneous events or circumstances that may affect the integrity of the samples (such as fossil-fueled motors in use nearby, painting activities upwind of sampling sites, etc.);
- Description of equipment used on site, including time and date of calibration; and
- Maps or photographs acquired or taken at the sampling site; and forms used during sampling.

All logbook entries will be made in indelible black or blue ink. No erasures will be permitted. If an incorrect entry is made, the data will be crossed out with a single strike mark and initialed by the originator. Entries will be organized into easily understandable tables if possible.

7.5 CHAIN-OF-CUSTODY PROCEDURES

Proper chain-of-custody and sample tracking methods will be used during sample collection. These methods include maintaining documentation necessary to trace sample possession, and the proper completion of standardized chain-of-custody forms used to accompany samples shipped to the analytical laboratory.

Field personnel (samplers) have custody of the physical evidence collected from the environment (samples). Samplers are responsible for documentation and tracking tasks when collecting samples designated for laboratory analysis or archiving. The samplers are responsible for the care and custody of the collected samples, and the proper and complete preparation of all sample labels and chain-of-custody forms related to the samples, until the samples are transferred or dispatched properly.

During an investigation, custody is maintained if an environmental sample is:

- In one's actual physical possession or view;
- In one's physical possession and has not been tampered with (i.e., under lock or official seal);
- Retained in a secure area with restricted access; or
- Placed in a container and secured with an official seal such that the sample cannot be accessed without breaking the seal.

A chain-of-custody form will be used as the sample custody and analyses specification document for all samples from the time of collection until laboratory analysis.

7.5.1 Field Procedures for Custody Documentation

The following chain-of-custody procedures will be implemented to maintain and document sample possession:

- Samples will be collected as described in the Work Plan.
- The sampler (or person in possession of samples) is responsible for the care and custody of the samples collected until they are properly transferred or dispatched to the analytical laboratory.
- Sample labels will be completed for each sample container. Block, printed text, and indelible ink must be used.
- When possible, all samples pertaining to one physical sampling location will be recorded on the same chain-of-custody. For easier data storage, separate chain-of-custody paperwork for each unique project site will be used.

7.5.2 Transfer of Custody and Shipment

Samples must always be accompanied by chain-of-custody paperwork. When possession of samples is transferred, the individuals relinquishing and receiving will sign, date, and note the time in the appropriate space on the custody paperwork. If the transfer occurs within the sampling team, the individual receiving the samples must document the range of sample numbers transferred to his/her possession in the "Received By" field. This act documents the physical transfer of the sample or group of samples from the sampler to other field personnel. When shipping samples by overnight courier, the individual in possession of the samples relinquishes the samples by signing, dating, and noting the time and completing the "Received By" box with the courier name and airbill number.

All shipments will be accompanied by the appropriate chain-of-custody and analysis specification document(s) identifying the shipment container's contents and analyses needed for each sample. The original documents will be sealed in a plastic bag and taped to the lid of the ice chest.

Field personnel will notify the laboratory representative of Saturday sample delivery, if necessary.

7.6 ANALYTICAL AND QUALITY CONTROL PROCEDURES

7.6.1 Quality Control Checks

The QC checks of laboratory sample analysis will be used to assess and document data quality and to identify discrepancies in the measurement process that need correction. The collection and analysis of trip blanks, equipment decontamination rinsates, field duplicates, MS/MSDs, and leak tests will be used as QC checks on the representativeness of the environmental samples, the thoroughness of the field equipment decontamination procedures, the precision of sample collection and handling procedures, and the accuracy of laboratory analysis. The quantities and types of control samples to be used are shown in Table 6-4, and the sample nomenclature is shown in Table 6-1 and included below.

Trip Blanks

Trip blanks will be used to assess VOC contamination introduced into the sample containers through diffusion during sample transport and storage. One trip blank scheduled for VOC analysis will be included in each ice chest used to transport VOC soil or water samples, per the HML user manual. Trip blanks will be prepared by the analytical laboratory using pre-preserved volatile organic analysis (VOA) vials and High-Performance Liquid Chromatography (HPLC) organic-free water, shipped with the other sample containers provided by the laboratory, and returned to the testing laboratory for analysis along with the VOC water samples collected during the sampling event. The trip blanks will remain unopened throughout the storage and transportation processes, and will be analyzed in the same manner as the environmental samples. Trip Blanks will be identified as "TB" with consecutive numbers following for each trip blank submitted (TB-1, TB-2, etc.).

Equipment Decontamination Rinsate Samples

Equipment rinsate samples will be used to assess the adequacy of procedures to prevent cross-contamination of samples due to sample equipment contamination. Rinsate samples will be collected from any reusable equipment (e.g., direct-push sampler) at the conclusion of decontamination during the well installation or soil or groundwater sampling. Rinsate samples are not required for laboratory-cleaned or disposable equipment used for soil gas sampling. One rinsate sample will be collected each day of sampling. Appropriate sample containers will be filled to yield the proper sample volume for each type of analysis to be conducted by the laboratory. The equipment rinsates will be handled and analyzed in the same manner as environmental water samples. Rinsate blanks will be identified as RB, with consecutive numbers following for each rinsate blank submitted (RB-1, RB-2, etc.).

Field Duplicates

Field duplicate samples will be collected at a rate of 10 percent of the total number of samples, per the matrix. The field duplicates will be handled and analyzed in the same manner as the other environmental samples. Data resulting from field duplicates, and their corresponding environmental samples, will be used in the determination of precision. The proposed field duplicates are shown in Table 6-4.

Matrix Spike/Matrix Spike Duplicates

For accuracy and precision determinations of samples analyzed by the laboratory, 5 percent of the total number of samples will be MS/MSDs. The MS/MSDs will be analyzed during the sampling for soil and/or groundwater samples, but not for soil vapor samples. This will require the collection of a triple-volume sample. This information will be used to assess the effect of the matrix conditions on analytical samples. A known concentration of the spike solution will be added to each sample in the laboratory, and analyzed in the same manner as the environmental samples. MS/MSD samples are identified in Table 6-4.

7.6.2 Equipment Calibration

A photoionization detector (PID) will be used to monitor ambient air conditions, as described in the HSP, and to screen soil cores. The PID will be calibrated daily using calibration gas consisting of 100 parts per million (ppm) isobutylene, and the result of the calibration will be recorded on the field logbooks. If calibration is off by more than 2 percent, the PID will be re-calibrated. If calibration cannot be completed accurately, an additional PID will be dispatched to the Site.

7.7 DATA QUALITY MANAGEMENT

7.7.1 Data Handling Systems

This section describes the generation, review, and routing of field sampling and laboratory analysis data, and discusses the monitoring and controls established to track field and laboratory data through the following events:

- Field form completion;
- Field review and correction; and
- Storage and retrieval.

Data collection procedures and instructions included in this section provide the guidance necessary to complete the field forms and analytical sampling paperwork involved with data collection activities.

Field Review and Correction

After field data and analytical sampling paperwork is completed, substantial effort must be made to ensure that the information recorded is accurate, complete, and legible. Data review and correction protocols have been established for both field- and office-specific data collection and processing. Technical personnel will document and review their own work, and are accountable for its correctness. The intent of the review is to ensure that all forms are complete, legible, and possess the required data elements.

Specific review considerations will be made for sample shipment paperwork.

Sample Shipment Paperwork

Before analytical samples are shipped from the field to the designated laboratory, chain-of-custody paperwork will undergo thorough QC checks. First, a check will be performed by field personnel after all chain-of-custody forms and labels have been completed. The reviewer will ensure that the following measures have been taken:

- All forms must be completed using a ballpoint pen. All sample labels must be completed with an indelible marker. Block lettering is strongly recommended.
- If an error is made on any form, the error should be struck with a single line and the correct value written close to the old value with the correction initialed and dated. The incorrect value should not be written over or obliterated in any way.
- If any sample shipment or paperwork error occurs, it is to be documented in the field personnel notebook.

7.7.2 Analytical Data Review

Analytical data will be reviewed for the following (as applicable): holding times, surrogate recoveries, method blank analysis, and MS/MSD recoveries (expressed as accuracy, precision, and relative percent difference). These are as described in the following sections.

7.7.3 Data Assessment Procedures

All data generated will be assessed for accuracy, precision, completeness, representativeness, and comparability. In addition to an evaluation of these parameters, the designated reviewer will also evaluate:

- Correct use of sample numbers, etc.;
- Correct types and numbers of sample bottles;
- Specification of preservation where necessary;
- Dates and initials of corrections;
- Correct custody transfers between field personnel; and
- Accuracy.

Accuracy measures the average or systematic error of an analytical method. This measure is defined as the difference between the average of reported values and the actual value. Accuracy will be expressed as the percent bias. The closer this value is to zero, the more accurate the data. This quantity is defined as follows:

Bias (%) = $$\frac{MC - KC}{KC} \times 100$$

where KC = Known concentration of an analyte

MC = Measured concentration of an analyte

Precision

Precision examines the spread of data about their mean. The spread presents how different the individual reported values are from the average reported values. Precision is a measure of the magnitude of errors and will be expressed as the relative percent difference (RPD), or the relative standard deviation (RSD), in case of two or more replicates. The lower the values, the more precise the data. These quantities are defined as follows:

RPD (%) = $$\frac{D1 - D2}{(D1 + D2)/2} \times 100$$

RSD (%) = 100(S/M)

where D1 = First sample value

D2 = Second sample value (duplicate)

S = Standard deviation

M = Mean

Completeness

Completeness determines whether a sufficient number of valid measurements were obtained. The closer this value is to 100, the more complete the measurement process. This quantity will be calculated as follows:

Completeness (%) $\frac{V}{P} \times 100$

where V = Number of valid measurements

P = Number of planned measurements

Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the environmental condition. Following a determination of precision, a statement of representativeness will be prepared, noting the degree to which data are believed to represent the environment.

Comparability

Comparability expresses the confidence with which one set of data can be compared to another.

7.7.4 Data Reporting

Field measurements and observations will be recorded on standard data collection forms shown in Appendix B. Laboratory measurements will be recorded in standard formats that identify site location, sample identification, date, parameter, parameter value, and detection limit. Analytical reporting limits will be selected so that they are below the regulatory screening or action levels for the media being analyzed. Both laboratory and appropriate field data will be combined and summarized in final tables and graphs that are appropriate to the type of data, and convey information to support the findings, conclusions, and recommendations of the data collection program. In all cases, data will be clearly tabulated and presented in a consistent manner to facilitate data comparison.

8.0 REPORTING

The Draft Corrective Action Plan will be prepared following receipt of the laboratory analytical data from the samples collected. The CAP will present the data obtained and any corrective actions required in order to meet the SWRCB Low Threat Closure Policy.

9.0 REFERENCES

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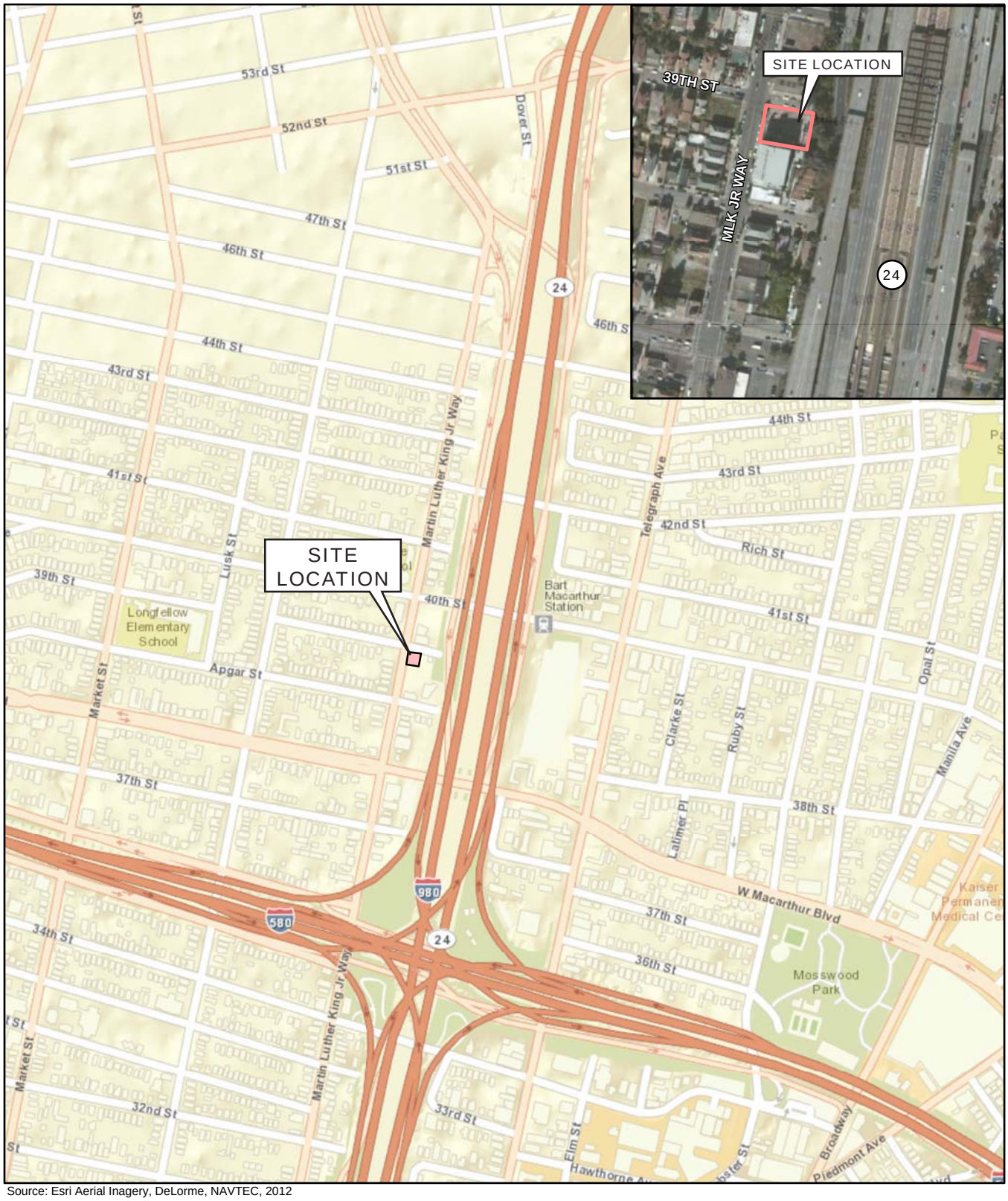
FIGURES



6/20/13 vsa ..T:\3884 MLK\Fig1_site_location.ai

Source: Esri Aerial Inagery, DeLorme, NAVTEC, 2012

0 500 1000 FEET

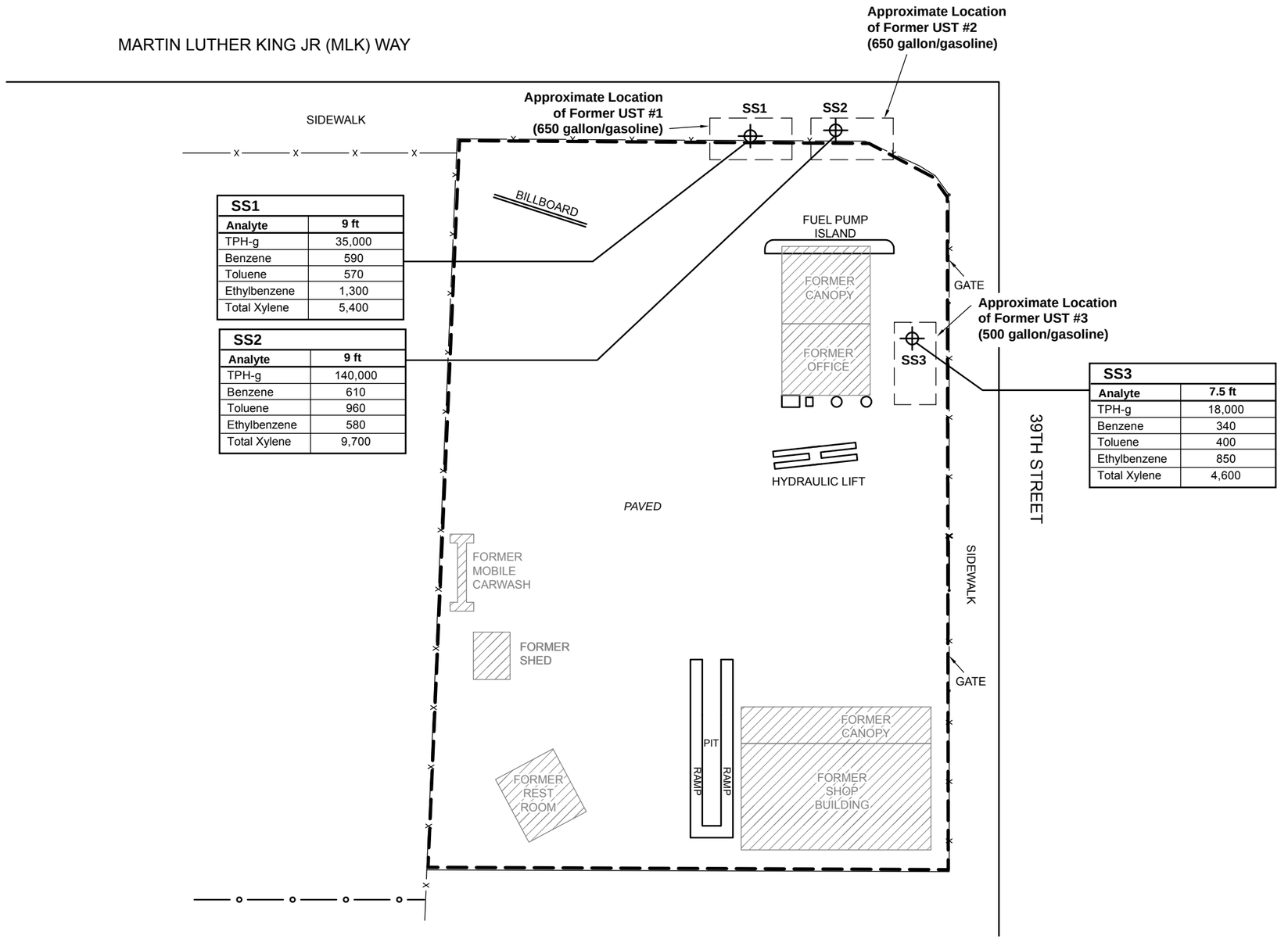
SITE LOCATION MAP

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 1



SS1	
Analyte	**9 ft**
TPH-g	35,000
Benzene	590
Toluene	570
Ethylbenzene	1,300
Total Xylene	5,400

SS2	
Analyte	**9 ft**
TPH-g	140,000
Benzene	610
Toluene	960
Ethylbenzene	580
Total Xylene	9,700

SS3	
Analyte	**7.5 ft**
TPH-g	18,000
Benzene	340
Toluene	400
Ethylbenzene	850
Total Xylene	4,600

SS1 Soil Boring Location, URS Geoprobe (2004)

Site Boundary

Chain Link Fence

Wood Fence

TPH-g Total Petroleum Hydrocarbon - Gasoline

Note:
All concentrations in micrograms per kilogram (µg/kg)

0 10 20 FEET

VOCs AND TPH-g IN SOIL – 1995

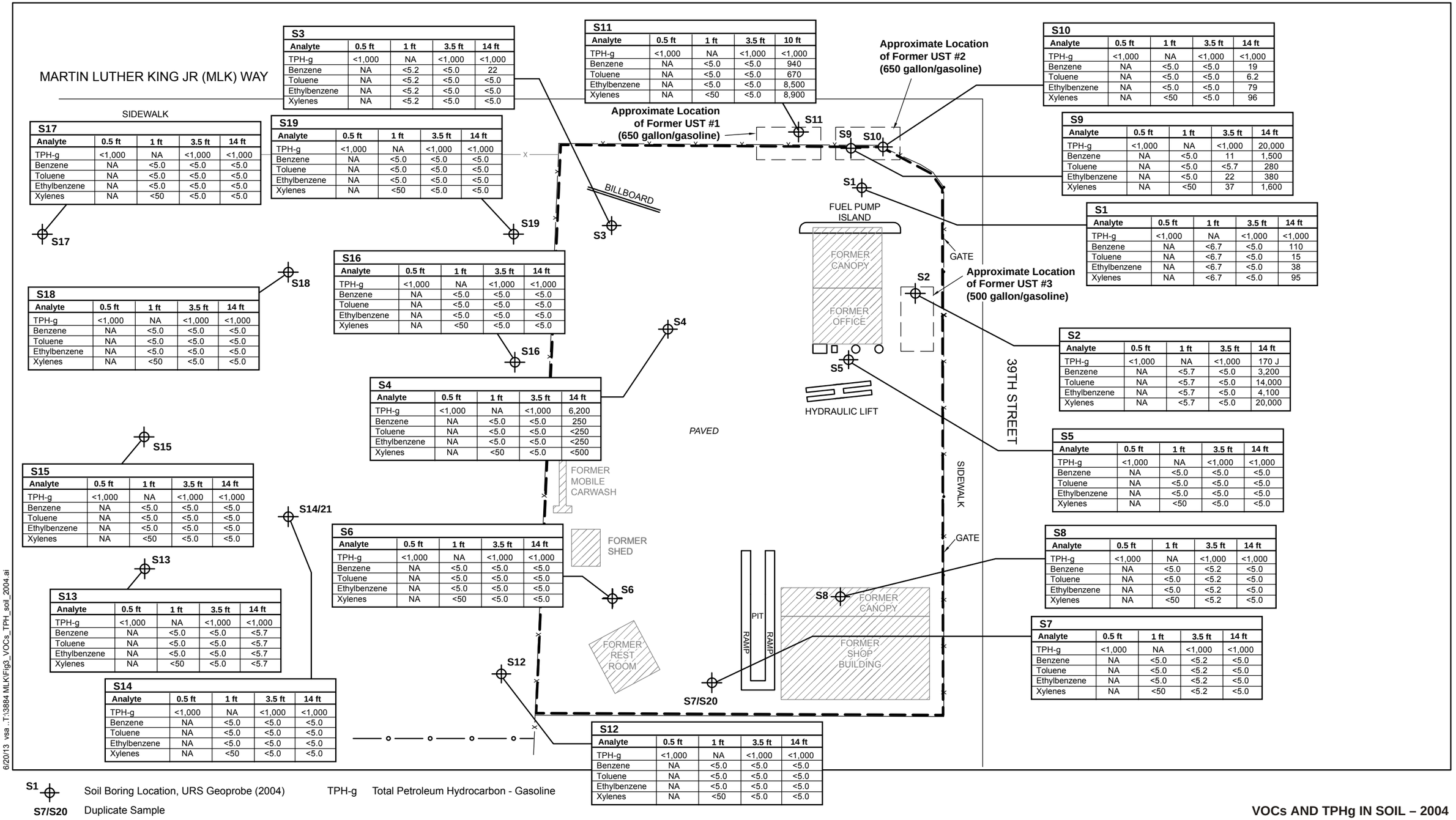
June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 2

6/20/13 vsa ..T:\3884 MLK\Fig2_VOCs_TPHg_soil_1995.ai



S3

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.2	<5.0	22
Toluene	NA	<5.2	<5.0	<5.0
Ethylbenzene	NA	<5.2	<5.0	<5.0
Xylenes	NA	<5.2	<5.0	<5.0

S11

Analyte	0.5 ft	1 ft	3.5 ft	10 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	940
Toluene	NA	<5.0	<5.0	670
Ethylbenzene	NA	<5.0	<5.0	8,500
Xylenes	NA	<50	<5.0	8,900

S10

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	19
Toluene	NA	<5.0	<5.0	6.2
Ethylbenzene	NA	<5.0	<5.0	79
Xylenes	NA	<50	<5.0	96

S17

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S19

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S9

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	20,000
Benzene	NA	<5.0	11	1,500
Toluene	NA	<5.0	<5.7	280
Ethylbenzene	NA	<5.0	22	380
Xylenes	NA	<50	37	1,600

S1

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<6.7	<5.0	110
Toluene	NA	<6.7	<5.0	15
Ethylbenzene	NA	<6.7	<5.0	38
Xylenes	NA	<6.7	<5.0	95

S16

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S18

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S2

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	170 J
Benzene	NA	<5.7	<5.0	3,200
Toluene	NA	<5.7	<5.0	14,000
Ethylbenzene	NA	<5.7	<5.0	4,100
Xylenes	NA	<5.7	<5.0	20,000

S4

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	6,200
Benzene	NA	<5.0	<5.0	250
Toluene	NA	<5.0	<5.0	<250
Ethylbenzene	NA	<5.0	<5.0	<250
Xylenes	NA	<50	<5.0	<500

S5

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S15

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S6

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S8

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.2	<5.0
Toluene	NA	<5.0	<5.2	<5.0
Ethylbenzene	NA	<5.0	<5.2	<5.0
Xylenes	NA	<50	<5.2	<5.0

S13

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.7
Toluene	NA	<5.0	<5.0	<5.7
Ethylbenzene	NA	<5.0	<5.0	<5.7
Xylenes	NA	<50	<5.0	<5.7

S7

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.2	<5.0
Toluene	NA	<5.0	<5.2	<5.0
Ethylbenzene	NA	<5.0	<5.2	<5.0
Xylenes	NA	<50	<5.2	<5.0

S14

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S12

Analyte	0.5 ft	1 ft	3.5 ft	14 ft
TPH-g	<1,000	NA	<1,000	<1,000
Benzene	NA	<5.0	<5.0	<5.0
Toluene	NA	<5.0	<5.0	<5.0
Ethylbenzene	NA	<5.0	<5.0	<5.0
Xylenes	NA	<50	<5.0	<5.0

S1 Soil Boring Location, URS Geoprobe (2004)

S7/S20 Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

TPH-g Total Petroleum Hydrocarbon - Gasoline

Note:
All concentrations in micrograms per kilogram (µg/kg)

0 10 20 FEET

VOCs AND TPHg IN SOIL – 2004

June 2013
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Oakland, California

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FIGURE 3

6/20/13 vsa ..T:\3884 MLK\Fig3_VOCs_TPH_soil_2004.ai

MARTIN LUTHER KING JR (MLK) WAY

G17	
Analyte	**Conc. µg/L**
TPH-g	<50
Benzene	0.59
Toluene	0.62
Ethylbenzene	<0.50
Xylenes	<1.0
MTBE	<5.0

G19	
Analyte	**Conc. µg/L**
TPH-g	<50
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Xylenes	<1.0
MTBE	<5.0

G11	
Analyte	**Conc. µg/L**
TPH-g	66
Benzene	2.3
Toluene	2.9
Ethylbenzene	1.6
Xylenes	5.2
MTBE	<50

G10	
Analyte	**Conc. µg/L**
TPH-g	97
Benzene	4.4
Toluene	1.5
Ethylbenzene	4.2
Xylenes	5.3
MTBE	6.5

G9	
Analyte	**Conc. µg/L**
TPH-g	1,200
Benzene	88
Toluene	42
Ethylbenzene	33
Xylenes	170
MTBE	7.9

G4	
Analyte	**Conc. µg/L**
TPH-g	950
Benzene	260
Toluene	<10
Ethylbenzene	74
Xylenes	58
MTBE	<100

G2	
Analyte	**Conc. µg/L**
TPH-g	22,000
Benzene	4,700
Toluene	5,500
Ethylbenzene	700
Xylenes	2,300
MTBE	<500

G13	
Analyte	**Conc. µg/L**
TPH-g	<50
Benzene	0.53
Toluene	0.58
Ethylbenzene	<0.50
Xylenes	<1.0
MTBE	<5.0

G12	
Analyte	**Conc. µg/L**
TPH-g	<50
Benzene	1.5
Toluene	2.6
Ethylbenzene	<0.50
Xylenes	<1.0
MTBE	<5.0

G7		G20	
Analyte	**Conc. µg/L**	**Analyte**	**Conc. µg/L**
TPH-g	190	TPH-g	64
Benzene	21	Benzene	2.7
Toluene	34	Toluene	3.4
Ethylbenzene	5.0	Ethylbenzene	0.61
Xylenes	16	Xylenes	1.5
MTBE	<5.0	MTBE	<5.0

Approximate Location of Former UST #1 (650 gallon/gasoline)

Approximate Location of Former UST #2 (650 gallon/gasoline)

Approximate Location of Former UST #3 (500 gallon/gasoline)

SIDEWALK

BILLBOARD

FUEL PUMP ISLAND

FORMER CANOPY

FORMER OFFICE

GATE

HYDRAULIC LIFT

PAVED

FORMER MOBILE CARWASH

FORMER SHED

FORMER REST ROOM

PIT

RAMP

RAMP

FORMER CANOPY

FORMER SHOP BUILDING

39TH STREET

SIDEWALK

GATE

G17 G19 G11 G10 G9 G4 G2 G13 G12 G7/G20

6/20/13 vsa ..T:\3884 MLK\Fig4_GrabGW_results_2004.ai

G2 Grab Groundwater Sample Location, URS 2004

G7/G20 Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

TPH-g Total Petroleum Hydrocarbon - Gasoline

Note:
All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

GRAB GROUNDWATER SAMPLE RESULTS – 2004 (URS)

June 2013
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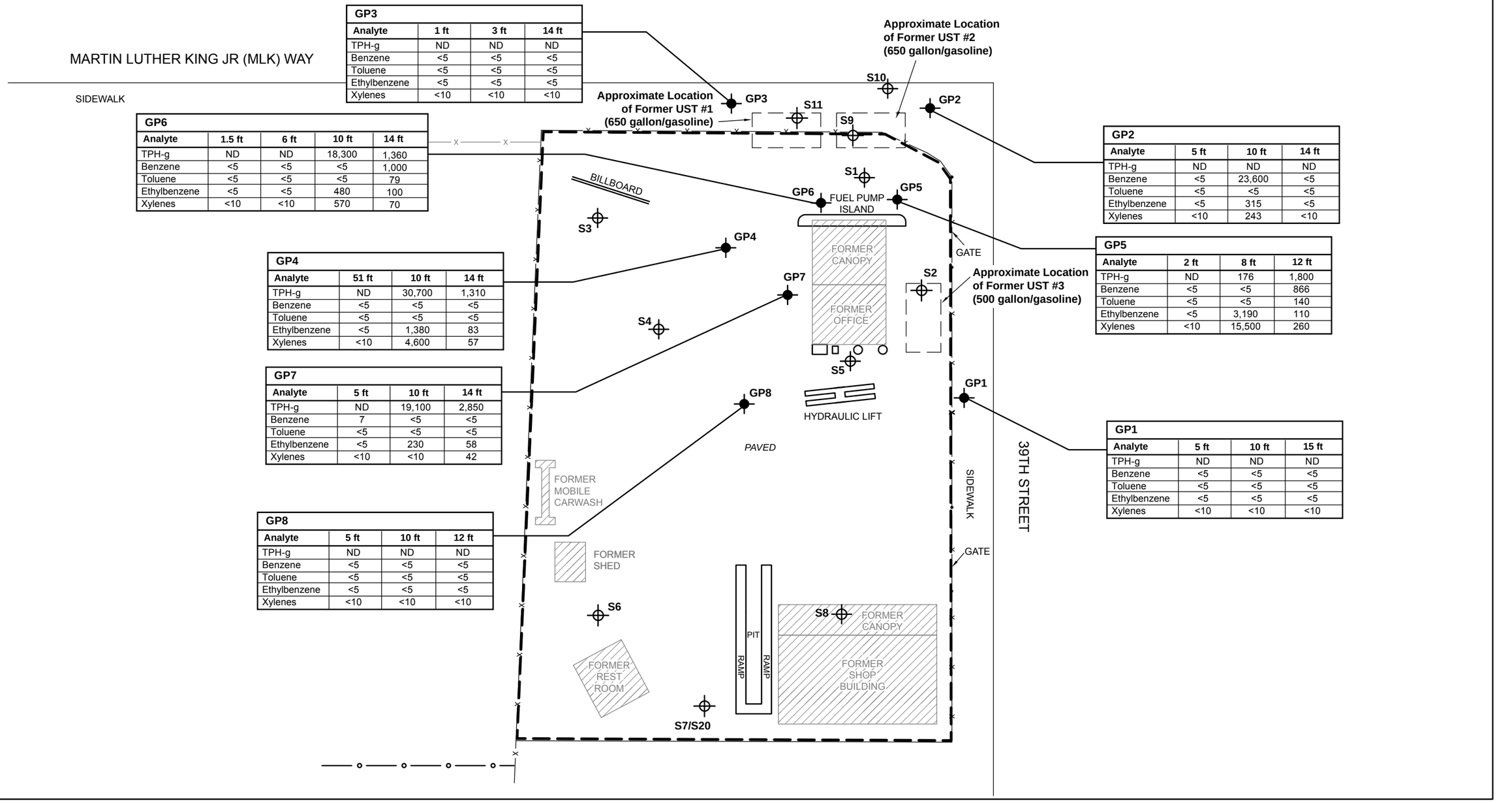
FIGURE 4



GP3			
Analyte	**1 ft**	**3 ft**	**14 ft**
TPH-g	ND	ND	ND
Benzene	<5	<5	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	<5	<5
Xylenes	<10	<10	<10

GP6				
Analyte	**1.5 ft**	**6 ft**	**10 ft**	**14 ft**
TPH-g	ND	ND	18,300	1,360
Benzene	<5	<5	<5	1,000
Toluene	<5	<5	<5	79
Ethylbenzene	<5	<5	480	100
Xylenes	<10	<10	570	70

GP2			
Analyte	**5 ft**	**10 ft**	**14 ft**
TPH-g	ND	ND	ND
Benzene	<5	23,600	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	315	<5
Xylenes	<10	243	<10

GP5			
Analyte	**2 ft**	**8 ft**	**12 ft**
TPH-g	ND	176	1,800
Benzene	<5	<5	866
Toluene	<5	<5	140
Ethylbenzene	<5	3,190	110
Xylenes	<10	15,500	260

GP4			
Analyte	**51 ft**	**10 ft**	**14 ft**
TPH-g	ND	30,700	1,310
Benzene	<5	<5	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	1,380	83
Xylenes	<10	4,600	57

GP7			
Analyte	**5 ft**	**10 ft**	**14 ft**
TPH-g	ND	19,100	2,850
Benzene	7	<5	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	230	58
Xylenes	<10	<10	42

GP1			
Analyte	**5 ft**	**10 ft**	**15 ft**
TPH-g	ND	ND	ND
Benzene	<5	<5	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	<5	<5
Xylenes	<10	<10	<10

GP8			
Analyte	**5 ft**	**10 ft**	**12 ft**
TPH-g	ND	ND	ND
Benzene	<5	<5	<5
Toluene	<5	<5	<5
Ethylbenzene	<5	<5	<5
Xylenes	<10	<10	<10

S1 Soil Boring Location, URS Geoprobe (2004)

GP1 JCC Geoprobe (Feb 21, 2006)

S7/S20 Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

TPH-g Total Petroleum Hydrocarbon - Gasoline

ND Non-detect (reporting limits not available); reporting limit expected to be between 500 µg/kg and 1,000 µg/kg.

Note:
All concentrations in micrograms per kilogram (µg/kg)

0 10 20 FEET

VOCs AND TPHg IN SOIL – 2006

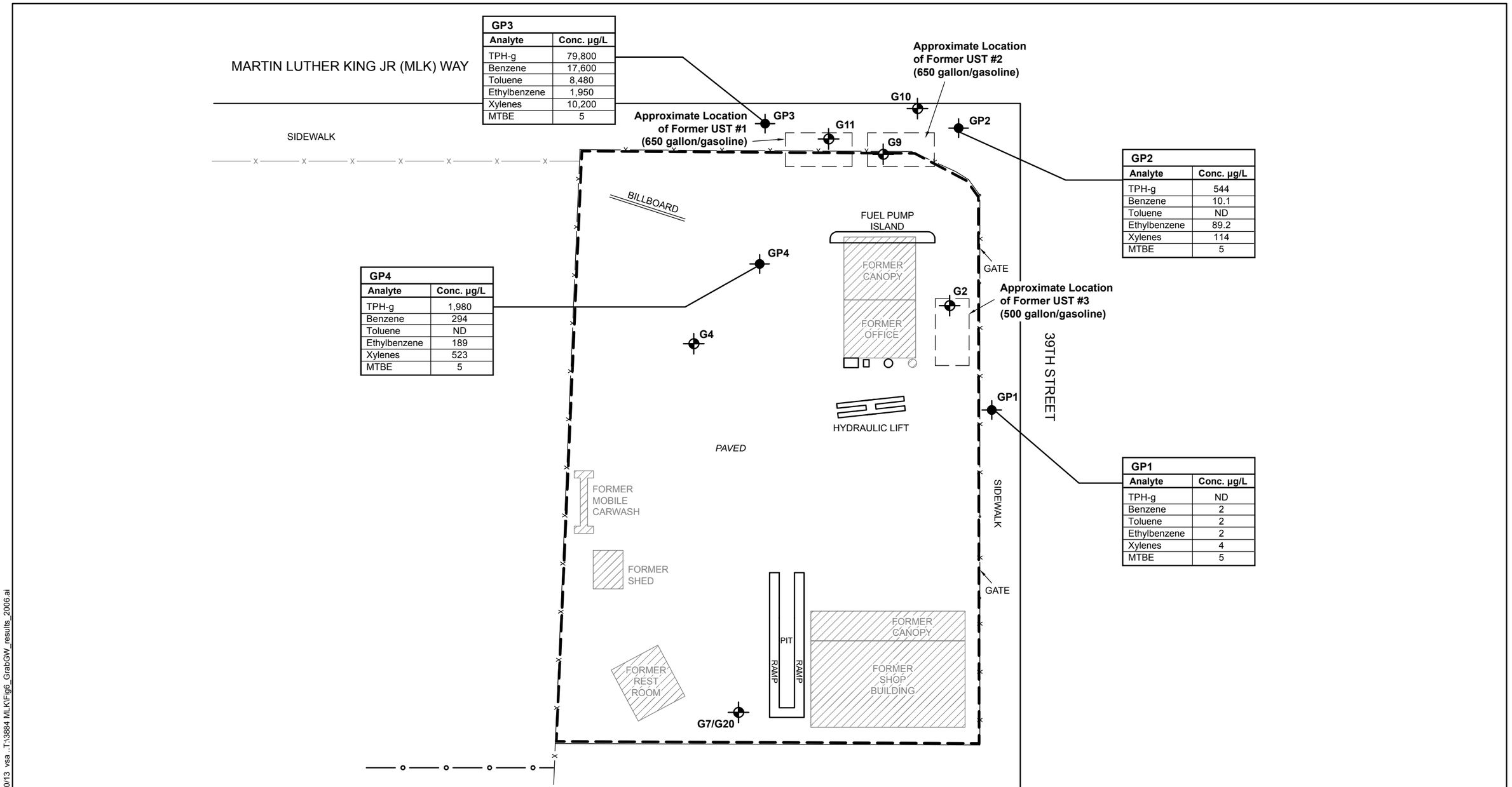
June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 5

6/20/13 vsa ..T:\3884 MLK\Fig5_VOCs_TPH_soil_2006.ai



GP3	
Analyte	**Conc. µg/L**
TPH-g	79,800
Benzene	17,600
Toluene	8,480
Ethylbenzene	1,950
Xylenes	10,200
MTBE	5

GP4	
Analyte	**Conc. µg/L**
TPH-g	1,980
Benzene	294
Toluene	ND
Ethylbenzene	189
Xylenes	523
MTBE	5

GP2	
Analyte	**Conc. µg/L**
TPH-g	544
Benzene	10.1
Toluene	ND
Ethylbenzene	89.2
Xylenes	114
MTBE	5

GP1	
Analyte	**Conc. µg/L**
TPH-g	ND
Benzene	2
Toluene	2
Ethylbenzene	2
Xylenes	4
MTBE	5

G2 Grab Groundwater Sample Location, URS 2004

GP1 JCC Geoprobe (Feb 21, 2006)

G7/G20 Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

TPH-g Total Petroleum Hydrocarbon - Gasoline

ND Non-detect. Reporting limits were not available for TPH-g. Reporting limit is assumed to be between 500 and 1,000 µg/L

Note:
All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

GRAB GROUNDWATER SAMPLE RESULTS – 2006 (JCC)

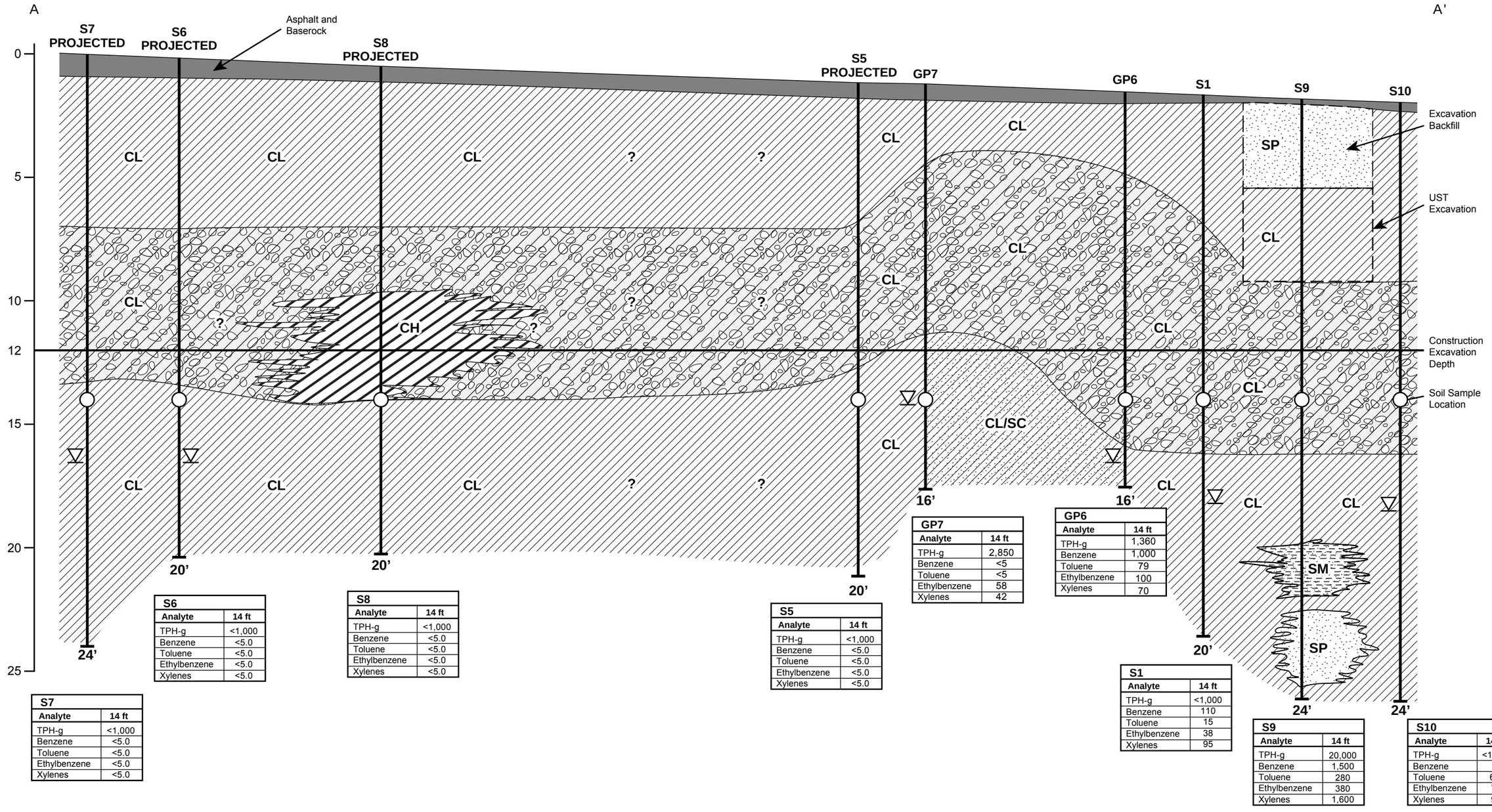
June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 6

6/20/13 vsa ..T:\3884 MLK\Fig6_GrabGW_results_2006.ai



S7	
Analyte	14 ft
TPH-g	<1,000
Benzene	<5.0
Toluene	<5.0
Ethylbenzene	<5.0
Xylenes	<5.0

S6	
Analyte	14 ft
TPH-g	<1,000
Benzene	<5.0
Toluene	<5.0
Ethylbenzene	<5.0
Xylenes	<5.0

S8	
Analyte	14 ft
TPH-g	<1,000
Benzene	<5.0
Toluene	<5.0
Ethylbenzene	<5.0
Xylenes	<5.0

S5	
Analyte	14 ft
TPH-g	<1,000
Benzene	<5.0
Toluene	<5.0
Ethylbenzene	<5.0
Xylenes	<5.0

GP7	
Analyte	14 ft
TPH-g	2,850
Benzene	<5
Toluene	<5
Ethylbenzene	58
Xylenes	42

GP6	
Analyte	14 ft
TPH-g	1,360
Benzene	1,000
Toluene	79
Ethylbenzene	100
Xylenes	70

S1	
Analyte	14 ft
TPH-g	<1,000
Benzene	110
Toluene	15
Ethylbenzene	38
Xylenes	95

S9	
Analyte	14 ft
TPH-g	20,000
Benzene	1,500
Toluene	280
Ethylbenzene	380
Xylenes	1,600

S10	
Analyte	14 ft
TPH-g	<1,000
Benzene	19
Toluene	6.2
Ethylbenzene	79
Xylenes	96

Asphalt and Baserock
Clay (CL)
Gravelly Clay (CL)
Silty Clay (CH)
Clay/Clayey Sand (CL/SC)
Sand (SM)
Sand (SP)
Soil Sample Location
First Encountered Groundwater

Note:
All concentrations in micrograms per kilogram (µg/kg)

CROSS SECTION A–A'

June 2013
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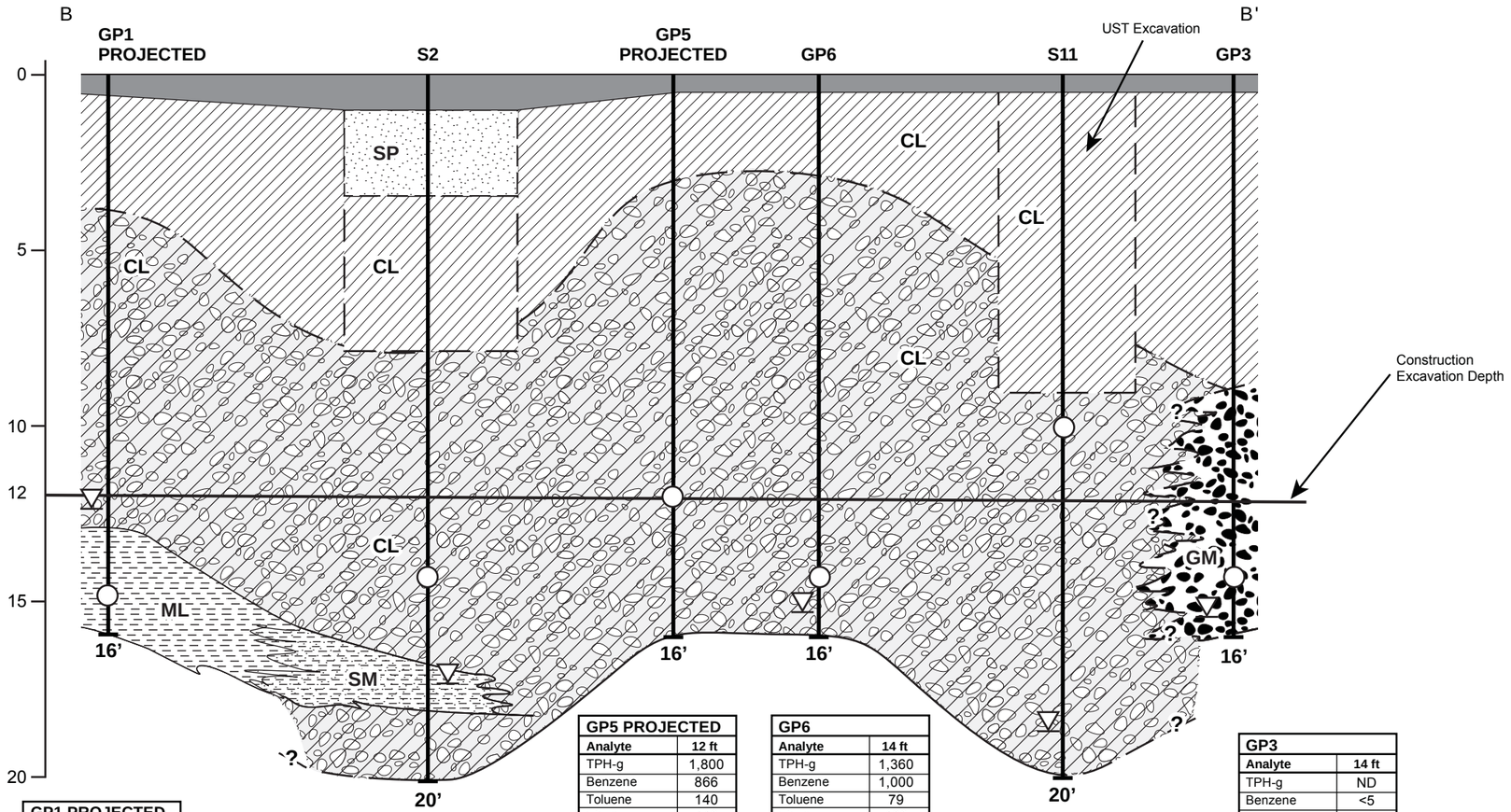
Oakland, California

URS

FIGURE 7

6/20/13 hk\vsa ...T:\3884 MLK\Fig7_xsection_AA.ai



GP1 PROJECTED	
Analyte	**15 ft**
TPH-g	ND
Benzene	<5
Toluene	<5
Ethylbenzene	<5
Xylenes	<10

S2	
Analyte	**14 ft**
TPH-g	170 J
Benzene	3,200
Toluene	14,000
Ethylbenzene	4,100
Xylenes	20,000

GP5 PROJECTED	
Analyte	**12 ft**
TPH-g	1,800
Benzene	866
Toluene	140
Ethylbenzene	110
Xylenes	260

GP6	
Analyte	**14 ft**
TPH-g	1,360
Benzene	1,000
Toluene	79
Ethylbenzene	100
Xylenes	70

S11	
Analyte	**10 ft**
TPH-g	<1,000
Benzene	940
Toluene	670
Ethylbenzene	8,500
Xylenes	8,900

GP3	
Analyte	**14 ft**
TPH-g	ND
Benzene	<5
Toluene	<5
Ethylbenzene	<5
Xylenes	<10

Asphalt and Baserock
Clay (CL)
Gravelly Clay (CL)
Silty Clay (CH)
Clay/Clayey Sand (CL/SC)
Sand (SM)
Sand (SP)
Soil Sample Location
First Encountered Groundwater

Note:
All concentrations in micrograms per kilogram (µg/kg)

CROSS SECTION B–B'

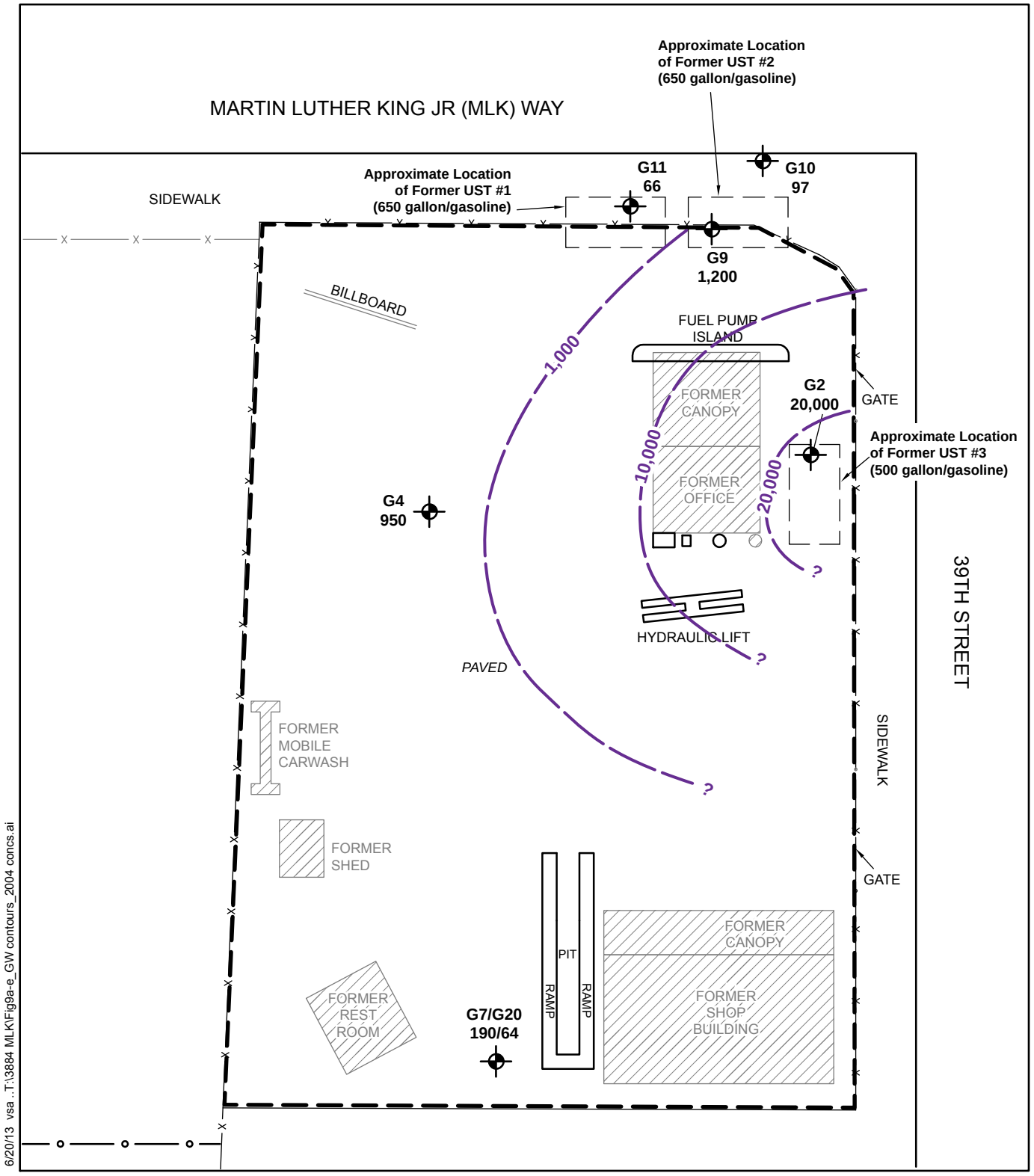
June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 8

6/20/13 hk/vsa ..T:\3884 MLK\Fig8_xsection_BB.ai



G2 — Groundwater Sample Location

G7/G20 — Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

TPH-g — Total Petroleum Hydrocarbon - Gasoline

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

GROUNDWATER ISOCONCENTRATIONS: TPH-g IN GROUNDWATER – 2004 (URS)

June 2013
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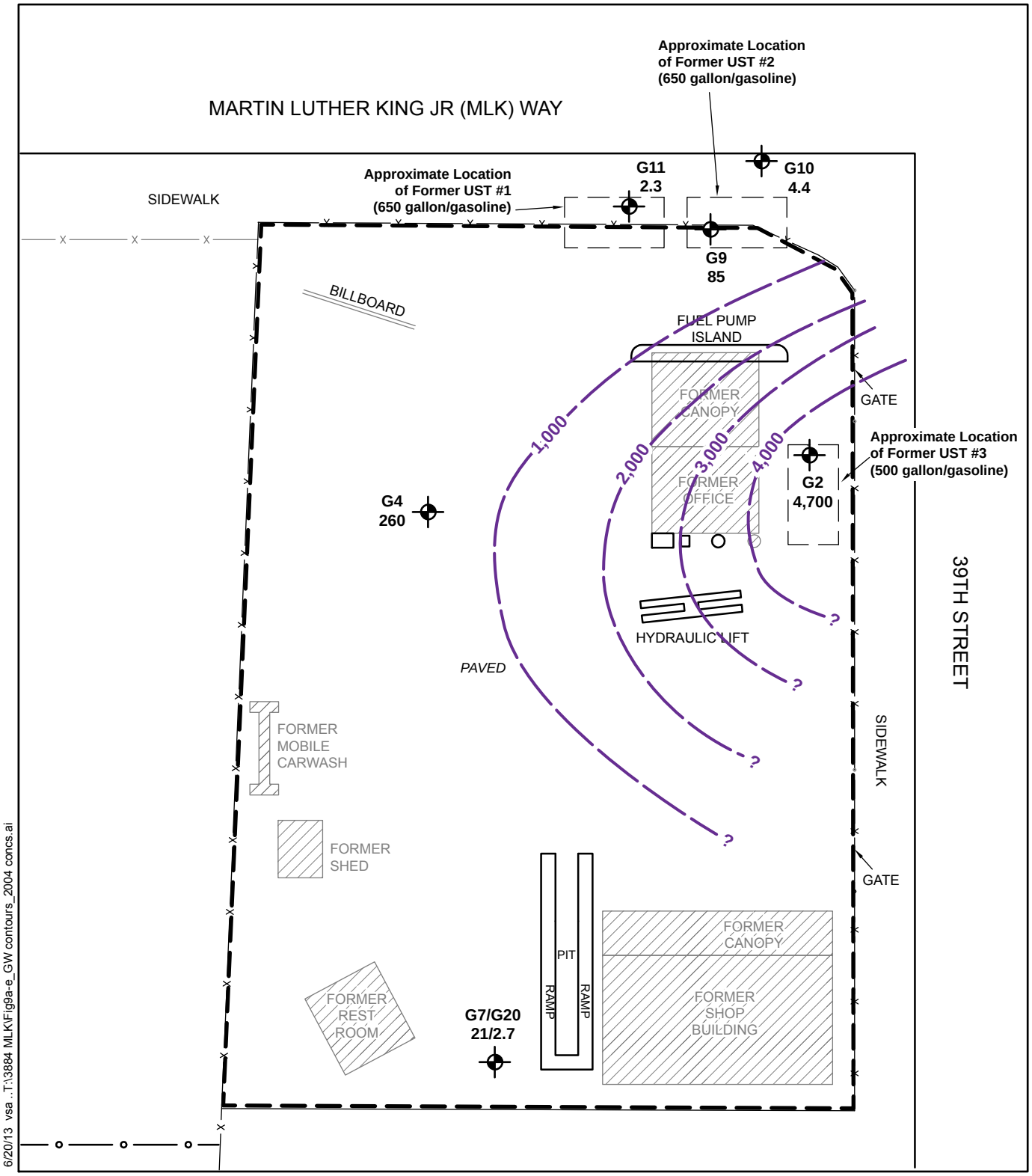
3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 9a



G2 — Groundwater Sample Location

G7/G20 — Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

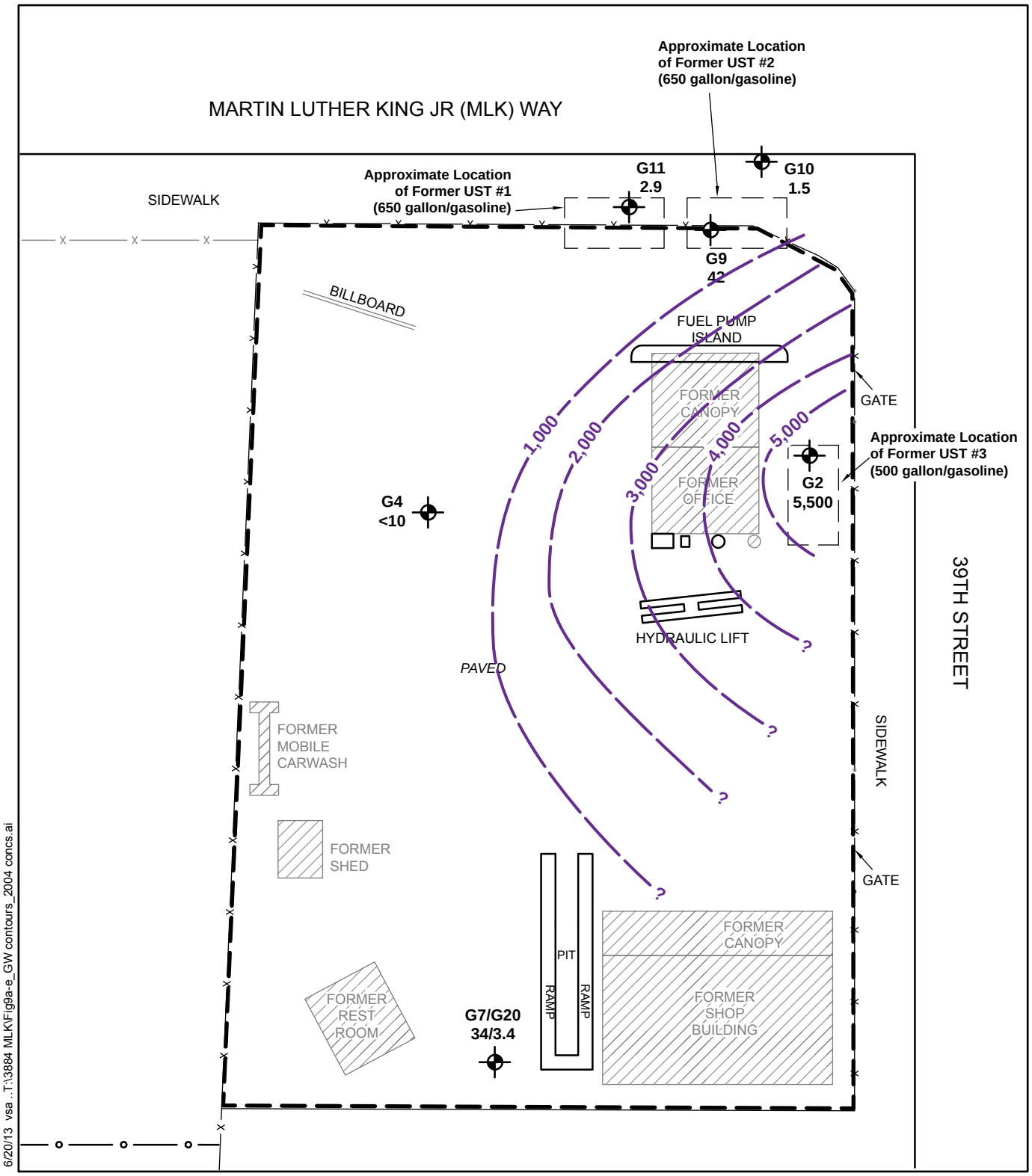
GROUNDWATER ISOCONCENTRATIONS: BENZENE IN GROUNDWATER – 2004 (URS)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 9b



G2 — Groundwater Sample Location

G7/G20 — Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

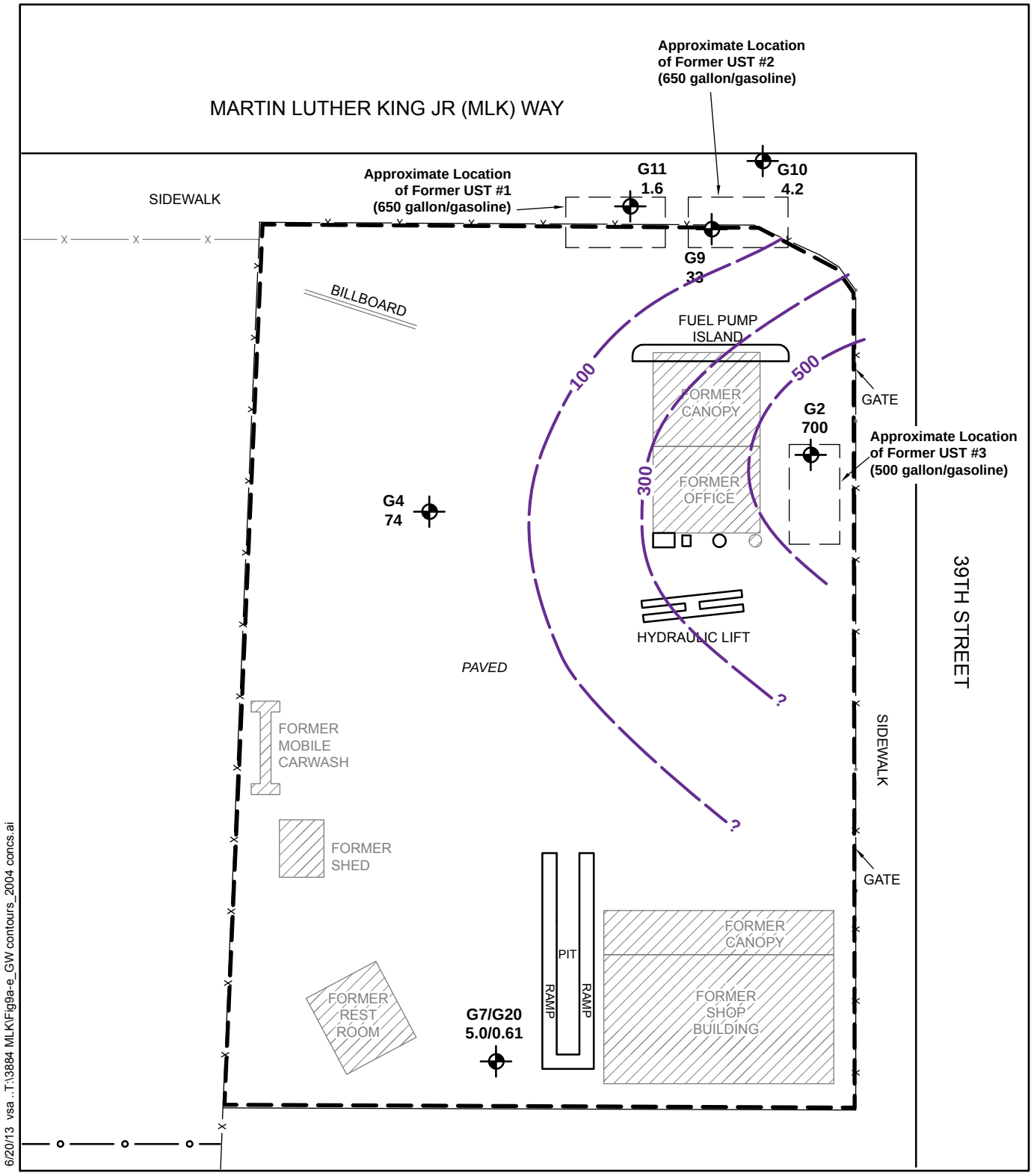
GROUNDWATER ISOCONCENTRATIONS: TOLUENE IN GROUNDWATER – 2004 (URS)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 9c



G2 — Groundwater Sample Location

G7/G20 — Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

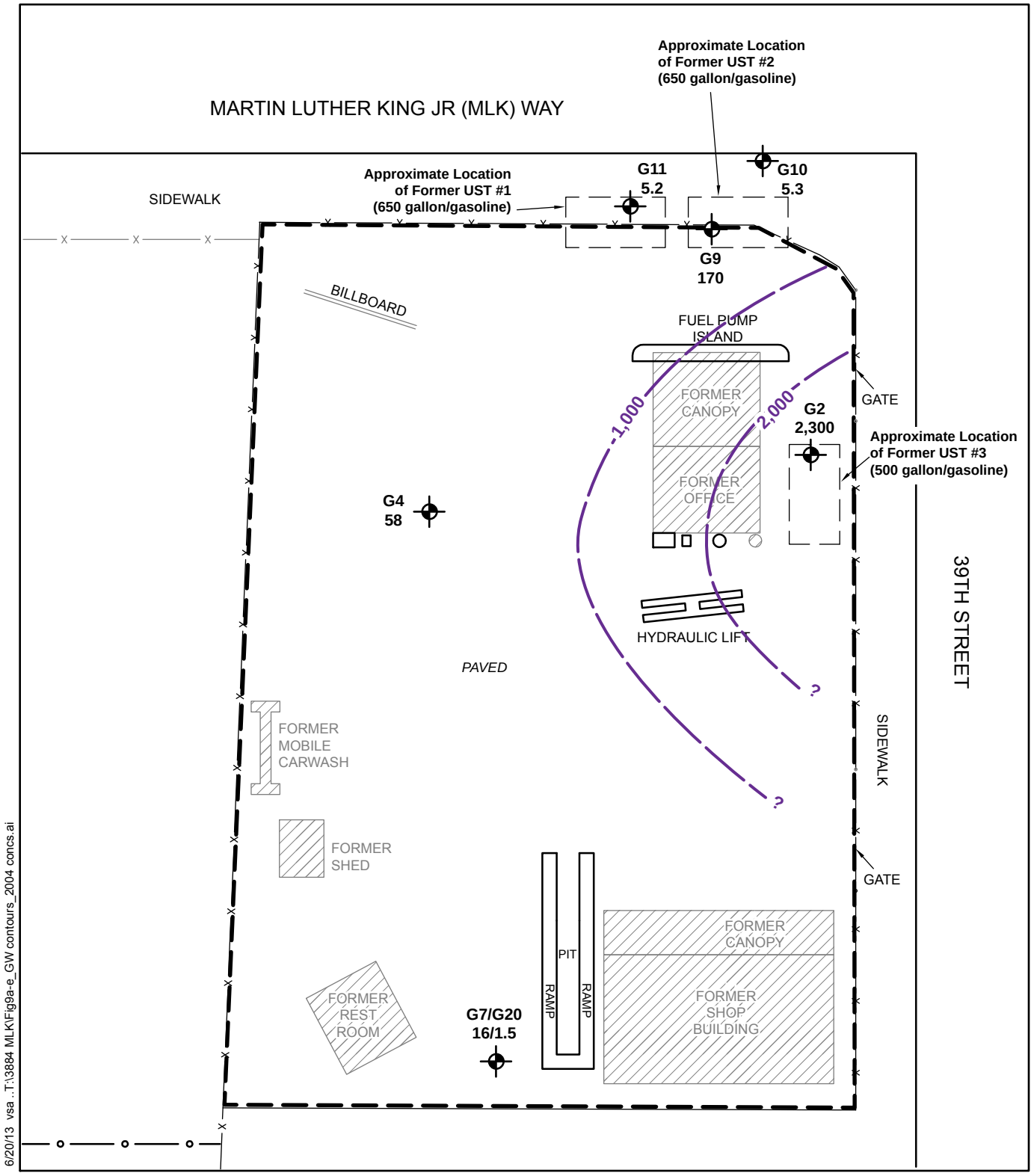
GROUNDWATER ISOCONCENTRATIONS: ETHYLBENZENE IN GROUNDWATER – 2004 (URS)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 9d



G2 Groundwater Sample Location

G7/G20 Duplicate Sample

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

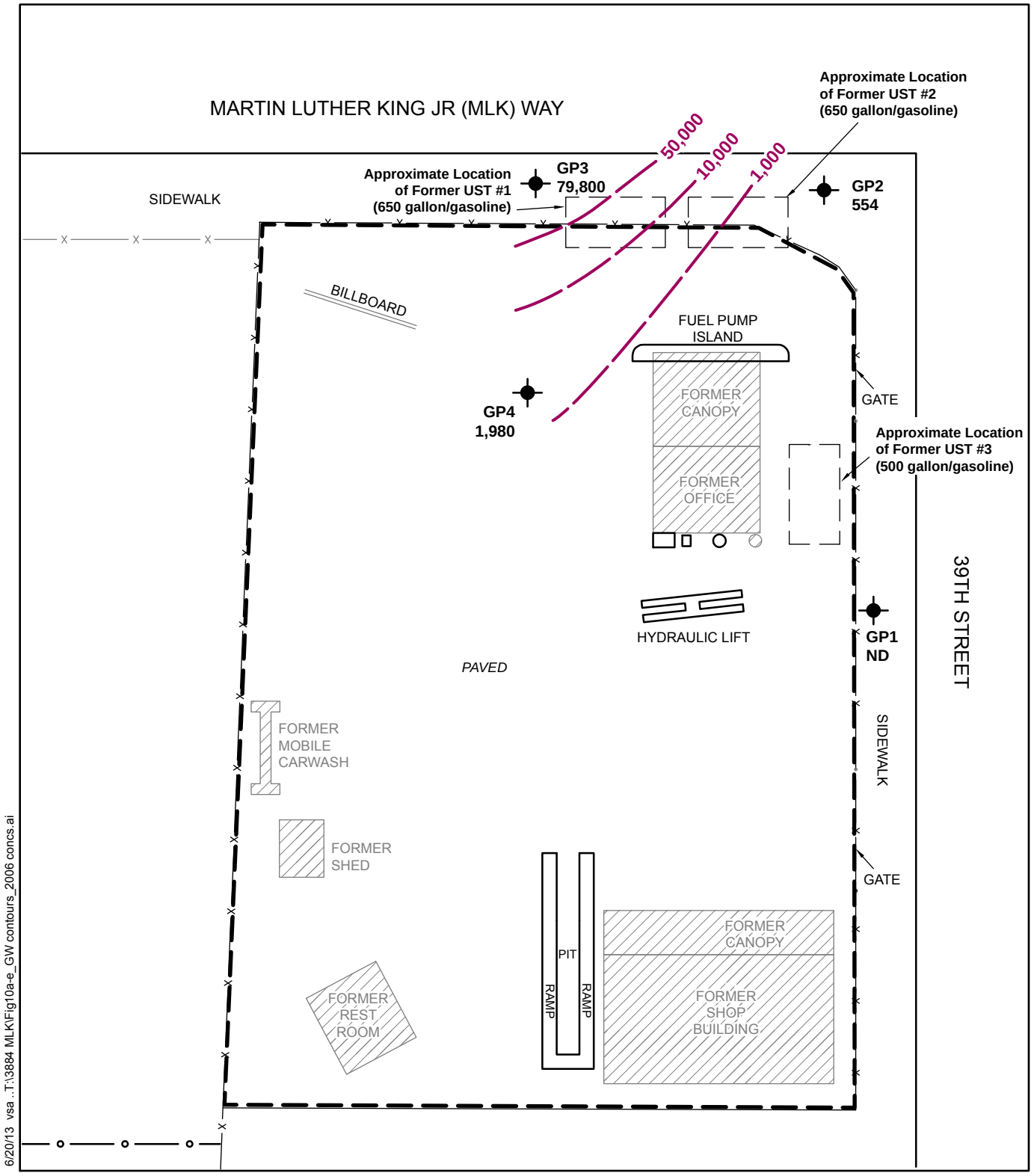
GROUNDWATER ISOCONCENTRATIONS: TOTAL XYLENES IN GROUNDWATER – 2004 (URS)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 9e



6/20/13 vsa ..T:\3884 MLK\Fig10a-e_GW contours_2006 concs.ai

GP1 — JCC Geoprobe (Feb 21, 2006)

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

ND — Non-detection

TPH-g — Total Petroleum Hydrocarbon - Gasoline

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

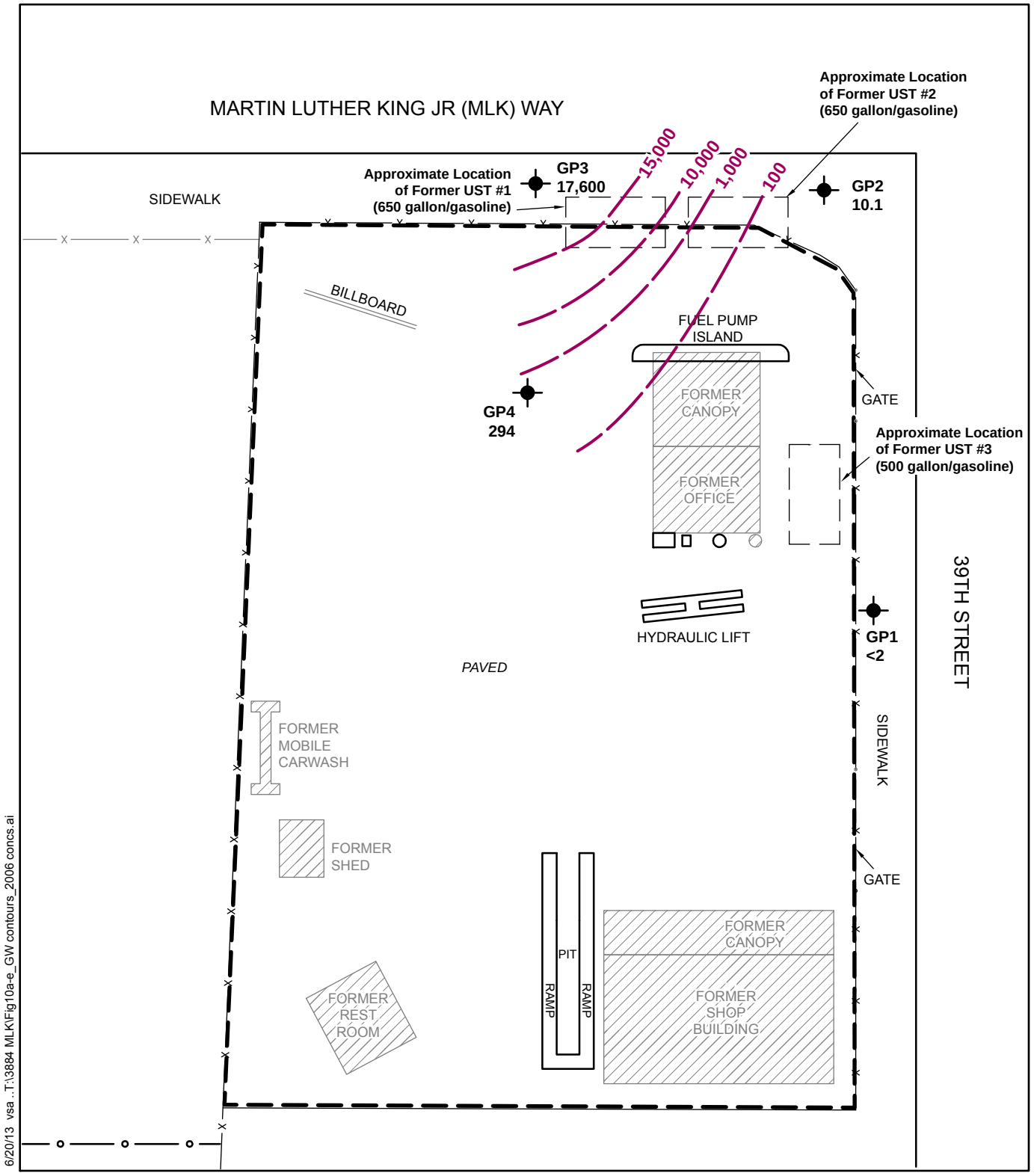
GROUNDWATER ISOCONCENTRATIONS: TPH-g IN GROUNDWATER – 2006 (JCC)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 10a



6/20/13 vsa ..T:\3884 MLK\Fig10a-e_GW contours_2006 concs.ai

GP1 — JCC Geoprobe (Feb 21, 2006)

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

<2 — Not detected above laboratory reporting limit

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

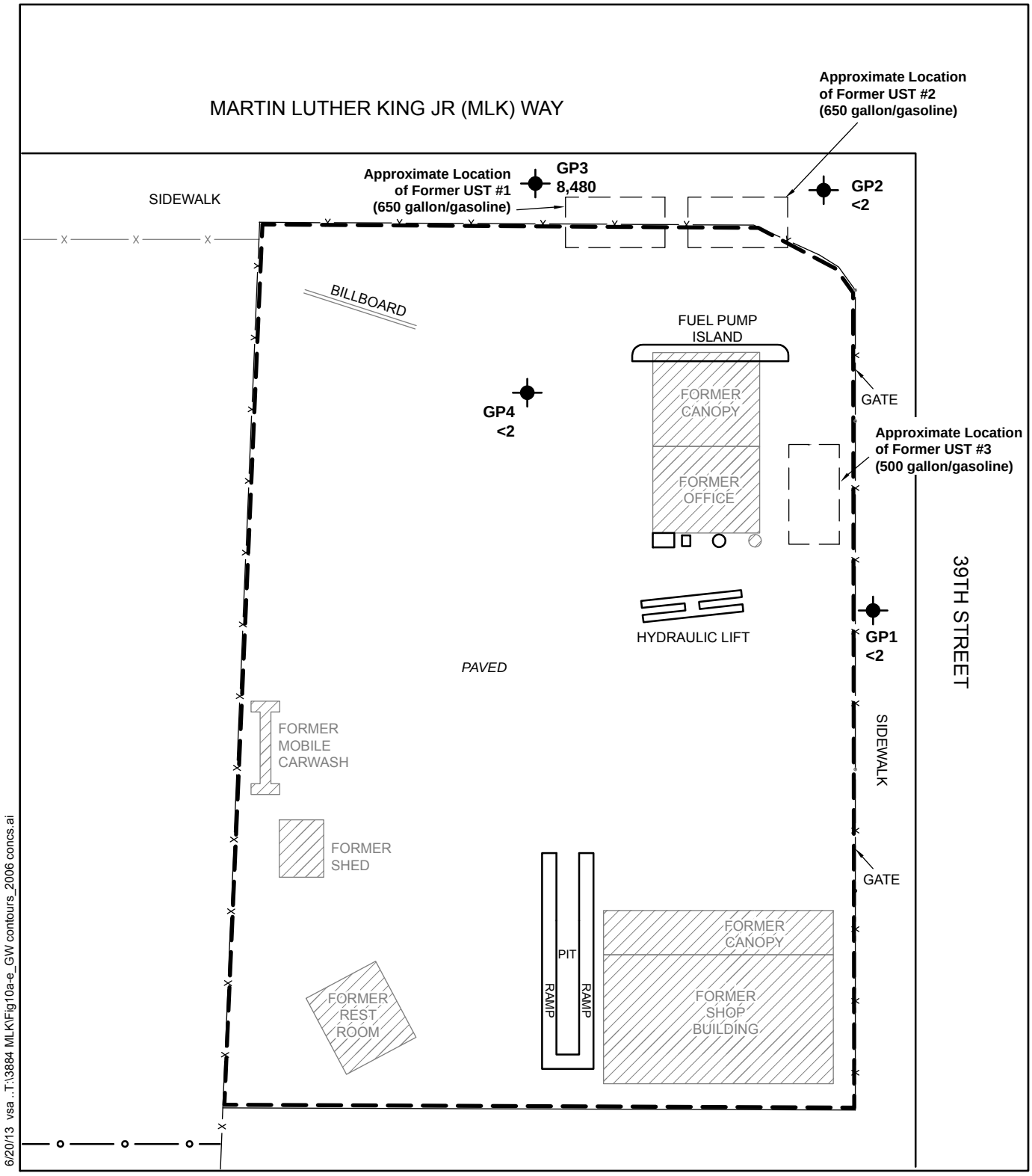
GROUNDWATER ISOCONCENTRATIONS: BENZENE IN GROUNDWATER – 2006 (JCC)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 10b



6/20/13 vsa ..T:\3884 MLK\Fig10a-e_GW contours_2006 concs.ai

GP1 — JCC Geoprobe (Feb 21, 2006)

Site Boundary

Chain Link Fence

Wood Fence

<2 — Not detected above laboratory reporting limit

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

GROUNDWATER ISOCONCENTRATIONS: TOLUENE IN GROUNDWATER – 2006 (JCC)

June 2013
28068161

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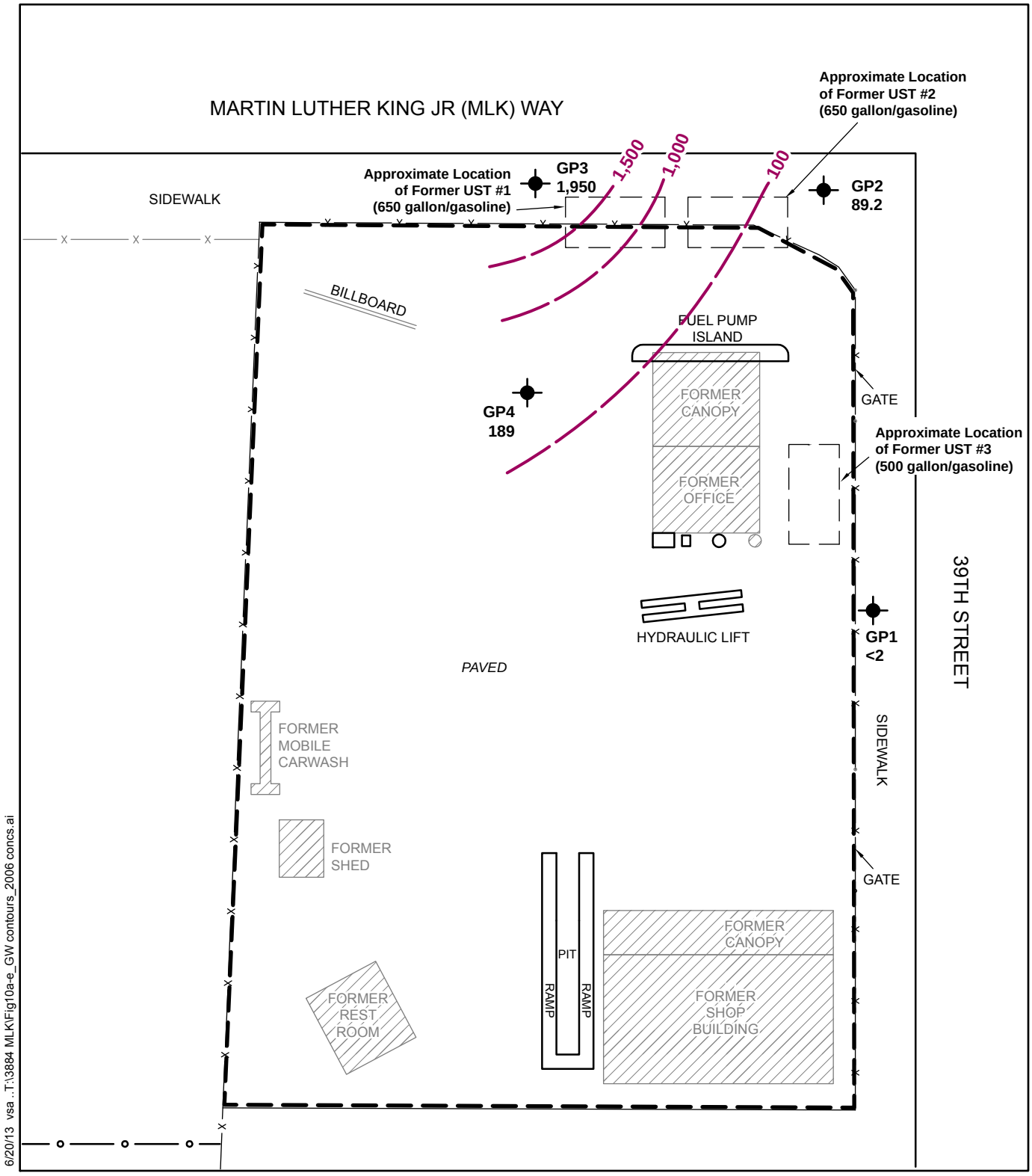
Oakland, California

URS

FIGURE 10c



6/20/13 vsa ..T:\3884 MLK\Fig10a-e_GW contours_2006 concs.ai

GP1 JCC Geoprobe (Feb 21, 2006)

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

<2 Not detected above laboratory reporting limit

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

GROUNDWATER ISOCONCENTRATIONS: ETHYLBENZENE IN GROUNDWATER – 2006 (JCC)

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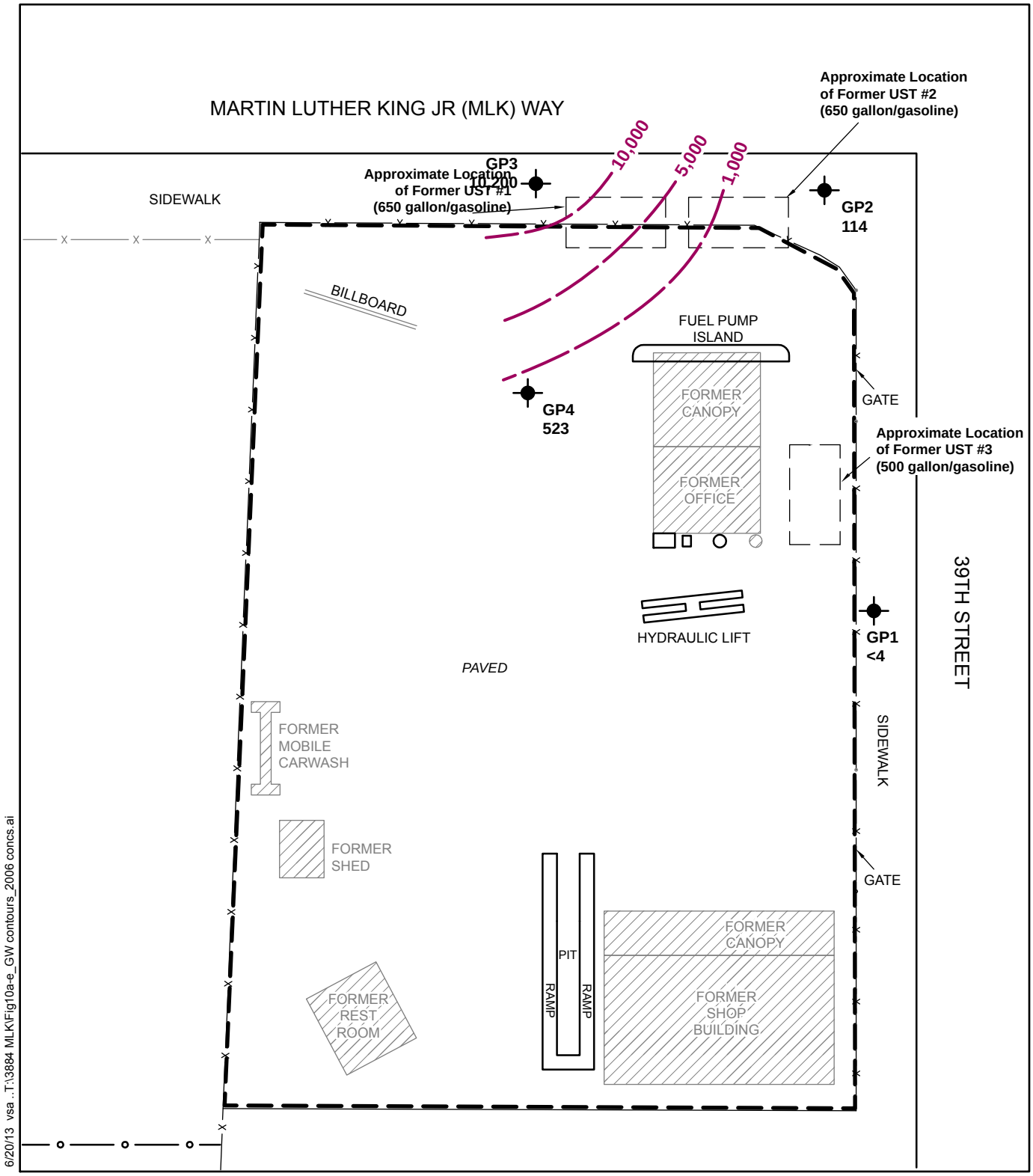
Oakland, California

URS

FIGURE 10d



6/20/13 vsa ..T:\3884 MLK\Fig10a-e_GW contours_2006 concs.ai

GP1 — JCC Geoprobe (Feb 21, 2006)

Site Boundary

Chain Link Fence

Wood Fence

Groundwater Contour

<4 — Not detected above laboratory reporting limit

Note: All concentrations in micrograms per liter (µg/L)

0 10 20 FEET

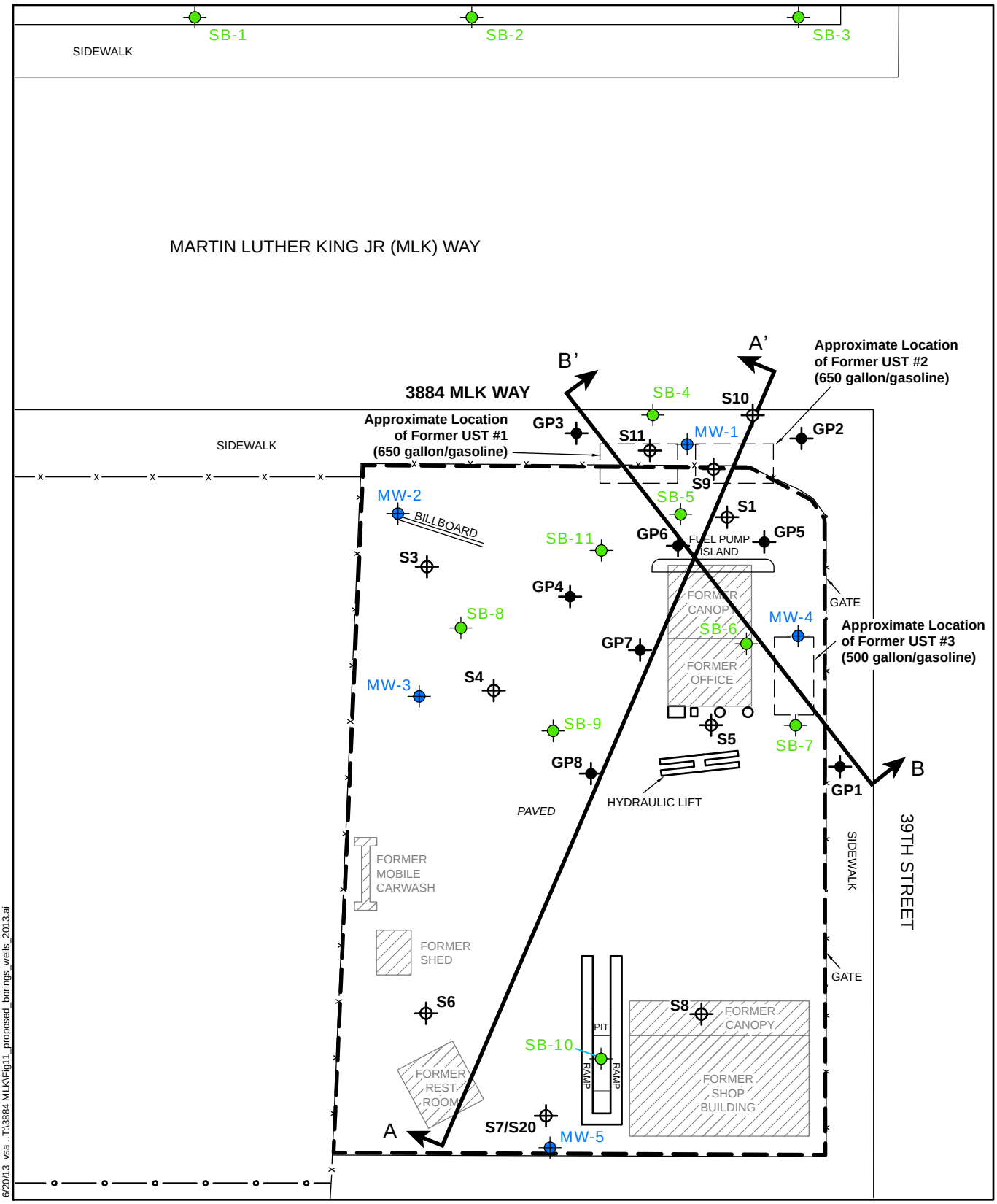
GROUNDWATER ISOCONCENTRATIONS: TOTAL XYLENES IN GROUNDWATER – 2006 (JCC)

June 2013
28068161

3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 10e



PROPOSED BORINGS AND MONITORING WELLS

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3884 Martin Luther King, Jr. Way
Oakland, California

URS

FIGURE 11

TABLES

Table 2-1
Historical Soil Results
3884 Martin Luther King Junior Drive Site

Origin	Analyte	Depth	TPH-G	Benzene	Toluene	Ethylbenz ene	Xylenes	MTBE	Other Oxygenates
Units		feet bgs	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Screening Level [1,2]			*100*	*44*	*2900*	*2300*	*2300*	*23*	
JCC, 2006	9795-GP1-5.0	5.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP1-10.0	10.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP1-15.0	15.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP2-5.0	5.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP2-10.0	10.0	23.6	< 5.0	< 5.0	315	243	< 5.0	ND
JCC, 2006	9795-GP2-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP3-5.0	5.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP3-10.0	10.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP3-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP4-5.0	5.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP4-10.0	10.0	30.7	< 5.0	< 5.0	1380	**4600**	< 5.0	ND
JCC, 2006	9795-GP4-14.0	14.0	1.31	< 5.0	< 5.0	83	57	< 5.0	ND
JCC, 2006	9795-GP5-2.0	2.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP5-8.0	8.0	176	< 5.0	< 5.0	**3190**	**15500**	< 5.0	ND
JCC, 2006	9795-GP5-12.0	12.0	1.8	**860**	140	110	260	< 5.0	ND
JCC, 2006	9795-GP6-1.5	1.5	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP6-6.0	6.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP6-10.0	10.0	18.3	< 5.0	< 5.0	480	570	< 5.0	ND
JCC, 2006	9795-GP6-14.0	14.0	1.36	**600**	79	100	70	< 5.0	ND
JCC, 2006	9795-GP7-5.0	5.0	ND	7	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP7-10.0	10.0	19.1	< 5.0	< 5.0	230	< 10.0	< 5.0	ND
JCC, 2006	9795-GP7-14.0	14.0	2.85	< 5.0	< 5.0	58	42	< 5.0	ND
JCC, 2006	9795-GP8-5.0	5.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP8-10.0	10.0	ND	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	ND
JCC, 2006	9795-GP8-12.0	12.0	ND	< 5.0	< 5.0	< 5.0	<10.0	< 5.0	ND
URS, 2004	S1-1.0	1.0	ND	< 6.7	< 6.7	< 6.7	< 6.7	< 6.7	NA
URS, 2004	S1-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S1-14.0	14.0	ND	**110**	15	38	95	18	NA
URS, 2004	S2-1.0	1.0	ND	< 5.7	< 5.7	< 5.7	< 5.7	< 5.7	NA
URS, 2004	S2-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S2-14.0	14.0	**170**	**3,200**	**14,000**	**4,100**	**20,000**	ND	NA
URS, 2004	S3-1.0	1.0	ND	< 5.2	< 5.2	< 5.2	< 5.2	< 5.2	NA
URS, 2004	S3-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S3-14.0	14.0	ND	22	ND	ND	ND	ND	NA
URS, 2004	S4-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S4-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S4-14.0	14.0	6.2	**250**	ND	ND	ND	ND	NA
URS, 2004	S5-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S5-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S5-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S6-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S6-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S6-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S7-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S7-3.5	3.5	ND	< 5.2	< 5.2	< 5.2	< 5.2	< 5.2	NA
URS, 2004	S7-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S8-1.0	1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA

Table 2-1
Historical Soil Results
3884 Martin Luther King Junior Drive Site

Origin	Analyte	Depth	TPH-G	Benzene	Toluene	Ethylbenz ene	Xylenes	MTBE	Other Oxygenates
Units		feet bgs	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Screening Level [1,2]			*100*	*44*	*2900*	*2300*	*2300*	*23*	
URS, 2004	S8-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S8-14.0	14.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S9-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S9-3.5	3.5	ND	11	ND	22	37	ND	NA
URS, 2004	S9-14.0	14.0	20	**1,500**	280	380	1,600	ND	NA
URS, 2004	S10-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S10-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S10-14.0	14.0	ND	19	6.2	79	96	ND	NA
URS, 2004	S11-1.0	1.0	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S11-3.5	3.5	ND	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NA
URS, 2004	S11-10.0	10.0	**220**	**940**	670	**8,500**	**8,900**	< 5.0	NA

Notes

1) Screening level for TPH-g is the RWQCB 2012 Low Threat UST Case Closure Policy soil value

2) Screening levels for BTEX and MTBE are the RWQCB Environmental Screening Levels for Residential soil

Bold = exceeds the screening level

TPH-g = Total Petroleum Hydrocarbons - Gasoline Range

MTBE = methyl tert butyl ether

Table 2-2
Historical Groundwater Results
3884 Martin Luther King Junior Drive Site

Origin	Sample ID	TPH-G	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Other Oxygenates
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Screening Level [1,2]		*100*	*1*	*150*	*300*	*1750*	*13*	
JCC, 2006	9795-GP1-W	ND	ND	ND	ND	< 4.0	< 5.0	ND
JCC, 2006	9795-GP2-W	**554**	**10.1**	ND	89.2	114	< 5.0	ND
JCC, 2006	9795-GP3-W	**79,800**	**17,600**	**8,480**	**1,950**	**10,200**	< 5.0	ND
JCC, 2006	9795-GP4-W	**1,980**	**294**	ND	189	523	< 5.0	ND
URS, 2004	G2	**22,000**	**4,700**	**5,500**	**700**	**2,300**	< 5.0	NA
URS, 2004	G4	**950**	**260**	ND	74	58	< 5.0	NA
URS, 2004	G7	**190**	**21**	34	5	10	< 5.0	NA
URS, 2004	G9	**1,200**	**88**	42	33	170	7.9	NA
URS, 2004	G10	**97**	**4.4**	1.5	4.2	5.3	6.5	NA
URS, 2004	G11	66	**2.3**	2.9	1.6	5.2	< 5.0	NA
URS, 2004	G12	ND	**1.5**	2.6	< 2.0	< 4.0	< 5.0	NA
URS, 2004	G13	ND	0.53	0.58	< 2.0	< 4.0	< 5.0	NA
URS, 2004	G17	ND	0.59	0.62	< 2.0	< 4.0	< 5.0	NA
URS, 2004	G19	ND	< 2	ND	< 2.0	< 4.0	< 5.0	NA
URS, 2004	G20	64	< 2	ND	< 2.0	< 4.0	< 5.0	NA

Notes 1) Screening levels for TPH-g is the RWQCB ESL.
2) Screening levels for BTEX and MTBE are the California MCLs.

TPH-g = Total Petroleum Hydrocarbons - Gasoline Range
MTBE = methyl tert butyl ether
BOLD - indicates value exceeds screening level

Table 2-3
California MCL Exceedences (in µg/L)

Analyte	CA MCL	G2	G4	G7	G9	G10	G11	G12
Benzene	1	**4,700**	**260**	**21**	**88**	**4.4**	**2.3**	**1.5**
1,2-DCA	0.5	<50	<10	<0.55	**2.7**	**1.3**	<0.5	<0.5
Cis-1,2-DCE	6	<50	**11**	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	300	**700**	74	5	33	4.2	1.6	<0.5
Toluene	150	**5,500**	<10	34	42	1.5	2.9	2.6
Xylenes	1,750	**2,300**	58	16	170	5.3	5.2	<1

Notes:

CA MCL – California Maximum Contaminant Level
Bold– above CA MCLs
DCA – Dichloroethane
DCE – Dichloroethene
<50 – not detected above the laboratory reporting limit of 50 µg/L.

Table 4-1
Site Conceptual Model

CSM Element	CSM Sub-Element	Description	Data Gap	Resolution
Geology and Hydrogeology	Regional	As described by URS (2004), the lithology encountered in the subsurface beneath the Site during drilling activities consisted predominantly of a brown to greenish-gray silty clay with sand and gravel. The primary stratigraphic units at the Site are listed below, with the approximate ranges of depth (bgs) each unit was encountered across the Site: • 0 to 5 feet bgs: The surface soil typically consisted of very dark-brown clay to dark-gray gravel fill, depending on whether the boring was in the vacant vegetated parcel (dark-brown clay), at 3860 MLK Jr. Way; or beneath the asphalt and concrete surfaces at the Lucky's Auto Body parcel at 3884 MLK Jr. Way (gravel fill). • 5 to 20 feet bgs: very dark-brown silty clay grades to a greenish-gray silty clay and brown silty clay and gravelly clay. Groundwater was encountered in direct-push boreholes at an average depth of 17.2 feet bgs, with depths ranging from 16.2 to 19.6 feet bgs. This groundwater depth is not considered a stabilized groundwater depth, because it was not measured from appropriately constructed monitoring wells.	None	NA
Geology and Hydrogeology	Site	Regional groundwater in the Oakland area generally follows topography, from areas of higher elevation in the east toward lower elevation in the west and southwest. The groundwater flow direction in the vicinity of the Site is to the west towards San Francisco Bay (Arcadis, 2012). URS reviewed groundwater investigation reports from the ARCO #4931 station at 731 West MacArthur Boulevard, approximately 1,000 feet southwest of the Site (Arcadis, 2012). The depth to water in the groundwater monitoring wells at the ARCO site ranged from approximately 3.2 to 10.8 feet bgs (approximately 52.2 to 43 feet elevation).	There are no monitoring wells on site so that the local groundwater flow direction and gradient is not known.	Five groundwater wells are to be installed at the site. Table 5-1: Item 1

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap	Resolution
Surface Water Bodies		The closest surface water body is the San Francisco Bay, which is 1.5 miles west of the site.		
Nearby Wells		The State Water Resource Quality Control Board (RWQCB) Geotracker GAMA website provides the locations of water supply wells proximal to the site. The nearest supply well is located approximately 2 miles southwest of the site. There are multiple monitoring wells in the vicinity of the site including those at the Arco services station at 781 West MacArthur Blvd., and Dollar Cleaners, 4860 – 4868 Telegraph Avenue, Oakland.	Need to conduct a well survey	Table 5-1: Item 3
Release Source and Volume		The three prior gasoline USTs (two 650-gallon and one 500-gallon) are considered the main source of the release of fuel hydrocarbons that have been detected in soil and groundwater beneath the Site. Tanks #1 and #2 were both observed to have one or more holes from corrosion at the time of removal. Although no holes were observed in Tank #3 during removal, the integrity of the tank was questionable as it split into two pieces along the weld during removal. Soil surrounding the tanks was stained green and was noted to have strong petroleum hydrocarbon odors. The release from the Tanks at the Site was discovered on January 5, 1995 during tank removal activities. The volume of the release is not known. The area around the ramps and pit in the southern area of the site is considered a potential source area.	Additional soil and groundwater data is required in the source areas.	Additional soil borings will be advanced in the source areas. Groundwater monitoring wells will be installed. Table 5-1: Items 1 & 2
LNAPL		There are currently no groundwater monitoring wells located at the Site. Although light non-aqueous phase liquids were not observed during grab groundwater sampling activities, concentrations of TPH-g in sample G2 (22,000 µg/L), located near former Tank #3, and sample GP3 (79,800 µg/L), located adjacent to former Tank #1 may indicate the potential for the presence of light non-aqueous phase liquid (LNAPL) to be present.	Need monitoring wells at the site.	Monitoring wells (5) to be installed. Table 5-1: Item 1

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap	Resolution
Source Removal Activities		Soil that was excavated from the UST pits during tank removal activities was returned to the excavation after the collection of soil samples for chemical analysis. There is no information regarding the quality of the soil that was placed back in the UST excavations. As such, with the exception of the removal of the USTs themselves, there have been no other source removal activities conducted at the Site.	Soil contamination at depth (12-foot bgs and deeper) is not well character-ized. Since the site is to be excavated to approximately 12 feet bgs for the construction of a parking garage, additional shallow soil sampling is not required.	Ten soil borings are proposed, as discussed in the data gaps table. Table 5-1: Item 2
Contaminants of Concern		Based on the historical investigations conducted at the Site, BTEX, cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA) and TPH-g are present in groundwater above their respective MCLs and/or ESLs. However, based on correspondence from the ACEHSD, the contaminants of concern (COCs) for the site are BTEX, and TPH-g. These COCs are present above the screening levels primarily in the northern corner of the Site, near the location of the former USTs. Benzene and TPH-g are also present in groundwater above their MCLs and ESLs in the southern portion of the Site in the vicinity of the truck ramp and pit adjacent to the former shop building, and in the northwestern area of the Site.		
Petroleum Hydrocarbons in Soil		Of the 58 samples analyzed from the two investigations, eight samples from seven borings exceeded their respective screening criteria. These samples were typically the deepest sample from the boring, ranging from 8.0 to 14.0 feet bgs. This is consistent with releases from a UST as opposed to a surface spill or release. Based on the historical investigation data, BTEX and TPH-g are the contaminants present in soil at concentrations exceeding their respective screening criteria. The contaminants are present mainly in soil at the location of former Tanks #1 through #3, and to a lesser	Additional soil sampling is required to better define the vertical extent of contamination. Redevelopment will include excavation of the entire site to	Additional soil borings to be advanced, as described in the data gaps table. Table 5-1: Item 2

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap	Resolution
		extent, near the former fuel pump island in the northern corner of the Site. The lateral extent of contamination exceeding the screening criteria appears to be limited to the area around the former USTs. Soil concentration in all the samples from boring GP3 and S10, located in the sidewalk by Martin Luther King Jr. Way near former Tank #1 and Tank #2 are below their respective screening criteria. There is no additional data from around former Tank #3. Given the nature of the petroleum hydrocarbon (mainly light fraction gasoline), the vertical extent of contamination beneath and in close proximity to the former tanks is likely limited to the lowest level of groundwater fluctuation.	a depth of 12 feet bgs for the construction of an underground parking garage.	
Petroleum Hydrocarbons in Groundwater		During the two subsurface investigations conducted at the Site, a total of 15 grab groundwater samples were collected and analyzed for TPH-g and BTEX, naphthalene, 1,2-DCA and cis-1,2-DCE.The results of the analyses are summarized in Table 2-2. Concentrations of TPH-g and/or BTEX exceeded their respective screening criteria in ten of the 15 samples analyzed. Similar to the soil sampling results, the highest concentrations were detected beneath or in close proximity to the former USTs. However, TPH-g and benzene were detected in one Site boring (G7) exceeding their respective screening criteria near the southern corner of the Site. There are no permanent monitoring wells located at the Site. As such, the groundwater flow direction across the Site cannot be evaluated. This has been defined as a significant data gap. The scope of work presented in this work plan includes the installation of four groundwater monitoring wells at the Site.	There are no monitoring wells on site.	Five monitoring wells will be installed, as described in the data gaps table and in the work plan. Table 5-1: Item 1
Risk Evaluation		The Site is a former auto body and car wash facility. The Site is currently vacant, and with the exception of a billboard located in the northwest corner of the Site, has no structures and is covered with either asphalt or concrete foundations from former buildings located at the Site. The Site is zoned for residential and current plans are to redevelop the Site for residential use. However, there may be		

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap	Resolution
		some commercial use on the ground level. This preliminary CSM assumes that development would consist of an underground parking garage; store fronts and residential units at ground level; and second story residential units. The CSM identifies the primary source; impacted media; release mechanism(s); secondary source(s); exposure route; potential receptors (residential, commercial/industrial worker, and construction worker), and an assessment of whether the exposure route/pathway is potentially complete, incomplete, or insignificant. Potential exposure routes that have been evaluated include incidental ingestion, dermal contact, dust inhalation, and vapor inhalation. For direct contact with contaminated soil, the exposure route for incidental ingestion, dermal contact, and dust inhalation for a residential and commercial/industrial worker are considered incomplete. These exposure routes for the construction worker are considered a potentially complete pathway, depending on the nature of the work. For volatilization from soil to outdoor air, vapor inhalation is the potential exposure pathway. Given dilution effects that take place outdoors, this exposure pathway is considered incomplete for all three potential receptors. For indoor air, this exposure pathway is considered potentially complete for all three potential receptors. For leaching of contaminants from soil to groundwater, the ingestion and dermal pathways for groundwater are considered incomplete, except for the construction worker, as shallow groundwater is not utilized as a drinking water source at the Site. For the construction worker, incidental ingestion and dermal contact is a potentially complete pathway. For volatilization from groundwater to outdoor air, the exposure pathway is considered insignificant due to dilution effects that take place outdoors. For indoor air, volatilization from groundwater to indoor air is considered a potentially complete pathway.		

Table 5-1
Data Gaps Summary and Proposed Investigation

Item	Data Gap	Proposed Investigation	Rationale	Analyses
1	Groundwater flow direction and gradient is unknown. There are only grab groundwater data points; there are no monitoring wells on site. There are no upgradient groundwater sample locations. The current groundwater data sets are 7 and 9 years old and may not be representative of current site conditions.	Install five groundwater monitoring wells, as described in the work plan. Wells will be constructed of 2-inch-diameter Schedule 40 PVC well casing, total depth up to 25 feet bgs; the screened interval will be determined based on observations of groundwater levels during field work. The well screen will consist of 5 to 10 feet of 0.010-inch well screen. Soil samples will be collected at 12 feet, 15 feet, and 20 feet bgs. Additional samples may be collected based on professional judgment.	The wells will be located to provide up- and downgradient control for the shallow groundwater plume. They will enable water level data to be collected to allow the groundwater flow direction and gradient to be calculated. Wells will be installed as follows: At the source area associated with UST #3. Downgradient of the site to the northwest, near the billboard. At the source area associated with USTs 1 and 2. Upgradient of the site adjacent to the ramp and pit. Adjacent to prior soil boring S4 (prior BTEX detections). Soil samples will be collected during well installation to further characterize subsurface soil contamination. Northern (off-site, downgradient) grab groundwater samples (far side of MLK, sidewalk): three borings.	Soil: TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE Soil samples from MW-1 will also be analyzed for PAHs. Groundwater: Natural attenuation parameters [TOC, Fe(2+), SO4, SO3, NO3, NO2, Dissolved Gases (methane)] at selected locations (3). BTEX, TPH-g

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap	Proposed Investigation	Rationale	Analyses
2	The soil data set does not adequately characterize the contamination (if any) that may remain on site after the excavation to approximately 11 to 12 feet bgs for the underground parking structure. The current soil data sets are 7 and 9 years old and may not be representative of current site conditions. Lithology below is not adequately characterized.	Eleven soil borings will be drilled to a total depth of 20 feet bgs. Soil samples will be collected at 12 feet, 15 feet, and 20 feet bgs from soil borings SB-4 through SB-10. Soil samples will not be collected from soil borings SB-1, SB-2, and SB-3 which are located across MLK north of the site, as there is no reason to suspect an off-site soil contamination source in this area. Borings will be logged using the Unified Soil Classification System. Grab groundwater samples will be collected from the first encountered groundwater at each soil boring.	Soil samples will be collected starting at 12 feet bgs. Shallow soil on site is to be excavated for disposal during the construction of the underground parking garage. Excavation will be conducted to a depth of about 12 feet bgs. Soil borings will be located as shown in the work plan figure: Source area borings: At the former locations of USTs 1, 2 and 3. One boring north of the site on the side walk of MLK Way. One boring between USTs 1 and 2 and the pump island (potential leakage from conveyance piping). One boring at the approximate location of UST 3 (in addition to the soil samples to be collected from the monitoring well to be installed at this location). One boring in the vicinity of the ramps and pit in the southern portion of the site (in addition to soil samples to be collected from the monitoring well in this area). Step out borings: Step out boring SB-5 to be completed proximal to the UST #3 source area. GP4 Area: Benzene was previously detected at 25,000 µg/kg at location GP4 (Carver, 2006). Two step-out borings will be completed in this area to further characterize soils at depth.	TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE Boring SB-4 (on sidewalk of MLK near UST 1): PAHs

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap	Proposed Investigation	Rationale	Analyses
3	There is no data on the presence and usage of wells in the vicinity of the site.	Obtain a well survey.	Identify irrigation and other wells in the site vicinity.	N/A
4	PAHs are potential COCs at the northern boundary of the site.	See soil borings – Item 2. PAHs will be analyzed at select locations as described in Item 2.	Item 2	Item 2
5	There is a potential source area in the vicinity of the ramps and pit.	A monitoring well will be installed in this area. It will also serve as the upgradient well for the site. See Item 2. A soil boring will also be completed in this area.	Item 2	Item 2
6	Determine size and contents of the three USTs that were removed from the site	Review prior reports.	Tanks #1 and #2 were identified as 650-gallon gasoline tanks. Tank #3 was a 500-gallon gasoline tank [Tank Removal Report – 1995]. Tanks #2 and #3 were observed to be badly deteriorated with holes due to corrosion.	NA
7	Confirm whether TPH-g and BTEX were detected during construction of the adjacent residential unit	Review prior reports.	The URS site investigation conducted in 2004 found no detections of TPH-g [<1,000 µg/kg] or BTEX [<5.0 µg/kg] in the borings completed to 14 feet bgs.	NA

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap	Proposed Investigation	Rationale	Analyses
8	Review data from the nearby service stations (Arco)	Review prior reports.	The former Arco station (731 West MacArthur Blvd.) is about 0.5 miles crossgradient of the 3884 MLK site. The BTEX levels are lower than those at the subject site; the Arco site does not appear to be contributing to on site TPH or BTEX contamination. Groundwater elevation data from this site was used to calculate groundwater flow direction, since there are currently no wells at the 3884 MLK site.	NA

Table 6-1
Sample Analytical Matrix

Location	Sample Number	Depth (feet)[1]	Soil TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE	Soil PAHs	Groundwater TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE	Natural Attenuation Analyses[2]	Note
Direct Push Boring – Soil Samples							
SB-4	SB-4-12	12	X				MS/MSD[4]
SB-4	SB-20-12	12	X				Duplicate
SB-4	SB-4-15	15	X				
SB-4	SB-4-20	20	X				
SB-5	SB-5-12	12	X				
SB-5	SB-5-15	15	X				
SB-5	SB-5-20	20	X				
SB-6	SB-6-12	12	X				MS/MSD[4]
SB-6	SB-6-15	15	X				
SB-6	SB-6-20	20	X				
SB-7	SB-7-12	12	X				
SB-7	SB-20-12	12	X				Duplicate
SB-7	SB-7-15	15	X				
SB-7	SB-7-20	20	X				
SB-8	SB-8-12	12	X				
SB-8	SB-8-15	15	X				
SB-8	SB-8-20	20	X				
SB-9	SB-9-12	12	X				
SB-9	SB-9-15	15	X				
SB-9	SB-9-20	20	X				
SB-10	SB-10-12	12	X				
SB-10	SB-10-15	15	X				
SB-10	SB-10-20	20	X				
SB-11	SB-11-12	12	X				
SB-11	SB-11-15	15	X				
SB-11	SB-11-20	20	X				

Table 6-1
Sample Analytical Matrix (Continued)

Location	Sample Number	Depth (feet)[1]	Soil TPH-g, BTEX, Naphthalene 1,2-DCA and cis-1,2-DCE	Soil PAHs	Groundwater TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE	Natural Attenuation Analyses[2]	Note
Monitoring Well Installation – Soil Samples							
MW-1	MW-1-12	12	X	X			Duplicate
MW-1	MW-1-15	15	X	X			
MW-1	MW-1-20	20	X	X			
MW-2	MW-2-12	12	X				
MW-2	MW-2-15	15	X				
MW-2	MW-2-20	20	X				
MW-3	MW-3-12	12	X				
MW-3	MW-3-15	15	X				
MW-3	MW-3-20	20	X				
MW-4	MW-4-12	12	X				Duplicate
MW-4	MW-4-15	15	X				
MW-4	MW-4-20	20	X				
MW-5	MW-5-12	12	X				
MW-5	MW-5-15	15	X				
MW-5	MW-5-20	20	X				
Grab Groundwater Samples							
SB-1	SB-1-GW-XX	TBD			X		
SB-2	SB-2-GW-XX	TBD			X		
SB-3	SB-3-GW-XX	TBD			X		
SB-4	SB-4-GW-XX	TBD			X		MS/MSD
SB-5	SB-5-GW-XX	TBD			X		
SB-6	SB-6-GW-XX	TBD			X		
SB-7	SB-7-GW-XX	TBD			X		
SB-7	SB-30-GW-XX	TBD			X		Duplicate
SB-8	SB-8-GW-XX	TBD			X		
SB-9	SB-9-GW-XX	TBD			X		
SB-10	SB-10-GW-XX	TBD			X		
SB-11	SB-11-GW-XX	TBD			X		

Table 6-1
Sample Analytical Matrix (Continued)

Location	Sample Number	Depth (feet)[1]	Soil TPH-g, BTEX, Naphthalene 1,2-DCA and cis-1,2-DCE	Soil PAHs	Groundwater TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE	Natural Attenuation Analyses[2]	Note
Monitoring Well Samples							
MW-1	MW-1	TBD			X	X	MS/MSD
MW-2	MW-2	TBD			X	X	
MW-3	MW-3	TBD			X		
MW-4	MW-4	TBD			X	X	
MW-4	MW-40	TBD			X		Duplicate
MW-5	MW-5	TBD			X	X	

Notes:

[1] Groundwater sample depths will be the middle of the screen for monitoring wells and approximately 14' bgs for soil borings subject to field verification.

[2] Natural Attenuation Analyses will include TOC, CH_4, Fe^{2+}, SO_4, SO_3, NO_3, NO_2, S^{2-}

[3] Field Duplicate Sample.

[4] Matrix spike/matrix spike duplicate.

TPH-g = Total Petroleum Hydrocarbons as gasoline
BTEX = benzene, toluene, ethylbenzene, and xylenes
XX-Depth at which groundwater is encountered.

Table 6-2
Sample Handling and Analysis Information

Sample Parameter	Matrix	Analysis Method	Sample Container	Holding Time	Preservation
TPH-g, BTEX, Naphthalene, 1,2-DCA and cis-1,2-DCE	Groundwater	8260B	3 X 40ml. VOA	14 days	HCl, 3 degrees Celsius
PAHs	Soil	8270	1 X 6" Acetate Sleeve	14 days extraction; 40 days analysis	4 degrees Celsius
TOC	Groundwater	SM 5310C	3 X 40ml VOA	28 days	H2SO4, 4 degrees Celsius
Dissolved Gases (methane)	Groundwater	MicroSeeps SOP-3	2 x 40ml VOA	30 days	Tri-sodium Phosphate
Ferrous Iron	Groundwater	SM 3500	2 x 40ml VOA	24 hours	HCl, 4 degrees Celsius
Nitrate, Nitrite Sulfate	Groundwater	SM 300.0	1 X 500ml poly bottle	Sulfate: 28 days; Nitrate/Nitrite: 48 hours	4 degrees Celsius
Sulfide	Groundwater	SM 4500 S2F	1 X 500ml poly bottle	7 days	NaOH & ZnOAc

Notes:

TPH-g = Total Petroleum Hydrocarbons as gasoline
BTEX = benzene, toluene, ethylbenzene, and xylenes
TOC = Total Organic Carbon

Table 6-3
Field Parameters and Calibration Procedures

Measurement	Instrument	Calibration Procedure/Precision
Water level	Electric sounder	Reference to /+ 0.01 ft
pH	pH probe[1]	2-point buffer solutions /+ 0.1 pH unit
Electric conductivity	Conductivity probe[1]	Standard solution /+ 100 µmhos/cm
Water temperature	Temperature probe[1]	Factory calibrated /+ 0.5°C checked against other thermometers
Oxidation-Reduction Potential	ORP probe[1]	Zoebell Solution
Dissolved oxygen	Dissolved oxygen probe[1]	Built-in calibration chamber

Notes:

[1] Taken with a multi-meter such as YSI 6920 from a sealed flow-through cell.

Abbreviations:

°C = degrees Celsius
µmhos/cm = micromhos per centimeter

Table 6-4
Anticipated QA/QC Samples

Sample Parameter	Matrix	Ground-water	Soil	Trip Blank[1]	Rinsate[2]	Field Duplicate	MS/MSD
TPH-g, BTEX, Naphthalene,1,2-DCA and cis-1,2-DCE	Grab Groundwater	11		1	1	1	1
TPH-g, BTEX, Naphthalene,1,2-DCA and cis-1,2-DCE	Groundwater	5		1	1	2	1
TPH-g, BTEX, Naphthalene,1,2-DCA and cis-1,2-DCE	Soil		39	NA	2	4	2
TOC	Groundwater	3		NA	NA	1	NA
Methane	Groundwater	3		NA	NA	1	NA
Fe^{2+}, SO_4, SO_3, NO_3, NO_2, S^{2-}	Groundwater	3		NA	NA	1	NA

Notes:

[1] One Trip Blank will be shipped for each cooler containing volatile samples.

[2] Rinsate blanks collected from decontaminated augers since no reusable groundwater sampling equipment will be used.

APPENDIX A
SITE HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

3884 Martin Luther King Drive Site
Oakland, California

Prepared for:

Cotter and Coyle

Prepared by:

URS
1 Montgomery Street, Suite 900
San Francisco, CA 94105

October 2012

HEALTH AND SAFETY PLAN
CONTACT AND APPROVAL SHEET
3884 Martin Luther King Site
Oakland, California

		PHONE
Project Number:	**28068161**	
Program Director:	**Giorgio Molinario**	**415-243-3783**
Project Manager	**Giorgio Molinario**	**415-243-3783** **415-609-6169 (cell)**
Site Safety Officer:	**Peter Healy**	**408-838-2984 (cell)**
Plan Reviewer:	**Susan Gulbrandsen, CIH, CSP**	**(805) 895-9286 cell**
Preparation Date:	**October 24, 2012**	
Expiration Date:	**October 24, 2013**	

APPROVALS

Health and Safety Plan Preparer:

11-5-12

Peter Healy **(DATE)**

Regional Health, Safety, and Environment Manager:

11-5-12

Susan Gulbrandsen, CIH, CSP **(DATE)**

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE INCORPORATED CERTIFICATION NUMBER 4902 CP EXPIRES 6-1-2013 PENNSYLVANIA - 1960 SUSAN C. GULBRANDSEN, CIH

Project Manager:

11-5-12

Giorgio Molinario **(DATE)**

This Health and Safety Plan is valid only for this specific project as described in Section 3.0. It is not to be used for other projects or subsequent phases of this project without the written approval of the Regional Health, Safety, and Environment Manager. A copy of this plan is to be maintained at the site at all times.

HEALTH AND SAFETY PLAN
TABLE OF CONTENTS

Section **Page**

Attachments

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/L	micrograms per liter
ACGIH	American Conference of Governmental Industrial Hygienists
BAAQMD	Bay Area Air Quality Management District
C	ceiling
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CGI	combustible gas indicator
CIH	Certified Industrial Hygienist
CNS	central nervous system
CSP	Certified Safety Professional
dBA	decibel
DOT	Department of Transportation
ESLI	End-of-Service-Life Indicator
eV	electron volts
EZ	Exclusion Zone
FID	flame ionization detector
GFCI	ground fault circuit interrupter
Hnu	ionizing radiation detection device
HSM	Health and Safety Manager
HSP	Health and Safety Plan
kV	kilovolt
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MSDS	Material Safety Data Sheet
ND	not detected
NIOSH	National Institute for Occupational Safety and Health
OBZ	operator’s breathing zone
OEL	occupational exposure limit
OSHA	Occupational Safety and Health Administration

OVA	organic vapor analyzer
OVM	organic vapor monitor
PA	Preliminary Assessment
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure limit
RHSEM	Regional Health, Safety, and Environment Manager
RWQCB	Regional Water Quality Control Board
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	short-term exposure limit
TLV	threshold limit value
URS	URS Corporation and subsidiaries
USA	Underground Services Alert
VOC	volatile organic compound

1.0 PLAN-AT-A-GLANCE

3884 Martin Luther King Site Health and Safety Plan Summary Sheet

THIS SUMMARY SHEET IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC HEALTH AND SAFETY PLAN (HSP) IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY.

EMERGENCY INFORMATION

Ambulance:	**911**
Fire:	**911**
Police:	**911 or 510-777-3211**
Hospital:	
	Alta Bates Summit Medical Center **350 Hawthorne Avenue** **Oakland, California** **Ph: (510) 655-4000**

Program Director:	**Giorgio Molinario**	**(415) 243-3783**
Task Manager:	**Giorgio Molinario**	**Cell: (415) 609-6169**
Client Contact	**Neil Cotter**	**(415) 215-5805**
HSE Representative:	**Fabiola Macias-Wallis**	**(415) 243-3718**
Regional HSE Manager:	**Susan Gulbrandsen**	**(805) 895-9286**
URS Occupational Health Nurse*:	**Jeanette Schrimsher**	**(512) 419-6440**

(*Call immediately in the event of a work-related injury)

Site Safety Officer:	**Peter Healy**	**(408) 838-2984 (cell)**
Cal OES:		**(800) 852-7550**

Note that persons without serious or life-threatening injuries should be escorted to an occupational health clinic or urgent care facility instead of a hospital. See Section 12.5

OCCUPATIONAL HEALTH CLINIC DIRECTIONS:

See map in Attachment A

Occupational Medicine
742 52nd Street
Oakland, California 94609
(510) 428-3620

Head North on Martin Luther King Jr Way (0.6 mi)
Turn **RIGHT** on 52nd Street (200 ft)
Destination will be on the RIGHT

HOSPITAL DIRECTIONS:

Alta Bates Summit Medical Center
350 Hawthorne Avenue
Oakland, California
Ph: (510) 655-4000

Head South on Martin Luther King Jr Way (0.4 mi)
Turn **LEFT** onto 34th Street (0.4mi)
Destination will be on your right.

See map in Attachment A

Additional information concerning emergency procedures is located in Section 11.0, and the hospital route map is located in Attachment A. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

CONSTITUENTS OF CONCERN

1.	**Total Petroleum Hydrocarbons Gasoline (TPH-g)**
2.	**Benzene**
3.	**Toluene**
4.	**Ethyl Benzene**
5.	**Xylene**
6.	**Total Petroleum Hydrocarbons as Motor Oil**
7.	**Total Petroleum Hydrocarbons as Diesel**
8.	**Lead**

PROJECT HAZARD ANALYSIS

High - Exposure likely more than 50% of the time **Med - Exposure likely 10-50% of the time**
Low - Exposure likely less than 10% of the time **n/a – Exposure not anticipated**

Task	Chemical Hazards	Heat/Cold Stress	Noise	Slip/Trip/ Fall	Lifting Hazards	Mechanical Hazards	Electro-cution	Explo-sion
1. Utility clearance/geophysical survey	N/A	Low-Med	N/A	Med	Low	N/A	N/A	N/A
2. Excavation / Trenching Oversight	Low	Low-Med	Low-Med	Med	Low	Low-Med	N/A	N/A
3. Drilling	Med	Low-Med	Med	Med	Med	Med	Low	Low
4. Soil and GW Sampling	Med	Low-Med	Med	Med	Low	Med	Low	Low
5. Air Monitoring	Low	Low-Med	Low-Med	Med	Low	Low-Med	Low	N/A
6. In Situ Injection	Med	Low-Med	Low	Med	Low	Med	Low	Low

Task	Minimum Protective Clothing/Equipment Requirements
1	Steel-toed boots, hard hat, safety glasses, high visibility safety vest, work gloves (as appropriate).
2, 3, 4, 5	Steel-toed boots, hard hat, safety glasses, high visibility safety vest, work gloves (as appropriate), nitrile gloves when handling potentially contaminated material, ear plugs or ear muffs.
6	Steel-toed boots, hard hat, safety glasses/with faceshield or safety goggles, high visibility safety vest, work gloves (as appropriate), nitrile gloves when handling potentially contaminated material, ear plugs or ear muffs. Chemical resistant Coveralls per injection chemical MSDSs . ANSI-approved eyewash.

PROTECTIVE CLOTHING (FIRST ACTION LEVEL)

Chemical Protective Clothing

Outer Coveralls: **Neoprene of nitrile**
Outer Gloves: **Neoprene or nitrile**
Inner Gloves: **Surgical nitrile**

The HSP Preparer has conducted a Hazard Assessment for this project based on information provided by the Project Manager, in accordance with 8 CCR 3380(f).

For more information on Personal Protective Equipment (PPE) and respiratory protection requirements, see the Action Levels table (Page 4) and Section 7.0.

ENGINEERING CONTROLS TO BE USED (as applicable)

- **Light colored PPE to reduce solar load for heat stress control**
- **Shade structure for work on sunny/warm days**

INSTRUMENTATION TO BE USED

__ HNu Photoionization Detector (PID) w/ __ Electron Volt Probe
_X Organic Vapor Monitor (OVM), PID w/ _10.6_ eV lamp
__ Photovac Microtip PID w/ __ eV lamp
__ MiniRAE PID w/ ___ eV lamp
__ Combustible Gas/O_2 Indicator
__ Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
__ Miniram Real-time Dust Monitor

For more information, see Section 6.0

PERSONAL EXPOSURE SAMPLING

__ Will be conducted
_X_ Will be conducted if PID readings require the use of respiratory protection as described in the Action Level Table (page 4) and in Section 6.1.1
__ Is not anticipated

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

- **Isobutylene (calibration gas)**
- **Hydrochloric Acid (Sample Bottle Preservative)**
- **Liquinox or Alconox (decontamination)**
- **Bentonite (construction)**
- **Sand (construction)**
- **Cement (construction)**
- **Regenesis ORC (optional pilot study)**
- **Regenesis RegenOx (optional pilot study)**

ACTION LEVELS (FOR PHOTOIONIZATION DETECTOR)

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 15 ppm	Point of Operations/ Release Source point	-----	Continued periodic monitoring	Minimum site ensemble
> 15 ppm (1st Action Level)	Point of Operations/ Release Source point	> 1 minute	Monitor OBZ; don protective clothing; establish work zones as described in Section 8.1	Minimum Site Ensemble, PLUS: Chemical-resistant boot covers or steel-toed boots, Tyvek ® coveralls, Nitrile Outer Gloves, and Nitrile Inner (surgical) gloves
< 15 ppm	OBZ	----	No respirators required	As for 1st Action Level
> 15 ppm (2nd Action Level)	OBZ	> 1 minute	Provide respiratory protection; establish decon area as described in 9.0. **Contact the RHSEM to perform personal monitoring as described in Section 6.1.1**	Add half-face respirators with organic vapor cartridges
> 75 ppm (3rd Action Level)	OBZ	>1 minute	Increase respiratory protection	Replace ½-face respirators with full-face respirators with organic vapor cartridges.
> 150 ppm or > 300 ppm	OBZ OBZ	>1 minute instantaneous	Stop work; move upwind while vapors dissipate. If elevated levels remain, evacuate upwind and notify RHSEM or PM.	As specified by RHSEM

OBZ = Operator's Breathing Zone
ppm = parts per million

For additional information on Action Levels and their implementation, see Sections 6.0 and 7.0.

HEALTH AND SAFETY EQUIPMENT LIST

Required	Not Required	
X		URS SMSs (relevant to project – see next page)
X		Occupational Safety and Health Administration (OSHA) “Safety on the Job” Posters
X		Hardhats
X		Safety glasses
X		Safety goggles or faceshield (For chemical injection activities)
X		Ear plugs or muffs
X		Chemical resistant coveralls (for injection or if second action level is exceeded)
X		Traffic safety vest
	X	Tyvek® coveralls
	X	Polycoated Tyvek® Q-23 coveralls
X		Steel-toed boots
	X	Chemical-resistant steel-toed boots or chemical-resistant boot covers
X		Work gloves
X		Nitrile or neoprene outer gloves
X		Surgical nitrile inner gloves
	X	Plastic sheeting (visqueen)
X		55-gallon 17-H drums (for contaminated solids)
X		55-gallon 17-E drums (for liquids)
	X	Drum liners
X		Barricade tape and barricades
X		Wash tubs and scrub brushes
X		Decontamination solution (i.e., TSP)
	X	Folding chairs
X		5- or 10-gallon portable eyewash (required if handling/pouring acids or mixing concrete or for in-situ chemical injection)
	X	Respirator sanitizing equipment
X		First aid kit
X		Infection control kit
X		Drinking water
X		Gatorade or similar drink
X		Type ABC fire extinguishers
	X	Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
X		Full-face respirators (NIOSH-approved)
X		Respirator cartridges **[organic vapor or OV/P100]**
X		PID w/[10.6] lamp and calibration kit
	X	Combustible gas indicator (CGI) and calibration kit
	X	Duct tape
X		Paper towels and hand soap
X		Spill sorbent
X		Plastic garbage bags
X		Broom and/or shovel

SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HSP

SMS	TOPIC	HSP SECTION
5	California Injury and Illness Prevention Program	3.0
46	Subcontractor Health and Safety Evaluation	4.1
2	Worker Right to Know	5.1.2
56	Drill Rig Safety	5.2.1
13	Excavation	5.2.2
18	Heat Stress	5.2.3
26	Noise and Hearing Conservation	5.2.4
69	Back Injury Prevention	5.2.6
19	Heavy Equipment Operations	5.2.7
34	Utility Clearances	5.2.8
32	Traffic Control	5.2.9
12, 16	Hand Tools and Portable Equipment	5.2.10
64	Hand Safety	5.2.11
47	Biological Hazards	5.2.12
43	I.H. Monitoring	6.1.1
29	Personal Protective Equipment	7.0
42	Respiratory Protection	8.3/8.9
30	Sanitation	10.1
65	Injury Management	12.5
49	Incident/Near Miss Reporting	12.6
72	Behavior-Based Safety Observations	13.3
78	Short Service Employees	4.1, 13.1
91	Concrete Operations	5.2.13
98	Management of Change	3.0

These SMSs are available on the URS Health, Safety, and Environment Web site. Access the Web site from the SoURSe or through the Internet (www.urshse). Copies of the SMSs referenced

by this HSP are to be maintained on site. Project Managers (PMs) are responsible to see that other SMSs relevant to field activities, but not directly referenced by this HSP, also are available on site.

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 SITE HISTORY

The 3884 Martin Luther King, Jr Way (MLK) site consists of approximately 0.58 acre of land located in Oakland, California. The site is made up of Former Lucky's Auto Body (approximately 10,250 square feet [ft^2]) and an adjacent vacant lot (approximately 15,095 ft^2). The site is located at the southeast corner of the intersection of Martin Luther King Jr. Way and 39th Street west of Highway 24 (URS, 2004).

Lucky's Auto Body operated as a gas station from the 1950s through the 1960s. In 1995, three underground storage tanks (USTs) were removed. Following the closure of the gas station, the site operated as an auto repair and engine cleaning business. A fuel and feed store and fuel yard operated at the Redevelopment parcel from the 1930s through the 1950s. A lumber store and warehouse operated on the parcel in the 1960s. The buildings were demolished in 1971, and the parcel has been vacant since that time.

2.1.1 SURROUNDING PROPERTY LAND USES

The Site is located in the northwest corner MLK way and 39th Street. The surrounding area is composed of residential homes and retail shops. The California State Highway 24 elevated freeway and elevated Bay Area Rapid Transit tracks lie to the immediate east.

2.1.2 PREVIOUS SITE ASSESSMENTS

Scott Environmental, UST Removal Report, January 1994

A limited soil investigation was conducted by Scott Environmental during the removal of three USTs from the H&L Luckett property (Lucky's Auto Body Site), located at 3884 MLK Jr. Way in Oakland. Tanks #1 and #2, both 650-gallon, were located beneath the City sidewalk along MLK Jr. Way, and Tank #3 (500-gallon), was located within the subject property along 39th Street (Figure 2). Tanks #2 and #3 were found to have one or more holes caused by corrosion. Tank #1 split into two pieces at the welded seam during removal, but no holes were noted. Soil samples were collected from each of the excavated UST pits, and analytical results indicated detectable concentrations of TPH-g, BTEX, and lead. The soil sample collected beneath the excavation of Tank #1 contained TPH-g (35 milligrams per kilogram [mg/kg]), benzene (590 micrograms per kilogram [µg/kg]), toluene (570 µg/kg), ethylbenzene (1,300 µg/kg), xylenes (5,400 µg/kg), and lead (2.6 mg/kg). The soil sample collected beneath the excavation of Tank #2 contained TPH-g (140 mg/kg), benzene (610 µg/kg), toluene (960 µg/kg), ethylbenzene (580

µg/kg), xylenes (9,700 µg/kg), and lead (7.9 mg/kg). The soil sample collected beneath the excavation of Tank #3 contained TPH-g (18 mg/kg), benzene (340 µg/kg), toluene (400 µg/kg), ethylbenzene (850 µg/kg), xylene (4,600 µg/kg), and lead (3.4 mg/kg). The excavated soil was returned to the pits after tank removal; no contaminated soil was off-hauled for disposal.

Subsurface Consultants, Phase I ESA, July 2002

A Phase I Environmental Site Assessment for the MacArthur Bay Area Rapid Transit (BART) Transit Village Project was completed in July 2002 by Subsurface Consultants, Inc. for the City of Oakland Public Works Agency, Environmental Services Division. Soil and groundwater sampling was not performed as part of the investigation.
The Phase I Assessment reported that, based on a database report, groundwater occurs at depths ranging from approximately 8 to 18 feet below ground surface (bgs) at some properties located within 1/4 mile of the site. The predominant groundwater flow direction is north-northwest.

URS Corporation, Environmental Investigation, 2004

In 2004 URS Corporation conducted a site investigation at the Lucky Auto Site at 3884 MLK Jr. Way in Oakland. The investigation included surface and subsurface soil sampling, groundwater sampling, and a pre-demolition lead based paint and asbestos survey. Elevated concentrations of TPH-g were noted in the soil samples near former USTs #2 and #3. Samples S2-168 and S11-120 had TPH-g concentrations of 170 mg/Kg and 220 mg/Kg, respectively. TPH-d and TPH-mo were not detected above ESLs during this investigation. Benzene was detected in three soil samples above the residential EPA PRG of 600 mg/Kg in borings adjacent to former USTs #1, #2, and #3. Benzene was detected at concentrations of 940 mg/Kg, 1,500 mg/Kg, and 3,200 mg/Kg in samples S11-120, S9-168, and S2-168, respectively. Metals analysis was performed on soil samples and results indicated relatively low concentrations in most locations, and are likely indicative of background concentrations (URS, 2004). SVOCs, PCBs, herbicides, and pesticides were not detected in soil samples above laboratory limits.

Grab groundwater samples were collected from 10 boring locations across the investigation area and tested for TPH-g, TPG-d, TPH-mo, and VOCs. TPH-g was detected in 9 samples with a maximum concentration of 22,000 µg/L at location G2, prior UST #3 location. Benzene was detected in seven samples with a maximum concentration of 4,700 µg/L at location G2. Grab groundwater sample G2 also contained elevated concentrations of Ethylbenzene, toluene, and xylenes, at 700 µg/L, 5,500 µg/L, and 2,300 µg/L, respectively.

The Lucky Auto site has been impacted by TPH-g and VOCs to soil and groundwater. Due to the limited number of borings near the former USTs, the lateral extent of soil contamination is unknown. Groundwater samples indicate that the leaking USTs are the source of the groundwater contamination in the northeastern part of the site. Given the suspected direction of groundwater

flow to the north/northwest and the location of the former USTs, it is assumed that groundwater contamination has migrated off-site (URS, 2004).

Based on these results, the Lucky Auto site has been impacted by TPH-g and BTEX to soil and groundwater and remediation will be required prior to redevelopment.

John Carver Consulting, Soil and Groundwater Investigation, 2006
JCC Advanced 8 additional boreholes at the Site in 2006 to collect soil and grab groundwater samples. The JCC investigation results were generally consistent with the URS investigation results: elevated concentrations of TPH-G and benzene were present primarily on the northwest portion of the Site adjacent to the former USTs and lower concentrations were present in a heterogeneous distribution across the western portion of the Site. The grab groundwater concentrations of TPH-G ranged from not detected to 79,800 µg/l. The benzene concentrations were generally consistent with the TPH-G and ranged from not detected to 17,600 µg/l. TPH-G concentrations in soil ranged from not detected to 176 mg/kg in GP5 at 8 feet bgs. Other elevated concentrations in soil were detected at GP2 (up to 23.6 mg/kg) and GP7 (up to 30.7 mg/kg) at 10 feet bgs.

2.2 PURPOSE AND SCOPE OF WORK

URS will conduct a site investigation including soil borings for soil and groundwater sampling, groundwater monitoring well installation, and groundwater monitoring well development. The purpose is to assess and evaluate subsurface conditions and contamination at the site.

Based on the results of the site investigation URS may perform hotspot excavations or trenching to remove contaminated soil and/or investigate the extent of soil with elevated levels of contaminants. These hotspots are anticipated to be in the northwest portion of the site and excavations are expected to be performed using an excavator with no trench/excavation entry. The layout and depth of the excavations is not known at this time, but they will be designed following applicable standards and URS SMSs. During excavation URS will monitor the breathing zone for VOCs following the procedures and action levels set in this HASP.

In addition, URS may perform an optional in situ treatment pilot study using Regenesis RegenOx and/or ORC compounds. The investigation sample results will aid in the design of a corrective action remedial plan for the excavation and removal of contaminated soil and areas requiring groundwater treatment.

3.0 APPLICABILITY

The purpose of this HSP, which was developed specifically for operations at the 3884 MLK Way, Oakland, California, is to assign responsibilities, establish personal protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the site. This HSP complies with, but does not replace, Title 8 California Code of Regulations (CCR) 5192 and Federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926. This HSP is to be used by URS personnel as a supplement to these rules, regulations, and guidance. This HSP is to be augmented by the URS Health, Safety, and Environment Program and Management System; relevant standards from that program and system are required to be available on site during all activities.

The provisions of the HSP are mandatory for all onsite employees engaged in hazardous material management activities associated with this project, which may involve health and safety hazards.

Changing and/or unanticipated site conditions may require modification of this HSP to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed with a URS health, safety, and environment professional prior to their implementation. If this is not feasible, the Site/Project Manager may modify the plan and record all changes in the field log book; under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations. See also SMS 98, Management of Change.

URS is providing a copy of this HSP to each site subcontractor to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. In turn, each subcontractor will provide documentation to URS that describes their procedures for addressing applicable the health and safety requirements for activities that are unique to their scope of services (for example: drill rig operation, excavation safety, electrical safety, etc.).

This Health and Safety Plan is part of URS' Injury and Illness Prevention Program (IIPP), as required by 8 CCR 3203. A copy of URS' written Injury and Illness Prevention Program is located in Safety Management Standard 5, which is to be available on site. Each subcontractor is required to have their own IIPP as applicable for their activities.

4.0 RESPONSIBILITIES

URS will have site safety and health oversight and coordination responsibilities for URS personnel; each subcontractor will be held accountable for the safe and healthful performance of work by each of its employees, subcontractors, or support personnel who may enter the site.

URS will adhere strictly to the provisions of this HSP, along with applicable regulations issued by governmental entities.

4.1 PROJECT MANAGER (URS)

The PM will direct URS onsite operations. The PM is also responsible for holding a pre-deployment operational readiness meeting to discuss the scope of work, staffing, equipment, budget, etc. The PM may delegate all or part of these duties to a properly qualified URS employee who is designated as the Site Manager. At the site, the PM, assisted by the Site Safety Officer (SSO), has primary responsibility for the following:

- Ascertaining that appropriate PPE and monitoring equipment are available and properly used by all onsite URS employees.

- Establishing that URS personnel are aware of the provisions of this HSP, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.

- Establishing that all URS onsite personnel have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance, as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators. Also ensuring that Short Service Employees (per SMS 78) are mentored for field activities.

- Verifying that subcontractors (of any tier) retained by URS meet minimum health and safety criteria as described by SMS 46.

- Ascertaining that URS personnel are aware of the potential hazards associated with site operations.

- Monitoring the safety performance of all URS personnel to see that required work practices are employed.

- Correcting any URS work practices or conditions that may result in injury or exposure to hazardous substances.

- Preparing any accident/incident reports for URS activities (see Section 12.6).
- Completing Safety Plan Compliance Agreements by URS personnel (see Attachment B).
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Obtaining utility clearances prior to the commencement of work (see Section 5.2.8).
- Ensuring that the appropriate SMSs are appended to this HSP and are available on site (see "Plan-at-a-Glance").
- Reviewing and approving this project HSP.

4.2 SITE SAFETY OFFICER (URS)

The SSO's duties may be carried out by the PM or another qualified URS Site Manager. The SSO is responsible for the following:

- Implementing the project HSP and reporting any deviations from the anticipated conditions described in that plan to the PM, and if necessary, the RHSEM.
- Determining that monitoring equipment is used properly by URS personnel and calibrated in accordance with manufacturer's instructions or other standards, and that results are properly recorded and filed.
- Checking with a URS Health, Safety, and Environment Representative to assure URS personnel have current medical clearance and training.
- Assuming any other duties as directed by the PM or RHSEM.
- Coordinating with a URS health, safety, and environment professional to identify URS personnel on site for whom special PPE, exposure monitoring, or work restrictions may be required.
- Conducting safety meetings for all site personnel in accordance with Section 13 of this HSP.
- Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).
- Providing ongoing review of protection level needs as project work is performed, and informing the PM of the need to upgrade/downgrade protection levels, as appropriate.

- Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.

- Establishing monitoring of URS personnel and recording the results of exposure evaluations.

- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.

- Maintaining the visitor log.

- Posting Occupational Safety and Health Administration (OSHA) “Safety of the Job” and other required posters at the site.

4.3 REGIONAL HEALTH, SAFETY, AND ENVIRONMENT MANAGER (URS)

The RHSEM is responsible for:

- Determining the need for periodic audits of the operation to evaluate compliance with this plan; and

- Providing health and safety support as requested by the SSO and PM.

4.4 PROJECT PERSONNEL (URS)

Project personnel involved in onsite investigations and operations are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees;

- Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SSO or PM;

- Implementing the procedures set forth in the HSP, and reporting any deviations from the procedures described in that HSP to the SSO or PM for action;

- Notifying the PM and SSO of any special medical problems (i.e., allergies) and seeing that all onsite URS personnel are aware of such problems; and

- Reviewing the project HSP and signing the Safety Plan Compliance Agreement.

4.5 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

Each subcontractor is requested to designate a Subcontractor's Safety Representative (SSR) who is the subcontractor supervisor. The SSR is responsible for the safe and healthful performance of work by his work force and subcontractors. During the subcontractor's activities onsite, the SSR will perform continuing work area inspections, participate in the development of job safety analyses, and conduct safety meetings/safety orientations for all new employees. The SSR will attend safety meetings with the SSO. The SSR will also investigate accidents and overexposures involving subcontractor personnel.

5.0 JOB HAZARD ANALYSIS

5.1 CHEMICAL HAZARDS

Two categories of chemical hazards are associated with site activities:

- Site constituents; and
- Chemicals used to conduct the site work.

Site constituents are those that exist at the site and are the cause for conducting site activities. The chemicals that are brought on site to conduct the work may be hazardous and subject to regulation under Cal/OSHA's Hazard Communication Standard (8 CCR 5194). **In particular, Regeneis ORC and Regeneis RegenOX may be used on site for in-situ pilot injection. The PM and SSO are to carefully review the MSDSs for these materials to ensure that appropriate personal protective equipment and procedures are followed.**

5.1.1 Site Constituents

From an occupational health standpoint, given that any potential exposure to site personnel will be only for a short period of time (intermittent for a maximum of several days), the levels of contaminants that have been, or could be, encountered during site activities should not represent a significant concern if the provisions of this HSP are appropriately implemented. However, given that the site is still under investigation, the potential for exposure to elevated levels of these contaminants may exist. Exposure to elevated levels of these contaminants may pose hazards. Overviews of these hazards are presented here in terms of the following types of occupational exposure limits:

- PEL Permissible Exposure Limit (Cal/OSHA Standard)
- TLV Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)
- REL Recommended Exposure Limit (NIOSH Guidance)
- STEL Short-Term Exposure Limit
- C Ceiling.

Cal/OSHA PELs, ACGIH TLVs, and NIOSH RELs are time-weighted averages (TWAs), which are defined as concentrations for a normal 8-hour work day and 40-hour work week to which almost all workers can be exposed repeatedly without suffering adverse health effects.

STEL is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to be likely to cause impairment of self-rescue or to precipitate accidental injury. The STEL is a 15-minute TWA that will not be exceeded at any time during the workday. STELs are used by OSHA, ACGIH, and NIOSH for chemical exposure criteria.

A ceiling value (C) is a concentration that will not be exceeded at any time in any workday. Ceiling limits are used by OSHA, ACGIH, and NIOSH for chemical exposure criteria.

VOLATILE ORGANIC COMPOUNDS:

Total Petroleum Hydrocarbons (as Gasoline)

Cal/OSHA PEL = 300 ppm
Cal/OSHA STEL = 500 ppm

Gasoline is a clear liquid with a characteristic odor. Gasoline is an eye and throat irritant at levels around the PEL, and causes narcotic effects (with symptoms including headache, nausea, dizziness, and blurred vision) at higher levels. Long term exposure can effect liver and kidney function. Some studies indicate a potential for gasoline to be an animal carcinogen, but this has not been fully established. Because gasoline is a mixture of varying proportions of dozens of hydrocarbons, a mean odor threshold has not been determined.

Benzene

Cal/OSHA PEL = 1 ppm “skin”
TLV = 0.5 ppm “skin”
REL = 0.1 ppm

Cal/OSHA STEL = 5 ppm
TLV STEL = 2.5 ppm

Benzene is a central nervous system depressant. Symptoms include headache, nausea, tremors, and fatigue, but these typically do not occur until exposure concentrations are in excess of 150 ppm. There is significant evidence that chronic exposures are carcinogenic causing a progressively malignant disease of the blood-forming organs (leukemia). Benzene is poorly absorbed through intact skin, but contact with liquid benzene may cause blistering and dermatitis. Benzene vapors can cause transient eye irritation. The mean air odor threshold for benzene is 34 ppm, which yields unsatisfactory warning properties. Benzene's ionization potential (IP) is 9.25 eV and its vapor pressure is 75 mm Hg. Benzene is known to the State of California to cause cancer under the criteria of Proposition 65.

Toluene

Cal/OSHA PEL = 50 ppm "skin" Cal/OSHA STEL = 150 ppm Ceiling = 500 ppm
TLV = 20 ppm "skin"
REL = 100 ppm

Toluene is a central nervous system depressant. Symptoms include headache, nausea, dizziness and fatigue, but such symptoms typically do not occur at exposures below 200 ppm. Repeated and prolonged contact with liquid toluene may cause drying of the skin and dermatitis. Mild, transitory eye irritation may be experienced with exposure to vapors above 200 ppm. Toluene is not considered carcinogenic. Toluene's mean odor threshold is 3 ppm, which gives it good warning properties. Toluene's ionization potential (IP) is 8.82 eV, and its vapor pressure is 22 mm Hg. Toluene is known to the State of California to cause reproductive toxicity under the criteria of Proposition 65.

Ethyl Benzene

Cal/OSHA PEL/REL = 100 ppm PEL/TLV STEL = 125 ppm
TLV = 20 ppm

Ethyl benzene is an eye and mucous membrane irritant at levels well above the TLV. Liquid ethyl benzene is a significant skin irritant, and can cause defatting and blistering with repeated exposures. Vapor can cause transitory eye irritation at concentrations above 200 ppm. The mean odor threshold is 0.5 ppm, which gives it good warning properties. Ethyl benzene's ionization potential is 8.76 eV, and its vapor pressure is 10 mm Hg. Ethyl Benzene is known to the State of California to cause cancer under the criteria of Proposition 65.

Xylene (o-, m-, p-isomers)

Cal/OSHA PEL/TLV/REL = 100 ppm TLV/STEL = 150 ppm Ceiling = 300 ppm

Xylene is an eye, nose and throat irritant at concentrations nearing 200 ppm. At higher concentrations, it is a central nervous system depressant, with symptoms including nausea, fatigue, and headaches. Liquid xylene acts on the skin as an irritant and can cause dermatitis. Exposure to vapor can cause eye irritation. Xylene is not considered carcinogenic. Xylene's mean odor threshold is 1 ppm, which gives it good warning properties. The ionization potential for the Xylene isomers are 8.56, 8.56, and 8.44 eV, respectively, and the vapor pressures range from 7 to 9 mm Hg.

Total Petroleum Hydrocarbons as Motor Oil

No occupational exposure limits

The systemic toxicity of motor oil is considered to be low. Accidental ingestion of large quantities of motor oil produces gastrointestinal irritation in humans with symptoms including nausea, vomiting and diarrhea. Repeated long-term dermal exposure in humans may produce skin rash and oil acne. No occupational exposure limits have been established.

Total Petroleum Hydrocarbons as Diesel

Cal/OSHA PEL = None

TLV = 100 mg/m^3 "skin" (total hydrocarbons inhalable fraction and vapor)

Diesel fuel is mildly toxic by ingestion. When inhaled, many of the constituents function as central nervous system depressants, with characteristic symptoms (headaches, nausea, dizziness, incoordination, and vomiting). Diesel fuel has been shown to be a strong skin irritant.

Few chronic inhalation or ingestion studies of the toxic effects of diesel vapors/fuels are available. Skin painting studies of experimental animals suggest the potential for weak tumor-producing activity.

Because diesel fuel is a complex mixture of varying proportions of hydrocarbons, a mean odor threshold or ionization potential has not been determined.

Metals

Lead

PEL = 0.05 mg/m^3 Action Level = 0.03 mg/m^3
TLV = 0.05 mg/m^3
REL = <0.1 mg/m^3

Acute lead poisoning usually manifests as gastroenteritis. Lead accumulates in the body; chronic lead poisoning is manifested by anemia, constipation, and abdominal pain. Accumulation in the peripheral nerves can lead to wrist and ankle drop.

Lead enters the body primarily by inhalation. In the respiratory tract, most lead compounds are absorbed rapidly and stored in nerve tissue so that poisoning can develop from long-term exposure to low doses. Poisoning can also develop slowly from ingestion via lead-contaminated food, drink or tobacco products. Prevention of lead poisoning is almost entirely a matter of good personal hygiene and housekeeping.

Lead is known to the State of California to cause cancer and reproductive toxicity under the criteria of Proposition 65.

5.1.2 Hazard Communication Materials

Materials that are considered hazardous materials under the Cal/OSHA Hazard Communication Standard (8 CCR 5194) may be used during this project. This project will not be using any materials in this category. Typically, projects include chemicals such as sample preservative and gasoline for equipment use. When these chemicals are used, in accordance with the URS Hazard Communication Program, the chemicals will be listed in Section 1.0; Material Safety Data Sheets (MSDSs) for the hazardous materials listed in Section 1.0 are included in Attachment E. The SSO will make copies of these MSDSs available to any subcontractors (i.e., drillers, excavators) on this project.

URS' written Hazard Communication Program is located in SMS 002, a copy of which is to be maintained on site.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Drill Rig Hazards
- Heavy Equipment Hazards
- Excavation Hazards (including falls or cave-in)
- Heat stress
- Noise from the operation of site equipment
- Slip-trip-fall type of accidents
- Back injuries due to improper lifting
- Being caught in or struck by moving equipment or traffic
- Electrocution or explosion hazards associated with drilling activities such as contact with overhead or underground power lines or pipelines or portable generators
- Encounters with pets, stray animals, or bites from insects
- Muscle strains from hand auger work

Hazards from cold stress, confined space entry, explosive atmospheres, poor illumination (night work), and ionizing radiation are not anticipated to be encountered and so are not addressed in this Plan.

5.2.1 Drill Rig Hazards

The drill rig operator has superior knowledge regarding drill rig maintenance, operation, and safety. The following information provides general guidelines for safe practices onsite. See also SMS 56 and the Environmental Remediation Drilling Safety Guidance Document on the URS HSE web site.

Movement of Drill Rigs

The following safety guidelines relate to off-road movement of drill rigs:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts, and similar obstacles.

  Lower the drilling mast (derrick) before moving the drill rig. Never move a drill rig with the drilling mast raised.

- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle of 4 by 4 or 6 by 6 vehicles or carriers when traveling off the highway on a hilly terrain.
- Use caution when traveling on a hillside. Conservatively evaluate the hillside capability of drill rigs, because the addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill.
- Attempt to cross obstacles such as small logs, small erosion channels, or ditches squarely, not at an angle.
- When lateral or overhead clearance is close, use the assistance of someone on the ground as a guide.

Underground utilities are as dangerous as overhead lines. Be aware and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer, and water. Ask for assistance:

- If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary or property line under the sign; telephone the utility company and check it out. The underground utilities may be a considerable distance away from the warning sign.
- Always contact the owners of the utility lines or the nearest underground utility location service before drilling. The utility personnel should determine the location of underground lines and should mark and flag these locations. Determine, with the utility personnel, what specific precautions must be taken to assure safety.

Housekeeping On and Around the Drill Rig

To complete the first requirement for safe field operations, the safety supervisor of the drilling crew must understand and fulfill his responsibility for maintenance and "housekeeping" on and around the drill rig. Suitable storage locations should be provided for all tools, materials, and supplies. The locations should allow for the convenient handling of tools, materials, or supplies without danger that these could fall on or hit a member of the drill crew or a visitor.

Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig. Pipe, drill rods, bits, casing, augers, and similar drilling tools should be stacked in an orderly manner on racks or sills to prevent spreading, rolling, or sliding.

Penetration hammers or other types of driving hammers should be placed at a safe location on the ground or secured to prevent movement when not in use. Work areas, platforms, walkways, scaffolding, and other access ways should be kept free of materials, obstructions, and substances such as ice, excess grease, or oil that could cause a surface to become slick or otherwise hazardous. Keep all controls, control linkages, and warning and operation lights and lenses free of oil, grease, and/or ice.

Do not store gasoline in any portable container other than a non-sparking, red container with a flame arrestor in the fill spout. The word "gasoline" must be clearly visible on the container.

Use of Hand Tools

There are many kinds of hand tools that can be used on or around a drill rig. The most important rule is "use the tool for its intended purpose." The following are a few specific and general suggestions that apply to the safe use of several hand tools often used on and around drill rigs.

- When a tool becomes damaged, either repair it before using it again or discard it.
- When using a hammer, any kind of hammer, for any purpose, wear safety glasses and require all others around you to do the same.
- When using a chisel, any kind of chisel, for any purpose, wear safety glasses and require all others around you to do the same.
- Keep all tools cleaned and stored in an orderly manner when not in use.
- Replace hook and heel jaws when they become visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be caught between the wrench handle and the ground or the platform, should the wrench slip or the joint suddenly let go.

Use of Augers

The following general procedures should be used when advancing a boring with continuous flight or hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at a low RPM.

- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must be sure that the tool handler is well away from the auger column and that the auger fork has been removed before starting rotation.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tool during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place your hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow your feet to get under the auger section that is being hoisted.
- When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
- Never use your hands or feet to remove cuttings away from auger.
- Augers should be cleaned only when the drill rig is in neutral, and the augers have stopped rotating.

Start-Up Procedures

All drill rig personnel and visitors should be instructed to "stand clear" of the drill rig immediately prior to and during and starting of an engine. Before starting a drill rig engine, make sure that all of the gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the correct non-actuating positions, and the cathead rope is not on the cathead.

Drill Rig Operation

Safety requires the attention and cooperation of every worker and site visitor. The following procedures are related to safety during drilling operations:

- Do not drive the drill rig from hole to hole with the mast in the raised position. Before raising the mast, look up to check for overhead obstructions.
- Before raising the mast, clear all drill rig personnel (with the exception of the operator) and visitors from the areas immediately to the rear and the sides of the mast. In addition, inform them that the mast is being raised.

- Before the mast of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be re-leveled if it settles after the initial set up. Lower the mast only when leveling jacks are down, and do not raise the leveling jack pads until the mast is completely lowered. Before starting drilling operations, secure and/or lock the mast, if required by the drill manufacturer's recommendations.
- The drill rig operator should operate a drill rig only from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill. "Horsing around" within the vicinity of the drill rig and tool and supply storage areas is strictly prohibited, even when the drill rig is shut down. Watch for slippery ground when mounting/dismounting the platform.
- Drilling operations should be terminated during an electrical storm.
- Consuming alcoholic beverages, depressants, stimulants, or any other chemical substance while on the job is strictly prohibited.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors or animals from stepping or falling into the hole. When the drilling project has been completed, all open boreholes should be covered, protected or backfilled adequately and according to local or state regulations.

5.2.2 Excavation Hazards

Where potential employee exposure to hazards associated with the excavation (e.g., entrapment, falls greater than 4 feet (1.2 meters), cave-ins, etc.) can reasonably be anticipated, an excavation-competent person must be on site. The competent person is responsible for conducting daily inspections of excavations, adjacent areas, protective systems prior to each shift, and has a knowledge of soils and soil classification. The competent person must also know and understand design and use of protective systems, and the requirements of applicable regulations. Entry into the excavation should not be made unless absolutely necessary. When performing excavation oversight or observation on an excavation/trench greater than 4 feet in depth, personnel must remain at least more than 2 feet from the leading edge of the excavation. For shoring, sloping, and water accumulation refer to SMS 013-NA.

5.2.3 Heat Stress Recognition and Control

Personnel will be briefed on the signs and symptoms of heat stress, personal risk factors, and appropriate control measures. Control measures include having shaded rest areas and at least one quart of water per employee per hour in accordance with 8 CCR 3395. Personnel will be instructed in recognizing the signs and symptoms of heat stress and control measures. Heat stress

monitoring shall commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70 degrees Fahrenheit (°F). If standard work garments (cotton coveralls) are worn, monitoring shall commence at 85°F. Additional information regarding URS' approach to Heat Stress is located in Safety Management Standard 18, a copy of which shall be maintained on site. Based on the typical summer temperatures in Richmond, California, and the wearing of Nomex coveralls, heat stress is a potential hazard.

5.2.4 Noise Hazards

Previous surveys indicate that heavy equipment may produce continuous and impact noise at or above the action level of 85 decibels (dBA). Such equipment on this project includes drill rigs, backhoes, and portable generators. All URS personnel within 25 feet of operating equipment, or near an operation that creates noise levels high enough to impair conversation, shall wear hearing protective devices (either muffs or plugs). All URS personnel are in the URS Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections. Additional information regarding URS' Hearing Conservation Program is located in Safety Management Standard 26, a copy of which shall be maintained on site.

5.2.5 Slip/Trip/Fall Hazards

Workers should exercise caution when walking around the site to avoid fall and trip hazards. If holes or uneven terrain are located in the work area which could cause site personnel to fall or trip, they must be covered, flagged or marked to warn workers. Workers should exercise caution around open excavations, such as test pits, and avoid getting closer than 2 feet to the edge of an unsloped excavation unless guardrails or fall protection is provided. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Gravel or sand should be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and plan the route to walk in areas of good stability.

5.2.6 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, any other objects that are of odd size or shape, or that weigh over 50 pounds. URS' safe lifting procedures are described in Safety Management Standard 69, a copy of which is to be available on site.

- Get help when lifting heavy loads. Portable generators will only be lifted using a two-person lift.

- When moving heavy objects such as drums or containers, use a dolly or other means of assistance.
- Plan the lift. If lifting a heavy object, plan the route and where to place the object. In addition, plan communication signals to be used (i.e., "1, 2, 3, lift," etc.).
- Wear sturdy shoes in good conditions that supply traction when performing lifts.
- Keep your back straight and head aligned during the lift and use your legs to lift the load – do not twist or bend from the waist. Keep the load in front of you – do not lift or carry objects from the side.
- Keeping the heavy part of the load close to your body will help maintain your balance.

5.2.7 Heavy Equipment

Operation of heavy equipment during site activities presents potential physical hazards to personnel. URS' procedures for heavy equipment (backhoes, excavators, bulldozers, dump trucks, compactors) operations are located in Safety Management Standard 19, a copy of which is to be maintained on site.

The following precautions must be observed whenever heavy equipment is in use:

- Personal protective equipment (PPE) such as steel-toed shoes, safety glasses or goggles, and hard hats must be worn whenever such equipment is present.
- Personnel must at all times be aware of the location and operation of heavy equipment, and take precautions to avoid getting the way of its operation. Never assume that the equipment operator sees you; make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.
- Traffic safety vests **ARE REQUIRED** for personnel working near mobile heavy equipment, such as backhoes and other excavators.
- Never walk directly in back of or to the side of, heavy equipment without the operator's acknowledgment.
- When an equipment operator must operate in tight quarters, the equipment subcontractor should provide a person to assist in guiding the operator's movements.
- Keep all non-essential personnel out of the work area.
- Any heavy equipment that is used in the exclusion zone should remain in that zone until its task is completed. The equipment subcontractor should completely decontaminate such equipment in the designated equipment decontamination area as required prior to

moving the equipment outside of the Exclusion Zone/Contamination Reduction Zone (EZ/CRC).

5.2.8 Utilities Clearance

The Site Manager is responsible to see that underground utility locations are identified prior to the com8mencement of any subsurface (> 1 foot) activities. Resources include site plans, utility companies, and regional utility locating services such as the 811 “one call” service. The proper utility company personnel should certify the deactivation of utilities, and the certification should be retained in the permanent log. URS' procedures for activities proximal to utility locations are located in Safety Management Standard 34, a copy of which is to be maintained on site.

Excavation, drilling, crane, or similar operations adjacent to overhead lines shall not be initiated until operations are coordinated with the utility officials. Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:

- Power has been shut off and positive means (e.g., lockout/tagout) have been taken to prevent lines from being energized. Wherever possible, the URS SSO will observe power shut off and place a lock and tag on the switch. In all cases utility company personnel shall certify in writing to the Site Manager or SSO the deactivation of overhead utilities, and the certification retained in the project files. The Site Manager or SSO must also attempt to verify power shut off by checking that power is no longer available to the affected building or equipment.

Equipment, or any part of the equipment, cannot come within the following minimum clearance from energized overhead lines:

Power Lines Nominal System (Kilovolt[kV])	Minimum Required Clearance
600v-50	**10 feet**
50-75	**11 feet**
75-125	**13 feet**
125-175	**15 feet**
175-250	**17 feet**
250-370	**21 feet**

370-550	**27 feet**
550-1000	**42 feet**

5.2.9 Work Area Protection

As the project operations may be undertaken in a roadway or parking lot, motor vehicles may be a hazard. Consideration should be given to parking a work vehicle within the coned area between the work area and oncoming traffic. URS' procedures for work zone traffic control are located in Safety Management Standard 32, a copy of which is to be maintained on site.

5.2.10 Hand Tools and Portable Equipment

Only authorized trained workers will be allowed to use powered hand tools, and only after reviewing the manufacturer's safety procedures. All tools will be inspected by the operator prior to use and defective tools will be removed from service. Guards for moving parts are not to be removed.

Electric-power tools will be double-insulated or grounded. All power tools not plugged directly into a building's fixed electrical system must be plugged into a ground fault circuit interrupter-protected supply (i.e., an extension cord with a ground fault circuit interrupter [GFCI]). Tools shall not be lifted or lowered by their electrical cords.

Pneumatic (air-powered) tools are to be connected to the hose in a manner which prevents accidental disconnecting. Impact tools shall have their attachments secured to prevent them from accidentally being expelled. Safety features, such as muzzle-to-work contact actuators on nail drivers, shall not be removed or overridden.

Fuel-powered tools shall be stopped while being refueled, serviced, or maintained. Regulations governing the storage and transport of flammable liquids are to be adhered to. If fuel-powered tools are operated indoors or in enclosed spaces, provisions shall be made to prevent the build-up of toxic gases (see Section 6.2.)

Indoor working conditions may not have enough natural illumination. Portable generators will be used to supplement the area. Some precautions are noted below:

Portable Electric Generator (<5 KW)

- All extension cords which supply power from a portable generator to a piece of equipment or portable power tool are to be equipped with a GFCI.
- Generators are to be off and should be cool prior to refueling.

- All electrical components are to be in sound condition with no exposed parts. Grounding continuity is to be maintained between the generator and the frame.
- Generators are not to be operated within enclosed areas.
- At least one 20-lb. fire extinguisher rated type ABC is to be located where gasoline is stored.

5.2.11 Hand Safety/Open Blade Prohibition

Gloves must resist puncturing and tearing as well as provide the necessary chemical resistance. In many instances, particularly when protecting against concentrated source materials, gloves may have to be layered. In this case, gloves are referred to as "inner" gloves and "outer" gloves. Heavy leather gloves may be worn over chemical protective gloves when doing heavy work which could tear the chemical glove. If they become contaminated, leather gloves should be discarded because leather is difficult to decontaminate.

Open blade tools such as pocket knives, army knives, etc. are not permitted on-site. For cutting tasks, snips or other blade-protected tools must be used instead. Scissors may be used where appropriate. See also SMS 64, Hand Safety.

5.2.12 Biological Hazards

Biological Hazards are also discussed in SMS 47. Avoidance of biological hazards involves simple principles. Personnel should remain alert to their surroundings and avoid areas where the hazard would be expected. Do not disturb any nests or hives that may be encountered. For insects, avoid reaching under logs or rocks, into well heads, burrows, or crevices where insects may be present (especially spiders). Do not pet, feed, or engage with animals, especially dogs and cats.

Some bees are attracted to noise produced by heavy equipment and certain colors and odors, such as bright yellow clothing and cologne, so those items should be avoided.

Ticks are usually found in tall grass or bushes, so great care should be taken when traversing these areas, and only if absolutely necessary. Keep hair constrained so that it doesn't make contact with plants if you bend over. In heavily infested areas, Tyvek or Kleenguard coveralls are recommended. Kleenguard has an advantage that it is a breathable weave and less of a heat stress burden.

When in an area suspected of harboring ticks (grassy, bushy, or woodland area) the following precautions can minimize the changes of being bitten by a tick:

1. Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists. In areas of infestation, Tyvek or Kleenguard coveralls are recommended.
2. Wear light colored clothing so ticks can be easily spotted.
3. Wearing tick repellents may be useful.

4. Inspect clothing frequently while in tick habitat.

5. Inspect your head and body thoroughly when you return from the field.

6. Remove any attached ticks by tugging with tweezers where the tick's mouth parts enter the skin. Do not squeeze or crush it.

Snakes are also typically found near rocks or logs or in grassy areas, though snakes may lie out in the open in sunny areas; be mindful of where you step or reach. Snake guards should be worn if appropriate, especially if working in terrain that would hide the presence of snakes.

Poison Oak or Poison Ivy are both three-lobed leafy plants that cause irritation via plant oils. Severe skin and eye irritation may occur; transfer may even occur from touching clothing that has been in contact with the plants. The roots of poison oak are also harmful. In areas where poison oak is anticipated wear long pants and long sleeves and it is recommended that Tyvek or Kleenguard and disposable gloves are also worn in heavily infested areas. Use extreme caution when removing potentially contaminated clothing and promptly wash your hands, preferably with a coarse or gritty soap, such as Lava or similar, to remove plant oils. Be sure to shower at the end of the shift.

The following sections describe specific insect and snake hazards and First Aid Procedures:

Spiders

Spiders in the United States are generally harmless, with two notable exceptions: the Black Widow spider (Latrodectus Mactans) and the Brown Recluse or violin spider (Lox Osceles Reclusa).

The symptoms of a Black Widow spider bite are: slight local reaction, severe pain produced by nerve toxin, profuse sweating, nausea, painful cramps in abdominal muscles, and difficulty in breathing and speaking. Victims recover in almost all cases, but an occasional death is reported.

Field personnel should exercise caution when lifting covers off manholes, sumps, etc., since Black Widow spiders can typically be found in these areas.

General First Aid for Poisonous Insect Bites and Stings:

1. Minor Bites and Stings
   - Cold applications.
   - Soothing lotions, such as calamine.
2. Severe Reactions
   - Give artificial respiration if indicated.

- Apply a constricting band above the injection site on the victim's arm or leg (between the site and the heart). Do not apply tightly. You should be able to slip your index finger under the band when it is in place.
- Keep the affected part down, below the level of the victim's heart.
- If medical care is readily available, leave the band in place; otherwise, remove it after 30 minutes.
- Apply ice contained in a towel or plastic bag, or cold cloths, to the site of the sting or bite.
- Give home medicine, such as aspirin, for pain.
- If the victim has a history of allergic reactions to insect bites or is subject to attacks of hay fever or asthma, or if he or she is not promptly relieved of symptoms, call a physician or take the victim immediately to the nearest location where medical treatment is available. In a highly sensitive person, do not wait for symptoms to appear, since delay can be fatal.
- In case of a bee sting, remove and discard the stinging apparatus and venom sac.

Lyme Disease

Lyme disease is an illness caused by a bacterium which may be transmitted by the bite of a tick (Ixodes Dammini), commonly referred to as the "Deer Tick". The tick is about the size of a sesame seed, as distinguished from the Dog Tick, which is significantly larger. The Deer Tick is principally found along the Atlantic coast, living in grassy and wooded areas, and feeds on mammals such as mice, shrews, birds, raccoons, opossums, deer, and humans. Not all ticks are infected with the bacterium, however. When an infected tick bites, the bacterium is passed into the bloodstream of the host, where it multiplies. The various stages and symptoms of the disease are well recognized and, if detected early, can be treated with antibiotics.

Removal of ticks is best accomplished using small tweezers. Do not squeeze the tick's body. Grasp it where the mouth parts enter the skin and tug gently, but not firmly, until it releases its hold on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Wipe the bite thoroughly with an antiseptic and seek medical attention as soon as possible.

The illness typically occurs in the summer and is characterized by a slowly expanding red rash, which develops a few days to a few weeks after the bite of an infected tick. This may be accompanied by flu-like symptoms along with headache, stiff neck, fever, muscle aches, and/or general malaise. At this stage treatment by a physician is usually effective; but, if left alone, these early symptoms may disappear and more serious problems may follow. The most common late symptom of the untreated disease is arthritis. Other problems that may occur include meningitis and neurological and cardiac abnormalities. It is important to note that some people do not get the

characteristic rash but progress directly to the later manifestations. Treatment of later symptoms is more difficult than early symptoms and is not always successful.

Snakebite Avoidance and First Aid Procedure

Elaborate care for snakebite is usually not necessary because in most cases the victim can reach professional medical care within 30 minutes. The most important step in first aid procedures is to transport the victim to the hospital quickly. Meanwhile, take action with the first aid procedures listed below.

- Call 911 to report a snakebite victim.
- Keep the victim calm. Monitor airway, breathing, and circulation.
- Wash the wound and keep the affected part still. Splint a bitten arm or leg. Keep the affected area lower than the heart to slow down the progress of the venom from the bite site to the heart.
- DO NOT APPLY ICE, DO NOT CUT THE WOUND, DO NOT APPLY A TOURNIQUET. If in a remote area, contact 911 via radio, then carry the victim or have him or her walk slowly to the transfer area.

Other factors to consider in providing first aid treatment:

- Shock - Keep the victim lying down and comfortable if possible, and maintain his or her body temperature.
- Breathing and Pulse - Constantly monitor airway, breathing and respirations. Administer artificial resuscitation or CPR if needed.
- Observing the Snake - If feasible without injuring additional personnel, observe and take notes of the size, color, and markings of the snake.
- Medications - Do not give the person alcohol, sedatives, aspirin, or any other medication while transferring to the medical facility.

5.2.13 Concrete Operations

Those pouring and surfacing concrete are to wear rubber boots, safety glasses, and gloves. An ANSI-approved eyewash and bottles of neutralizer are to be present in any pour area, or any area where dry Portland cement is being handled or mixed with water or aggregate. See SMS 91 for additional concrete requirements.

6.0 EXPOSURE MONITORING PLAN

Heat stress, noise, and chemical exposures may be encountered at this site. Heat stress monitoring and prevention is addressed in Section 5.2.3. Noise levels will not be monitored; URS personnel will wear hearing protection as described in Section 5.2.4.

6.1 CHEMICAL EXPOSURE MONITORING

The field instrumentation described in this HSP has been specifically selected for the contaminants that may be reasonably anticipated to be encountered during the course of this project. Selection factors include anticipated airborne concentrations, potential interference, ionization potentials, instrument sensitivity, and occupational exposure limits. The action levels specified in Section 1.0 were established with the expectation that specific instruments will be used. **DO NOT SUBSTITUTE INSTRUMENTS WITHOUT THE CONSENT OF THE HSP PREPARER OR THE REGIONAL HEALTH, SAFETY, AND ENVIRONMENT MANAGER.**

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area. For this project, the contaminant source point is undefined. Monitoring will be performed in the general area where employees are working. If readings exceed 15 ppm > one minute, monitoring will start immediately in the OBZ of the employees in the area and employees will don full face respirators.

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area (e.g., at the borehole and cuttings adjacent to the borehole). If readings exceed the first Action Level (15 ppm > 1 minute), monitoring in the operator's breathing zone (OBZ) of the person working nearest the point of operations/contaminant source will start immediately, and site personnel will don protective clothing.

A reading in the OBZ above the second Action Level (15 ppm > 1 minute) will require the use of half-face respirators with appropriate cartridges. An OBZ reading above the third Action Level (75 ppm > 1 minute) will require the use of full-face respirators with appropriate cartridges. If the monitoring instrument reads more than the fourth Action Level (150 ppm > 1 minute), or 300 ppm instantaneously), work will stop, and workers will move upwind while the airborne contaminants dissipate. If elevated levels remain for more than five minutes, the source of the airborne contamination will be covered with clean soil, plastic sheeting, or foam (or controlled in

an appropriate manner), and the Regional Health, Safety, and Environment Manager or PM will be contacted for further guidance.

6.1.1 Personal Exposure Monitoring

In accordance with 8 CCR 5192(h), a URS industrial hygienist will perform quantitative personal monitoring for personnel at greatest risk of exposure (i.e., those working in the exclusion zone) if the Second Action Level is exceeded. The industrial hygienist will determine who to sample based upon site conditions at the time of the sampling.

Personnel will be monitored for petroleum hydrocarbons in accordance with National Institutes for Occupational Safety and Health (NIOSH) Method 1501. If approved by the industrial hygienist, validated passive samplers may be used in lieu of Method 1501. A laboratory accredited by the American Industrial Hygiene Association will perform analyses, and results will be reported and records maintained in accordance with OSHA criteria.

URS' procedures for personal monitoring are located in Safety Management Standard 43, a copy of which is to be maintained on site.

6.2 BACKGROUND READINGS

All direct-reading instrument readings will be evaluated relative to background reading, not "meter zero." Prior to the start of work at each shift, and whenever there is a significant shift in wind direction, instrument readings will be obtained upwind of the site work zone in order to determine the level of "background" readings from local vehicle traffic, emissions from nearby operations unrelated to the site, etc. Site readings will be evaluated against these background readings (i.e., if an action level is listed as 20 ppm, it is evaluated as 20 ppm above background). The SSO should consult with the RHSEM regarding the potential health hazards associated with background readings above 5 ppm.

6.3 DATA LOGGING

All monitoring data, including background readings, will be logged in the field log book. The results of daily instrument calibrations can either be logged in the field log book. All monitoring instruments will be calibrated in accordance with the manufacturer's instructions prior to the start of each shift. Calibration should also be performed when inconsistent or erratic readings are obtained. If an instrument cannot be calibrated to specification, or becomes otherwise inoperable, all invasive site work (i.e., drilling, excavating) will cease until the instrument is appropriately repaired or replaced**;** the PM or HSP Preparer should be contacted for further guidance.

6.4 DUST CONTROL

High winds and site operations can cause airborne dust hazards. Since the site is paved it is unlikely that significant dust will be generated; however, if site operations generate sustained visible dust, a water mist will be applied to reduce dust generation.

6.5 CARBON MONOXIDE CONTROL

The use of internal combustion equipment such as generators, automobiles, drill rigs, etc. can produce carbon monoxide, a colorless, odorless, and toxic gas. Since no indoor operations are anticipated accumulation of carbon monoxide is not anticipated.

6.6 EXPLOSIVE ATMOSPHERES

Explosive atmospheres are not anticipated at this site. Employees will stop work if odors or high PID readings occur.

6.7 OXYGEN-DEFICIENT ATMOSPHERES

Oxygen deficient atmospheres are not anticipated..

7.0 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) for site personnel includes:

- Hardhat (with orange tape band for SSE employees)
- Safety glasses with side shields (or impact resistant goggles)
- Steel-toed boots or Chemical-resistant steel-toed boots
- Ear protection in vicinity of noisy equipment
- Work gloves and/or chemical-resistant gloves
- Traffic safety vest in the vicinity of heavy equipment

As the various monitoring action levels are reached, additional PPE is required. Section 1.0 describes the incremental PPE requirements relative to specific action levels and the specific kinds of PPE to be used. Procedures for the use and selection of PPE are provided in SMS 029, a copy of which is to be maintained on site.

7.1 LIMITATIONS OF PROTECTIVE CLOTHING

The protective equipment ensembles selected for this project are anticipated to provide protection against the types and concentrations of hazardous materials that may be encountered during field operations. However, no protective garment, glove, or boot is resistant to all chemicals at any concentration; in fact, chemicals may continue to permeate or degrade a garment even after the source of the contamination is removed.

To obtain optimal usage from PPE, the following procedures are to be followed by all URS personnel.

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift.
- Inspect all clothing, gloves and boots both prior to and during use for:
  - Imperfect seams;
  - Non-uniform coatings;
  - Tears; and
  - Poorly functioning closures**.**
- Inspect reusable garments, boots, and gloves prior to and during use for:
  - Visible signs of chemical permeation, such as swelling, discoloration, stiffness, or brittleness; and
  - Cracks or any signs of puncture or abrasion.

Reusable garments exhibiting any of these characteristics will be discarded.

8.0 RESPIRATORY PROTECTION

8.1 RESPIRATOR SELECTION

Engineering controls and safe work practices (e.g., elimination of the source of contamination, ventilation equipment, working upwind, limiting exposure time, etc.). always must be the primary control for air contaminants. Respirators will be used if engineering or work practice controls are not feasible for controlling airborne exposures below acceptable concentrations and as an interim control measure while engineering or work practice controls are implemented.

Once the need for respirators has been established, the respirators will be selected on the basis of the hazards to which the worker is exposed. Only NIOSH-approved respirators will be issued. Selection criteria established in 8 CCR 5144 have been used by the Preparer of this HSP in determining respirator requirements for this project.

> **CAUTION**: Full-face piece or half-face piece air-purifying respirators are not to be used where there is an oxygen deficiency. Only air-supplied respirators with an emergency escape cylinder or self-contained breathing apparatus will be worn when an oxygen deficiency exists.
>
> **CAUTION**: A respirator does not protect against excessive heat or against a hazardous substance that can attack the body through the skin.

Airborne contaminants have been evaluated based on the suspected contaminants of concern. The concentration of the airborne chemical hazard will be evaluated using direct-reading instruments to determine what type of respirator will be used. Airborne readings will be compared to the action levels in the table in Section 1.0. See action level/respirator requirements in Section 6.1.

8.2 MEDICAL SCREENING

Project employees are enrolled in the URS Medical Surveillance Program and are medically evaluated in compliance with the requirements of 8 CCR 5144(a)(10). Employees who are not medically cleared to wear respirators will not be assigned to this project.

The medical status of each employee is reviewed annually and as may be deemed necessary by the examining physician if the physical status of the employee changes.

8.3 FIT TESTING

A person wearing a respirator must be clean-shaven in the area of the face-piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face respirators. Persons with facial conditions that prevent a proper seal are not allowed to wear a respirator until the condition is corrected. Facial conditions that may cause a seal problem include missing dentures, scars, severe acne, etc. Contact lenses may be worn with respiratory protection.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Fit testing will be performed in accordance with accepted fit test procedures defined in SMS 042, a copy of which is to be maintained at the site.

Records of fit testing will be maintained on site or by the employee's office and/or corporate medical surveillance program.

Respirator wearers will perform a user seal check each time they put on the respirator. For air-purifying respirators, the positive user seal check is performed by removing the exhalation valve cover, placing the palm over the respirator exhalation valve, and exhaling gently. The respirator mask should puff out without noticeable leakage. The negative user seal check is performed by placing the palms over both of the respirator cartridges, inhaling gently, and holding the breath for 10 seconds. The respirator mask should remain collapsed on the face without noticeable leakage.

8.4 RESPIRATOR USE INSTRUCTIONS

Only those employees who have been properly trained and qualified on the specific type of respirator to be worn may use respirators. No individual will enter an area where the use of respiratory protective equipment is required unless the person has been trained.

All employees whose job assignments require the use of respirators are trained in accordance with 8 CCR 5144 during an initial 40-hour and annual refresher training for hazardous waste operations.

Hands-on training in inspecting and donning a respirator, including user seal checks, also is provided at the time of fit testing. Retraining is performed annually on each type of respirator worn by the individual. In addition, site-specific respirator training is provided during site safety briefings conducted by the SSO. Training records are kept in the employee’s training file.

A particulate respirator cartridge will be changed out when the wearer has difficulty breathing through the cartridge. Chemical gas or vapor respirator cartridges will be **changed out after every use.**

The fit of a chemical gas or vapor respirator will be rechecked, and the cartridges will be changed, if the wearer detects chemical odor or feels chemical irritation on the skin, both of which are indicators of leakage or cartridge breakthrough. Where available, an End-of-Service Life Indicator (ESLI) will be used on chemical respirator cartridges. Cartridges will be changed as soon as the ESLI indicates that the cartridge is saturated and no longer effective in absorbing airborne chemicals**.**

8.5 RESPIRATOR INSPECTION

The user will inspect respirators before and after each day's use. The inspection procedure for air-purifying respirators (full-face piece and half-face piece cartridge respirators) follows.

Examine the face piece for:

- Excessive dirt;
- Cracks, tears, holes, or distortion from improper storage;
- Inflexibility;
- Cracked or badly scratched lenses (full-face only);
- Incorrectly mounted eyeglass lenses or broken or missing mounting clips (full-face only); and
- Cracked or broken air-purifying element holder, badly worn threads, or missing gaskets.

Examine the head straps or head harness for:

- Breaks or cracks;
- Broken or malfunctioning buckles;
- Excessively worn serration on the headstraps, which may permit slippage;
- Loss of elasticity

Examine the two inhalation valves and the exhalation valve for:

- Foreign material (e.g., hairs, particles, etc.);
- Improper insertion of the valve body in the face piece;

- Cracks, tears, or chips in the valve body, particularly in the sealing surface; and
- Missing or defective exhalation valve covers.

Examine the air-purifying cartridge for:

- Missing or worn cartridge-holder gasket;
- Incorrect cartridge/canister for the hazard;
- Incorrect cartridge installation, loose connections, or cross threading in the holder; and
- Cracks or dents in the outside case or threads of the filter or cartridge/canister.

8.6 CLEANING OF RESPIRATORS

Respirators assigned and worn by one individual must be dismantled and thoroughly cleaned and disinfected after each day's use. Visitors' respirators or respirators assigned to several individuals must be cleaned and disinfected after each use. A disinfectant spray or wipe is approved as a disinfectant between uses during the day but not for cleaning and sanitizing after each day's use. Care must be taken to prevent damage from rough handling during the cleaning procedure. After cleaning, respirators must be reassembled. The procedures for cleaning respirators follow.

- **Washing**: Disassemble and wash with a mild liquid detergent in warm water (not to exceed 110°F). A stiff bristle (not wire) brush may be used.
- **Rinsing**: Rinse in clean water (110°F maximum) to remove all traces of detergent. This is important to prevent dermatitis.
- **Disinfecting**: Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Alternatively, a weak chlorine bleach solution (1 milliliter of liquid bleach per liter of water) may be used.
- **Final Rinsing**: Rinse thoroughly in clean water (110°F maximum) to remove all traces of disinfectant. This is important to prevent dermatitis.
- **Drying**: Drain and dry by hanging by the straps from racks (take care to prevent damage) or by towel drying with clean, soft cloths or paper towels.

8.7 MAINTENANCE OF RESPIRATORS

Routine respirator maintenance, such as replacing missing valves, gaskets, and nosecups, must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. The substitution of parts from a different brand or

type of respirator is generally not possible, invalidates the technical approval of the respirator, and is not permitted. Any respirator suspected of being defective must be removed from service and replaced.

8.8 STORAGE OF RESPIRATORS

When not in use, respirators must be stored to protect them from dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and physical damage. Respirators must be stored in sealable (e.g., Ziploc® or twist-tie) reusable plastic bags between shifts.

The respirator storage environment must be clean, dry, and away from direct sunlight. Onsite cabinets or cases are suggested. Storing bagged respirators in vehicles is discouraged because of the potential for damage from other material or equipment.

8.9 ADDITIONAL INFORMATION

Additional information on the URS Respiratory Protection Program is located in SMS 042, a copy of which is to be available on site.

9.0 SITE CONTROL

9.1 GENERAL

Barricade tape and/or barricades shall be used to delineate a work zone for safety purposes around the work area. Cones will be used to direct and slow traffic around the work area. Work will be conducted in a parking area that can be closed to traffic. The barriers should be set in a 25-foot radius (as practical) around the work area to provide sufficient maneuvering space for personnel and equipment. A short piece of barricade tape can be affixed to a secure upright (e.g., drill rig mast or vehicle antenna) to serve as a wind direction telltale. A 5-foot opening in the barricades at the support zone (upwind of the work area) will serve as the personnel and equipment entry and exit point. The personnel decontamination station will be established at this point if formal decontamination procedures are required (see Section 9.0). All entry and exit from the work area will be made at this opening in order to control potential sources of contamination and leave contaminated soil and debris in the work area.

At the end of the shift, all boring/sampling holes and excavations must be covered or otherwise secured. All cuttings and decontamination fluids are to be handled in accordance with relevant regulations and instructions from the PM.

The PM or SSO (with the assistance of the facility representative) will determine an upwind evacuation area prior to each shift, and all personnel will be notified of its location. A horn or other signaling device will be used to signal an evacuation in the event of an emergency. Three blasts of the horn will be the signal to immediately stop work and proceed to the evacuation area.

The SSO will see that all site visitors sign the visitors' log and that all personnel and site visitors who enter the work area do so only after presenting evidence of both their participation in a medical surveillance program and completion of health and safety training programs that fulfill the requirements of this plan.

The SSO will provide site hazard and emergency action information to all site visitors before they enter the site. This can be done by providing a copy of this HSP to the visitor.

9.2 WORK ZONES

Work zones must be established as described below.

- Exclusion Zone (EZ) – a 25-foot (as practical) circle around the work area will be defined before work starts. The encircled area will constitute the Exclusion Zone. This zone is where potentially hazardous contaminants and physical hazards to the workers will be contained. Appropriate personal protection as described in Section 1.0 will be required in

this area. Plastic sheeting (visqueen) and/or tarps may be used as necessary to control contaminated materials spilled to the ground during site operations. The size of the Exclusion Zone may be altered to accommodate site conditions and to ensure contaminant containment.

- Contamination Reduction Zone (CRZ) – a corridor leading from the Exclusion Zone will be defined, and will lead from the work area to a break area. All decontamination activities will occur in the CRZ. A waste container will be placed at the end of the corridor so contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area should be controlled using plastic sheeting. No personnel or site visitors will be permitted into the Contamination Reduction Zone or Exclusion Zone unless they are in full compliance with the requirements of this Plan.

Support Zone – a Support Zone, the outermost part of the site, must be defined for each field activity. Support equipment is located in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (upwind of work area), and resources (i.e., roads, shelter, utilities).

10.0 DECONTAMINATION PROCEDURES

If the monitoring instrument readings indicate respirator use (the Second Action Level [15 ppm > 1 minute]) in the Operator's Breathing Zone, the following steps will be followed whenever personnel leave the exclusion zone/work area:

1. Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decon tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner may also be used for decon. All waste and spent decon solutions will be properly contained.
2. Scrub boots with a stiff bristle brush and water. Washtubs and chairs will be provided.
3. Remove outer gloves (and boot covers, if used).
4. Remove Tyvek® coverall; discard in provided container.
5. Remove hardhat and eye protection.
6. Remove respirator.
7. Remove inner gloves.
8. Wash hands and face.

The decontamination area will be covered with plastic sheeting, which will be replaced when torn or heavily soiled, and at the end of each shift.

Each worker will be responsible for cleaning, sanitizing and storing their own respirator in accordance with manufacturer's guidance (i.e., washing in warm water and detergent or sanitizing solution, air drying, and storing in a plastic storage bag; see Sections 8.6 – 8.8). Cartridges will be changed in accordance with the procedures described in Section 8.4.

All spent decontamination fluids (rinse waters, etc.) shall be handled as directed by the PM and in accordance with relevant regulations.

10.1 SANITATION

Potable water will be made available at the site, either from a pressurized source or commercially available bottled water. Drinking cups will be supplied so personnel will neither drink directly from the source of water nor have to share drinking cups. Sources of non-potable water shall be clearly labeled as such.

Unless toilet facilities are available on site or transportation is readily available to transport personnel to nearby (within 5 minutes) toilet facilities, portable toilet facilities, such as chemical toilets, will be provided on site.

Washing facilities will be provided on site, and will be located in the decontamination area or the support area. Soap, clean water, wash basins and single-use towels will be available for personnel use.

URS' procedures for site sanitation are located in Safety Management Standard 30, a copy of which is to be maintained on site.

10.2 DECONTAMINATION – MEDICAL EMERGENCIES

In the event of physical injury or other serious medical concerns, immediate first aid is to be administered in lieu of further decontamination efforts.

See Emergency Decontamination chart for a decision tree for emergency decontamination.

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by personnel will be either appropriately decontaminated or properly disposed of as hazardous waste.

It is expected that all tools will be constructed of non-porous, non-absorbent materials. This will aid the decontamination process. Any tool, or part of a tool, which is made of a porous/absorbent material will be discarded and disposed of as a hazardous waste if it cannot be properly decontaminated.

Tools will be placed on a decontamination pad or into a bucket and thoroughly washed using a soap solution and brushing, followed by a fresh water rinse. All visible particles are to be removed before the tool is considered clean.

11.0 SAFE WORK PRACTICES

11.1 GENERAL SITE RULES

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.
- Alcohol consumption is prohibited during work hours. Excessive drinking is strongly discouraged at all times while the team is in the field. Use of prescription medications that impair judgment or affect motor skill and all illegal drugs are also prohibited. For additional information, please review the URS Substance Abuse Policy. Behavior that could endanger the health or safety of any individual of the field team will not be tolerated. Any individual violating these requirements will be subject to disciplinary action that may include termination.
- Personnel will wash their hands and faces thoroughly with soap and water prior to eating, drinking, or smoking.
- Personnel will avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning, or sitting on contaminated surfaces. Do not place monitoring equipment on potentially contaminated surfaces (i.e., the ground, etc.).
- All field crew members should remain alert to potentially dangerous situations in which they should not become involved (i.e., note the presence of strong, irritating, or nauseating odors, etc.).
- Only those vehicles and the equipment required to complete work tasks should be permitted within the work zone. All non-essential vehicles should remain within the support zone.
- Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or the loss of control during transport.
- Spills should be prevented, to the extent possible. Should a spill occur, any liquid should be contained, if possible.
- Splashing of contaminated materials should be prevented.
- Field crew members should be familiar with the physical characteristics of the site operations including:
  - Wind direction in relation to the contaminated area;
  - Accessibility to equipment and vehicles;

  - Areas of known or suspected contamination;
  - Site access; and
  - Nearest water sources.

- The number of personnel and equipment in the work area should be minimized, but only to the extent consistent with workforce requirements for safe site operations.
- All wastes generated by URS activities at the site will be disposed of as directed by the PM.
- All personal protective equipment will be used as specified and required.
- The buddy system will be used at all times when sampling for hazardous material, when the first action level criteria have been exceeded, or when working in remote areas.
- Personnel are to immediately notify the SSO or Site Manager if any indications of potential explosions or unusual conditions are observed.

11.2 SAMPLING PRACTICES

For all sampling activities, the following standard safety procedures will be employed:

- All sampling equipment will be cleaned before proceeding to the site.
- At the sampling site, sampling equipment will be cleaned after each use.
- Work in "cleaner" areas will be conducted first, where practical.
- All unauthorized personnel will remain outside the EZ at all times.

11.3 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If samples to be collected during the course of this project fall under criteria that define them as hazardous materials under Department of Transportation (DOT) regulations 49 CFR Parts 171-177 (see URS guidelines for determination), then they *must* be shipped in accordance with those regulations by an individual who is certified as having been "function-specific" trained, as required under the DOT regulations.

12.0 EMERGENCY RESPONSE PLAN

It is URS policy to evacuate personnel from areas of hazardous material emergencies and to summon outside assistance from agencies with personnel trained to respond to the specific emergency. This section outlines the procedures to be followed by URS personnel in the event of a site emergency. These procedures are to be reviewed during the onsite safety briefings conducted by the SSO.

In the event of a fire or medical emergency, the emergency numbers identified in Section 1.0 (page 1) can be called for assistance.

12.1 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area a safe distance from any health or safety hazard (typically, the URS field office, unless conditions dictate otherwise). The SSO (in cooperation with a facility representative) will designate a primary assembly area prior to the start of work each day. The assembly area may have to be re-designated by the SSO in the event that the area of influence of an emergency affects the primary assembly area. Once personnel are assembled, the SSO will do a head count. The SSO will evaluate the assembly area to determine whether it is outside of the influence of the situation; if it is not, the SSO will redirect the group to a new assembly area where a new head count will be taken.

During any site evacuation, all employees will be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence. The SSO will provide site personnel with specific evacuation instructions via the site emergency radio, if necessary, specifying the actual site conditions.

12.2 FIRE

Fire prevention procedures are described in SMS 14, a copy of which is to be maintained on site. To protect against fires, the following special precautions must be taken.

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the EZ, the SSO must be contacted. In some cases, the client may require to be contacted as well, to determine whether a hot work permit is required. A detailed inspection of the work area will be conducted to determine whether potential fire sources exist; if they do, they must be removed to at least 35 feet away before work can commence.

- Two 20-lb. type ABC fire extinguishers must be located at the work area when cutting or welding is being conducted, and a fire watch will be posted.

- Upon completion of the cutting/welding activities, the area will be inspected for hot metal, slag, etc. The fire watch will remain at its station for at least 15 minutes after the hot work is completed.

Type ABC fire extinguishers will be available on site to contain and extinguish small fires. The local or facility fire department will be summoned in the event of any fire on site.

12.3 COMMUNICATION

Due to the limited scope of this project, verbal communication will be adequate. Employees will have a cell phone available.

12.4 EMERGENCY RESPONSE PROCEDURES

The emergency response team will consist of employees who assume the following roles:

- Emergency care provider(s)
- Provide first aid/CPR as needed
- Communicator

  The role of the communicator is to maintain contact with appropriate emergency services and to provide as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator will be located as close to the scene as possible to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.

- Site Supervisor

  The site supervisor (usually the SSO) will survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow up responsibilities include replacing or repairing damaged equipment, documenting the incident, and notifying appropriate personnel/agencies described under Incident Reporting. Responsibilities also include reviewing and revising site safety and contingency plans as necessary.

  In the event of an emergency, follow the procedures outlined. Notify site personnel of the situation, survey the scene to determine whether the situation is safe, to determine what happened, and to search for other victims. The Emergency Response Checklist can be used to help remember the things to do in an emergency.

12.5 MEDICAL EMERGENCY RESPONSE PLAN

At least one URS employee on site will hold a current certificate in American Red Cross Standard First Aid. This training provides six and one-half hours of instruction in adult CPR and basic first aid. If an injury occurs, but it is not particularly serious or life threatening, the person should be escorted to the nearest occupational health clinic or urgent care facility. See SMS 65 for additional information concerning injury management. If a medical emergency exists, personnel should:

- Consult the emergency phone number list and request an ambulance immediately.
- Perform First Aid/CPR as necessary.
- Stabilize the injured; decontaminate if necessary, and extricate *only* if the environment the injured/ill person is in is dangerous or unsafe and ONLY if the rescuers are appropriately protected from potential hazards that might be encountered during the rescue.
- When emergency services personnel arrive, communicate all first aid activities that have occurred.
- Transfer responsibility for the care of the injured/ill to the emergency services personnel.

The following items and emergency response equipment will be located within easy access at all times:

- First aid kit and infection control kit.
- Emergency telephone numbers list.

Drugs, inhalants, or medications will not be included in the first aid kit.

Supplies should be reordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents, and supplies that have been used must be reordered.

12.6 INCIDENT/NEAR MISS REPORTING

ALL site injuries and illnesses must be reported to the SSO and PM immediately following first-aid treatment. Work is to be stopped until the PM or SSO and RHSEM have determined the cause of the incident and have taken the appropriate action to prevent a reoccurrence. Any injury or illness, regardless of severity, is to be reported on the accident report form (see SMS 49-1).

"Near Miss" reports are to be submitted to URS electronically via the "Near Miss/Safety Observation" database. Near misses are unplanned events that could have resulted in injury, property, or equipment damage if there was a change in time or space.

12.7 OPERATION SHUTDOWN/STOP WORK AUTHORITY

If known or possible hazardous situations are present, or if work tasks are unclear, any project member may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. All project members are encouraged to exercise "stop work" authority as part of applying principles of the behavior based safety culture. If the situation is related to emissions, during operation shutdown, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The SSO will have ultimate authority for operations shutdown and restart.

12.8 SPILL OR HAZARDOUS MATERIALS RELEASE

In the unlikely event of a larger release of hazardous materials as a result of site activities, site personnel will evacuate to the predesignated assembly area. The local Designated Emergency Response Authority (DERA) will be notified by the SSO immediately and appropriate actions will be taken to protect the public health and mitigate the contaminant release. The DERA can be reached through the local police or fire department. The Site Safety Officer or Site Manager will make the following emergency contacts:

URS Project Manager

Cal OES (if RQ is exceeded or threat of significant release)
(800) 852-7550

EPA Response Center (depending if CERCLA RQ is exceeded)
(800) 424-8802

13.0 TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS

13.1 TRAINING AND MEDICAL SURVEILLANCE

All URS site personnel will have met the requirements of 29 CFR 1910.120(e)/8 CCR 5192(e), including:

- Forty hours of initial off-site training or its recognized equivalent;
- Eight hours of annual refresher training for all personnel (as required);
- Eight hours of supervisor training for personnel serving as SSOs; and
- Three days of work activity under the supervision of a trained and experienced supervisor.

All URS site personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f)/8 CCR 5192(f). Current copies of training certificates and statements of medical program participation for all URS personnel are maintained by the local office. Short service employees (SSEs) will be mentored in the field by experienced personnel for a period of six months unless a variance has been granted by the employee's supervisor (see SMS 78 for additional information). Contractor personnel are to provide evidence of their training and medical clearance to the PM or SSO prior to the start of field work.

In addition, all URS site personnel will review this HSP and sign a copy of the Safety Plan Compliance Agreement provided in Attachment B. The PM will maintain these agreements at the site and place them in the project file at the conclusion of the operation.

Prior to the start of operations at the site, the SSO will conduct a site safety briefing, which will include all personnel involved in site operations. At this meeting, the SSO will discuss:

- Contents of this HSP;
- Types of hazards at the site and means for minimizing exposure to them;
- The type of monitoring that will be performed;
- Action levels for upgrade and downgrade of PPE;
- PPE that will be used;
- Site-specific respiratory protection requirements;
- Decontamination protocol;
- Site control measures, including safe operating practices and communication;

- Location and use of emergency equipment; and
- Evacuation signals and procedures.

All site personnel, including subcontractor personnel, are to attend the briefings and sign the briefing form.

Subsequent site safety briefings will be conducted at least weekly, or whenever there is a change in task or significant change in task location. Briefings also will be conducted whenever new personnel report to the site.

13.2 JOB SAFETY ANALYSES/SITE INSPECTIONS

The URS Site Manager or Site Safety Officer is to conduct a daily job safety analysis (JSA) prior to the start of each shift and document on the form found in Attachment E. Subcontractors are encouraged to participate in this process, including developing JSAs for their specific operations (such as drill rig operations). Example JSAs are available on the HSE website for a variety of tasks. The purpose of the JSA is to identify the steps in the tasks that will be performed, the respective hazards, and methods to eliminate or control the hazards. The JSA will be updated during the shift if new or different tasks or unanticipated hazards are encountered, or if the control measures are inadequate. The completed forms are to be maintained on site until the completion of the project, at which time they are to be placed in the project files.

13.3 BEHAVIOR BASED SAFETY OBSERVATIONS

A behavior based observation is to be made at least once a week using the form SMS 72-1. Observations may be made by the SSO, PM, other site employees, or subcontractors. Completed forms are intended to be used to spot trends and serve as an aid for health and safety briefings to communicate positive work practices and areas in need for improvement. “Safety Observation” reports are to be submitted to URS electronically via the “Near Miss/Safety Observation” database. See SMS 72 for additional information.

14.0 RECORDKEEPING

The PM and SSO are responsible for site recordkeeping. Prior to the start of work, they will review this HSP; if no changes are needed, they will sign the approval form (PM) or acceptance form (SSO) and forward a copy to the RHSEM.

All URS personnel will review the HSP and sign the Safety Plan Compliance Agreement in Attachment B; copies of these forms will be maintained in the project file as noted in Section 12.

The SSO will conduct a Site Safety Briefing in accordance with Section 13 and have all attendees sign the form in Attachment B; copies will be maintained in the project file.

Any incident or exposure incident will be investigated and the Incident Report form (SMS 049) will be completed and forwarded to the Office Health, Safety, and Environment Representative, the RHSEM, and to incidentreport@urscorp.com.

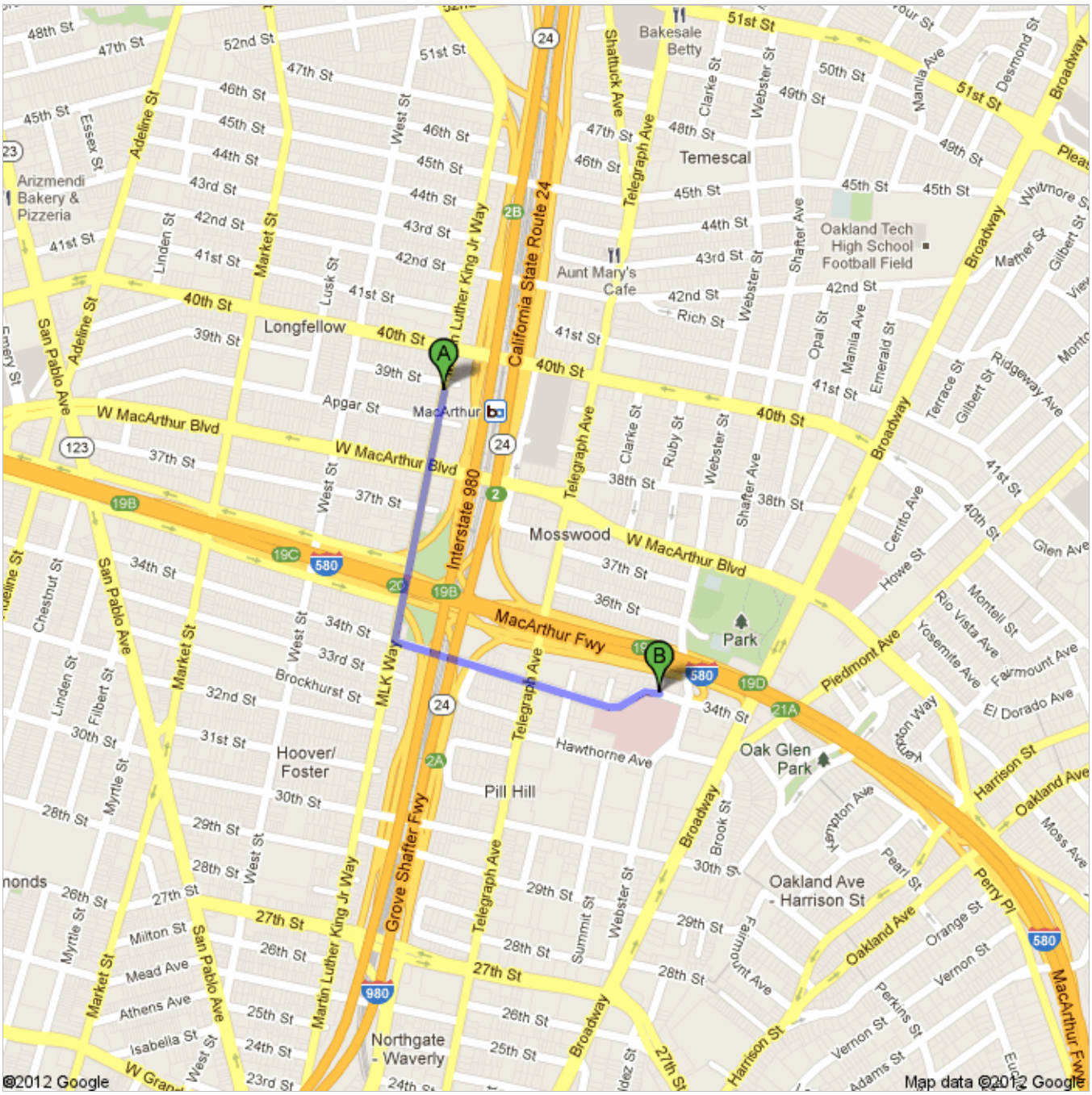
All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this HSP will be recorded in the field log.

ATTACHMENT A

HOSPITAL ROUTE MAP AND CLINIC ROUTE MAP

Google

Directions to Alta Bates Summit Medical Center, 350 Hawthorne Avenue, Oakland, CA 94609
0.8 mi – about **3 mins**



3884 Martin Luther King Jr Way, Oakland, CA 94609

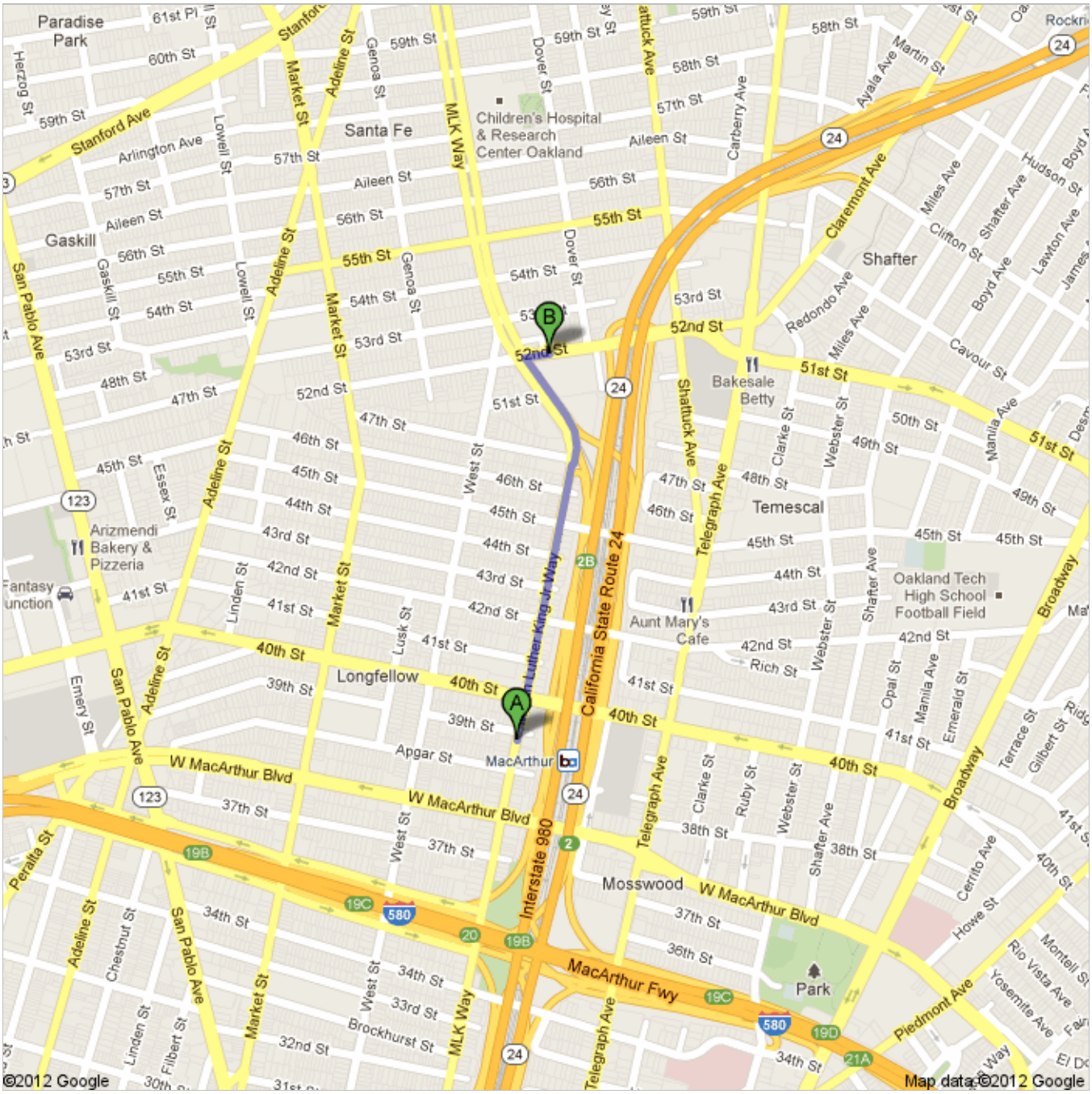
1.	Head **south** on **Martin Luther King Jr Way/MLK** toward **Apgar St** About 1 min	go 0.4 mi total 0.4 mi
 2.	Turn left onto **34th St** Destination will be on the right About 2 mins	go 0.4 mi total 0.8 mi

Alta Bates Summit Medical Center, 350 Hawthorne Avenue, Oakland, CA 94609

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to Alanna Chan, RD
Alanna Chan, RD, 747 52nd Street, Oakland, CA 94609 - (510) 428-3886
0.6 mi – about **3 mins**
Occupational Clinic Directions



3884 Martin Luther King Jr Way, Oakland, CA 94609

1.	Head **north** on **Martin Luther King Jr Way/MLK** toward **39th St** About 3 mins	go 0.6 mi total 0.6 mi
 2.	Turn right onto **52nd St** Destination will be on the right	go 200 ft total 0.6 mi

Alanna Chan, RD
Alanna Chan, RD, 747 52nd Street, Oakland, CA 94609 - (510) 428-3886

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT B

FIELD FORMS

SAFETY PLAN COMPLIANCE AGREEMENT AND
MEDICAL EMERGENCY CONTACT SHEET

I have received a copy of the Health and Safety Plan for this Project. I have reviewed the plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the plan.

SIGNED:_____ _____
Signature Date

SIGNED:_____ _____
Signature Date

SIGNED:_____ _____
Signature Date

SIGNED:_____ _____
Signature Date

SIGNED:_____ _____
Signature Date

MEDICAL EMERGENCY CONTACT SHEET

This brief Medical Emergency Contact Sheet will be kept in the Support Zone during site operations. It is in no way a substitute for the Medical Surveillance Program requirements of the URS Health, Safety, and Environment Program. This data sheet will accompany injured personnel when medical assistance or transport to hospital facilities is necessary.

Employee	Emergency Contact:	Phone #	Relationship	Do you wear contact lenses?

Daily Project Review

Project Name/Number Hard Chrome Engineering/ 28067756 **Date:** _____

Work Area _____ **Permits(s) required and attached** ☐ **YES** ☐ **NO**

Major Steps of Task:	Recognized/Unanticipated Hazards:	Safe Plan:	Tools *Required* to do the job safely:

Adjacent Work/Processes and/or co-occupancy ☐ **Yes** ☐ **No** ☐ **Notified them of our presence** ☐ **Coordinated with adjacent work supervisor/customer operator**

TEAM MEMBERS SIGNATURES

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

The signature of the Supervisor certifies the completion of the Project Review by the crew.

Supervisor's Signature: _____ Date _____

Instructions: 1. Write the name of the job or task in the space provided. 2. Conduct a walk-through survey of work area. 3. Write the steps of the task in a safe sequence. 4. List all possible hazards involved in each step as well as reaction to failure. 5. In the Safe Plan column, provide the corrective actions that will be taken to keep the hazard from becoming an accident or injury. 6. In Tools column list tools needed to do the job, additional safety equipment, etc. 7. Have each team member that helped develop and will use this form sign in the spaces provided at the bottom. 8. Review the form at the end of the task for improvements. **(NOTE:** THE WORK SHALL STOP IF CONDITIONS CHANGE, JOB CHANGES, OR DEFICIENCY IN PLAN IS NOTED.)

Review checklist on next page

Daily Project Review

Safe Plan of Action Checklist (Check the items that apply)

Permits/Clearances

- ☐ Utility Clearance Obtained
- ☐ Confined Space
- ☐ Critical Lift
- ☐ Hoisting & Rigging Safety Review
- ☐ Boom Assembly and Breakdown
- ☐ Boom Proximity
- ☐ Concrete Structure Penetration
- ☐ Soil Excavation
- ☐ Pneumatic Test
- ☐ Hot Work
- ☐ Scaffolding Erection Plan
- ☐ Steel Erection/Decking/Flooring/ Grating Checklist
- ☐ Request for Shutdown
- ☐ Electrically Hazardous Work
- ☐ Radiation Work Permit for Visitors

Required PPE

- ☐ Hard Hat
- ☐ Ear Plugs/Ear Muffs

Eye Protection

- ☐ Safety Glasses
- ☐ Face Shield
- ☐ Chemical Goggles
- ☐ Welding Hood

Hand Protection

- ☐ Cut Resistant Gloves
- ☐ Welders Gloves
- ☐ Nitrile Gloves
- ☐ Surgical Gloves
- ☐ Rubber Gloves
- ☐ Electrical Insulated Gloves
- ☐ Arm Sleeves

Foot Protection

- ☐ Safety Toe Boots
- ☐ Rubber Boots
- ☐ Rubber Boot Covers
- ☐ Dielectric Footware

Respiratory Protection

- ☐ Dust Mask (NIOSH)
- ☐ Air Purifying Respirator
- ☐ Supplied Air Respirator
- ☐ SCBA
- ☐ Emergency Escape Respirator

Special Clothing

- ☐ Tyvek®
- ☐ Poly Coated Tyvek®
- ☐ NOMEX®
- ☐ Rain Suit

Fall Protection

- ☐ Harness
- ☐ Double Lanyard Required
- ☐ Anchorage Point Available

Hazards	Safe Plan	
☐ Overhead Utilities	☐ Power de-energization required ☐ Required clearance distance = _____ ft.	☐ Insulation blankets required ☐ Wire watcher required ☐ Safe work zone marked
☐ Crane or other Lifting Equipment	☐ Signalman assigned ☐ Tag lines in use ☐ Lifting equipment inspected	☐ Area around crane barricaded ☐ Personnel protected from overhead load
☐ Underground Utilities	☐ Reviewed as-builts ☐ Required clearance distance = _____ ft.	☐ Subsurface surveys ☐ Received dig permit ☐ Safe work zone marked
☐ Electrical	☐ Lock Out/Tag Out/Try Out? ☐ Reviewed electrical safety procedures	☐ Permit required ☐ Confirm that equipment is de-energized ☐ Additional info below
☐ Excavations	☐ Permits ☐ Inspected prior to entering ☐ Barricades provided ☐ Access/egress provided	☐ Proper sloping/shoring ☐ Protection from accumulated water
☐ Fire Hazard	☐ Permit ☐ Fire Extinguishers ☐ Unnecessary flammable material removed	☐ Fire watch ☐ Adjacent area protected ☐ Additional info below
☐ Vehicular Traffic or Heavy Equipment	☐ Traffic Barricades ☐ Cones ☐ Signs ☐ Communication with equipment operator	☐ Flagmen ☐ Lane closure ☐ Additional information below
☐ Noise > 85 dB	Hearing protection is required: ☐ Ear plugs ☐ Ear muffs	☐ Both ☐ Additional info below
☐ Hand & Power Tools:	☐ Inspect general condition ☐ GFCI in use ☐ Reviewed safety requirements in operators manual(s)	☐ Identified PEP required for each tool ☐ Guarding OK ☐ Additional info below
☐ Hand Hazards	☐ List sharp tools, material, equipment ☐ PPE gloves, etc. ☐ Protected sharp edges as necessary	☐ Additional info below
☐ Manual Lifting	☐ Reviewed proper lifting tech. ☐ Hand protection required ☐ Back support belts	☐ Identified material requiring lifting equipment ☐ Additional information below
☐ Ladders	☐ Inspect general condition before use ☐ Ladder tied off ☐ Proper angle and placement	☐ Ladder inspected within last quarter ☐ Reviewed ladder safety
☐ Scaffolds	☐ Inspect general condition before use ☐ Toe boards used ☐ Footings adequate	☐ Tags in place ☐ Properly secured ☐ Materials properly stored on scaffold
☐ Slips, Trips, Falls	☐ Inspect for trip hazards ☐ Hazards marked ☐ Extension cords properly secured ☐ Work zone free of debris	☐ Tools & material properly stored ☐ Additional information below
☐ Pinch Points	List potential pinch points: ☐ Working near operating equipment ☐ Hand/Body positioning	☐ Additional information below
☐ Working w/Chemicals	☐ The task creates potential for direct contact with hazardous chemicals. ☐ Reviewed MSDS hazards and precautions ☐ Have identified proper PPE (respirators, clothing, gloves, etc.	☐ Have proper containers and labels
☐ Heat Stress Potential	☐ Heat stress monitoring (>85º F; 29.4º C) ☐ Liquids available ☐ Sun Screen ☐ Reviewed Heat Stress symptoms	☐ Cool down periods ☐ Additional info below
☐ Cold Stress Potential	☐ Proper clothing (i.e., gloves, coat, coveralls) ☐ Reviewed Cold Stress symptoms ☐ Warm up periods	☐ Wind chill (<32º F; 0º C) ☐ Additional information below
☐ Environmental	☐ Air emissions ☐ Water discharge ☐ Pollution prevention	☐ Hazardous wastes ☐ Other wastes ☐ Waste minimization
☐ Natural or Site Hazards	☐ Weather ☐ Terrain ☐ Animals/reptiles/insects hazards	☐ Adjacent operations or processes ☐ Biological hazards
☐ Overhead Work	☐ Caution barricade tape required ☐ Rigid railing required ☐ Covers over opening	☐ Danger barricade tape required ☐ Warming signs required

Additional Information

URS	Health, Safety and Environment **BEHAVIOR BASED SAFETY CHECKLIST**	Attachment 072-1 NA Issue Date: September 2003 Revision 2: February 2009

Date:

Job Location: Hard Chrome Engineering, Oakland CA

Task/Work Observed: _____ Observer: _____

	Safe	Unsafe	Comments *
Personal Protective Equipment			
Head	☐	☐	
Hand	☐	☐	
Feet	☐	☐	
Eyes/Face	☐	☐	
Skin	☐	☐	
Hearing	☐	☐	
Fall Protection	☐	☐	
Equipment / Tools			
Proper tool for the job	☐	☐	
Condition	☐	☐	
Proper Use	☐	☐	
Body Use / Position			
Lifting	☐	☐	
Pinch Point	☐	☐	
Ladder / stairs	☐	☐	
Hand placement	☐	☐	
Travel path / speed	☐	☐	
Body position	☐	☐	
Work Practices			
Follow Safety Plan / Procedures	☐	☐	
Housekeeping	☐	☐	
Other			
_____	☐	☐	
_____	☐	☐	
_____	☐	☐	

* Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

URS	Health, Safety and Environment **INCIDENT / NEAR MISS REPORT FORM**	Attachment 049-1 NA Issue Date: May 2001 Revision 7: February 2009

ADMINISTRATIVE INFORMATION

Database Office ID:

☐ URS Division	☐ EG&G Division
RBU:	SBU:
Region:	SBE Director:
Client Sector:	Program:

NOTIFICATION / LOCATION DATA

Site or Office:		Customer/Client Name:
Date of Event:	Time of Event:	Time Employee Started Work:
Date Supervisor Notified:	Time Supervisor Notified:	Name of Employee Submitting Report:
Client Notification Completed (if required)? ☐ Yes ☐ No		Project/Order Number:

TYPE OF EVENT (Check all applicable items)

Illness (Check one)
- ☐ Employee
- ☐ Subcontractor
- ☐ Other

Injury (Check one)
- ☐ Employee
- ☐ Subcontractor
- ☐ Other

NAME of Injured/Ill Employee: _____

Near Miss (Check the potential consequences):
- ☐ Injury
- ☐ Equipment Damage
- ☐ Property Damage
- ☐ Environmental release
- ☐ Other (describe)

Property Damage (Check one)
- ☐ Company (owned, leased, rented)
- ☐ Client/Customer
- ☐ Other

Vehicular Accident (Check one)
- ☐ Company (owned, leased, rented)
- ☐ Client/Customer
- ☐ Other

- ☐ Fire
- ☐ Explosion
- ☐ Flash
- ☐ Other (describe): _____

EVENT SUMMARY

Briefly state the facts contributing to the event. Attach additional pages and supporting information, as necessary. Avoid use of employees' names. *If this is an injury or illness, supply additional information as required on Page 2.*

ROOT CAUSE DETERMINATION

Root Cause (State the root or primary cause, then select the most appropriate cause category from Page 4):

CONTRIBUTING FACTORS

Contributing Causes (Describe any contributing causes, then select the applicable cause categories from Page 4):

CORRECTIVE ACTIONS

List methods of preventing/avoiding this type of incident/near miss in the future. There must be one or more corrective actions for each root cause.

NOTE: If this is a near miss report, no further information is required. Submit only the first page of the form. The preferred method of distribution of near miss reports is by e-mail attachment either in Word, or scanned to PDF. Forward URS near miss reports to incidentreport@urscorp.com. Alternatively, reports may be faxed to 512.419.6413.

Additional Distribution: ☐ Office/Site Manager ☐ Regional/SBE/SBU HSE Manager ☐ Office/Site HSE Representative

FOR INJURIES/ILLNESS ONLY

Employee Information

What was the employee's location when the injury/illness occurred (include city and state)?

What was the employee doing when the injury/illness occurred? Describe the activity as well as the tools, equipment, or material you were using.

What happened? Describe how the injury/illness occurred.

What was the injury or illness? Describe the part of the body that was affected and how it was affected. Use the Incident pick lists on Page 4 to aid in your description.

What level of medical treatment was received? ☐ First Aid ☐ Clinic/Physician ☐ Emergency Room ☐ Refused/None

List witnesses and/or other employees involved. Attach statements where applicable.

Do you feel URS/EG&G provided you with the proper safety instructions (including PPE usage) for the task you were performing at the time of the incident? ☐ Yes ☐ No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Mark all PPE being used when the incident occurred:

☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Safety Shoes
☐ Half-face Respirator	☐ Full-face Respirator	☐ Protective Gloves	☐ Chemical Gloves
☐ Hard Hat	☐ Hearing Protection	☐ Other (describe):	

Injured/Ill Employee Signature: _____ Date: _____

Name of Injured/Ill Employee (Please print clearly): _____

Employee Number: Contact Phone Number:

Additional Sheets Attached? ☐ Yes ☐ No (Include photos, maps, and/or diagrams when possible.)

Supervisor Information

Describe any additional/different details other than those provided on the previous page. Avoid use of employees' names, where possible. Attach additional sheets, drawings, or photos, as needed.

Were the required tools available at the time of the injury? ☐ Yes ☐ No (Explain below)

At the time of the injury, was the employee using the correct tools for the task? ☐ Yes ☐ No (Explain below)

Was the employee sent for substance screening? ☐ Yes ☐ No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Supervisor Signature: _____ Date: _____

Supervisor Name (Please print clearly):

HSE Representative Comments

Signature: _____ Date: _____

Supervisor Name (Please print clearly):

Site/Office Manager Comments

Signature: _____ Date: _____

Supervisor Name (Please print clearly): _____

DISTRIBUTION

NOTE: *The preferred method of distribution of this report is by e-mail attachment either in Word, or scanned to PDF. Forward URS injury/illness reports to incidentreport@urscorp.com. Alternatively, reports may be faxed to 512.419.6413. Initial reports must be delivered within 24 hours of incident. More detailed follow-up reports may be submitted later.*

Additional Distribution: ☐ Program/Client Sector Manager ☐ Regional/SBE/SBU HSE Manager ☐ Office HSE Representative

ROOT CAUSE CATEGORIES

Check all cause categories that apply to the incident/near miss, then choose the root cause (or causes) category from the boxes checked. Enter where indicated on Page 1.

PHYSICAL/ENVIRONMENT

- ☐ Extreme cold/ice
- ☐ Extreme heat
- ☐ Working/walking surface unfavorable
- ☐ Inadequate lighting
- ☐ Excessive noise
- ☐ Chemical exposure
- ☐ Biological hazards (animal/plant)
- ☐ Other weather
- ☐ Other

SYSTEMS

- ☐ Inadequate training/instruction
- ☐ Inadequate management system
- ☐ Missing or incorrect procedures or planning
- ☐ Inadequate management emphasis on safety
- ☐ Corporate/operations procedures not communicated
- ☐ Other

PHYSICAL/EQUIPMENT, TOOLS, and PPE

- ☐ Failure due to improper maintenance
- ☐ Failure due to improper design
- ☐ Other

HUMAN

- ☐ Failure to adequately recognize hazards
- ☐ Failure to follow procedures
- ☐ Failure to recognize condition change
- ☐ Impaired state (drug, alcohol, other)
- ☐ Physical/psychological limitation for task
- ☐ Inadequate communications (i.e., supervisor/employee)
- ☐ Carelessness by affected person(s)
- ☐ Carelessness by other person(s)
- ☐ Improper selection of equipment/tool/PPE
- ☐ Improper use of equipment/tool/PPE
- ☐ Other

INCIDENT PICK LIST

NATURE OF INJURY/ILLNESS

- ☐ Amputation
- ☐ Burn
- ☐ Concussion
- ☐ Contusion/Abrasion
- ☐ Corneal Abrasion
- ☐ Dental
- ☐ Dermatitis
- ☐ Fatality
- ☐ Fracture
- ☐ Hearing Loss
- ☐ Heat-Related Illness
- ☐ Hernia
- ☐ Insect Bite
- ☐ Laceration/Puncture
- ☐ Other
- ☐ Respiratory Disorder
- ☐ Sprain/Strain

BODY PART

- ☐ Ankle/Foot
- ☐ Arm/Elbow
- ☐ Back
- ☐ Eyes
- ☐ Head
- ☐ Hip/Groin
- ☐ Internal Organs/Blood
- ☐ Leg/Knee
- ☐ Multiple Body Parts
- ☐ Neck/Cervical
- ☐ Respiratory
- ☐ Shoulder
- ☐ Trunk
- ☐ Wrist/Hand

DIRECT CAUSE

- ☐ Animal/Insect Contact
- ☐ Biological Agent
- ☐ Caught Between
- ☐ Ergonomics/Repetitive Trauma
- ☐ Exposure To
- ☐ Miscellaneous
- ☐ Motor Vehicle Wreck
- ☐ Overexertion
- ☐ Poisonous Plant
- ☐ Slips/Trips/Falls
- ☐ Struck Against
- ☐ Struck By

URS	Health, Safety and Environment **VEHICLE INCIDENT REPORT**	Attachment 057-1 WD Issue Date: February 2009

To be used for **all** vehicle accidents involving vehicles owned, leased, or rented by the Washington Division or the client and personal vehicles used on Washington Division business.

Name of Employee Involved in Accident _____

Was the employee injured? Yes ☐ No ☐ **Job Title:**

Was anyone else injured? Yes ☐ No ☐ _____

List all passengers and attach a statement from each: _____

_____

Office Location _____ **Date of Accident** _____

Employee Phone/Cell # _____ **Office Phone #** _____

Describe Injury (including medical treatment, if any):

Company Vehicle ☐
Personal Vehicle ☐
Rental Vehicle ☐
Government or Customer Vehicle ☐

On Company business at the time of accident? Yes ☐ No ☐

Vehicle Identification Number (company or personal):

_____

Year _____ Make _____ Model _____

Other Driver's Information

Name _____ Phone Number _____

Address _____

Insurance Co. _____ Policy # _____

License Plate # _____ Make _____ Model _____

Description of Accident

Time of Accident _____ Police Report # _____

Location of Accident _____ Police Department _____

Description (provide a clear, inclusive description of the accident):

_____

_____

_____

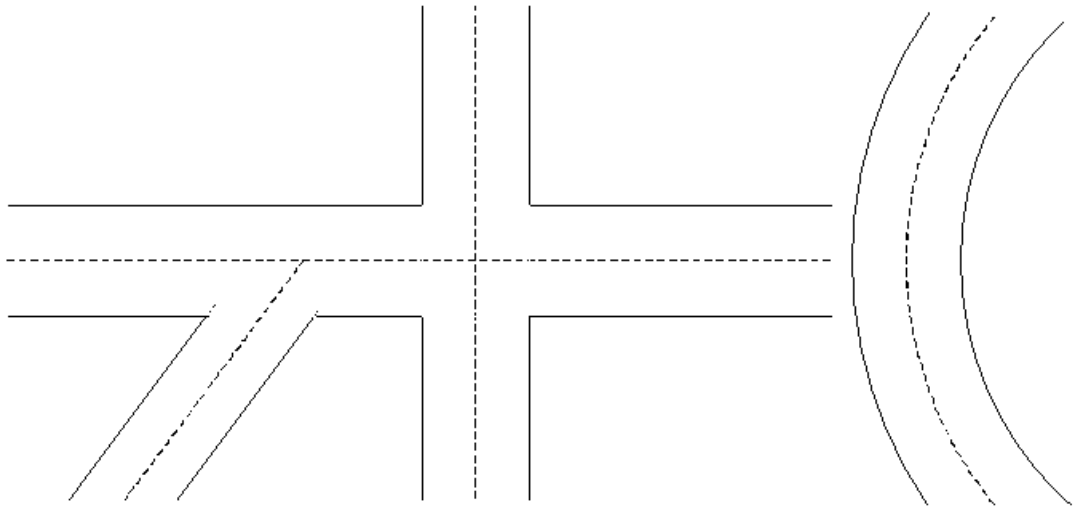
_____

Accidents should be reported immediately to the Business Manager/Project Manager or as required by your Business Unit accident reporting procedures.

URS	Health, Safety and Environment **VEHICLE INCIDENT REPORT**	Attachment 057-1 WD Issue Date: February 2009

To be used for **all** vehicle accidents involving vehicles owned, leased, or rented by the Washington Division or the client and personal vehicles used on Washington Division business.

Draw a diagram showing the position of vehicles before and after the accident. Correct the diagram to fit your situation. Attach police report if available.



Check all applicable conditions on each subject

WEATHER

- ☐ Clear
- ☐ Cloudy
- ☐ Fog
- ☐ Rain
- ☐ Snow
- ☐ Sleet
- ☐ Other

LIGHTING

- ☐ Daylight ☐ Dark
- ☐ Dusk ☐ Dawn
- ☐ Dark - no street lights on
- ☐ Dark - street lights on
- ☐ Headlights
- ☐ Headlights on dim
- ☐ Headlights on bright
- ☐ No lights on

ROAD SURFACE

- ☐ Dry
- ☐ Wet
- ☐ Muddy
- ☐ Snowy
- ☐ Snow-covered
- ☐ Ice in places
- ☐ Ice -covered
- ☐ Other

ROAD DESCRIPTION

- ☐ Straight ☐ Curve
- ☐ Level
- ☐ Hill ☐ Up ☐ Down
- ☐ Paved ☐ Black top
- ☐ One-way
- ☐ Two-way
- ☐ Divided road
- ☐ Intersection

ACTION OF DRIVER	You	Other
Exceeding safe speed	☐	☐
On wrong side of street	☐	☐
Did not have right-of-way	☐	☐
Disobeyed traffic signal	☐	☐
Passed illegally	☐	☐
Improper turning	☐	☐
Improper backing	☐	☐
Following too closely	☐	☐
Failure to signal	☐	☐
Improper lane change	☐	☐
Misjudged clearance	☐	☐
Other	☐	☐

What was speed limit?

_____ MPH

Witnesses?

☐ Yes ☐ No

Traffic control

- ☐ Signal lights
- ☐ Caution lights
- ☐ Stop sign
- ☐ Police officer
- ☐ None ☐ Other

Witness Name _____

Address _____

_____

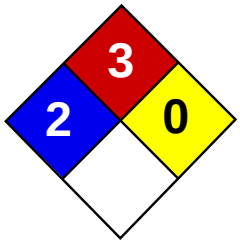
Name _____

Address _____

_____

ATTACHMENT C

MATERIAL SAFETY DATA SHEETS



Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powferful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 06/09/2012 12:00 PM

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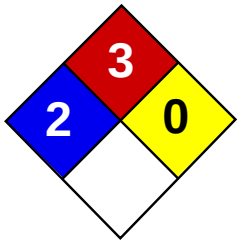

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET
MSDS NUMBER: 401638MT - 0

24 Hour Emergency Assistance: CHEMTEL
MSDS Assistance Number: (877) 276-7285

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: TX Conventional Gasoline with EtOH

PRODUCT CODE(S): 00376, 00379, 00385, 00386, 00387, 00388, 00458, 00479, 00485, 00486, 00488, 00495, 00498, 00504, 00531, 00545, 03783, 03784, 03785, 03787, 03788, 03789, 26766
MANUFACTURER ADDRESS:Motiva Enterprises LLC, P.O. Box 4540, Houston, TX. 77210-4540

SECTION 2 PRODUCT/INGREDIENTS

CAS#	CONCENTRATION	INGREDIENTS
Mixture	100 %volume	Gasoline
Mixture	0 - 49.99 %volume	Miscellaneous Hydrocarbons
1330-20-7	0 - 24.99 %volume	Xylene, mixed isomers
108-88-3	0 - 24.99 %volume	Toluene
64-17-5	5 - 9.99 %volume	Ethanol
95-63-6	0 - 4.99 %volume	1,2,4-Trimethyl Benzene (Pseudocumene)
71-43-2	0 - 3.99 %volume	Benzene
100-41-4	0 - 4.49 %volume	Ethyl Benzene
110-54-3	0 - 2.99 %volume	Hexane
110-82-7	0 - 0.99 %volume	Cyclohexane
100-42-5	0 - 0.99 %volume	Styrene
91-20-3	0 - 0.99 %volume	Naphthalene

NOTE: Content of Gasoline components will vary; Individual components may be present from trace amounts up to the maximum shown.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Appearance & Odor: Bronze color, clear & bright liquid. Hydrocarbon odor.
Health Hazards: Toxic and harmful if inhaled. May be harmful or fatal if swallowed. Do not induce vomiting. May cause aspiration pneumonitis. May cause CNS depression.
Physical Hazards: Material is extremely flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.
NFPA Rating (Health, Fire, Reactivity): 1, 3, 0
Hazard Rating:Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

Inhalation:
Toxic and harmful if inhaled. May cause irritation to the nose, throat and respiratory tract. Breathing of high vapor concentrations may cause CNS depression, evidenced by dizziness, light-headedness, headache, nausea, drowsiness, and loss of coordination. Continued inhalation may result in unconsciousness.

Eye Irritation:
May be irritating to the eyes causing a burning sensation, redness, swelling and/or blurred vision.

Skin Contact:
May be irritating to the skin causing a burning sensation, redness and/or swelling. Prolonged or repeated skin contact can cause defatting and drying of the skin which may result in a burning sensation and a dried, cracked appearance.

Ingestion:
This material may be harmful or fatal if swallowed. Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis. Generally considered to have a low order of acute oral toxicity.
Other Health Effects:
Carcinogenic in animal tests. Gasoline has been tested by API in a long-term inhalation test in mice and rats. There was an increased incidence of liver cancer in female mice. Male rats had a dose related increase in kidney tumors. This effect was due to formation of alpha-2u-globulin in the rats. This material is not formed in humans and is therefore not considered relevant. It is probable that the material causes cancer in laboratory animals. Material may adversely effect male reproductive performance based on testing in laboratory animals.

Refer to Section 11, Toxicological Information, for specific information on the following effects:
Developmental Toxicity, Genotoxicity, Immunotoxicity, Reproductive Toxicity

Primary Target Organs:
The following organs and/or organ systems may be damaged by overexposure to this material and/or its components:
Cardiovascular System, Blood/Blood Forming Organs, Kidney, Liver
Signs and Symptoms:
Irritation as noted above. Aspiration pneumonitis may be evidenced by coughing, labored breathing and cyanosis (bluish skin); in severe cases death may occur. Damage to blood-forming organs may be evidenced by: a) easy fatigability and pallor (RBC effect), b) decreased resistance to infection (WBC effect), c) excessive bruising and bleeding (platelet effect). Kidney damage may be indicated by changes in urine output or appearance, pain upon urination or in the lower back or general edema (swelling from fluid retention). Liver damage may be indicated by loss of appetite, jaundice (yellowish skin and eye color), fatigue and sometimes pain and swelling in the upper right abdomen.

For additional health information, refer to section 11.

SECTION 4 FIRST AID MEASURES

Inhalation:
Move victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Skin:
Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes and follow by washing with soap if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye:
Flush eyes with large amounts of water for at least 15 minutes. If redness, burning, blurred vision or swelling persist, transport to nearest medical

facility for additional treatment.

Ingestion:
DO NOT take internally. Do NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. Get medical attention. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

Note to Physician:
If more than 2.0ml/kg body weight has been ingested and vomiting has not occurred, emesis should be induced with supervision. Keep victim's head below hips to prevent aspiration. If symptoms such as loss of gag reflex, convulsions, or unconsciousness occur before emesis, gastric lavage using a cuffed endotracheal tube should be considered.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point [Method]: -40 ?F/-40 ?C [Tagliabue Closed Cup]
Flammability in Air: 1.3 - 7.6 %volume

Extinguishing Media:
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

Fire Fighting Instructions:
DANGER! EXTREMELY FLAMMABLE. Clear fire area of all non-emergency personnel. Only enter confined fire space with full bunker gear, including a positive pressure, NIOSH-approved, self-contained breathing apparatus. Cool surrounding equipment, fire-exposed containers and structures with water. Container areas exposed to direct flame contact should be cooled with large quantities of water (500 gallons water per minute flame impingement exposure) to prevent weakening of container structure.

Unusual Fire Hazards:
Vapors are heavier than air accumulating in low areas and traveling along the ground away from the handling site. Do not weld, heat or drill on or near container. However , if emergency situations require drilling, only trained emergency personnel should drill.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures:
DANGER! EXTREMELY FLAMMABLE! Eliminate potential sources of ignition. Handling equipment must be bonded and grounded to prevent sparking.

Spill Management:
Dike and contain spill.

FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Reporting:
U.S. regulations require reporting releases of this material to the

environment which exceed the reportable quantity to the National Response Center at (800)424-8802.
CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). Spills into or leading to surface waters that cause a sheen must be reported to the National Response Center, 1-800-424-8802.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures:
Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Ground all handling equipment to prevent sparking. Do not siphon gasoline by mouth; harmful or fatal if swallowed. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

For use as a motor fuel only. Do not use as a cleaning solvent or for other non-motor fuel uses.

Handling:
Surfaces that are sufficiently hot may ignite liquid material. Material is extremely flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

Keep containers closed when not in use. WARNING! The flow of gasoline through the pump nozzle can produce static electricity, which may cause a fire if gasoline is pumped into an ungrounded container. To avoid static buildup, place approved container on the ground. Do not fill container in vehicle or truck bed. Keep nozzle in contact with container while filling. Do not use automatic pump handle (latch-open) device. Keep all storage vessels closed. Material will ignite when exposed to air. Air trapped within the storage container may be removed by placing dry ice in the container prior to closing. Turn off all battery operated portable electronic devices (examples include: cellular phones, pagers and CD players) before operating gasoline pump. Use only with adequate ventilation.

Storage:
Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

Keep liquid and vapor away from heat, sparks and flame. Extinguish pilot lights, cigarettes and turn off other sources of ignition prior to use and until all vapors have dissipated. Use explosion-proof ventilation indoors and in laboratory settings.

Container Warnings:
Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Benzene ACGIH TLV TWA: 0.5 ppmv STEL: 2.5 ppmv Notation: Skin
Benzene OSHA PEL TWA: 1 ppmv STEL: 5 ppmv
Cyclohexane ACGIH TLV TWA: 300 ppmv
Cyclohexane OSHA PEL TWA: 300 ppmv
Ethanol ACGIH TLV TWA: 1000 ppmv
Ethyl Alcohol OSHA PEL TWA: 1000 ppmv
Ethyl Benzene ACGIH TLV TWA: 100 ppmv STEL: 125 ppmv
Ethyl Benzene OSHA PEL TWA: 100 ppmv
Ethyl Benzene OSHA PEL - 1989(revoked) TWA: 100 ppmv STEL: 125 ppmv

Gasoline ACGIH TLV TWA: 300 ppmv STEL: 500 ppmv
Gasoline OSHA PEL - 1989(revoked) TWA: 300 ppmv STEL: 500 ppmv
N-Hexane OSHA PEL TWA: 50 ppmv
N-Hexane OSHA PEL - 1989(revoked) TWA: 50 ppmv
Naphthalene ACGIH TLV TWA: 10 ppmm STEL: 15 ppmm
Naphthalene OSHA PEL TWA: 10 ppmv
Naphthalene OSHA PEL - 1989(revoked) TWA: 10 ppmv STEL: 15 ppmv
Styrene ACGIH TLV TWA: 20 ppmv STEL: 40 ppmv
Styrene OSHA PEL TWA: 100 ppmv Ceiling: 200 ppmv
Styrene OSHA PEL - 1989(revoked) TWA: 50 ppmv STEL: 100 ppmv
Toluene ACGIH TLV TWA: 50 ppmv Notation: Skin
Toluene OSHA PEL TWA: 200 ppmv Ceiling: 300 ppmv
Toluene OSHA PEL - 1989(revoked) TWA: 100 ppmv STEL: 150 ppmv
Toluene SHELL INTERNAL TWA: 50 ppmv
Trimethyl Benzene ACGIH TLV TWA: 25 ppmv
Trimethyl Benzene OSHA PEL - 1989(revoked) TWA: 25 ppmv
Trimethyl Benzene SHELL PEL - 1989(revoked) TWA: 25 ppmv
xylene (o-, m-, p- isomers) OSHA PEL TWA: 100 ppmv
xylene (o-, m-, p- isomers) OSHA PEL - 1989(revoked) TWA: 100 ppmv STEL: 150 ppmv
Xylene (o-, m-, p-isomers) ACGIH TLV TWA: 100 ppmv STEL: 150 ppmv
EXPOSURE CONTROLS
Adequate explosion-proof ventilation indoors and in laboratory settings to control airborne concentrations below the exposure guidelines/limits.

PERSONAL PROTECTION
Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles - If liquid contact is likely.

Skin Protection:
Use protective clothing which is chemically resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Published literature, test data and/or glove and clothing manufacturers indicate the best protection is provided by:
Neoprene, or Nitrile Rubber, or Polyvinyl Alcohol (PVA)

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:
Supplied-Air Respirator. Air-Purifying Respirator for Organic Vapors.
Self-contained breathing apparatus for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Bronze color, clear & bright liquid. Hydrocarbon odor.
Substance Chemical Family: Hydrocarbon
Appearance: Bronze color, clear & bright liquid.

Flammability in Air: 1.3 - 7.6

Flash Point: -40 ?F [Tagliabue Closed Cup]

Freezing Point: -72 ?F

Solubility (in Water): Negligible

Specific Gravity: 0.72 - 0.76

Stability: Stable

Vapor Density: 3.5

Vapor Pressure: 7 - 14.5 [Reid]

Viscosity: < 1.4 cSt Typical @ 100 ?F

Volatility: 100 %weight

SECTION 10 REACTIVITY AND STABILITY

Stability:
Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat, sparks, open flames and other ignition sources.

Materials to Avoid:
Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products:
Thermal decomposition products are highly dependent on combustion conditions. A complex mixture of airborne solids, liquids and gases will evolve when this material undergoes pyrolysis or combustion. Aldehydes, Carbon Monoxide, Carbon Dioxide, Peroxide
and other unidentified organic compounds may be formed upon combustion.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity
Dermal LD50 >2 g/kg(Rabbit) OSHA: Non-Toxic Based on similar material(s)
Eye Irritation Moderate to Severe Irritation [Human] OSHA: Irritating Based on similar material(s)
Oral LD50 >5 g/kg(Rat) OSHA: Non-Toxic Based on similar material(s)
Skin Irritation 0.98 [Rabbit, 24 hour(s)] OSHA: Irritating Based on similar material(s)

Carcinogenicity:
Gasoline has been tested by API in a long-term inhalation test in mice and rats. There was an increased incidence of liver cancer in female mice. Male rats had a dose related increase in kidney tumors. This effect was due to formation of alpha-2u-globulin in the rats. This material is not formed in humans and is therefore not considered relevant.

Carcinogenicity Classification
Gasoline
NTP: No IARC: Possible Carcinogen (2B) ACGIH: A3 OSHA: Yes
Benzene
NTP: Yes IARC: Carcinogen (1) ACGIH: A1 OSHA: Yes
Ethyl Benzene
NTP: No IARC: Possible Carcinogen (2B) ACGIH: A3 OSHA: No
Naphthalene
NTP: Yes IARC: Possible Carcinogen (2B) ACGIH: A4 OSHA: No

Styrene
NTP: No IARC: Possible Carcinogen (2B) ACGIH: A4 OSHA: No
Toluene
NTP: No IARC: Not Classifiable (3) ACGIH: A4 OSHA: No
Carcinogenicity
Chronic inhalation of wholly vaporized gasoline produced kidney tumors in male rats and liver tumors in female mice. The kidney tumors have been shown to develop through a unique mechanism involving Alpha-2u globulin. This protein is not present in humans making the kidney tumors irrelevant to potential human health risks. Origin of the female mouse liver tumors is less understood, leaving their significance for human risks uncertain. Prolonged and repeated exposure to high concentrations (10s to 100s ppm) of benzene may cause serious injury to blood-forming organs, is associated with anemia (depletion of blood cells) and is linked to the later development of acute myelogenous leukemia (AML) in humans. A recent chronic bioassay of ethylbenzene by the NTP produced clear evidence of carcinogenicity in male rats based on kidney tumor increase. Other animal tumors possibly associated with ethylbenzene include testicular adenomas in male rats, kidney tumors in female rats, lung tumors in male mice and liver tumors in female mice. Toluene is not known to be mutagenic or carcinogenic although available human and experimental animal data are limited and insufficient to assess carcinogenic potential. A two-year inhalation study in rats found that naphthalene caused tumors in the lining of the nose (olfactory epithelial neuroblastoma) and respiratory tract (respiratory epithelial adenoma) of both male and female animals. There is also limited evidence of carcinogenic effects in female mice in a similar study.

Cardiovascular System
While there is no evidence that workplace exposure to acceptable levels of toluene vapors (e.g., the TLV) have produced cardiac effects in humans, high concentrations may cause cardiac sensitization and sudden lethality has been reported from habitual sniffing of solvents or glue. Animal studies have confirmed the sensitizing effects. Sensitization may lead to fatal changes in heart rhythms. Hypoxia or injection of adrenalin-like agents may enhance this effect. Thickening of heart blood vessels has been reported in animals exposed to xylene.

Developmental Toxicity
Daily exposure of pregnant rats to unleaded gasoline vapor at concentrations up to 9000 ppm resulted in no detectable maternal or developmental toxicity. Numerous studies of benzene in experimental animals have failed to detect teratogenic effects (birth defects) even at doses of benzene toxic to the mothers. There is some evidence of fetal toxicity, but not malformations, in mice and rabbits exposed to 500 ppm and higher concentrations of benzene vapor during gestation. Ethylbenzene caused birth defects in rats but not rabbits at doses that produced toxic effects in the mothers. n-Hexane produced fetal toxicity, reduced fetal weight, in mice at maternally toxic doses. Developmental toxicity studies of xylenes showed embryolethal/toxic and teratogenic effects with maternal toxicity. Many case studies involving abuse during pregnancy implicate toluene as a developmental toxicant. Studies in laboratory animals have shown developmental effects comparable to those reported in humans, but the effects were generally associated with maternal toxicity. Ethanol ingestion during pregnancy has been reported to cause birth defects in some infants.

Genotoxicity
Unleaded gasoline was tested for genetic activity in tests using microbial cells, cultured mammalian cells and rats (bone marrow) and was judged to be negative in every case. Benzene has been shown to be non-mutagenic or weakly mutagenic in a variety of in vitro (test tube) systems. It has, however, been found to cause other types of chromosome damage (micronuclei, chromosome breakage, non-dysjunctional events) in both laboratory animals and workers exposed to high doses of benzene. These effects appear to be related to one or more metabolites of benzene, possibly acting in combination. Benzene metabolites can also bind to proteins forming detectable complexes (adducts). There is limited evidence of binding to the genetic material (DNA) itself. The relationship of these effects to the causation of leukemia or tumors in experimental animals is unknown. Changes in chromosomes of lymphocytes have

been identified in some studies of humans exposed to styrene. The significance of these changes is not known, and other such studies have produced negative results. Chromosomal breaks have been reported in the bone marrow cells of rats exposed to styrene by inhalation along with increased frequency of sister chromatid exchanges in alveolar macrophages, bone marrow cells and regenerating liver cells. Ethylbenzene was not mutagenic in a number of in vitro procedures. Naphthalene was non-mutagenic using in vitro (test tube) evaluations, specifically Ames and rat embryo cell transformation assays. Cyclohexane and pseudocumene were also negative in Ames testing. Toluene was negative in the Ames assay and negative for chromosomal aberrations and sister-chromatid exchanges in human lymphocytes and in an in vitro test using hamster cells. Mouse lymphoma test results for toluene were inconclusive.

Blood/Blood Forming Organs
Prolonged and repeated exposure to high concentrations (10s to 100s ppm) of benzene may cause serious injury to blood-forming organs and is associated with anemia (depletion of blood cells). Repeated exposure of rabbits to high cyclohexane vapor concentrations causes a slight increase in blood clotting time. Blood effects were seen in rats following prolonged and repeated oral exposure to a mixture of xylenes containing ethylbenzene.

Immunotoxicity
Various studies of workers exposed to high levels of benzene have found impairment of both humoral (antibody) and cellular immunity, most notably a decrease in levels of circulating leukocytes. Many of these exposures also involve other solvents and chemicals. Animal studies with high benzene doses have reported similar effects.

Kidney
Long-term inhalation of wholly vaporized gasoline caused increased kidney weight and progressive nephropathy (tissue damage) in male rats. In rats exposed orally to a xylene mixture also containing ethylbenzene, males developed hyaline droplet changes and females showed evidence of early chronic nephropathy. Intentional abuse of toluene vapors by 'glue-sniffers' has been associated with damage to the kidneys.

Liver
Inhalation of gasoline vapor increased liver weights, urinary excretion of ascorbic acid, and hepatic enzyme activity in male rats. Liver weight increases were seen in rats dosed orally for 90 days with a xylene mixture also containing ethylbenzene. Reversible liver damage has been reported in persons exposed to toluene by solvent abuse. Prolonged and repeated consumption of ethanol has been shown to cause liver damage in animals and cirrhosis in humans.

Neurotoxicity
Inhalation exposure to high n-hexane concentrations has resulted in peripheral neuropathy in rodents and also in human workers. Rats receiving prolonged and repeated exposure to high doses of xylene have shown hearing loss. Prolonged and repeated exposures to high toluene concentrations (mixed solvent) have resulted in hearing loss in laboratory animals. There have also been reports of hearing damage in humans overexposed to toluene and other solvents, however, these effects and their possible relationship to noise exposure remain uncertain. Intentional inhalation ('glue-sniffing') and resulting overexposure to toluene vapors has been linked to brain injury. Rats exposed repeatedly to high concentrations of styrene vapor also developed hearing deficits.

Reproductive Toxicity
Inhalation of high n-hexane concentrations resulted in testicular and epididymal lesions in laboratory animals. Animal studies on benzene have shown testicular effects and alteration in reproductive cycles.

Sensitization
Gasoline and component petroleum streams blended to produce it were tested in animal studies and found not to cause skin sensitization.

Systemic Toxicity

Studies on n-hexane in laboratory animals have shown mild, transitory effects on the spleen and blood (white blood cells) and evidence of nasal tract and lung damage. Chronic exposure to vapors of a mixture containing 50% pseudocumene (and possibly contaminated with benzene) caused decreased weight gain and blood changes (lymphopenia and neutrophilia), liver, lung, spleen, kidney, and bone marrow effects in rats. Microscopic changes in the lung, including congestion, hemorrhage, edema, exudation, and leukocyte infiltration were observed in rats and guinea pigs following acute inhalation of styrene. In fatally exposed animals, pulmonary congestion, edema, and necrosis of the kidney and liver were reported. Repeated exposure to high vapor concentrations of cyclohexane caused minor microscopic liver and kidney changes in rabbits. Laboratory animals exposed to prolonged and repeated doses of xylenes by various routes have shown effects in liver, kidneys, lungs, spleen, heart, blood and adrenals. Persons on disulfiram (Antabuse(R)) therapy should be aware that the ethyl alcohol in this product is hazardous to them just as is alcohol from any source. Disulfiram reactions (vomiting, headache and even collapse) may follow ingestion of small amounts of alcohol and have also been described from skin contact.

SECTION 12 ECOLOGICAL INFORMATION

Environmental Impact Summary:
There is no ecological data available for this product.

SECTION 13 DISPOSAL CONSIDERATIONS

RCRA Information:

Under RCRA, it is the responsibility of the user of the material to determine, at the time of the disposal, whether the material meets RCRA criteria for hazardous waste. This is because material uses, transformations, mixtures, processes, etc. may affect the classification. Refer to the latest EPA, state and local regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification

Proper Shipping Name: Gasohol
Identification Number: NA1203
Hazard Class/Division: 3 (Flammable Liquid)
Packing Group: II
Marine Pollutant % of Total: 100 %weight
Marine Pollutant: Marine Polluntant based on the presence of >10% hydrocarbons listed in 49 CFR 172.101, appendix B; main constituents Trimethylbenzene and Naphthalene.
Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule. Per 49 CFR 130.5, containers of 3500 gallon capacity or greater transported by road or rail are excepted from 49 CFR 172.303(L)(2) if shipping papers contain the word 'OIL'; exceptions are not applicable to shipments by water.
Emergency Response Guide # 128

International Air Transport Association

Hazard Class/Division: 3 (Flammable Liquid)
Identification Number: NA1203
Packing Group: II
Proper Shipping Name: Gasohol

International Maritime Organization Classification

Hazard Class/Division: 3 (Flammable Liquid)
Identification Number: NA1203
Packing Group: II
Proper Shipping Name: Gasohol

SECTION 15 REGULATORY INFORMATION

FEDERAL REGULATORY STATUS

OSHA Classification:
Product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Comprehensive Environmental Release, Compensation & Liability Act (CERCLA):
Benzene RQ 10 lbs Reportable Spill => 205 lbs or 34 gal

Ozone Depleting Substances (40 CFR 82 Clean Air Act):
This material does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

Superfund Amendment & Reauthorization Act (SARA) Title III:

There are no components in this product on the SARA 302 list.

SARA Hazard Categories (311/312):
Immediate Health:YES Delayed Health:YES Fire:YES Pressure:NO Reactivity:NO

SARA Toxic Release Inventory (TRI) (313):
Xylene (mixed isomers), 1,2,4-Trimethylbenzene, Toluene, Naphthalene, N-Hexane, Ethylbenzene, Cyclohexane, Benzene, Styrene

Toxic Substances Control Act (TSCA) Status:
All component(s) of this material is(are) listed on the EPA/TSCA Inventory of Chemical Substances.

This product may be subject to export notification under TSCA Section 12(b);
Contains: Cyclohexane

Other Chemical Inventories:
Australian AICS, Canadian DSL, Chinese Inventory, European EINECS, Japan ENCS, Korean Inventory, Philippines PICCS,

State Regulation
The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List:
Benzene (71-43-2) 0 - 3.99 %volume Carcinogen
Benzene (71-43-2) 0 - 3.99 %volume Mutagen
Benzene, Methyl- (108-88-3) 0 - 24.99 %volume
Cyclohexane (110-82-7) 0 - 0.99 %volume
Ethanol (64-17-5) 5 - 9.99 %volume
Ethylbenzene (0851) 0 - 4.49 %volume
Naphthalene (1322) 0 - 0.99 %volume
Styrene (100-42-5) 0 - 0.99 %volume Mutagen
Xylenes (1330-20-7) 0 - 24.99 %volume

Pennsylvania Right-To-Know Chemical List:
Benzene (71-43-2) 0 - 3.99 %volume Spec Haz Sub/Env Hazardous
Benzene, dimethyl- (1330-20-7) 0 - 24.99 %volume Environmental Hazard
Benzene, ethenyl (100-42-5) 0 - 0.99 %volume Environmental Hazard
Benzene, Ethyl- (100-41-4) 0 - 4.49 %volume Environmental Hazard
Benzene, Methyl- (108-88-3) 0 - 24.99 %volume Environmental Hazard
Cyclohexane (110-82-7) 0 - 0.99 %volume Environmental Hazard
Ethanol (64-17-5) 5 - 9.99 %volume
Naphthalene (91-20-3) 0 - 0.99 %volume Environmental Hazard

SECTION 16 OTHER INFORMATION

Revision#: 0
Revision Date: 03/05/2003
Revisions since last change (discussion): This Material Safety Data Sheet (MSDS) has been newly created to fully comply with the guidance contained in the ANSI MSDS standard (ANSI Z400.1-1998). We encourage you to take the opportunity to read the MSDS and review the information contained therein.

SECTION 17 LABEL INFORMATION

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT. THIS LABEL COMPLIES WITH THE REQUIREMENTS OF THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) FOR USE IN THE WORKPLACE. THIS LABEL IS NOT INTENDED TO BE USED WITH PACKAGING INTENDED FOR SALE TO CONSUMERS AND MAY NOT CONFORM WITH THE REQUIREMENTS OF THE CONSUMER PRODUCT SAFETY ACT OR OTHER RELATED REGULATORY REQUIREMENTS.

PRODUCT CODE(S): 00376, 00379, 00385, 00386, 00387, 00388, 00458, 00479, 00485, 00486, 00488, 00495, 00498, 00504, 00531, 00545, 03783, 03784, 03785, 03787, 03788, 03789, 26766

TX Conventional Gasoline with EtOH

DANGER!

EXTREMELY FLAMMABLE. VAPORS MAY EXPLODE. MAY BE FATAL IF INHALED. OVEREXPOSURE TO VAPORS CAN CAUSE CNS DEPRESSION. MAY CAUSE SKIN AND EYE IRRITATION. ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAINS BENZENE WHICH IS A CANCER HAZARD - LINKED TO DEVELOPMENT OF ACUTE MYELOGENOUS LEUKEMIA. LONG-TERM EXPOSURE TO GASOLINE VAPORS HAS CAUSED CANCER IN LABORATORY ANIMALS. PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE OIL ACNE OR DERMATITIS.

MAY CAUSE DAMAGE TO: Cardiovascular System, Blood/Blood Forming Organs,

Kidney, Liver

Refer to Section 11, Toxicological Information, for specific information on the following effects:
Developmental Toxicity, Genotoxicity, Immunotoxicity, Reproductive Toxicity

Precautionary Measures:
Avoid heat, sparks, open flames and other ignition sources. Avoid breathing of vapors, fumes, or mist. Do not take internally. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Keep container closed when not in use. Wash thoroughly after handling.

FIRST AID

Inhalation: Move victim to fresh air and provide oxygen if breathing is difficult. Get medical attention. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact: Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes and follow by washing with soap if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact: Flush eyes with large amounts of water for at least 15 minutes. If redness, burning, blurred vision or swelling persist, transport to nearest medical facility for additional treatment.
Ingestion: DO NOT take internally. Do NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs. Get medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Have victim rinse mouth out with water, then drink sips of water to remove taste from mouth. In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

FIRE

In case of fire, Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water. Material will float and can be re-ignited on surface of water.

SPILL OR LEAK
Dike and contain spill.
FOR LARGE SPILLS: Remove with vacuum truck or pump to storage/salvage vessels.

FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

CONTAINS: Miscellaneous Hydrocarbons, Mixture; Xylene, mixed isomers, 1330-20-7; Toluene, 108-88-3; Ethanol, 64-17-5; 1,2,4-Trimethyl Benzene (Pseudocumene), 95-63-6; Benzene, 71-43-2; Ethyl Benzene, 100-41-4; Hexane, 110-54-3; Cyclohexane, 110-82-7; Styrene, 100-42-5; Naphthalene, 91-20-3

NFPA Rating (Health, Fire, Reactivity): 1, 3, 0

TRANSPORTATION
US Department of Transportation Classification

Proper Shipping Name: Gasohol
Identification Number: NA1203
Hazard Class/Division: 3 (Flammable Liquid)
Packing Group: II
Marine Pollutant % of Total: 100 %weight
Marine Pollutant: Marine Polluntant based on the presence of >10% hydrocarbons listed in 49 CFR 172.101, appendix B; main constituents Trimethylbenzene and Naphthalene.

Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule. Per 49 CFR 130.5, containers of 3500 gallon capacity or greater transported by road or rail are excepted from 49 CFR 172.303(L)(2) if shipping papers contain the word 'OIL'; exceptions are not applicable to shipments by water.
Emergency Response Guide # 128

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flames or heat. Keep container closed and drum bungs in place.

Name and Address
Motiva Enterprises LLC
P.O. Box 4540
Houston, TX 77210-4540

TRANSPORTATION EMERGENCY

HEALTH EMERGENCY

ADMINISTRATIVE INFORMATION
MANUFACTURER ADDRESS: Motiva Enterprises LLC, P.O. Box 4540, Houston, TX. 77210-4540
Company Product Stewardship & Regulatory Compliance Contact: David Snyder
Phone Number: (281) 874-7728

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO US AT THIS TIME, AND IS BELIEVED TO BE ACCURATE BASED UPON THAT : IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT, FOR PURPOSE OF HAZARD COMMUNICATION. IT IS NOT INTENDED TO CONSTITUTE PRODUCT PERFORMANCE INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, UNDERLYING DATA OR THE INFORMATION CONTAINED HEREIN. YOU ARE URGED TO OBTAIN DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

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43393-12170-100R-04/19/2004

WARDS NATURAL SCIENCE ESTABLIS -- HYDROCHLORIC ACID, 0.1M; HYDROCHLORIC ACID, 1

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MSDS Safety Information

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MSDS Date: 01/02/1998
MSDS Num: CKJXG
Product ID: HYDROCHLORIC ACID, 0.1M; HYDROCHLORIC ACID, 1M
MFN: 01
Responsible Party
Cage: 63759
Name: WARDS NATURAL SCIENCE ESTABLISHMENT INC
Address: 5100 W HENRIETTA RD
Box: 92912
City: ROCHESTER NY 14692
Info Phone Number: (716) 359-2502 OR 800-962-2660
Emergency Phone Number: 800-227-1150

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Ingredients

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Cas: 7647-01-0
RTECS #: MW4025000
Name: HYDROCHLORIC ACID
< Wt: 4.
OSHA PEL: C7 MG/M3;C5 PPM
ACGIH TLV: NOT ESTABLISHED
ACGIH STEL: C7.5 MG/M3;C5 PPM
EPA Rpt Qty: 5000 LBS
DOT Rpt Qty: 5000 LBS

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Health Hazards Data

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Effects of Exposure: TARGET ORGANS:NO DATA AVAILABLE. EYES: MAY CAUSE IRRITATION. SKIN: MAY CAUSE IRRITATION. INGESTION: MAY CAUSE GASTROINTESTINAL DISCOMFORT. INHALATION: MAY CAUSE IRRITATION TO RESPIRATORY TRACT.
Medical Cond Aggravated By Exposure: RESPIRATORY CONDITIONS.
First Aid: EYES-FLUSH WITH WATER FOR 15 MINS, RAISING & LOWERING EYELIDS OCCASIONALLY. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. SKIN-THOROUGHLY WASH EXPOSED AREA FOR 15 MINS. REMOVE CONTAMINATED CLOTHING. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. INGESTION-DO NOT INDUCE VOMITING. IF SWALLOWED, IF CONSCIOUS, GIVE PLENTY OF WATER IMMEDIATELY & CALL A PHYSICIAN OR POISON CONTROL CENTER. NEVER GIVE ANY THING BY MOUTH TO AN UNCONSCIOUS PERSON. INHALATION-REMOVE TO FRESH AIR. GIVE OXYGEN IF BREATHING IS DIFFICULT; GIVE ARTIFICAL RESPIRATION IF BREATHING HAS STOPPED. KEEP WARM, QUIET, & GET MEDICAL ATT ENTION.

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Handling and Disposal

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Spill Release Procedures: VENTILATED AREA OF SPILL. ELIMINATE ALL SOURCES OF IGNITION. REMOVE ALL NON-ESSENTIAL PERSONNEL FROM AREA. CLEAN-UP PERSONNEL SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND CLOTHING. ABSORB MATERIAL WITH SUITABLE ABSORBENT AND CONTAINERIZE FOR DISPOSAL.
Waste Disposal Methods: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS. ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE.
Handling And Storage Precautions: KEEP CONTAINER TIGHTLY CLOSED IN A COOL, WELL VENTILATED AREA AWAY FROM INCOMPATIBLE MATERIALS.
Other Precautions: HANDLE EMPTY CONTAINERS WITH CAUTION.

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Fire and Explosion Hazard Information

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Flash Point Text: NON-COMBUSTIBLE
Extinguishing Media: WATER SPRAY.
Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR FULL PROTECTIVE EQUIPMENT AND NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS.
Unusual Fire/Explosion Hazard: NONE CITED.

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Control Measures

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Respiratory Protection: A NIOSH/MSHA CHEMICAL CARTRIDGE SHOULKD BE WORN IF PEL OR TLV IS EXCEEDED.
Ventilation: LOCAL EXHAUST: YES. MECHANICAL (GENERAL): YES. SPECIAL:NO. OTHER: NO.
Protective Gloves: RUBBER, NEOPRENE, PVC, OR EQUIVALENT.
Eye Protection: SPLASH PROOF CHEMICAL SAFETY GOGGLES SHOULD BE WORN AT ALL TIMES.
Other Protective Equipment: LAB COAT, EYE WASH, AND SAFETY SHOWER.
Work Hygienic Practices: LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health: WARD'S P/N: 378605, HYDROCHLORIC ACID.

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Physical/Chemical Properties
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HCC: C1
Boiling Point: =110.C, 230.F
Melt/Freeze Pt: =-74.C, -101.2F
Vapor Pres: 160@20C
Vapor Density: 1.25
Spec Gravity: 1.1885
Evaporation Rate & Reference: 2.0(BUAC=1)
Solubility in Water: MISCIBLE
Appearance and Odor: CLEAR, COLORLESS LIQUID WITH AN ACRID ODOR.
Percent Volatiles by Volume: 99.9+

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Reactivity Data
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Stability Indicator: YES
Stability Condition To Avoid: HEAT, CONTACT WITH METALS.
Materials To Avoid: BASES, ALKALIES AND AMINES.
Hazardous Decomposition Products: TOXIC HYDROGEN CHLORIDE GAS.
Hazardous Polymerization Indicator: NO

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Toxicological Information
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Toxicological Information: IHL-HMN LDLO: 1300 PPM/30M. CHRONIC:TESTSONLABORATORY ANIMALS INDICATE MATERIAL MAY PRODUCE ADVERSE MUTAGENIC AND REPRODUCTIVE EFFECTS.

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Ecological Information
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Ecological: EPA WASTENUMBER: D002.

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MSDS Transport Information
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Transport Information: HYDROCHLORIC ACID, SOLUTION.

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Regulatory Information
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Sara Title III Information: HAZARD CATEGORY FOR SARA SECTION 311/312REPORTING: ACUTE. SARA EHSSEC. 302TPQ: 500 (HYDROCHLORIC ACID). SARA SEC. 313CHEMICALSNAMELIST: YES (HYDROCHLORIC ACID).
Federal Regulatory Information: EPA TSCA STATUS: ONTSCAINVENTORY. CERCLA SEC. 103RQ ;BS.:5000 (HYDROCHLORIC ACID).

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Other Information
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Other Information: EMERGENCY OVERVIEW: CAUSES SEVERE BURNS. MAY BE FATAL IF INHALED OR SWALLOWED. VAPOR EXTREMELY IRRITATING. MAY CAUSE DAMAGE TO RESPIRATORY PASSAGES AND LUNGS.

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Transportation Information
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Responsible Party Cage: 63759
Trans ID NO: 152683
Product ID: HYDROCHLORIC ACID, 0.1M; HYDROCHLORIC ACID, 1M
MSDS Prepared Date: 01/02/1998
Review Date: 05/01/2000
MFN: 1

Multiple KIT Number: 0
Review IND: Y
Unit Of Issue: CY
Type Of Container: CYLINDER

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Detail DOT Information

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DOT PSN Code: HJG
DOT Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN ID Num: UN1789
DOT Packaging Group: II
Label: CORROSIVE
Special Provision: A3,A6,B3,B15,N41,T9,T27
Packaging Exception: 154
Non Bulk Pack: 202
Bulk Pack: 242
Max Qty Pass: 1 L
Max Qty Cargo: 30 L
Vessel Stow Req: C

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Detail IMO Information

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IMO PSN Code: IEX
IMO Proper Shipping Name: HYDROCHLORIC ACID
IMDG Page Number: 8183
UN Number: 1789
UN Hazard Class: 8
IMO Packaging Group: II/III
Subsidiary Risk Label: -
EMS Number: 8-03
MED First Aid Guide NUM: 700

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Detail IATA Information

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IATA PSN Code: NPG
IATA UN ID Num: 1789
IATA Proper Shipping Name: HYDROCHLORIC ACID
IATA UN Class: 8
IATA Label: CORROSIVE
UN Packing Group: II
Packing Note Passenger: 809
Max Quant Pass: 1L
Max Quant Cargo: 30L
Packaging Note Cargo: 813
Exceptions: A3

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Detail AFI Information

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AFI PSN Code: NPG
AFI Proper Shipping Name: HYDROCHLORIC ACID, SOLUTION
AFI Hazard Class: 8
AFI UN ID NUM: UN1789
AFI Packing Group: II
Special Provisions: P4, A3, A6, N41
Back Pack Reference: A12.3

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HAZCOM Label

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Product ID: HYDROCHLORIC ACID, 0.1M; HYDROCHLORIC ACID, 1M
Cage: 63759
Company Name: WARDS NATURAL SCIENCE ESTABLISHMENT INC
Street: 5100 W HENRIETTA RD
PO Box: 92912
City: ROCHESTER NY
Zipcode: 14692-9012
Health Emergency Phone: 800-227-1150
Label Required IND: Y

Date Of Label Review: 05/01/2000
Status Code: A
Origination Code: F
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: CAUTION
Respiratory Protection IND: YES
Health Hazard: Slight
Contact Hazard: Slight
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: TARGET ORGANS:NO DATA AVAILABLE. EYES: MAY CAUSE IRRITATION. SKIN: MAY CAUSE IRRITATION. INGESTION: MAY CAUSE GASTROINTESTINAL DISCOMFORT. INHALATION: MAY CAUSE IRRITATION TO RESPIRATORY TRACT.

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AIRGAS INC -- ISOBUTYLENE-C4H8

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MSDS Safety Information

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FSC: 6665
NIIN: 01-214-8247
MSDS Date: 01/16/1998
MSDS Num: CLCRL
Product ID: ISOBUTYLENE-C4H8
MFN: 01
Responsible Party
Cage: UO451
Name: AIRGAS INC
Address: 259 RADNOR-CHESTER RD SUITE 100
City: RADNOR PA 19087-5240
Info Phone Number: 1-610-687-5253
Emergency Phone Number: (800)424-9300
Resp. Party Other MSDS No.: DOCUMENT NUMBER: 1031
Chemtrec IND/Phone: (800)424-9300
Published: Y

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Preparer Co. when other than Responsible Party Co.

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Cage: 0KBF5
Name: CHEMICAL SAFETY ASSOCIATES INC
Address: 9163 CHESAPEAKE DR
City: SAN DIEGO CA 92123-1002

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Contractor Summary

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Cage: UO451
Name: AIRGAS INC
Address: 259 RADNOR-CHESTER RD SUITE 100
City: RADNOR PA 19087-5240
Phone: 1-610-687-5253
Cage: 7Z016
Name: KAMPI COMPONENTS CO., INC.
Address: 210 RT 13
Box: 721
City: BRISTOL PA 19007-3517
Phone: 215-736-2000
Contract Number: SP0440-00-M-JA63

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Item Description Information

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Item Manager: S9G
Item Name: CALIBRATION GAS CYL

Specification Number: NONE
Type/Grade/Class: NONE
Unit of Issue: EA
UI Container Qty: 1
Type of Container: CYLINDER
==========
Ingredients
==========
Cas: 115-11-7
RTECS #: UD0890000
Name: ISOBUTYLENE
> Wt: 90.

Name: MAXIMUM IMPURITIES
< Wt: 1.
==========
Health Hazards Data
==========
Route Of Entry Inds - Inhalation: YES
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO
Effects of Exposure: ACUTE: THE MOST SIGNIFICANT HAZARD IS OXYGEN-DEFICIENT ATOMSPHERES. AT HIGH CONCENTRATIONS UNCONSCIOUSNESS OR DEATH MAY OCCUR. CONTACT WITH LIQUIDFIED GAS OR RAPIDLY EXPANDING GASES MAY CAUSE FROSTBIT E. ISOBUTYLENE ALSO HAS SOME DEGREE OF ANESTHETIC ACTION AND CAN BE MILDLY IRRITATING TO THE MUCOUS MEMBRANES. CHRONIC: NO KNOWN ADVERSE HEALTH EFFECTS ASSOCIATED WITH CHRONIC EXPOSURE TO ISOBUTYLENE. TARGET ORGANS: RESPIRATORY SYSTEM.
Explanation Of Carcinogenicity: ISOBUTYLENE IS NOT FOUND ON THE FOLLOWING LISTS: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, AND THEREFORE IS NEITHER CONSIDERED TO BE NOR SUSPECTED TO BE A CANCER-CAUSING AGENT BY THESE AGENCIES.
Signs And Symptions Of Overexposure: INHALATION: SYMPTOMS OF OXYGEN DEFICIENCY INCLUDE RESPIRATORY DIFFICULTY, HEADACHES, RINGING IN EARS, DIZZINESS, DROWSINESS, UNCONSCIOUSNESS, NAUSEA, VOMITING, AND DEPRESSION OF ALL THE SENSES. UNDER SOME CIRCUSTANCES OF OVEREXPOSURE, DEATH MAY OCCUR.
First Aid: RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO ISOBUTYLENE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. AT A MINIMUM, SELF-CONTAINED BREATHING APPARATUS AND FIRE-RETARDANT PERSONAL PROTECTIVE EQUIPMENT SHOULD BE WORN. FIRE PROTECTION MUST BE PROVIDED DURING RESCUE SITUATIONS. REMOVE VICTIMS(S) TO FRESH AIR. TRAINED PERSONNEL SHOULD ADMINISTER OXYGEN AND/OR CARDIO-PULMONARY RESUS CITATION, IF NECESSARY. IN CASE OF FROSTBITE, PLACE FROSTBITEN PART IN WARM WATER. (CONTD. SEE OTHER INFORMATION)
==========
Handling and Disposal
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Spill Release Procedures: UNCONTROLLED RELEASES SHOULD BE COVERED BY TRAINED PERSONNEL USING PRE-PLANNED PROCEDURES. PROPER PROTECTIVE EQUIPMENT SHOULD BE USED. ADEQUATE FIRE PROTECTION MUST BE PROVIDED. MINIMUM PERSONAL PROTE CTIVE EQUIPMENT SHOULD BE LEVEL B: FIRE RETARDANT PROTECTIVE CLOTHING, GLOVES RESISTANT TO TEARS AND SELF CONTAINED BREATHING APPARATUS. USE NON-SPARKING TOOLS AND (CONTD. SEE "WASTE DISPOSAL))

Waste Disposal Methods: WASTE DISPOSAL MUST BE IN ACCORDANCE WITH APPROPRIATE FEDERAL, STATE, AND LOCAL REGULTIONS. RETURN CYLINDERS WITH ANY RESIDUAL PRODUCT TO AIRGAS INC. DO NOT DISPOSE OF LOCALLY. (CONTD. FROM "SPILL REL EASE") EQUIPMENT. IF NOT ABLE TO STOP RELEASE, ALLOW GAS TO RELEASE IN PLACE OR REMOVE TO A SAFE ARE A AND ALLOW GAS TO RELEASE.

Handling And Storage Precautions: STORE IN COOL(,< 125F), DRY, WELL-VENTILATED AREA AWAY FROM SOURCES OF HEAT, IGNITION, DIRECT SUNLIGHT. COMPRESSED GASES PRESENT SAFETY HAZARD. STORE AWAY FROM OXIDIZERS, OXIGEN, CHLORINE, FLUORINE, H EAVILY TRAFFICKED AREAS, EMERGENCY EXITS. POST "NO SMOKING OR NO OPEN FLAMES " SIGNS.

Other Precautions: ELECTRICAL EQUIPMENT SHOULD BE NON-SPARKING. MOVE CYLINDERS WITH HAND TRUCK. DO NOT DRAG, ROLL, DROP, STRIKE EACH OTHER. SECURE FIRMLY. DO NOT HEAT CYLINDER OR USE OILS OR GREASE ON GAS-HANDLING FITTI NGS OR EQUIPMENT. USE DESIGNATED CGA FITTINGS. DO NOT USE ADAPTERS. USE CHECK VALVE OR TRAP IN DISCH ARGE LINE.

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Fire and Explosion Hazard Information

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Flash Point Method: CC

Flash Point: <-10.C, 14.F

Autoignition Temp: =465.C, 869.F

Lower Limits: 1.8

Upper Limits: 9.6

Extinguishing Media: EXTINGUISH ISOBUTYLENE FIRES BY SHUTTING OFF THE SOURCE OF THE GAS. USE WATER SPRAY OR A FOAM AGENT TO COOL FIRE-EXPOSED CONTAINERS, STRUCTURES AND EQUIPMENT.

Fire Fighting Procedures: STRUCTURAL FIREFIGHTERS MUST WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE EQUIPMENT. THE BEST FIRE-FIGHTING TECHNIQUE MAY BE SIMPLY TO LET THE BURNING GAS ESCAPE FROM THE PRESSURIZED CY LINDER, TANK CAR, OR PIPELINE. STOP THE LEAK BEFORE EXTINGUISHING FIRE. LEAKING GAS COULD EXPLOSIVELY RE-IGNITE.

Unusual Fire/Explosion Hazard: WHEN INVOLVED IN A FIRE, THIS MATERIAL MAY IGNITE AND PRODUCE TOXIC GASES, INCLUDING CARBON MONOXIDE AND CARBON DIOXIDE.

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Control Measures

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Respiratory Protection: MAINTAIN OXYGEN LEVELS ABOVE 19.5% IN THE WORKPLACE. USE SUPPLIED AIR RESPIRATORY PROTECTION IF OXYGEN LEVELS ARE BELOW 19.5% OR DURING EMERGENCY RESPONSE TO A RELEASE OF ISOUTYLENE. IF RESPIRATORY PR OTECTION IS REQUIRED, FOLLOW THE REQUIREMENTS OF THE FEDERAL OSHA RESPIRATORY STANDARD (29 CFR 1910.134) OR EQUIVALENT STATE STANDARDS.

Ventilation: USE ADEQUATE VENTILATION. LOCAL EXHAUST VENTILATION IS PERFERRED,

BECAUSE IT PREVENTS ISOBUTYLENE DISPERSION INTO THE WORKPLACE BY EMLIMINATING IT AT THE SOURCE
Protective Gloves: RESISTANT TO TEARS. USE LOW-TEMPERATURE PROTECTIVE GLOVED (E.G., KEVLAR)
Eye Protection: SPLASH GOGGLES OR SAFETY GLASSES.
Other Protective Equipment: USE BODY PROTECTION . TRANSFER OF LARGE QUANTITIES UNDER PRESSURE MAY REQUIRE PROTECTIVE EQUIPMET TO PROTECT FROM SPLASHES OF LIQUIDFIED PRODUCT AS WELL AS FIRE RETARANAT ITEMS.
Work Hygienic Practices: AS WITH ALL CHEMICALS, AVOID GETTING ISOBUTYLENE IN YOU. DO NOT EAT OR DIRNK WHILE HANDLING CHEMICALS. BEWARE OF ANY SIGNS OF DIZZINESS OR FATIGUE; EXPOSURES TO FATAL CONCENTRATIONS OF ISOBUTYLENE COULD
Supplemental Safety and Health: (CONTD. FROM FIRST AID) DO NOT USE HOT WATER. IF WARM WATER NOT AVAILABLE, OR IMPRACTICAL TO USE, WRAP AFFECTED PARTS GENTLY IN BLANKETS. (SEE OTHER INFORMATION)
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Physical/Chemical Properties
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HCC: G2
Boiling Point: =-6.9C, 19.6F
Melt/Freeze Pt: =-140.C, -220.F
Vapor Pres: 39 PSIA
Vapor Density: 0.15LB/FT3
Spec Gravity: 1.997
PH: NA
Solubility in Water: INSOLUBLE
Appearance and Odor: COLORLESS LIQUID/ GAS WITH THE UNPLEASANT ODOR OF BURNING COAL.
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Reactivity Data
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Stability Indicator: YES
Stability Condition To Avoid: CONTACT WITH INCOMPATIBLE MATERIALS AND EXPOSURE TO HEAT, SPARKS, AND ORTHER SOURCES OF IGNITION. CYLINDERS EXPOSED TO HIGH TEMPERATURES OR DIRECT FLAME CAN RUPTURE OR BURST.
Materials To Avoid: STRONG OXIDIZERS (E.G., CHLORINE, BROMINE PENTAFLUORIDE, OXYGEN, OXYGEN DIFLUORIDE, AND NITROGEN TRIFLUORIDE).
Hazardous Decomposition Products: WHEN IGNITED IN THE PRESENCE OF OXYGEN, THIS GAS WILL BURN TO PRODUCE CARBON MONOXIDE AND CARBON DIOXIDE.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: WILL NOT OCCUR.
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Toxicological Information
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Toxicological Information: LC50 (RAT, INHALATION): 620 G/M3/ 4 HOURS; LC50 (MOUSE, INHALATION): 415 G/M3/ 2 HOUR. ISOBUTYLENE IS NOT FOUND ON FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, AND THEREFORE IS NEITHER CONSIDERED TO BE N OR SUSPECTED TO BE A CANCER-CAUSING AGENT BY THESE AGENCIES. PRODUCT MAY BE MILDLY IRRITATING TO THE MUCOUS MEMBRANES. IN ADDITION, CONTACT WITH RAPIDLY

EXPANDING GASES CAN CAUSE FROSTBITE TO EXPOSED TISSUE. ISOBUTYLENE IS NOT KNOWN TO CAUSE SENSITIZATION IN HUMANS. NO MUTAGENIC EFFECTS, NO EMBRYOTOXIC EFFECTS, NO TERATOGENIC EFFECTS, NO REPRODUCTIVE TOXICITY EFFECTS HAVE BEEN DESCRIBED FOR BUTYLE NE.

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Ecological Information

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Ecological: ENVIRONMENTAL STABILITY: THIS GAS WILL BE DISSIPATED RAPIDLY IN WELL-VENTILATED AREAS. EFFECTS OF MATERIAL ON PLANTS OR ANIMALS: ANY ADVERSE EFFECT ON ANIMALS WOULD BE RELATED TO OXYGEN-DEFICIENT ENVI RONMENTS. NO ADVERSE EFFECT IS ANTICIPATED TO OCCUR TO PLANT LIFE, EXCEPT FOR FROST PRODUCED IN THE PRESENCE OF RAPIDLY EXPANDING GASES. EFFECT OF CHEMICAL ON AQUATIC LIFE: NO EVIDENCE IS CURRENTLY AV AILABLE ON THE EFFECTS OF ISOBUTYLENE ON AQUATIC LIFE.

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MSDS Transport Information

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Transport Information: THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION. PROPER SHIPPING NAME: ISOBUTYLENE; CLASS: 2.1 (FLAMMABLE GAS); UN 1055; PKG: N/A; DOT LABELS REQUIRED: FLAMMABLE GAS; NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 115. ALTERNATE DESCRIPTION: PSN: PETROLEUM GASES, LIQUIDFIED; CLASS: 2.1 (FLAMMABLE GAS); UN 1075; PKG N/A; DOT LABEL REQUIRE D: FLAMMABLE GAS; NORTH AMERICAN EMERGENCY GUIDEBOOK NUMBER: 115; MARINE POLLUTANT: ISOBUTYLENE IS NOT CLASSIFIED BY THE DOT AS A MARINE POLLUTANT (AS DEFINED BY 49 CFR 172.101, APPENDIX B). CANADA: SAME AS ABOVE.

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Regulatory Information

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Sara Title III Information: ISOBUTYLENE IS NOT SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 302, 304, AND 313 OF TITLE I I I OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT. U.S. SARA THRESHOLD PLANNING QUANTITY: N/A. U. S. CERCLA REPORTABLE QUANTITY (RQ): NOT APPLICIABLE.ING RE

Federal Regulatory Information: ISOBUTYLENE IS LISTED ON THE U.S. TSCA INVENTORY. ISOBUTYLENE IS SUBJECT TO REPORTING REQUIREMENTS OF SECTION 112(R) OF THE CLEAN AIR ACT. THRESHOLD QUANTITY FOR THIS GAS IS 10,000 LB. DEPENDING ON SP ECIFIC OPERATIONS INVOLVING USE OF ISOBUTYLENE, REGULATIONS OF THE PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS MAY BE APPLICABLE (29 CFR 1910.119) UNDER THIS REGULATION ISOBUTYLENE IS NOT LISTED IN APPENDIX A; HOWEVER, ANY PROCESS THAT INVOLVES A FLAMMABLE GAS ON-SITE, IN ONE LOCATION, I N QUANTITIES OF 10,000 LB (4,553 KG) OR GREATER IS COVERED UNDER THIS REGULATION UNLESS IT IS USED AS A FUEL.

State Regulatory Information: CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): ISOBUTYLENE IS NOT ON THE CALIFORNIA PROPOSITION 65 LISTS. PRODUCT COVERED UNDER FOLLOWING STATE REGULATIONS: AK: DESIGNATED TOXIC AND HAZARDOUS SUBSTANCES. CA: PERMISSIBLE EXPOSURE LIMITS FOR CHEMICAL CONTAMINANTS; FL:SUBSTANCE LIST; MA: SUBSTANCE LIAT; MN:LIST OF HAZARDOUS SUBSTANCES; NJ: RIGHT TO KNOW HAZARDOUS SUBSTANCE LIST; PA:

HAZARDOUS SUBSTANCE LIST; RI: HAZARDOUS SUBSTANCE LIST; TX: HAZARDOUS SUBSTANCE LIST: WV: HAZARDOUS SUBSTANCE LIST; WI: TOXIC AND HAZARDOUS SUBSTANCES.

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Other Information
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Other Information: (CONTD. FROM FIRST AID) DO NOT USE HOT WATER. IF WARM WATER NOT AVAILABLE, WRAP AFFECTED PARTS IN BLANKETS. ALTERNATIVELY, IF FINGERS OR HANDS ARE FORTBITTEN, PLACE IN ARMPIT. HAVE VICTIM GENTLY EXERC ISE AFFECTED PARTS WHILE BEING WARMED. SEEK MEDICAL ATTENTION. TAKE COPY OF LABEL AND MSDS TO PHYSICIAN WITH VICTIM. NFPA RATING: HEALTH: 1; FLAMMIBILITY: 4; REACTIVITY: 0. RATINGS: HEALTH: 1; FLAMMABILITY: 4; REACTIVITY: 0; PROTECTIVE EQUIPMENT: B. CANADIAN W SYMBOLS: CLASS A: COMPRESSED GAS; CLASS B1: FLAMMABLE GAS.

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Transportation Information
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Responsible Party Cage: UO451
Trans ID NO: 156921
Product ID: ISOBUTYLENE-C4H8
MSDS Prepared Date: 01/16/1998
Review Date: 05/14/2001
MFN: 1
Multiple KIT Number: 0
Unit Of Issue: EA
Container QTY: 1
Type Of Container: CYLINDER
Additional Data: TRANSPORTATION DATA PER MANUFACTURER'S MSDS.

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Detail DOT Information
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DOT PSN Code: HTR
DOT Proper Shipping Name: ISOBUTYLENE
DOT PSN Modifier: SEE ALSO PETROLEUM GASES, LIQUEFIED
Hazard Class: 2.1
UN ID Num: UN1055
Label: FLAMMABLE GAS
Special Provision: 19
Packaging Exception: 306
Non Bulk Pack: 304
Bulk Pack: 314,315
Max Qty Pass: FORBIDDEN
Max Qty Cargo: 150 KG
Vessel Stow Req: E
Water/Ship/Other Req: 40

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Detail IMO Information
==========

IMO PSN Code: IRQ
IMO Proper Shipping Name: ISOBUTYLENE
IMDG Page Number: 2147
UN Number: 1055
UN Hazard Class: 2(2.1)
IMO Packaging Group: -
Subsidiary Risk Label: -
EMS Number: 2-07
MED First Aid Guide NUM: 310

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Detail IATA Information

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IATA PSN Code: OHI
IATA UN ID Num: 1055
IATA Proper Shipping Name: ISOBUTYLENE
IATA UN Class: 2.1
IATA Label: FLAMMABLE GAS
Packing Note Passenger: FORB
Max Quant Pass: FORB
Max Quant Cargo: 150KG
Packaging Note Cargo: 200
Exceptions: A1

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Detail AFI Information

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AFI PSN Code: OHI
AFI Proper Shipping Name: ISOBUTYLENE
AFI Hazard Class: 2.1
AFI UN ID NUM: UN1055
Special Provisions: P4
Back Pack Reference: A6.3, A6.5

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HAZCOM Label

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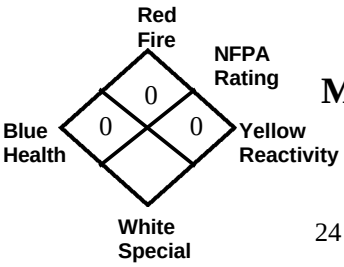
Product ID: ISOBUTYLENE-C4H8
Cage: UO451
Assigned IND: Y
Company Name: AIRGAS INC
Street: 259 RADNOR-CHESTER RD SUITE 100
City: RADNOR PA
Zipcode: 19087-5240
Health Emergency Phone: (800)424-9300
Label Required IND: Y
Date Of Label Review: 05/14/2001
Status Code: A
Label Date: 05/14/2001
Origination Code: F
Eye Protection IND: YES

Skin Protection IND: YES
Signal Word: DANGER
Respiratory Protection IND: YES
Health Hazard: Moderate
Contact Hazard: Moderate
Fire Hazard: Severe
Reactivity Hazard: None
Hazard And Precautions: FLAMMABLE LIQUID AND GAS UNDER PRESSURE. CAN FORM EXPLOSIVE MIXTURES WITH AIR. MAY CAUSE FROSTBITE. KEEP AWAY FROM HEAT (< 125F), FLAMES, AND SPARKS. STORE AND USE WITH ADEQUATE VENTILATION. MOST SIGN IFICANT HAZARD IS OXYGEN-DEFICIENT ATOMSPHERES.
==========
Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.



Liqui-Nox ®

MATERIAL SAFETY DATA SHEET

Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	LIQUI-NOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 2001
Chemical Family:	Anionic Liquid Detergent
Manufacturer Catalog Numbers for sizes	1232, 1201, 1215 and 1255

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in LIQUI-NOX¨ as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	214°F
Vapor Pressure (mm Hg):	No Data
Vapor Density (AIR=1):	No Data
Specific Gravity (Water=1):	1.075
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Slower
Solubility in Water:	Completely soluble in all proportions.
Appearance:	Yellow liquid, nearly odorless
pH:	8.5 (1%)

IV. FIRE AND EXPLOSION DATA

Flash Point:	None (Cleveland Open Cup)
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Conditions To Avoid:	None
Incompatibility (Materials To Avoid):	Oxidizing agents.
Hazardous Decomposition or Byproducts:	May release SO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? No Skin? Yes Ingestion? Yes
Health Hazards (Acute and Chronic):	Skin contact may prove locally irritating, causing drying and/or chapping. Ingestion may cause discomfort and/or diarrhea.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Prolonged skin contact may cause drying and/or chapping.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. For small spills recover as much as possible with absorbent material and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	No special precautions in storing. Use protective equipment when handling undiluted material.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Not Required
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are recommended.
Eye Protection:	Goggles and/or splash shields are recommended.
Other Protective Clothing or Equipment:	Not required
Work/Hygienic Practices:	No special practices required

MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types)

MSDS No. 9909

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 ^{o}F (> 52 ^{o}C) minimum PMCC
AUTOIGNITION POINT:	494 ^{o}F (257 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist	
	ACGIH	100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA	
	ACGIH	10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE
Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 ^{o}C)
VAPOR PRESSURE:	0.009 psia @ 70 ^{o}F (21 ^{o}C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 ^{o}F (16 ^{o}C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)
This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING HEALTH: 0
FIRE: 2
REACTIVITY: 0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING HEALTH: 1 * * Chronic
FIRE: 2
PHYSICAL: 0

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

Remediation and Natural Attenuation Services Incorporated
6712 West River Road
Brooklyn Center, MN 55430

Product Information: 763-585-6191 Issue Date: December 7, 2007

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Section 1: IDENTIFICATION

1.1 Product Name: Newman Zone –Buffered Nonionic Formulation 190-6730
1.2 Product Type: Edible Industrial Nutrient for Microbial Organisms
1.3 Hazard Rating: Health: 1 Fire: 1 Reactivity: 1
1.4 Formula: Proprietary

Substances Subject to SARA 313 Reporting Are Indicated by "#"

It is our opinion that the above named product does not meet the definition of "hazardous Chemical" as defined in the OSHA "Hazard Communication Standard" regulation 29 CFR 1910.1200. This material Safety Data Sheet is provided as general information for health and safety guidelines.

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Section 2: INGREDIENTS/COMPOSITION

	CAS No.	%	PEL	(mg/m^3) TWA
Soybean Oil (food grade)	8001-22-7	46	15(Mist)	10(Mist)
Sodium-L-Lactate	867-56-1	4		
Sodium Bicarbonate	144-55-8	1		
Food Additives/Emulsifiers/Preservatives	(Proprietary)	<10		
Water		<45		

EMERGENCY ONLY, 24-HOUR SERVICE: CHEMTREC: 1-800-424-9300

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Section 3: PHYSICAL AND CHEMICAL CHARACTERISTICS

This section completed per formulation ingredient data unless stated.

- Solubility: Dispersible in water (product)
- PH: 8.3 (product)
- Specific Gravity: 0.99 (product)
- Boiling Point: NA
- Vapor Pressure: NA
- Vapor Density: NA
- Percent Volatile By Volume (%): NA
- Evaporation Rate: NA
- Viscosity: 23.6 cps @ 68^{o}F (Brookfield)(product)
- Product Appearance and Odor: White opaque liquid, vegetable oil odor.

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Section 4: FIRE AND EXPLOSION HAZARDS

This section completed per formulation ingredient data unless stated.

4.1 Special Fire Hazards: Product - none, does not support combustion.

Flash Point: >540 degrees F (Pure Soybean Oil Closed Cup).
Flammable Limits
LEL ND
UEL ND

4.2 Fire Fighting Methods: Use method appropriate for surrounding fire.

4.3 Extinguishing Media: Dry Chemical or CO_2 Preferable; water may cause spattering or spreading.

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Section 5: HEALTH HAZARD DATA

5.1 THIS PRODUCT IS USED FOR SOIL AND GROUND WATER REMEDIATION BUT IS FORMULATED USING FOOD AND FOOD GRADE ADDITIVES. PROCESSING, PACKAGING, SANITATION AND STORAGE OF THE PRODUCT FOLLOWS THE BEST PRACTICES USED FOR FOOD PRODUCTS.

5.2 Effects of Overexposure: NA

5.3 Emergency and First Aid Procedures: If inhaled, remove from contaminated atmosphere. For eye contact immediately flush eyes with large amounts of water. Ensure rinsing entire surface of eye & under lid. For skin contact wash affected areas thoroughly with soap and water. Seek medical help for persistent irritation.

5.4 Hydrolyzed soy protein has been identified by the United States Food and Drug Administration as a food allergen. Symptoms include swelling of the lips, stomach cramps, vomiting, diarrhea, skin hives, rashes, eczema and breathing problems.

5.5 Occupational Exposure Limits [8-hour time weighted averages (TWA)]:

	CAS No.	mg/m^3 OSHA PEL/ACGIH TLV
Soybean Oil (food grade)	8001-22-7	15(Mist)/10(Mist)

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Section 6: REACTIVITY DATA

This section completed per formulation ingredient data unless stated.

6.1 Stability: Stable under normal conditions.

6.2 Conditions to Avoid: NA

6.3 Incompatibilities: None known

6.4 Hazardous Decomposition Products: Product - None identified. Ingredients – Carbon oxides. Biological decomposition (spoilage) may result in offensive odors.

6.5 Hazardous Polymerization; None known

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Section 7: SPILL OR LEAK PROCEDURES

This section completed per formulation ingredient data unless stated.

7.1 Spill Response: Water dispersible. Same as for vegetable oil spills: isolate spill, prevent from entering waterways, and sewer systems. Sorb or remove spilled materials as soon as possible. Oils and specific quantities of oils may be reportable under federal, state, or local regulations.
7.2 Waste Disposal Method: This product is not hazardous, however, wastes must be disposed in accordance with local, state or federal regulations. Consult with local sewer authority, or solid waste facility prior to disposition.

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Section 8: SPECIAL PRECAUTIONS

No protective equipment is necessary under normal use conditions.

8.1 Eyes: If splashing may occur, eye protection recommended.
8.3 Skin: Wear impervious gloves for prolonged or repeated exposure.
8.4 Respiratory: Avoid breathing mists of this product

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Section 9: TRANSPORTATION PRECAUTIONS

This section completed per formulation ingredient data unless stated.

9.1 Transportation Considerations: This product is not classified as dangerous in the meaning of transport regulations. Shippers and transporters may need to meet packaging and transportation requirements for certain oils and respective quantities under CFR 49 Part 130.

The above information is believed to be correct with respect to the formula used to manufacture the product in the country of origin. As data, standards, and regulations change, and conditions of use and handling are beyond our control, NO WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION.

LAFARGE CORPORATION -- PORTLAND CEMENT, PORTLAND CEMENT TYPE II

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MSDS Safety Information

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MSDS Date: 03/01/1998
MSDS Num: CJNDR
Product ID: PORTLAND CEMENT, PORTLAND CEMENT TYPE II
MFN: 01
Responsible Party
Cage: TO104
Name: LAFARGE CORPORATION
Address: 11130 SUNRISE VALLEY DR, SUITE 300
City: RESTON VA 20191-4393
Info Phone Number: 703-264-3600
Emergency Phone Number: 800-424-9300 (CHEMTREC)
Chemtrec IND/Phone: (800)424-9300
Review Ind: Y
Published: Y

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Contractor Summary

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Cage: TO104
Name: LAFARGE CORPORATION
Address: 11130 SUNRISE VALLEY DR, SUITE 300
City: RESTON VA 20191-4393
Phone: 703-264-3600

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Ingredients

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Cas: 12168-85-3
Name: TRICALCIUM SILICATE; (TRI-CALCIUM SILICATE)
% low Wt: 20.
% high Wt: 70.
Other REC Limits: N/K (FP N)
OSHA PEL: N/K (FP N)
OSHA STEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
ACGIH STEL: N/K (FP N)

Cas: 10034-77-2
Name: DICALCIUM SILICATE; (DI-CALCIUM SILICATE)
% low Wt: 10.
% high Wt: 60.
Other REC Limits: N/K (FP N)
OSHA PEL: N/K (FP N)
OSHA STEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
ACGIH STEL: N/K (FP N)

Cas: 12068-35-8
Name: ALUMINUM CALCIUM IRON OXIDE (AL2CA4FE2O10);
(TETRA-CALCIUM-ALUMINO-FERRITE)
% low Wt: 5.
% high Wt: 15.
Other REC Limits: N/K (FP N)
OSHA PEL: N/K (FP N)
OSHA STEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
ACGIH STEL: N/K (FP N)

Cas: 7778-18-9
RTECS #: WS6920000
Name: CALCIUM SULFATE
% low Wt: 2.

% high Wt: 10.
Other REC Limits: N/K (FP N)
OSHA PEL: 15 MG/M3
OSHA STEL: N/K (FP N)
ACGIH TLV: 10 MG/M3
ACGIH STEL: N/K (FP N)

Cas: 12042-78-3
Name: TRICALCIUM ALUMINATE; (TRI-CALCIUM ALUMINATE)
% low Wt: 1.
% high Wt: 15.
Other REC Limits: N/K (FP N)
OSHA PEL: N/K (FP N)
OSHA STEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
ACGIH STEL: N/K (FP N)

Cas: 1317-65-3
RTECS #: EV9580000
Name: NATURAL CALCIUM CARBONATE; (CALCIUM CARBONATE)
% low Wt: 0.
% high Wt: 5.
Other REC Limits: N/K (FP N)
OSHA PEL: 15 MG/M3
OSHA STEL: N/K (FP N)
ACGIH TLV: 10 MG/M3
ACGIH STEL: N/K (FP N)

Cas: 1309-48-4
RTECS #: OM3850000
Name: MAGNESIUM OXIDE
% low Wt: 0.
% high Wt: 4.
Other REC Limits: N/K (FP N)
OSHA PEL: 15 MG/M3
OSHA STEL: N/K (FP N)
ACGIH TLV: 10 MG/M3
ACGIH STEL: N/K (FP N)

Cas: 1305-78-8
RTECS #: EW3100000
Name: CALCIUM OXIDE
% low Wt: 0.
% high Wt: .2
Other REC Limits: N/K (FP N)
OSHA PEL: 5 MG/M3
OSHA STEL: N/K (FP N)
ACGIH TLV: 2 MG/M3
ACGIH STEL: N/K (FP N)

Cas: 14808-60-7
RTECS #: VV7330000
Name: SILICA, CRYSTALLINE-QUARTZ; (CRYSTALLINE SILICA)
% low Wt: 0.
% high Wt: .2
Other REC Limits: N/K (FP N)
OSHA PEL: see Table Z-3
OSHA STEL: N/K (FP N)
ACGIH TLV: 0.1 MG/M3
ACGIH STEL: N/K (FP N)

Name: CHROMATES
% Wt: 0-0.005
Other REC Limits: N/K (FP N)
OSHA PEL: 5 MG/M3 (RESP DUST)

OSHA STEL: N/K (FP N)
ACGIH TLV: 5 MG/M3 (RESP DUST)
ACGIH STEL: N/K (FP N)
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Health Hazards Data
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Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: YES
Carcinogenicity Inds - NTP: YES
IARC: YES
OSHA: NO
Effects of Exposure: INHALATION (ACUTE): BREATHING DUST MAY CAUSE NOSE, THROAT OR LUNG IRRITATION AND CHOKING. THE DESCRIBED EFFECTS DEPEND ON THE DEGREE OF EXPOSURE. INHALATION (CHRONIC): PROLONGED OR REPEATED EXPOSURE M AY CAUSE LUNG INJURY INCLUDING SILICOSIS. THIS PRODUCT MAY CONTAIN CRYSTALLINE SILICA. CRYSTALLINE SILICA HAS BEEN CLASSIFIED BY IARC AS A KNOWN HUMAN CARCINOGEN. SOME HUMAN STUDIES INDICATE POTENTIAL FOR LUNG CANCER FROM CRYSTALLINE SILICA EXPOSURE. RISK OF INJURY DEPENDS ON DURATION AND LEVEL OF EXPOSURE. LONG TERM EXPOSURES WHICH RESULT IN SILICOSIS MAY RESULT IN ADDITIONAL HEALTH EFFECTS. (EFF ECTS OF OVEREXPOSURE)
Explanation Of Carcinogenicity: SILICA, CRYSTALLINE-QUARTZ: IARC MONOGRAPHS, SUPPLEMENT, VOLUME 68, 1997: GROUP 1. NTP 8TH ANNUAL REPORT ON CARCINOGENS, 1998: REASONABLY ANTICIPATED TO BE HUMAN CARCINOGEN. HUMAN: LUNG.
Signs And Symptions Of Overexposure: HEALTH HAZARDS: EYE CONTACT (ACUTE/CHRONIC): MAY CAUSE IRRITATION, SEVERE BURNS AND DAMAGE TO CORNEA. SKIN CONTACT (ACUTE/CHRONIC): MAY CAUSE DRY SKIN, REDNESS, DISCOMFORT, IRRITATION OR SEVERE BURNS. MAY PRODUCE ALLERGIC REACTION POTENTIALLY ASSOCIATED WITH HEXAVALENT CHROMIUM. THICKENING OF THE SKIN (SCLERODERMA) MAY BE ASSOCIATED WITH EXPOSURE TO HIGH LEVELS OF CRYSTALLINE SILICA. INGESTION (AC UTE/CHRONIC): INGESTION OF LARGE AMOUNTS MAY CAUSE INTESTINAL DISTRESS.
First Aid: INHALATION: MOVE PERSON TO FRESH AIR. SEEK MEDICAL ATTENTION FOR DISCOMFORT. EYES: RINSE THOROUGHLY WITH WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION FOR ABRASIONS. SKIN: WASH WITH SOAP AND W ATER. USE MOISTURIZING CREAMS FOR IRRITATED SKIN. SEEK MEDICAL ATTENTION FOR BURNS. INGESTION: DO NOT INDUCE VOMITING, BUT DRINK PLENTY OF WATER. SEEK MEDICAL ATTENTION FOR DISCOMFORT.
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Handling and Disposal
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Spill Release Procedures: GENERAL: WIND BLOWN DUST MAY CAUSE THE HAZARDS IDENTIFIED IN HEALTH HAZARDS SECTION. REMOVE SPILLED MATERIAL TO LIMIT POTENTIAL HARM. LAND/WATER SPILL: CLEAN UP SPILLED MATERIAL.
Waste Disposal Methods: DISPOSE IN LANDFILL IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS. ANY DISPOSAL PRACTICE MUST BE IN ACCORDANCE WITH LOCAL, PROVINCIAL, STATE AND FEDERAL LAWS AND REGULATIONS. CONTACT LOCAL ENVIRONMENT AL AGENCY FOR SPECIFIC RULES.
Handling And Storage Precautions: GENERAL: AVOID ACCIDENTAL RELEASE. STORE DRY AND AWAY FROM WATER. STORAGE TEMPERATURE: UNLIMITED. STORAGE PRESSURE: UNLIMITED. EMPTY CONTAINERS: DISPOSE OF CONTAINERS IN AN APPROVED LANDFILL OR INCINE RATOR.
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Fire and Explosion Hazard Information
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Flash Point Text: NONE
Autoignition Temp Text: NONE
Lower Limits: NOT COMBUST
Upper Limits: NOT COMBUST
Extinguishing Media: USE MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Fire Fighting Procedures: WEAR NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N). AVOID BREATHING DUST. TREAT ADJACENT MATERIAL.
Unusual Fire/Explosion Hazard: THIS PRODUCT IS NOT A FIRE HAZARD. HAZARDOUS COMBUSTION PRODUCTS: NONE.
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Control Measures

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Respiratory Protection: UNDER ORDINARY CONDITIONS NO RESPIRATORY PROTECTION IS REQUIRED. WEAR A NIOSH APPROVED RESPIRATOR WHEN EXPOSED TO DUST ABOVE EXPOSURE LIMITS.
Ventilation: USE EXHAUST VENTILATION TO MAINTAIN DUST LEVELS BELOW EXPOSURE LIMITS IN WORKPLACES WITH POOR VENTILATION AND DUSTY CONDITIONS.
Protective Gloves: WEAR IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPROVED CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: EYEWASH AND DELUGE SHOWER MEETING ANSI DESIGN CRITERIA (FP N). USE SHOES AND PROTECTIVE CLOTHING TO PREVENT SKIN CONTACT.
Supplemental Safety and Health: VAPOR DENSITY: NOT MEASURABLE.
==========
Physical/Chemical Properties
==========
Boiling Point: >1000.C, 1832.F
M.P/F.P Text: NONE, SOLID
Vapor Pres: NOT MEASURABLE
Vapor Density: SUP DAT
Spec Gravity: 3.2
PH: 12-13(IN WATER)
Viscosity: NONE, SOLID
Evaporation Rate & Reference: NOT MEASURABLE
Solubility in Water: SLIGHT (0.1-1.0%)
==========
Reactivity Data
==========
Stability Indicator: YES
Stability Condition To Avoid: PRODUCT IS STABLE BUT MUST BE KEPT DRY. REACTS WITH WATER FORMING POLYMERIZED SILICATES AND CALCIUM OXIDE.
Materials To Avoid: DISSOLVES IN HYDROFLUORIC ACID PRODUCING CORROSIVE SILICON TETRAFLUORIDE GAS. SILICATES REACT WITH POWERFUL OXIDIZERS SUCH AS FLUORINE, CHLORINE TRIFLUORIDE AND OXYGEN DIFLUORIDE.
Hazardous Decomposition Products: NONE, POWDERED SOLID.
Hazardous Polymerization Indicator: NO
==========
Toxicological Information
==========
Toxicological Information: FOR DETAILED TOXICOLOGICAL INFORMATION CONTACT: ENVIRONMENT AND GOVERNMENT AFFAIRS, LAFARGE CORPORATION, P.O. BOX 4600, RESTON, CA 20195-1415, (703) 264-3600.
==========
Ecological Information
==========
Ecological: FOR DETAILED ECOLOGICAL INFORMATION CONTACT: ENVIRONMENT AND GOVERNMENT AFFAIRS, LAFARGE CORPORATION, P.O.BOX 4600, RESTON, VA 20195-1415, (703) 264-3600.
==========
MSDS Transport Information
==========
Transport Information: NOT A HAZARDOUS MATERIAL FOR DOT OR TDG SHIPPING.
==========
Regulatory Information
==========
Sara Title III Information: SECTIONS 311-312 HAZARD CATEGORY: THIS PRODUCT HAS BEEN REVIEWED ACCORDING TO THE EPA HAZARD CATEGORIES PROMULGATED UNDER SECTIONS 311 AND 312 OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 19 86 AND IS CONSIDERED A HAZARDOUS CHEMICAL AND A DELAYED HEALTH HAZARD. SARA SECTION 313 INFORMATION: THIS PRODUCT CONTAINS NONE OF THE SUBSTANCES SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 O F TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.
Federal Regulatory Information: OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: THIS PRODUCT IS CONSIDERED BY OSHA TO BE A HAZARDOUS CHEMICAL AND SHOULD BE INCLUDED IN THE EMPLOYER'S HAZARD COMMUNICATION PROGRAM. CERCLA/SUPERFUND, 40 CFR 117, 302: NOT LISTED. TOXIC SUBSTANCE CONTROL ACT (TSCA): SOME CONSTITUENTS IN THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY. W

INFORMATION: THIS PRODUCT CONTAINS SUBSTANCES CONSIDERED TO BE HAZARDOUS BY HEALTH CANADA AND IS A CONTROLLED PRODUCT. CONSULT LOCAL AUTHORITIES FOR ACCEPTABLE EXPOSURE LIMITS. W INFORMATION: (416) 327-7066. W CLASSIFICATION: D2A, E.

State Regulatory Information: CALIFORNIA PROPOSITION 65: CRYSTALLINE SILICA (CAS # 14808-60-7) IS CONSIDERED TO BE A CARCINOGEN BY THE STATE OF CALIFORNIA.

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Other Information

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Other Information: NOTE: THIS MSDS COVERS MANY PRODUCTS. INDIVIDUAL COMPOSITION OF HAZARDOUS CONSTITUENTS WILL VARY.

==========

HAZCOM Label

==========

Product ID: PORTLAND CEMENT, PORTLAND CEMENT TYPE II
Cage: TO104
Assigned IND: Y
Company Name: LAFARGE CORPORATION
Street: 11130 SUNRISE VALLEY DR, SUITE 300
City: RESTON VA
Zipcode: 20191-4393
Health Emergency Phone: 800-424-9300 (CHEMTREC)
Label Required IND: Y
Date Of Label Review: 09/29/1999
Status Code: A
Origination Code: F
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: WARNING
Respiratory Protection IND: YES
Health Hazard: Moderate
Contact Hazard: Moderate
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: ACUTE: INHAL: BREATHING DUST MAY CAUSE NOSE, THROAT/LUNG IRRIT & CHOKING.EYE CONTACT: MAY CAUSE IRRIT, SEV BURNS & DMG TO CORNEA. SKIN CONT: MAY CAUSE DRY SKIN,REDNESS,DISCOMFORT, IRRIT/SEV BURNS. ING EST OF LRG AMTS MAY CAUSE INTESTINAL DISTRESS. CHRONIC: CANCER HAZARD. CONTAINS SILICA, CRYSTALLINE-QUARTZ WHICH IS LISTED AS A HUMAN LUNG CARCINOGEN (FP N). INHAL: PRLNGD/RPTD EXPOS MAY CA USE LUNG INJURY INCLUDING SILICOSIS. SKIN & EYE CONT: IRRIT & BURNS. MAY PRODUCE ALLERGIC RXN POTENTIALLY ASSOCIATED WITH HEXAVALENT CHROMIUM. THICKENING OF THE SKIN (SCLERODERMA) MAY BE ASSOCIATED WI TH EXPOSURE TO HIGH LEELS OF CRYSTALLINE SILICA.

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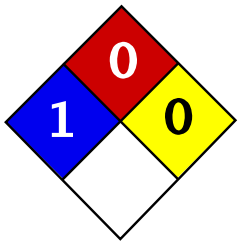

Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Sand MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sand

Catalog Codes: SLS3064

CAS#: 14808-60-7

RTECS: VV73330000

TSCA: TSCA 8(b) inventory: Quartz

CI#: Not applicable.

Synonym: Sand; Sea Sand

Chemical Name: Not available.

Chemical Formula: SiO2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Feldspars (Ca, K, Na) Alluminum Silicates		
Quartz (Crystalline Silica)	14808-60-7	

Toxicological Data on Ingredients: Sand LD50: Not available. LC50: Not available. Quartz: LCL (Human) - Route: Inhalation; Dose: 300 ug/m3/10Y.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC. Classified A2 (Suspected for human.) by ACGIH.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to lungs, upper respiratory tract.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Keep container tightly closed.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Do not breathe dust. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] Respirable [Quartz or Crystalline Silica]
TWA: 0.05 (mg/m3) from NIOSH Respirable. [Quartz or Crystalline Silica]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Granular solid.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: Not available.

Color: Amber. Grey.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: 1.8 to 2.5+ (depending on mineral compostion) (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:
Incompatible with oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, oxygen difluroide.
When exposed to high temperature quartz can change crystalline structure to form tridymite (above 870 C) or crystobalite (above 1470 C).
Soluble in hydrofluoric acid and produces a corrosive gas - silicon tetrafluoride.
Quartz is attacked by strong alkalis and hydrofluoric acid.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC. Classified A2 (Suspected for human.) by ACGIH.
May cause damage to the following organs: lungs, upper respiratory tract.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May contain more than 1% quartz and may cause cancer (tumorigenic). Quartz has been identified by IARC as a class 1 carcinogen.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: No adverse health effects expected.
Eyes: May cause eye irritation.
Ingestion: No adverse health effects expected.
Inhalation: Affects respiration and irritates respiratory tract. Acute pneumoconiosis from overwhelming exposure to silica dust has occurred. Coughing and irritation of throat are early symptoms.
Inhalation of quartz is classified as a human carcinogen. Risk of cancer depends upon duration and level of exposure. May also affect liver.
Chronic exposure can also cause silicosis, a form of lung scaring that can cause shortness of breath, reduced

lung function. May also affect blood.
Aggravation of Pre-existing Conditions: Inhalation may increase the progression of tuberculosis; susceptibility is apparently not inceased. Persons with impaired respiratory function may be more susceptible to the effects of this substance. Smoking can increase the risk of lung injury.
Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Quartz
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Quartz
TSCA 8(b) inventory: Quartz

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R45- May cause cancer.
S2- Keep out of the reach of children.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent.
Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

Other Special Considerations: Not available.

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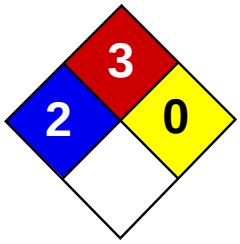
Last Updated: 11/06/2008 12:00 PM



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

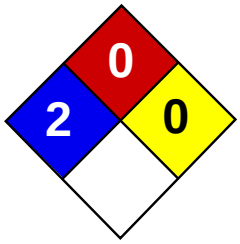
Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 06/09/2012 12:00 PM



Material Safety Data Sheet
Bentonite MSDS

Section 1: Chemical Product and Company Identification

Product Name: Bentonite

Catalog Codes: SLB1441, SLB2935, SLB4435

CAS#: 1302-78-9

RTECS: CT9450000

TSCA: TSCA 8(b) inventory: Bentonite

CI#: Not applicable.

Synonym: Montmorillonite;

Chemical Name: Not available.

Chemical Formula:
(Al,Fe1.67Mg.33)Si10(OH)2Na(+)Ca(++)/2.33

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Bentonite	1302-78-9	100

Toxicological Data on Ingredients: Bentonite LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Potential Chronic Health Effects:
Hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: Not available.

Color: Beige. (Light.)

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: 2.5 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Very slightly soluble in cold water, hot water. Insoluble in methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Causes damage to the following organs: lungs.

Other Toxic Effects on Humans:
Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Bentonite

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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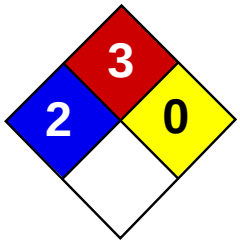

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
p-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: p-Xylene

Catalog Codes: SLX1120

CAS#: 106-42-3

RTECS: ZE2625000

TSCA: TSCA 8(b) inventory: p-Xylene

CI#: Not applicable.

Synonym: p-Methyltoluene

Chemical Name: 1,4-Dimethylbenzene

Chemical Formula: C6H4(CH3)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{p-}Xylene	106-42-3	100

Toxicological Data on Ingredients: p-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 12400 mg/kg [Rabbit.]. VAPOR (LC50): Acute: 4550 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 138°C (280.4°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 9 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:
Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 12400 mg/kg [Rabbit.]. Acute toxicity of the vapor (LC50): 4550 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: p-Xylene Florida: p-Xylene Massachusetts RTK: p-Xylene New Jersey: p-Xylene TSCA 8(b) inventory: p-Xylene SARA 313 toxic chemical notification and release reporting: p-Xylene CERCLA: Hazardous substances.: p-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes. R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du rÃ¨glement sur le transport des marchandises dangeureuses au canada. Centre de conformitÃ© internatinal LtÃ©e. 1986.

Other Special Considerations: Not available.

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Last Updated: 06/09/2012 12:00 PM

APPENDIX B
FIELD DATA COLLECTION FORMS

URS

1 Montgomery St, Suite 900
San Francisco, CA 94104
415.896.5858 Fax 415.882.9261

SAMPLING LOG SHEET

SITE CONDITIONS

SITE NAME AND ADDRESS	JOB NUMBER	DATE

PRE-PURGE CALIBRATION			
METER USED: YSI6920 YSI3500 MP2 OTHER _____	DATE:	TIME:	BY:

INDIVIDUALS CONDUCTING FIELDWORK

_____

_____

_____

WEATHER CONDITIONS

WEATHER _____

WIND SPEED _____

WIND DIRECTION _____

OTHER NOTES

_____

_____

_____

_____

_____

_____

URS

1 Montgomery St., Suite 900
San Francisco, CA 94104
415.896.5858 Fax 415.882.9261

SAMPLING LOG SHEET

WELL SAMPLING

SITE NAME AND ADDRESS	JOB NUMBER	DATE

WELL NUMBER

WELL / WATER STATUS		
DEPTH TO WATER (FROM TOP OF PVC)	WELL DIAMETER	
DEPTH TO OIL	OIL SHEEN? (YES/NO)	
TOTAL DEPTH OF WELL	WATER COLOR & ODOR; GENERAL WATER CONDITION	
IS WELL LOCKED? (YES/NO)		
IS THERE A WELL CAP? (YES/NO)		
REMARKS: (Weather/Area? Ground surface/Nearby activities/Etc.)		

FIELD READINGS

METHOD: LF ☐ STANDARD ☐

TIME	WATER LEVEL (feet)	PURGE RATE: (mL/min)	VOLUME PURGED (L)	TEMP. °C	CONDUCT. at 25 C (µs/cm)	D.O. (mg/L)	pH	REDOX POTENTIAL (mV)	TURBIDITY (NTU)

SAMPLE TAKEN	
TIME:	WATER LEVEL:
OTHER NOTES:	

LOCATION OF BORING

JOB NUMBER	CLIENT	LOCATION

DRILLING METHOD:

BORING NUMBER

SHEET OF

SAMPLING METHOD:

DRILLING

START TIME	FINISH TIME

SURFACE CONDITIONS:

DATE	DATE

DATUM ELEVATION

DRILLING CONTRACTOR

BY DATE CHECKED BY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE NUMBER / SAMPLE DEPTH	BLOWS/FT. SAMPLER	OVA: AUGER	OVA: SAMPLE	OVA: CUTTINGS	DEPTH IN FEET	SOIL GRAPH
								0	
								1	
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								0	
								1	
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								0	
								1	

URS

APPENDIX C
HISTORICAL ANALYTICAL RESULTS

APPENDIX C
HISTORICAL ANALYTICAL RESULTS

John Carver Consulting
Soil and Groundwater Analytical Data 2006

The following tables were not available electronically and could therefore not be readily updated to replace "ND" with "<MRL."

Method Reporting Limits are as follows:

	Soil (mg/kg)	Ground Water (µg/L)
TPH-g	1*	50*
Benzene	0.005	2
Toluene	0.005	2
Ethylbenzene	0.005	2
Xylenes	0.010	4
MTBE	0.005	5

* Estimated MRL. Laboratory data does not list the MRL for TPH-g.

URS
Historical Analytical Data 2004

MRLs for the ND analytes are provided in the URS Data Summary tables earlier in this Appendix.

Scott Environmental 1995

TABLE 1

Summary of Soil Sampling Results

SAMPLE I.D.	TPH-G (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENE (ug/Kg)	LEAD (mg/Kg)
SS-1	35	590	570	1300	5400	2.6
SS-2	140	610	960	580	9700	7.9
SS-3	18	340	400	850	4600	3.4

TPH-G: EPA Method 5030/8015; Detection Limit 1.0 mg/kg
BTEX : EPA Method 8020; Detection Limit 5.0 ug/kg
Lead: EPA Method 7420; Detection Limit 1.0 mg/kg

URS 2004

Table 5-1
TPH as gasoline, diesel, and motor oil - Soil Analytical Results
Lucky's Auto Body Site

Sample ID (Soil Boring ID-Depth in inches)	Units	Analytical Result Total Petroleum Hydrocarbons (TPH)		
		Gasoline (C6-C12) TPH-gasoline	Middle distillates (C9-C25) TPH-diesel	Residual fuels (C24-C40) TPH-motor oil
S1-6	mg/Kg	<1.0	NA	NA
S1-42	mg/Kg	<1.0	NA	NA
S1-168	mg/Kg	<1.0	NA	NA
S2-6	mg/Kg	<1.0	NA	NA
S2-42	mg/Kg	<1.0	NA	NA
S2-168	mg/Kg	**170 J**	NA	NA
S3-6	mg/Kg	<1.0	NA	NA
S3-42	mg/Kg	<1.0	NA	NA
S3-168	mg/Kg	<1.0	NA	NA
S4-6	mg/Kg	<1.0	NA	NA
S4-42	mg/Kg	<1.0	NA	NA
S4-168	mg/Kg	6.2 J	NA	NA
S5-6	mg/Kg	<1.0	NA	<10
S5-42	mg/Kg	<1.0	NA	<10
S5-168	mg/Kg	<1.0	NA	NA
S6-6	mg/Kg	<1.0	NA	NA
S6-42	mg/Kg	<1.0	NA	NA
S6-168	mg/Kg	<1.0	NA	NA
S7-6	mg/Kg	<1.0	NA	NA
S7-42	mg/Kg	<1.0	NA	23 J
S7-168	mg/Kg	<1.0	NA	NA
S8-6	mg/Kg	<1.0	7.1 J	<10
S8-42	mg/Kg	<1.0	NA	NA
S8-168	mg/Kg	<1.0	NA	NA
S9-6	mg/Kg	<1.0	NA	NA
S9-42	mg/Kg	<1.0	NA	NA
S9-168	mg/Kg	20	NA	NA
S10-6	mg/Kg	<1.0	NA	NA
S10-42	mg/Kg	<1.0	NA	NA
S10-168	mg/Kg	<1.0	NA	NA
S11-6	mg/Kg	<1.0	NA	NA
S11-42	mg/Kg	<1.0	NA	NA
S11-120	mg/Kg	**220 J**	NA	NA
S12-6	mg/Kg	<1.0	NA	NA
S12-42	mg/Kg	<1.0	NA	NA
Regulatory Guideline				
ESL - Shallow Soil (≤3m bgs)	mg/Kg	100	100	500
ESL - Deep Soil (≥3m bgs)	mg/Kg	100	100	1,000

Notes:
ESL - California Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs) - Residential Soils (2003)
(C6-C12) -petroleum mixtures with a carbon ranges of C6 to C12
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
All TPH-gasoline analyses completed by Severn Trent Laboratory (STL)
All TPH-diesel, motor oil analyses completed by Sequoia Analytical Laboratory
J - Concentration flagged as estimated based on QA/QC review of laboratory data
<1.0 - less than the laboratory reporting limit of 1.0 mg/Kg
NA - Not Analyzed
Shaded values exceed their respective RWQCB ESLs

Table 5-1
TPH as gasoline, diesel, and motor oil - Soil Analytical Results
Lucky's Auto Body Site

Sample ID (Soil Boring ID-Depth in inches)	Units	Analytical Result Total Petroleum Hydrocarbons (TPH)		
		Gasoline (C6-C12) TPH-gasoline	Middle distillates (C9-C25) TPH-diesel	Residual fuels (C24-C40) TPH-motor oil
S12-168	mg/Kg	<1.0	NA	NA
S13-6	mg/Kg	<1.0	NA	NA
S13-42	mg/Kg	<1.0	NA	NA
S13-168	mg/Kg	<1.0	NA	NA
S14-6	mg/Kg	<1.0	NA	NA
S14-42	mg/Kg	<1.0	NA	NA
S14-168	mg/Kg	<1.0	NA	NA
S15-6	mg/Kg	<1.0	NA	NA
S15-42	mg/Kg	<1.0	NA	NA
S15-168	mg/Kg	<1.0	NA	NA
S16-6	mg/Kg	<1.0	NA	NA
S16-42	mg/Kg	<1.0	NA	NA
S16-168	mg/Kg	<1.0	NA	NA
S17-6	mg/Kg	<1.0	NA	NA
S17-42	mg/Kg	<1.0	NA	NA
S17-168	mg/Kg	<1.0	NA	NA
S18-6	mg/Kg	<1.0	NA	NA
S18-42	mg/Kg	<1.0	NA	NA
S18-168	mg/Kg	<1.0	NA	NA
S19-6	mg/Kg	<1.0	NA	NA
S19-42	mg/Kg	<1.0	NA	NA
S19-168	mg/Kg	<1.0	NA	NA
*S20-6	mg/Kg	<1.0	NA	NA
*S20-42	mg/Kg	<1.0	NA	NA
*S20-168	mg/Kg	<1.0	NA	NA
**S21-6	mg/Kg	<1.0	NA	NA
**S21-42	mg/Kg	<1.0	NA	NA
**S21-168	mg/Kg	<1.0	NA	NA
Regulatory Guideline				
ESL - Shallow Soil (≤3m bgs)	mg/Kg	100	100	500
ESL - Deep Soil (≥3m bgs)	mg/Kg	100	100	1,000

Notes:
ESL - California Regional Water Quality Control Board (RWQCB) environmental Screening Levels (ESLs) - Residential Soils (2003)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
(C6-C12) -petroleum mixtures with a carbon ranges of C6 to C12
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
All TPH-gasoline analyses completed by Severn Trent Laboratory (STL)
All TPH-diesel, motor oil analyses completed by Sequoia Analytical Laboratory
J - Concentration flagged as estimated based on QA/QC review of laboratory data
<1.0 - less than the laboratory reporting limit of 1.0 mg/Kg
NA - Not Analyzed
Shaded values exceed their respective RWQCB ESLs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			SI-12	S1-42	S1-168	S2-12	S2-42	S2-168	S3-12	S3-42	S3-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	<6.7	<5.0	<5.8	<5.7	< 5.0	<260	<5.2	< 5.0	< 5.0
TCE	µg/Kg	53	<6.7	<5.0	<5.8	<5.7	< 5.0	<260	<5.2	< 5.0	< 5.0
1,1-DCA	µg/Kg	510,000	<6.7	<5.0	<5.8	<5.7	< 5.0	<260	<5.2	< 5.0	< 5.0
1,1-DCE	µg/Kg	120,000	<6.7	<5.0	<5.8	<5.7	< 5.0	<260	<5.2	< 5.0	< 5.0
Vinyl Chloride	µg/Kg	79	<6.7	<5.0	<5.8	<5.7	< 5.0	<260	<5.2	< 5.0	< 5.0
MTBE	µg/Kg	17,000	<6.7	<5.0	18	<5.7	< 5.0	<2,600	<5.2	<5.0	< 5.0
Benzene	µg/Kg	600	<6.7	<5.0	110	<5.7	< 5.0	**3,200**	<5.2	<5.0	22
Ethylbenzene	µg/Kg	8,900	<6.7	<5.0	38	<5.7	< 5.0	4,100	<5.2	<5.0	< 5.0
Naphthalene	µg/Kg	56,000	<13	<10	<12	<11	<10	830	<10	<10	<10
Toluene	µg/Kg	520,000	<6.7	<5.0	15	<5.7	< 5.0	14,000	<5.2	<5.0	< 5.0
Isopropylbenzene	µg/Kg	570,000	<6.7	<5.0	<5.8	<5.7	< 5.0	330	<5.2	<5.0	<5.0
n-Propylbenzene	µg/Kg	240,000	<6.7	<5.0	6.5	<5.7	<5.0	1,300	<5.2	<5.0	< 5.0
p-Isopropyltoluene	µg/Kg	NV	<6.7	<5.0	<5.8	<5.7	<5.0	<260	<5.2	<5.0	< 5.0
n-Butylbenzene	µg/Kg	240,000	<6.7	<5.0	<5.8	<5.7	< 5.0	760	<5.2	<5.0	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<6.7	<5.0	16	<5.7	< 5.0	6,700	<5.2	<5.0	< 5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<6.7	<5.0	7.5	<5.7	< 5.0	2,000	<5.2	<5.0	< 5.0
Total xylenes	µg/Kg	270,000	<6.7	<5.0	95	<5.7	< 5.0	20,000	<5.2	<5.0	< 5.0
Carbon disulfide	µg/Kg	360,000	<6.7	<5.0	< 5.8	<5.7	5.2	<510	<5.2	<5.0	< 5.0
tert-Butylbenzene	µg/Kg	390,000	<6.7	<5.0	<5.8	<5.7	<5.0	860	<5.2	<5.0	<5.0
sec-Butylbenzene	µg/Kg	220,000	<6.7	<5.0	<5.8	<5.7	<5.0	<260	<5.2	<5.0	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S4-12	S4-42	S4-168	S5-12	S5-42	S5-168	S6-12	S6-42	S6-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.0	< 250	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TCE	µg/Kg	53	< 5.0	< 5.0	< 250	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.0	< 250	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.0	< 250	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.0	< 250	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE	µg/Kg	17,000	<5.0	<5.0	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	µg/Kg	600	<5.0	<5.0	250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	µg/Kg	8,900	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	µg/Kg	56,000	<10	<10	< 250	<10	<10	<10	<10	<10	<10
Toluene	µg/Kg	520,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	µg/Kg	240,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	µg/Kg	NV	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	<5.0	< 250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total xylenes	µg/Kg	270,000	<5.0	<5.0	< 500	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon disulfide	µg/Kg	360,000	<5.0	<5.0	<500	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S7-12	S7-42	S7-168	S8-12	S8-42	S8-168	S9-12	S9-42	S9-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.7	<250
TCE	µg/Kg	53	< 5.0	< 5.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.7	<250
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.7	<250
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.7	<250
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.7	<250
MTBE	µg/Kg	17,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<2,500
Benzene	µg/Kg	600	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	11	**1,500**
Ethylbenzene	µg/Kg	8,900	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	22	380
Naphthalene	µg/Kg	56,000	<10	<10	<10	<10	<10	<10	<10	78	<250
Toluene	µg/Kg	520,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	280
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<250
n-Propylbenzene	µg/Kg	240,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	17	<250
p-Isopropyltoluene	µg/Kg	NV	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<250
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.2	<5.0	<5.0	<5.0	<5.0	<5.0	21	<250
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	82	840
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	21	260
Total xylenes	µg/Kg	270,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	37	1,600
Carbon disulfide	µg/Kg	360,000	<5.0	< 5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<500
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<250
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.7	<250

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S10-12	S10-42	S10-168	S11-12	S11-42	S11-120	S12-12	S12-42	S12-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.0	<5.4	< 5.0	< 5.0	<250	< 5.0	< 5.0	< 5.0
TCE	µg/Kg	53	< 5.0	< 5.0	<5.4	< 5.0	< 5.0	<250	< 5.0	< 5.0	< 5.0
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.0	<5.4	< 5.0	< 5.0	<250	< 5.0	< 5.0	< 5.0
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.0	<5.4	< 5.0	< 5.0	<250	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.0	<5.4	< 5.0	< 5.0	<250	< 5.0	< 5.0	< 5.0
MTBE	µg/Kg	17,000	<5.0	<5.0	<5.4	<5.0	<5.0	<2,500	<5.0	<5.0	<5.0
Benzene	µg/Kg	600	<5.0	<5.0	19	<5.0	<5.0	**940**	<5.0	<5.0	<5.0
Ethylbenzene	µg/Kg	8,900	<5.0	<5.0	79	<5.0	<5.0	8,500	<5.0	<5.0	<5.0
Naphthalene	µg/Kg	56,000	<10	<10	<11	<10	<10	4,100	<10	<10	<10
Toluene	µg/Kg	520,000	<5.0	<5.0	6.2	<5.0	<5.0	670	<5.0	<5.0	<5.0
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.0	16	<5.0	<5.0	1,300	<5.0	<5.0	<5.0
n-Propylbenzene	µg/Kg	240,000	<5.0	<5.0	41	<5.0	<5.0	5,300	<5.0	<5.0	<5.0
p-Isopropyltoluene	µg/Kg	NV	<5.0	<5.0	<5.4	<5.0	<5.0	390	<5.0	<5.0	<5.0
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.0	14	<5.0	<5.0	2,800	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	<5.0	98	<5.0	<5.0	20,000	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	<5.0	19	<5.0	<5.0	4,100	<5.0	<5.0	<5.0
Total xylenes	µg/Kg	270,000	<5.0	<5.0	96	<5.0	<5.0	8,900	<5.0	<5.0	<5.0
Carbon disulfide	µg/Kg	360,000	<5.0	<5.0	<5.4	<5.0	<5.0	<500	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.0	<5.4	<5.0	<5.0	<250	<5.0	<5.0	<5.0
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.0	6.3	<5.0	<5.0	590	<5.0	<5.0	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S13-12	S13-42	S13-168	S14-12	S14-42	S14-168	S15-12	S15-42	S15-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.0	<5.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TCE	µg/Kg	53	< 5.0	< 5.0	<5.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.0	<5.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.0	<5.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.0	<5.7	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE	µg/Kg	17,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	µg/Kg	600	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	µg/Kg	8,900	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	µg/Kg	56,000	<10	<10	<11	<10	<10	<10	<10	<10	<10
Toluene	µg/Kg	520,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	µg/Kg	NV	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total xylenes	µg/Kg	270,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon disulfide	µg/Kg	360,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.0	<5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S16-12	S16-42	S16-168	S17-12	S17-42	S17-168	S18-12	S18-42	S18-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.2	< 5.0
TCE	µg/Kg	53	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.2	< 5.0
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.2	< 5.0
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.2	< 5.0
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	<5.2	< 5.0
MTBE	µg/Kg	17,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Benzene	µg/Kg	600	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Ethylbenzene	µg/Kg	8,900	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Naphthalene	µg/Kg	56,000	<10	<10	<10	<10	<10	<10	<10	<10	<10
Toluene	µg/Kg	520,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
n-Propylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
p-Isopropyltoluene	µg/Kg	NV	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Total xylenes	µg/Kg	270,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
Carbon disulfide	µg/Kg	360,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.2	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-2
VOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S19-12	S19-42	S19-168	*S20-12	*S20-42	*S20-168	**S21-12	**S21-42	**S21-168
Volatile Organic Compounds by EPA 8260B											
PCE	µg/Kg	1,500	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TCE	µg/Kg	53	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCA	µg/Kg	510,000	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1-DCE	µg/Kg	120,000	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/Kg	79	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE	µg/Kg	17,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
Benzene	µg/Kg	600	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
Ethylbenzene	µg/Kg	8,900	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
Naphthalene	µg/Kg	56,000	<10	<10	<10	<10	<10	<10	<10	<10	<10
Toluene	µg/Kg	520,000	<5.0	<5.0	<5.0	<5.0	<5.0	8.6	<5.0	<5.0	<5.0
Isopropylbenzene	µg/Kg	570,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	µg/Kg	NV	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
n-Butylbenzene	µg/Kg	240,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	µg/Kg	52,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	µg/Kg	21,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
Total xylenes	µg/Kg	270,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
Carbon disulfide	µg/Kg	360,000	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/Kg	390,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	µg/Kg	220,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

VOC analyses completed by Severn Trent Laboratories (STL)

<5.0 - less than laboratory reporting limit of 5.0 µg/Kg

NV = No Listed PRG Value

Shaded values are above the respective EPA PRGs

Table 5-3
Metals - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)						
			S1-6	S2-6	S2-42	S2-168	S3-6	S4-6	S5-6
Metals by EPA 6010B									
Arsenic	mg/Kg	0.39/22[1]	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Barium	mg/Kg	5,400	201 J	26.7 J	176 J	130 J	173 J	195 J	139 J
Beryllium	mg/Kg	150	0.84	<0.25	0.79	0.70	1.14	0.74	0.88
Cadmium	mg/Kg	37	0.92	<0.50	2.85	1.16	0.85	0.92	0.67
Cobalt	mg/Kg	900	9.3	6.02	9.67	8.76	28.7	10.1	13.7
Chromium	mg/Kg	210	40.1	28.7	36.9	39.4	38.4	38.2	40.2
Copper	mg/Kg	3,100	60.8	16.9	66.2	45.0	36.5	45.9	21.3
Molybdenum	mg/Kg	390	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel	mg/Kg	1,600	46.7	30.0	39.8	54.6	49.5	46.9	26.7
Lead	mg/Kg	247 [2]	9.09	<5.0	102	11.6	11.9	89.6	9.49
Selenium	mg/Kg	390	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5
Thallium	mg/Kg	5.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Vanadium	mg/Kg	550	39.9	22.1	36.5	35.0	40.5	33.3	40.3
Zinc	mg/Kg	23,000	61.1	34.6	306	97.3	50.1	89.1	38.3

Notes:

[1] 0.39 mg/kg is the cancer endpoint PRG, 22 mg/kg is the noncancer endpoint PRG

[2] Screening level based on LeadSpread value calculated by DTSC's Lead Risk Assessment Spreadsheet

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

<5.0 - less than the laboratory reporting limit of 5.0 mg/K

J - Concentration flagged as estimated based on QA/QC review of laboratory data

Shaded values are above the respective EPA PRGs or DTSC's LeadSpread Value

Table 5-3
Metals - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)						
			S6-6	S6-42	S7-6	S8-6	S9-6	S9-42	S9-168
Metals by EPA 6010B									
Arsenic	mg/Kg	0.39/22[1]	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Barium	mg/Kg	5,400	191 J	77.7 J	221 J	129 J	7.96 J	153 J	108 J
Beryllium	mg/Kg	150	0.75	0.44	0.79	0.89	<0.25	0.75	0.61
Cadmium	mg/Kg	37	0.73	<0.50	0.99	0.72	<0.50	1.91	0.85
Cobalt	mg/Kg	900	9.58	5.43	14.3	11.2	5.85	10.0	6.7
Chromium	mg/Kg	210	30.0	27.9	30.9	37.4	22.0	49.4	26.2
Copper	mg/Kg	3,100	27.4	23.5	28.5	22.4	8.11	33.9	27.4
Molybdenum	mg/Kg	390	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel	mg/Kg	1,600	38.8	19.6	55.2	34.4	24.9	54.9	46.4
Lead	mg/Kg	247 [2]	15.9	11.6	38.3	9.74	<5.0	20.6	7.55
Selenium	mg/Kg	390	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5
Thallium	mg/Kg	5.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Vanadium	mg/Kg	550	35.0	22.6	36.5	35.6	17.3	34.8	25.9
Zinc	mg/Kg	23,000	53.6	47.5	80.6	42.6	21.8	72.0	62.7

Notes:

[1] 0.39 mg/kg is the cancer endpoint PRG, 22 mg/kg is the noncancer endpoint PRG

[2] Screening level based on LeadSpread value calculated by DTSC's Lead Risk Assessment Spreadsheet

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

<5.0 - less than the laboratory reporting limit of 5.0 mg/K

J - Concentration flagged as estimated based on QA/QC review of laboratory data

Shaded values are above the respective EPA PRGs or DTSC's LeadSpread value

Table 5-3
Metals - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)						
			S10-6	S10-42	S10-168	S11-6	S11-42	S11-120	S12-6
Metals by EPA 6010B									
Arsenic	mg/Kg	0.39/22[1]	<5.0	**6.24**	<5.0	<5.0	<5.0	<5.0	<5.0
Barium	mg/Kg	5,400	216 J	194 J	133 J	165 J	144 J	176 J	269 J
Beryllium	mg/Kg	150	0.82	0.91	0.64	0.97	0.71	0.76	0.93
Cadmium	mg/Kg	37	0.87	2.16	1.18	1.36	0.91	1.12	0.92
Cobalt	mg/Kg	900	11.3	14.0	10.2	10.8	8.86	16.7	17.5
Chromium	mg/Kg	210	38.1	40.9	33.5	38.6	39.4	47.7	37.3
Copper	mg/Kg	3,100	25.5	40.6	25.6	22.7	20.6	27.5	25.2
Molybdenum	mg/Kg	390	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel	mg/Kg	1,600	51.0	56.7	56.6	30.7	39.5	67.8	56.4
Lead	mg/Kg	247 [2]	12.4	13.8	11.4	10.5	8.97	11.8	14.0
Selenium	mg/Kg	390	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5
Thallium	mg/Kg	5.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Vanadium	mg/Kg	550	39.8	42.7	33.5	38.0	34.2	39.9	40.7
Zinc	mg/Kg	23,000	52.8	61.9	67.2	45.0	47.7	65.4	56.0

Notes:

[1] 0.39 mg/kg is the cancer endpoint PRG, 22 mg/kg is the noncancer endpoint PRG

[2] Screening level based on LeadSpread value calculated by DTSC's Lead Risk Assessment Spreadsheet

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

<5.0 - less than the laboratory reporting limit of 5.0 mg/K

J - Concentration flagged as estimated based on QA/QC review of laboratory data

Shaded values are above the respective EPA PRGs or DTSC's LeadSpread value

Table 5-3
Metals - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)						
			S13-6	S14-6	S15-6	S16-6	S17-6	S17-168	S18-6
Metals by EPA 6010B									
Arsenic	mg/Kg	0.39/22[1]	<5.0	**9.79**	**15.8**	<5.0	<5.0	<5.0	<5.0
Barium	mg/Kg	5,400	209 J	288 J	250 J	142 J	101 J	63.8	173 J
Beryllium	mg/Kg	150	0.96	0.88	0.61	0.77	0.98	0.44	0.86
Cadmium	mg/Kg	37	1.11	1.05	1.61	0.58	0.89	0.57	0.78
Cobalt	mg/Kg	900	11.3	10.8	12.6	5.94	14.1	9.6	8.98
Chromium	mg/Kg	210	49.8	20.1	35.3	32.2	41.6	24.6	37.4
Copper	mg/Kg	3,100	25.6	37.6	34.7	20.4	25.2	18.2	22.4
Molybdenum	mg/Kg	390	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel	mg/Kg	1,600	46.1	32.2	39.5	28.1	46.6	35.9	42.3
Lead	mg/Kg	247 [2]	12.7	239	234	11.0	11.7	6.34	11.4
Selenium	mg/Kg	390	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5
Thallium	mg/Kg	5.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Vanadium	mg/Kg	550	43.9	25.1	34.4	30.5	42.0	22.5	36.3
Zinc	mg/Kg	23,000	65.3	155	233	43.8	58.4	52.4	51.7

Notes:

[1] 0.39 mg/kg is the cancer endpoint PRG, 22 mg/kg is the noncancer endpoint PRG

[2] Screening level based on LeadSpread value calculated by DTSC's Lead Risk Assessment Spreadsheet

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

<5.0 - less than the laboratory reporting limit of 5.0 mg/K

J - Concentration flagged as estimated based on QA/QC review of laboratory data

Shaded values are above the respective EPA PRGs or DTSC's LeadSpread value

Table 5-3
Metals - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)					
			S19-6	*S20-6	**S21-6	Background Soil Samples		
						SB1-6	SB2-6	SB3-6
Metals by EPA 6010B								
Arsenic	mg/Kg	0.39/22[1]	<5.0	<5.0	**8.69**	**7.84**	**37.2**	<5.0
Barium	mg/Kg	5,400	188 J	225 J	259 J	294 J	203 J	159 J
Beryllium	mg/Kg	150	0.97	0.84	0.81	0.66	0.66	0.62
Cadmium	mg/Kg	37	0.75	0.96	1.42	1.57	1.84	2.03
Cobalt	mg/Kg	900	13.4	13.9	9.85	10.4	10.1	7.61
Chromium	mg/Kg	210	37.4	38.6	27.2	35.2	37.7	41.1
Copper	mg/Kg	3,100	23.2	40.0	37.0	103	53.9	48.5
Molybdenum	mg/Kg	390	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel	mg/Kg	1,600	35.7	48.4	35.4	43.8	41.6	37.2
Lead	mg/Kg	247 [2]	11.6	24.7	**285**	**461**	**467**	219
Selenium	mg/Kg	390	<7.5	<7.5	<7.5	<7.5	<7.5	<7.5
Thallium	mg/Kg	5.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Vanadium	mg/Kg	550	38.6	39.8	28.9	38.0	32.4	30.4
Zinc	mg/Kg	23,000	52.8	74.2	218	314	362	312

Notes:

[1] 0.39 mg/kg is the cancer endpoint PRG, 22 mg/kg is the noncancer endpoint PRG

[2] Screening level based on LeadSpread value calculated by DTSC's Lead Risk Assessment Spreadsheet

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

<5.0 - less than the laboratory reporting limit of 5.0 mg/K

J - Concentration flagged as estimated based on QA/QC review of laboratory data

Shaded values are above the respective EPA PRGs or DTSC's LeadSpread value

Table 5-4
SVOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)							
			S1-6	S2-6	S3-6	S4-6	S5-6	S6-6	S7-6	S8-6
Semivolatile Organics by 8270C										
Acenaphthene	mg/Kg	3,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Anthracene	mg/Kg	22,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzoic acid	mg/Kg	100,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(b)fluoranthene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(k)fluoranthene	mg/Kg	0.38	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(g,h,i)perylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(a)pyrene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzyl alcohol	mg/Kg	18,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethoxy) methane	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethyl)ether	mg/Kg	0.21	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroisopropyl) ether	mg/Kg	2.9	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
bis(2-Ethylhexyl) phthalate	mg/Kg	35	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Bromophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Butyl benzyl phthalate	mg/Kg	12,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloroaniline	mg/Kg	240	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloronaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloro-3-methylphenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	mg/Kg	63	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chlorophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Chrysene	mg/Kg	3.8	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenz(a,h)anthracene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenzofuran	mg/Kg	290	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-butyl phthalate	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	mg/Kg	370	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,3-Dichlorobenzene	mg/Kg	16	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,4-Dichlorobenzene	mg/Kg	3.4	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3,3-Dichlorobenzidine	mg/Kg	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenol	mg/Kg	180	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Diethyl phthalate	mg/Kg	49,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4-Dimethylphenol	mg/Kg	1,200	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dimethyl phthalate	mg/Kg	100,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4,6-Dinitro-2-methylphenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol	mg/Kg	120	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrotoluene	mg/Kg	120	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,6-Dinitrotoluene	mg/Kg	61	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-octyl phthalate	mg/Kg	2,400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluorene	mg/Kg	2,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobenzene	mg/Kg	0.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobutadiene	mg/Kg	6.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorocyclopentadiene	mg/Kg	370	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachloroethane	mg/Kg	35	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Indeno(1,2,3-c,d)pyrene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Isophorone	mg/Kg	510	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylnaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylphenol	mg/Kg	3,100	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Methylphenol	mg/Kg	310	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Naphthalene	mg/Kg	56	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitroaniline	mg/Kg	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/Kg	20	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitrophenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Nitrophenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
N-Nitrosodiphenylamine	mg/Kg	99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
N-Nitroso-di-n-propylamine	mg/Kg	0.069	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pentachlorophenol	mg/Kg	3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Phenol	mg/Kg	37,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pyrene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,2,4-Trichlorobenzene	mg/Kg	650	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4,5-Trichlorophenol	mg/Kg	6,100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	mg/Kg	6.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by Sequoia Analytical Laboratory

All Values reported in milligrams per kilogram (mg/kg)

NV = No Listed PRG Value

< - less than indicated reporting limit

Table 5-4
SVOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)							
			S9-6	S10-6	S11-6	S12-6	S13-6	S14-6	S15-6	S16-6
Semivolatile Organics by 8270C										
Acenaphthene	mg/Kg	3,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Anthracene	mg/Kg	22,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzoic acid	mg/Kg	100,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(b)fluoranthene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(k)fluoranthene	mg/Kg	0.38	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(g,h,i)perylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(a)pyrene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzyl alcohol	mg/Kg	18,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethoxy) methane	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethyl)ether	mg/Kg	0.21	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroisopropyl) ether	mg/Kg	2.9	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
bis(2-Ethylhexyl) phthalate	mg/Kg	35	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Bromophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Butyl benzyl phthalate	mg/Kg	12,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloroaniline	mg/Kg	240	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloronaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloro-3-methylphenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	mg/Kg	63	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chlorophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Chrysene	mg/Kg	3.8	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenz(a,h)anthracene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenzofuran	mg/Kg	290	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-butyl phthalate	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	mg/Kg	370	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,3-Dichlorobenzene	mg/Kg	16	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,4-Dichlorobenzene	mg/Kg	3.4	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3,3-Dichlorobenzidine	mg/Kg	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenol	mg/Kg	180	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Diethyl phthalate	mg/Kg	49,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4-Dimethylphenol	mg/Kg	1,200	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dimethyl phthalate	mg/Kg	100,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4,6-Dinitro-2-methylphenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol	mg/Kg	120	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrotoluene	mg/Kg	120	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,6-Dinitrotoluene	mg/Kg	61	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-octyl phthalate	mg/Kg	2,400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluorene	mg/Kg	2,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobenzene	mg/Kg	0.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobutadiene	mg/Kg	6.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorocyclopentadiene	mg/Kg	370	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachloroethane	mg/Kg	35	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Indeno(1,2,3-c,d)pyrene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Isophorone	mg/Kg	510	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylnaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylphenol	mg/Kg	3,100	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Methylphenol	mg/Kg	310	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Naphthalene	mg/Kg	56	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitroaniline	mg/Kg	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/Kg	20	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitrophenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Nitrophenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
N-Nitrosodiphenylamine	mg/Kg	99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
N-Nitroso-di-n-propylamine	mg/Kg	0.069	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pentachlorophenol	mg/Kg	3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Phenol	mg/Kg	37,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pyrene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,2,4-Trichlorobenzene	mg/Kg	650	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4,5-Trichlorophenol	mg/Kg	6,100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	mg/Kg	6.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by Sequoia Analytical Laboratory

All Values reported in milligrams per kilogram (mg/kg)

NV = No Listed PRG Value

< - less than indicated reporting limit

Table 5-4

SVOCs - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)					
			S17-6	S17-168	S18-6	S19-6	*S20-6	**S21-6
Semivolatile Organics by 8270C								
Acenaphthene	mg/Kg	3,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Anthracene	mg/Kg	22,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzoic acid	mg/Kg	100,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)anthracene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(b)fluoranthene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(k)fluoranthene	mg/Kg	0.38	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(g,h,i)perylene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzo(a)pyrene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzyl alcohol	mg/Kg	18,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethoxy) methane	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroethyl)ether	mg/Kg	0.21	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bis(2-chloroisopropyl) ether	mg/Kg	2.9	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
bis(2-Ethylhexyl) phthalate	mg/Kg	35	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Bromophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Butyl benzyl phthalate	mg/Kg	12,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloroaniline	mg/Kg	240	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chloronaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chloro-3-methylphenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	mg/Kg	63	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Chlorophenyl phenyl ether	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Chrysene	mg/Kg	3.8	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenz(a,h)anthracene	mg/Kg	0.062	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dibenzofuran	mg/Kg	290	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-butyl phthalate	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	mg/Kg	370	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,3-Dichlorobenzene	mg/Kg	16	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,4-Dichlorobenzene	mg/Kg	3.4	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3,3-Dichlorobenzidine	mg/Kg	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dichlorophenol	mg/Kg	180	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Diethyl phthalate	mg/Kg	49,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4-Dimethylphenol	mg/Kg	1,200	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dimethyl phthalate	mg/Kg	100,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4,6-Dinitro-2-methylphenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol	mg/Kg	120	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrotoluene	mg/Kg	120	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,6-Dinitrotoluene	mg/Kg	61	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Di-n-octyl phthalate	mg/Kg	2,400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluorene	mg/Kg	2,700	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobenzene	mg/Kg	0.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorobutadiene	mg/Kg	6.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Hexachlorocyclopentadiene	mg/Kg	370	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachloroethane	mg/Kg	35	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Indeno(1,2,3-c,d)pyrene	mg/Kg	0.62	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Isophorone	mg/Kg	510	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylnaphthalene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylphenol	mg/Kg	3,100	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Methylphenol	mg/Kg	310	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Naphthalene	mg/Kg	56	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitroaniline	mg/Kg	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Nitroaniline	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	mg/Kg	20	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Nitrophenol	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Nitrophenol	mg/Kg	NV	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
N-Nitrosodiphenylamine	mg/Kg	99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
N-Nitroso-di-n-propylamine	mg/Kg	0.069	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pentachlorophenol	mg/Kg	3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/Kg	NV	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Phenol	mg/Kg	37,000	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Pyrene	mg/Kg	2,300	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1,2,4-Trichlorobenzene	mg/Kg	650	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2,4,5-Trichlorophenol	mg/Kg	6,100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	mg/Kg	6.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Analyses completed by Sequoia Analytical Laboratory

All Values reported in milligrams per kilogram (mg/kg)

NV = No Listed PRG Value

< - less than indicated reporting limit

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S1-6	S1-42	S1-168	S2-6	S2-42	S2-168	S3-6	S3-42	S3-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<33	NA	<33	<33	NA	<32	<33	NA
Dichlorprop	µg/Kg	NV	<330	<330	NA	<330	<330	NA	<320	<330	NA
2,4-D	µg/Kg	690,000	<330	<330	NA	<330	<330	NA	<320	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<32	<33	NA
2,4,5-T	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<32	<33	NA
2,4-DB	µg/Kg	490,000	<330	<330	NA	<330	<330	NA	<320	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	7.0	8.2	7.2	**9.1**	7.0	7.0	6.6	5.9	6.3
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
UJ - Results flagged as estimated reporting limits based on QA/QC review of laboratory data
NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S4-6	S4-42	S4-168	S5-6	S5-42	S5-168	S6-6	S6-42	S6-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<33	NA	<33	<33	NA	<33	<33	NA
Dichlorprop	µg/Kg	NV	<330	<330	NA	<330	<330	NA	<330	<330	NA
2,4-D	µg/Kg	690,000	<330	<330	NA	<330	<330	NA	<330	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<33	<33	NA
2,4,5-T	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<33	<33	NA
2,4-DB	µg/Kg	490,000	<330	<330	NA	<330	<330	NA	<330	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	<1.0 UJ	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	6.8	**5.3**	6.1	6.3	6.9	6.4	6.6	6.3	6.3
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
UJ - Results flagged as estimated reporting limits based on review of laboratory QA/QC data
NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S7-6	S7-42	S7-168	S8-6	S8-42	S8-168	S9-6	S9-42	S9-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<32	<33	NA	<33	<33	NA	<33	<33	NA
Dichlorprop	µg/Kg	NV	<320	<330	NA	<330	<330	NA	<330	<330	NA
2,4-D	µg/Kg	690,000	<320	<330	NA	<330	<330	NA	<330	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<32	<33	NA	<33	<33	NA	<33	<33	NA
2,4,5-T	µg/Kg	NV	<32	<33	NA	<33	<33	NA	<33	<33	NA
2,4-DB	µg/Kg	490,000	<320	<330	NA	<330	<330	NA	<330	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	4.0	6.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<2.0	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	3.2	3.9	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	4.0	5.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	6.1	5.7	6.5	7.6	**5.3**	5.7	7.8	7.2	7.2
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
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NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Boring ID - Depth in inches)								
			S10-6	S10-42	S10-168	S11-6	S11-42	S11-120	S12-6	S12-42	S12-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<33	NA	<33	<33	NA	<32	<33	NA
Dichlorprop	µg/Kg	NV	<330	<330	NA	<330	<330	NA	<320	<330	NA
2,4-D	µg/Kg	690,000	<330	<330	NA	<330	<330	NA	<320	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<32	<33	NA
2,4,5-T	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<32	<33	NA
2,4-DB	µg/Kg	490,000	<330	<330	NA	<330	<330	NA	<320	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	6.5	6.1	7.0	6.9	6.0	6.5	6.4	5.8	6.3
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
UJ - Results flagged as estimated reporting limits based on review of laboratory QA/QC data
NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S13-6	S13-42	S13-168	S14-6	S14-42	S14-168	S15-6	S15-42	S15-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<33	NA	<33	<33	NA	<33	<33	NA
Dichlorprop	µg/Kg	NV	<330	<330	NA	<330	<330	NA	<330	<330	NA
2,4-D	µg/Kg	690,000	<330	<330	NA	<330	<330	NA	<330	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<33	<33	NA
2,4,5-T	µg/Kg	NV	<33	<33	NA	<33	<33	NA	<33	<33	NA
2,4-DB	µg/Kg	490,000	<330	<330	NA	<330	<330	NA	<330	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	<2.0
4,4'-DDT	µg/Kg	1,700	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	<1.0 UJ	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	7.0	6.7	6.2	6.8	6.5	6.3	5.9	7.0	7.6
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
UJ - Results flagged as estimated reporting limits based on review of laboratory QA/QC data
NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S16-6	S16-42	S16-168	S17-6	S17-42	S17-168	S18-6	S18-42	S18-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<32	NA	<33	<33	NA	<33	<33	NA
Dichlorprop	µg/Kg	NV	<330	<320	NA	<330	<330	NA	<330	<330	NA
2,4-D	µg/Kg	690,000	<330	<320	NA	<330	<330	NA	<330	<330	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<32	NA	<33	<33	NA	<33	<33	NA
2,4,5-T	µg/Kg	NV	<33	<32	NA	<33	<33	NA	<33	<33	NA
2,4-DB	µg/Kg	490,000	<330	<320	NA	<330	<330	NA	<330	<330	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	6.2	**5.2**	6.2	5.8	6.4	7.1	6.2	6.2	7.0
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)

*Soil Sample S20 is a Field Duplicate of Soil Sample S7

**Soil Sample S21 is a Field Duplicate of Soil Sample S14

Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)

Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)

PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory

Asbestos analyses completed by Forensic Analytical

< - less than laboratory reporting limit

UJ - Results flagged as estimated reporting limits based on review of laboratory QA/QC data

NV = No Listed PRG Value

ND - None Detected

NA - Not Analyzed

Table 5-5
Herbicides, Pesticides, PCBs, pH, and Asbestos - Soil Analytical Results
Lucky's Auto Body Site

Analyte	Units	EPA PRG (Residential)	Analytical Results (Soil Boring ID - Depth in inches)								
			S19-6	S19-42	S19-168	*S20-6	*S20-42	*S20-168	**S21-6	**S21-42	**S21-168
Herbicides by EPA 8151A											
Dicamba	µg/Kg	1,800,000	<33	<33	NA	<33	NA	NA	<33	NA	NA
Dichlorprop	µg/Kg	NV	<330	<330	NA	<330	NA	NA	<330	NA	NA
2,4-D	µg/Kg	690,000	<330	<330	NA	<330	NA	NA	<330	NA	NA
2,4,5-TP (Silvex)	µg/Kg	NV	<33	<33	NA	<33	NA	NA	<33	NA	NA
2,4,5-T	µg/Kg	NV	<33	<33	NA	<33	NA	NA	<33	NA	NA
2,4-DB	µg/Kg	490,000	<330	<330	NA	<330	NA	NA	<330	NA	NA
Pesticides by EPA 8081											
Dieldrin	µg/Kg	30	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
4,4'-DDT	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
4,4'-DDE	µg/Kg	1,700	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
4,4'-DDD	µg/Kg	2,400	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
alpha-Chlordane	µg/Kg	1,600	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
gamma-Chlordane	µg/Kg	NV	<2.0	<2.0	<2.0	<2.0	<10	<10	<2.0	<2.0	<2.0
PCBs by EPA 8082											
Aroclor 1016	mg/Kg	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1221	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1232	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1242	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1248	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	mg/Kg	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1262	mg/Kg	NV	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH by EPA 9045C											
pH Concentration	SU	NV	6.2	**5.4**	6.7	6.4	6.0	6.1	6.4	6.3	6.7
Asbestos by EPA 600/R-93-116											
Fibers per sample	%	NV	ND	NA	NA	ND	NA	NA	ND	NA	NA

Notes:

PRG - US Environmental Protection Agency (EPA), Region IX, Preliminary Remediation Goals (PRGs) - Residential Soil (2002)
*Soil Sample S20 is a Field Duplicate of Soil Sample S7
**Soil Sample S21 is a Field Duplicate of Soil Sample S14
Soil analytical results reported as TSI-S7-42 (Targeted Site Investigation-Soil sample at boring 7-at a depth of 42 inches bgs)
Herbicides, Pesticides, and pH analyses completed by Severn Trent Laboratories (STL)
PCBs analyses completed by California Department of Toxic Substances Control (DTSC), Hazardous Materials Laboratory
Asbestos analyses completed by Forensic Analytical
< - less than laboratory reporting limit
UJ - Results flagged as estimated reporting limits based on review of laboratory QA/QC data
NV = No Listed PRG Value
ND - None Detected
NA - Not Analyzed

Table 5-6
TPH as gasoline and motor oil - Groundwater Analytical Results
Lucky's Auto Body Site

Sample ID (Groundwater Sample Location)	Units	Analytical Results Total Petroleum Hydrocarbons (TPH)	
		Gasoline (C6-C12) TPH-gasoline	Residual fuels (C24-C40) TPH-motor oil
G2	µg/L	**22,000**	NA
G4	µg/L	**950**	NA
G7	µg/L	**190**	NA
G9	µg/L	**1,200**	NA
G10	µg/L	97	NA
G11	µg/L	66	NA
G12	µg/L	<50	NA
G13	µg/L	<50	NA
G17	µg/L	<50	NA
G19	µg/L	<50	<500
***G20**	µg/L	64	NA
Regulatory Guideline			
ESL	µg/L	100	100

Notes:

*Groundwater Sample G20 is a Field Duplicate of Groundwater Sample G7

ESL - San Francisco Bay Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs) - for groundwater that is a potential drinking water source (2003)

(C6-C12) -petroleum mixtures with a carbon ranges of C6 to C12

Groundwater analytical results reported as TSI-G9 (Targeted Site Investigation-groundwater sample boring location 9)

All analyses completed by Severn Trent Laboratory (STL) unless otherwise noted.

<50 - less than the laboratory reporting limit of 50 µg/L

NA - Not analyzed

Shaded values exceed their respective RWQCB ESLs

Table 5-8
VOCs, Dissolved Metals, and pH - Groundwater Analytical Results
Lucky's Auto Body Site

Analyte	Units	CA MCL	Analytical Results (Groundwater Boring ID)					
			G2	G4	G7	G9	G10	G11
Volatile Organic Compounds by EPA 8260B								
MTBE	µg/L	13	<500	<100	<5.0	7.9	6.5	<5.0
Acetone	µg/L	NV	<5,000	<1,000	110	<50	<50	<50
Benzene	µg/L	1.0	**4,700**	**260**	**21**	**88**	**4.4**	**2.3**
1,2-Dichloroethane	µg/L	0.5	<50	<10	<0.50	**2.7**	**1.3**	<0.50
cis-1,2-Dichloroethene	µg/L	6	<50	**11**	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	300	**700**	74	5.0	33	4.2	1.6
Naphthalene	µg/L	NV	<100	<20	<1.0	9.3	<1.0	<1.0
Toluene	µg/L	150	**5,500**	<10	34	42	1.5	2.9
Isopropylbenzene	µg/L	NV	<50	<10	<0.50	1.7	<0.50	<0.50
n-Propylbenzene	µg/L	NV	<100	<20	<1.0	6.6	1.2	<1.0
p-Isopropyltoluene	µg/L	NV	<100	<20	<1.0	1.1	<1.0	<1.0
n-Butylbenzene	µg/L	NV	<100	<20	<1.0	4.8	<1.0	<1.0
1,2,4-Trimethylbenzene	µg/L	NV	230	72	1.6	32	3.1	1.3
1,3,5-Trimethylbenzene	µg/L	NV	82	21	0.61	13	0.88	<0.50
Total xylenes	µg/L	1,750	**2,300**	58	16	170	5.3	5.2
Carbon disulfide	µg/L	NV	<500	<100	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/L	NV	<100	<20	<1.0	<1.0	<1.0	<1.0
sec-Butylbenzene	µg/L	NV	<100	<20	<1.0	<1.0	<1.0	<1.0
Dissolved Metals by EPA 6010B								
Lead	µg/L	15	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH by EPA 9040B/150.1								
pH	SU	NV	6.4	6.5	6.4	6.2	NA	6.4

Notes:

*Groundwater Sample G20 is a Field Duplicate of Groundwater Sample G7

MCL - California Maximum Contaminant Levels - primary drinking water (2003)

Groundwater analytical results reported as TSI-G9 (Targeted Site Investigation-groundwater sample boring location 9)

All analyses completed by Severn Trent Laboratory (STL) unless otherwise noted.

<20 - less than the laboratory reporting limit of 20 µg/L

NV - No Listed Value

NA - Not Analyzed

Shaded values are above the respective MCL

Table 5-8
VOCs, Dissolved Metals, and pH - Groundwater Analytical Results
Lucky's Auto Body Site

Analyte	Units	CA MCL	Analytical Results (Groundwater Boring ID)				
			G12	G13	G17	G19	*G20
Volatile Organic Compounds by EPA 8260B							
MTBE	µg/L	13	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	µg/L	NV	<50	<50	<50	<50	<50
Benzene	µg/L	1.0	**1.5**	0.53	0.59	<0.50	**2.7**
1,2-Dichloroethane	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	µg/L	6	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	300	<0.50	<0.50	<0.50	<0.50	0.61
Naphthalene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	150	2.6	0.58	0.62	<0.50	3.4
Isopropylbenzene	µg/L	NV	<0.50	<0.50	<0.50	<0.50	<0.50
n-Propylbenzene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
p-Isopropyltoluene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
n-Butylbenzene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	µg/L	NV	<0.50	<0.50	<0.50	<0.50	<0.50
1,3,5-Trimethylbenzene	µg/L	NV	<0.50	<0.50	<0.50	<0.50	<0.50
Total xylenes	µg/L	1,750	<1.0	<1.0	<1.0	<1.0	1.5
Carbon disulfide	µg/L	NV	<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
sec-Butylbenzene	µg/L	NV	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Metals by EPA 6010B							
Lead	µg/L	15	NA	NA	NA	NA	<0.005
pH by EPA 9040B/150.1							
pH	SU	NV	6.7	6.7	7.0	6.7	6.4

Notes:

*Groundwater Sample G20 is a Field Duplicate of Groundwater Sample G7

MCL - California Maximum Contaminant Levels - primary drinking water (2003)

Groundwater analytical results reported as TSI-G9 (Targeted Site Investigation-groundwater sample boring location 9)

All analyses completed by Severn Trent Laboratory (STL) unless otherwise noted.

<20 - less than the laboratory reporting limit of 20 µg/L

NV - No Listed Value

NA - Not Analyzed

Shaded values are above the respective MCL

APPENDIX D

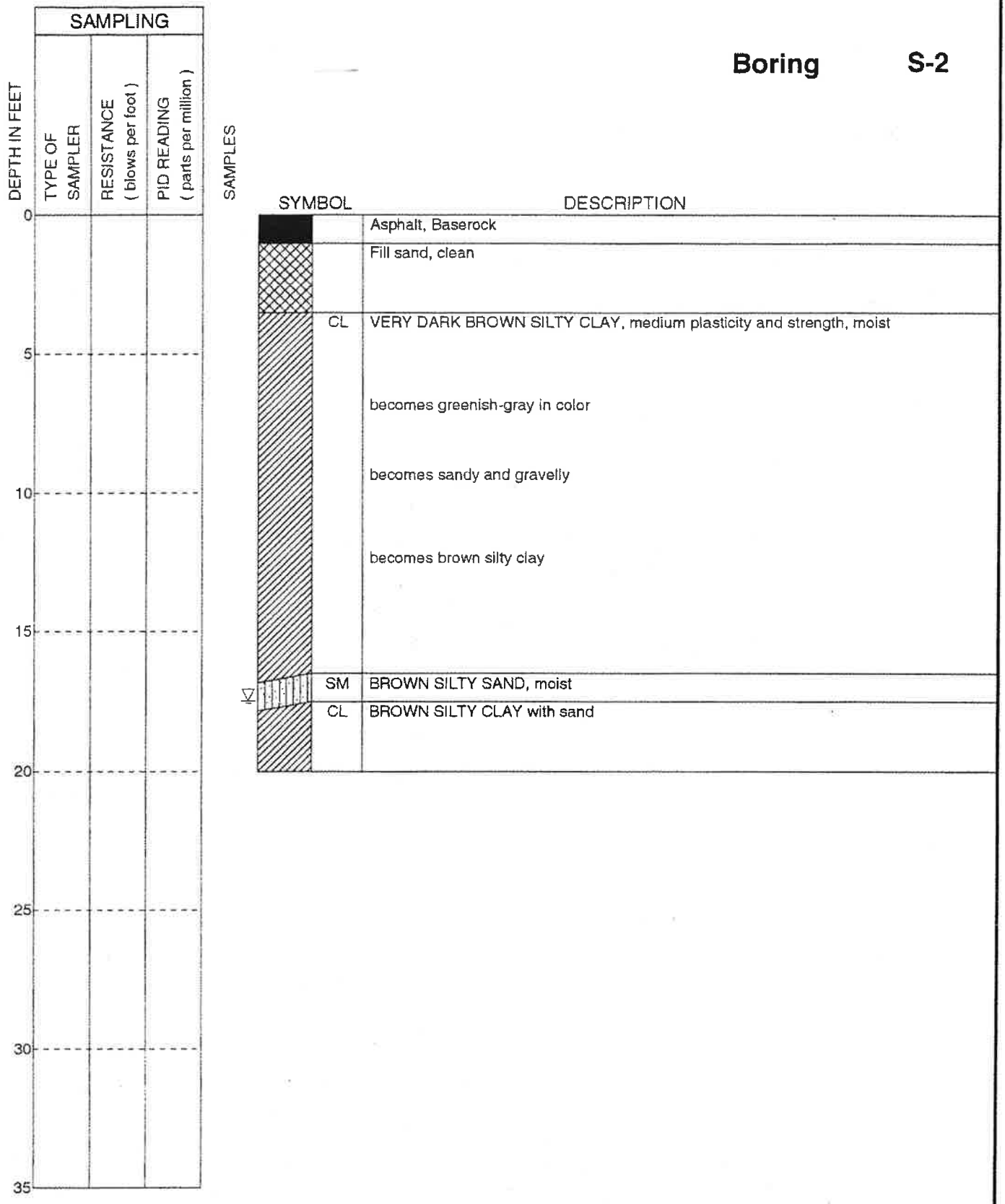
BORING LOGS FROM PRIOR REPORTS

Boring S-1

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt, Baserock
					CL	BROWN SILTY CLAY, medium plasticity and strength, moist
5						becomes gravelly
						becomes olive gray in color, with gravel
						hydrocarbon odor
10						becomes brown in color, less gravel
15						clean brown silty clay
					▽	water at 16.5' bgs
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-1	URS	**Log of Boring**
Date Completed: 4/21/04 Boring Depth: 22.0 ft	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Boring S-2



Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-2	URS		Log of Boring
Date Completed: 4/21/04 Boring Depth: 20.0 ft	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-3

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt, Baserock
					CL	VERY DARK BROWN SILTY CALY, medium platicity, medium strength, moist
5						
					CH	LIGHT GRAY/OLIVE GRAY SILTY CLAY, high plasticity, medium strength, moist
10						
					CL	BROWN SILTY CLAY, medium plasticity and strength, moist
15						
				▽		Groundwater assumed at 16.5' bgs from S-1 becomes very gravelly, >2" diamater
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-3	URS	**Log of Boring**
Date Completed: 4/21/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Boring S-4

DEPTH IN FEET	SAMPLES	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SYMBOL	DESCRIPTION
0						Asphalt, Baserock
					CL	VERY DARK BROWN SILTY CLAY, medium plasticity and strength, moist
						becomes light gray in color
5						olive gray in color, less gravel
10						becomes olive gray, sandy, gravelly, silty clay
15						becomes brown silty, sandy clay
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-4	URS	Log of Boring
Date Completed: 4/21/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-5

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Rock and Asphalt
					CL	VERY DARK BROWN SILTY CLAY, medium plasticity and strength, moist
						becomes olive gray in color
5						becomes sandy, gravelly, silty clay
						becomes greenish gray, brownish red mottled color
10						
						becomes brown silty clay, moist to wet
15						
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-5	URS		Log of Boring
Date Completed: 4/21/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-6

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt, baserock
					CL	VERY DARK BROWN SILTY CLAY,with rootlets, medium plasticity and strength, moist
5						becomes yellowish brown
						becomes gravelly
10						dry adn gravelly
15					CL	BROWN SITLY CLAY, moist
						water at 16.5' bgs
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-6	URS	Log of Boring
Date Completed: 4/21/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Boring S-7

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt, baserock
					CL	VERY DARK BROWN SILTY CLAY, medium plasticity and strength, moist
5						becomes yellowish brown
						becomes gravelly, dry
10						
						becomes yellowish brown-olive grey mottled, silty, clay, moist
15						
					▽	water at 16.5' bgs
20						becomes gravelly
25						
30						
35						

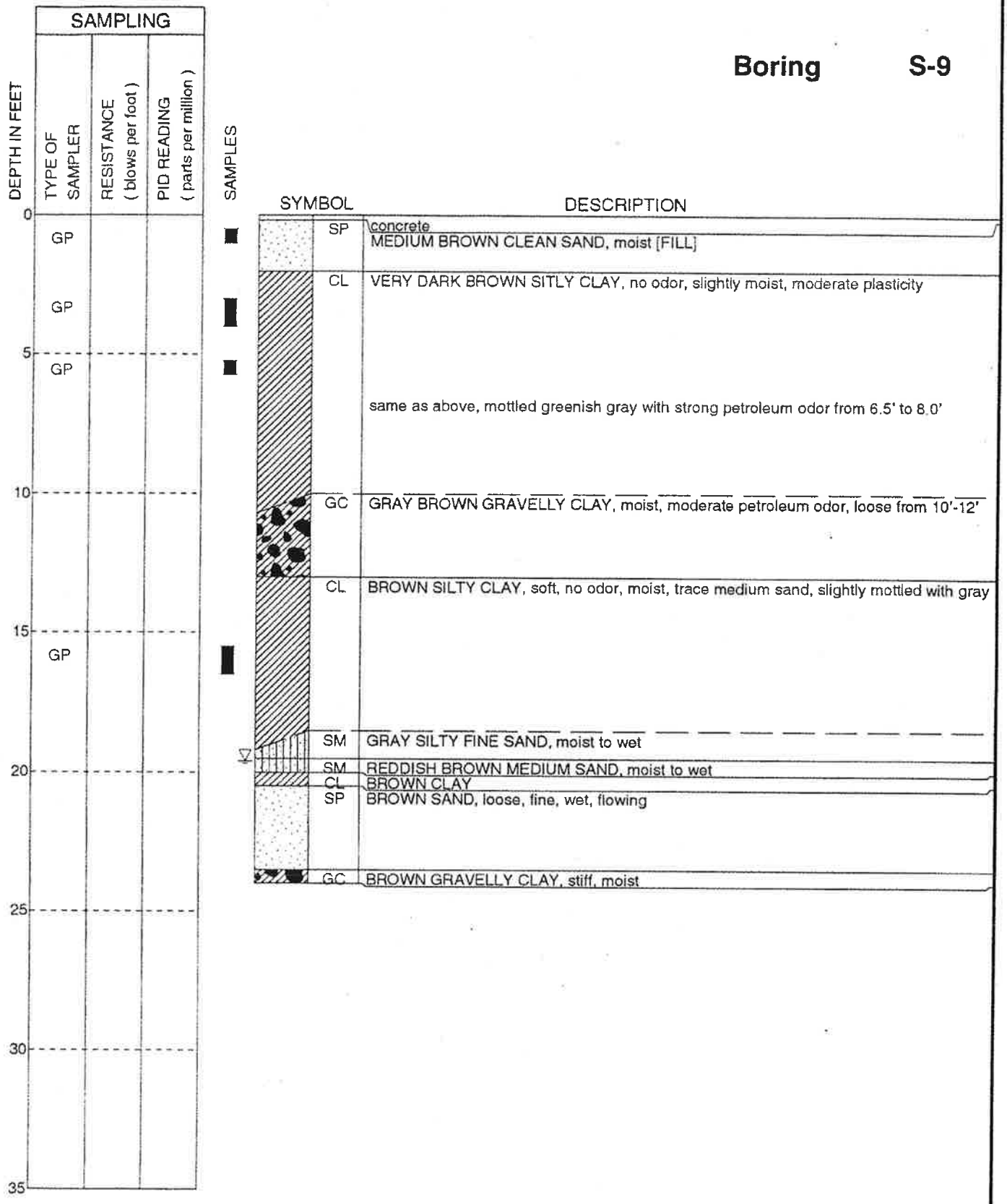
Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-7	URS	Log of Boring
Date Completed: 4/21/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Boring S-8

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt
					CL	VERY DARK BROWN SILTY CLAY, medium plasticity and strength, moist
						becomes yellowish brown in color
5						brown sandy, gravelly clay, dry
10					CH	BROWN SILTY CLAY with gravel, high plasticity and strength, dry
15					CL	YELLOWISH BROWN SILTY CLAY, medium plasticity and strength, moist
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-8	URS		Log of Boring
Date Completed: 4/22/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-9



Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-9	URS		Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-10

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Asphalt
					CL	VERY DARK BROWN SILTY, SANDY CLAY, medium plasticity, and strength, moist
5						becomes yellowish brown in color and gravelly, dry
						becomes greenish gray, gravelly clay, moist
10						
15						becomes silty, brown clay, moist to wet
				▽		Groundwater, becomes sandier
20						gravelly
25						
30						
35						

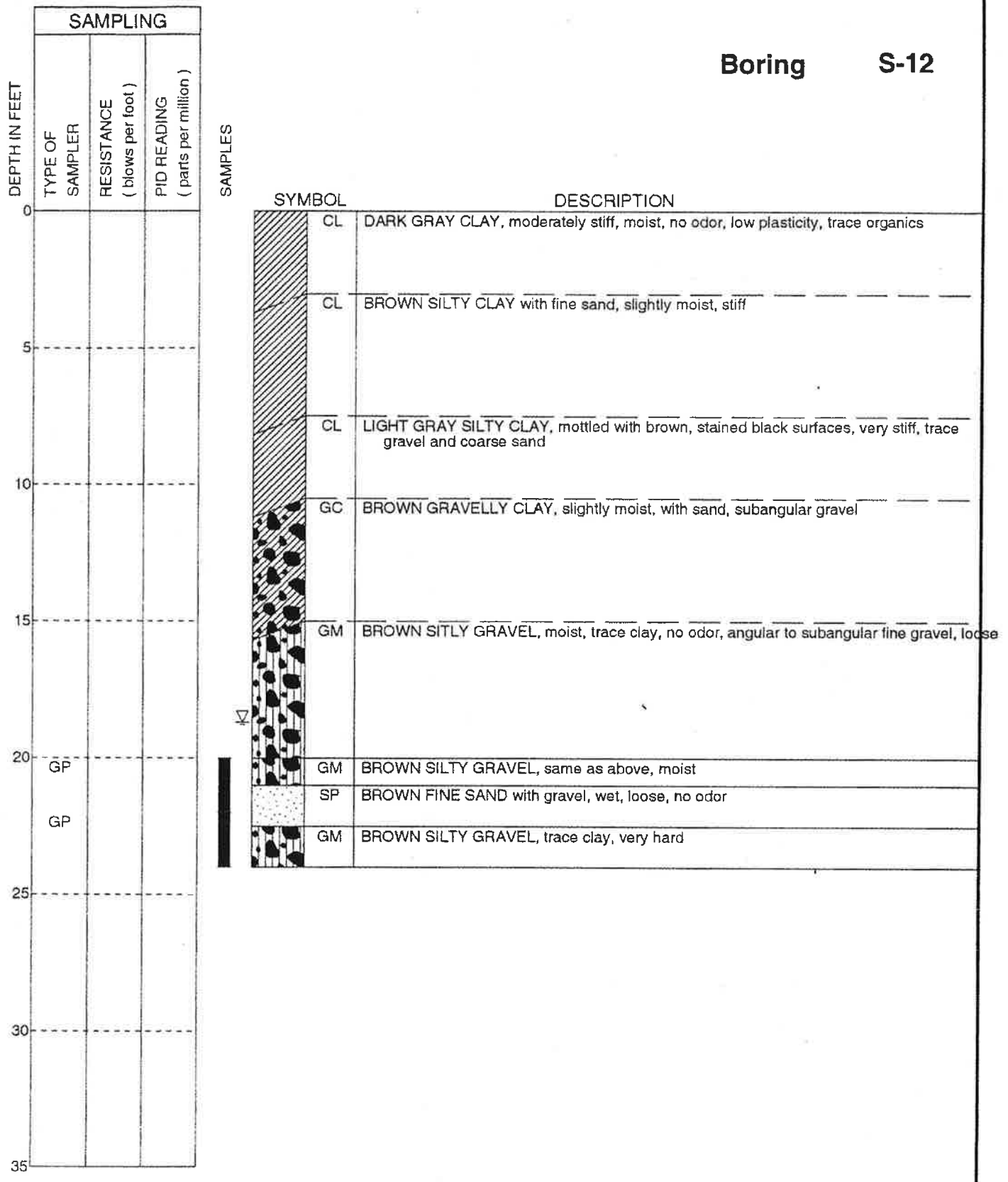
Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-10	URS	**Log of Boring**
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Boring S-11

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						concrete
					CL	VERY DARK BROWN SILTY CLAY, with gravel, medium plasticity and strength, moist
5						becomes very gravelly, yellowish brown, dry
						at 8.0' bgs, greenish gray color, hydrocarbon odor
10						green layer with hydrocarbon
						Brown silty clay, moist
15						becomes gravelly with sand
				▽		water at 18.6' bgs
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-11	URS		Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

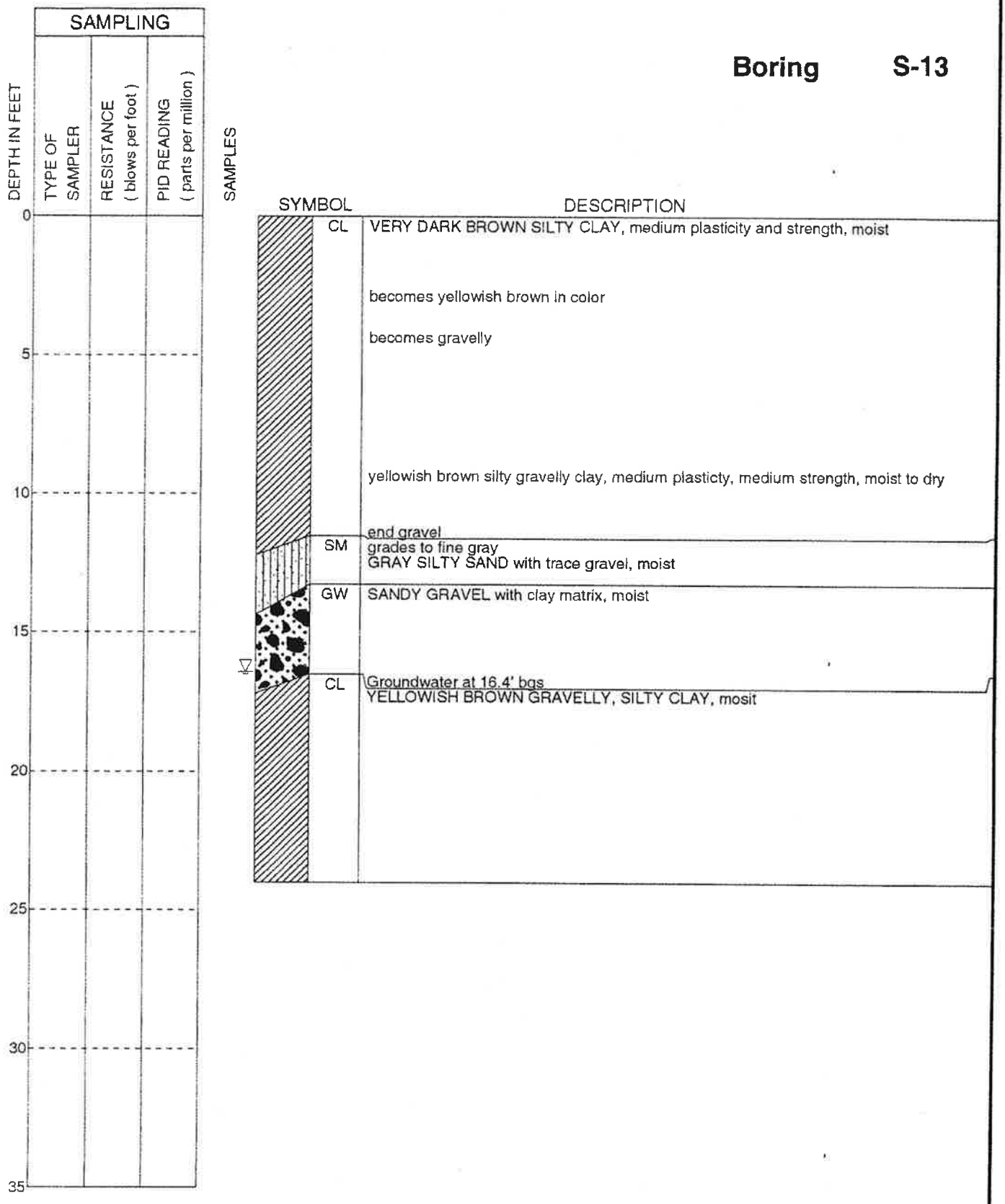
Boring S-12



Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-12	URS		Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Log Template: 14B June 15, 2004 PAGE 1 of 1

Boring S-13



Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-13	URS		Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Log Template: 14B

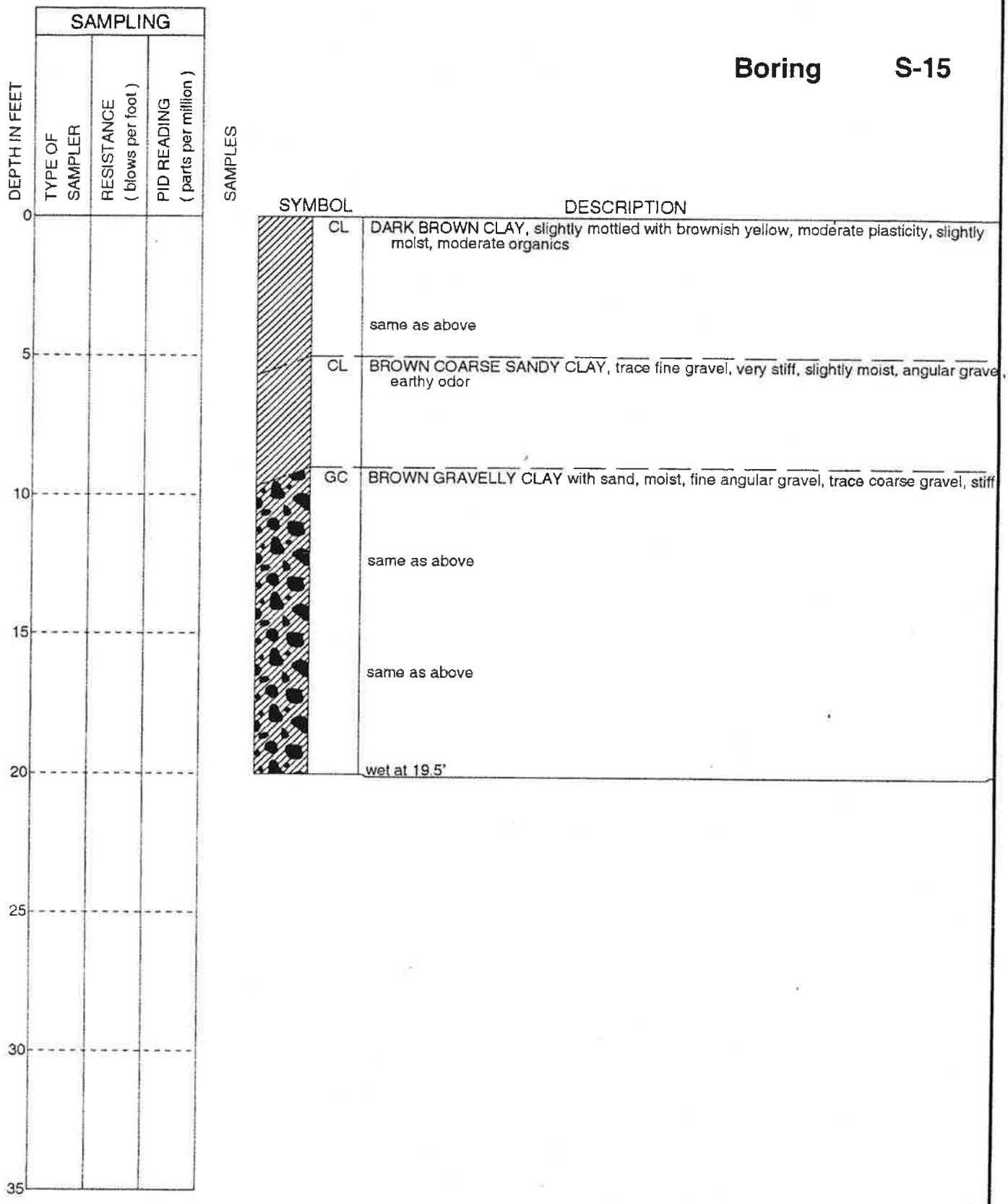
June 15, 2004

Boring S-14

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0						Grass
					CL	DARK BROWN CLAY, slightly moist, trace angular grave, trace organics, moderately stiff, no odor, trace man-made debris
5					CL	BROWN SILTY CLAY, with medium sand, stiff to very stiff, trace fine angular gravel
10					GC	BROWN GRAVELLY CLAY with medium and, moist, stiff, subangular gravel, no odor
15					GC	YELLOWISH-RED GRAVELLY SAND with clay, rounded to subrounded gravel, loose, moderately hard, no odor moist to wet at 17'
20						
25						
30						
35						

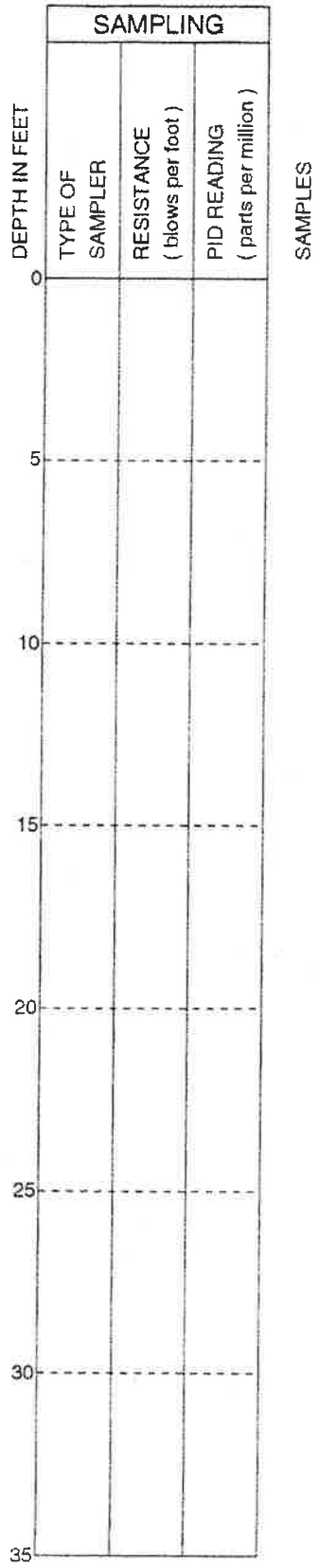
Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-14	URS		Log of Boring
Date Completed: 4/23/04 Boring Depth: 20.0 ft	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-15



Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-15	URS		Log of Boring
Date Completed: 4/23/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight	Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-16



SYMBOL		DESCRIPTION
		Grass
	CL	DARK BROWN CLAY, slightly mottled with dark gray, trace organics, moist, stiff, trace medium sand, no odor
	CL	BROWN SILTY CLAY, very stiff with sand, slightly mottled with black, slightly moist, no odor
		same as above, with coarse sand, trace angular fine gravel, moist
	ML	BROWN SANDY SILT, moist, moderately stiff, no odor
	GC	BROWN GRAVELLY CLAY with medium sand, moist, stiff, subangular to subrounded gravel no odor
		very moist to wet at 18'

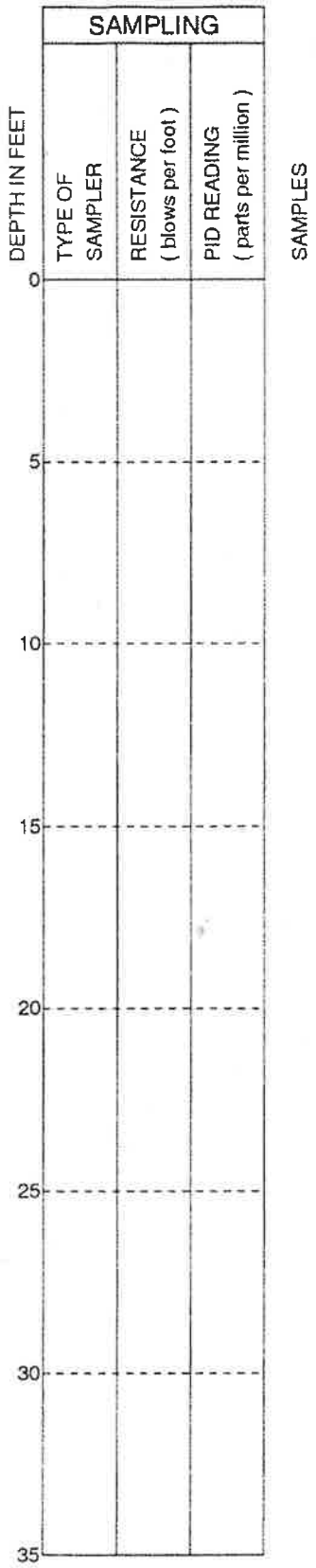
Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-16	URS	**Log of Boring**
Date Completed: 4/23/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-17

DEPTH IN FEET	SAMPLING: TYPE OF SAMPLER	SAMPLING: RESISTANCE (blows per foot)	SAMPLING: PID READING (parts per million)	SAMPLES	SYMBOL	DESCRIPTION
0					CL	VERY DARK BROWN SILTY CLAY, medium plasticity and strength, moist
						becomes yellowish brown color with gravel
5						mottled with greenish gray
10						becomes very gravelly and sandier
15				▽		gravelly, sandy clay, wet at 17'bgs
						yellowsh brown, sandy, gravelly clay, moist
20						
25						
30						
35						

Job No: 28066716.30000 Pt. ID: LUCKYA~1.GPJ / S-17	URS	Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

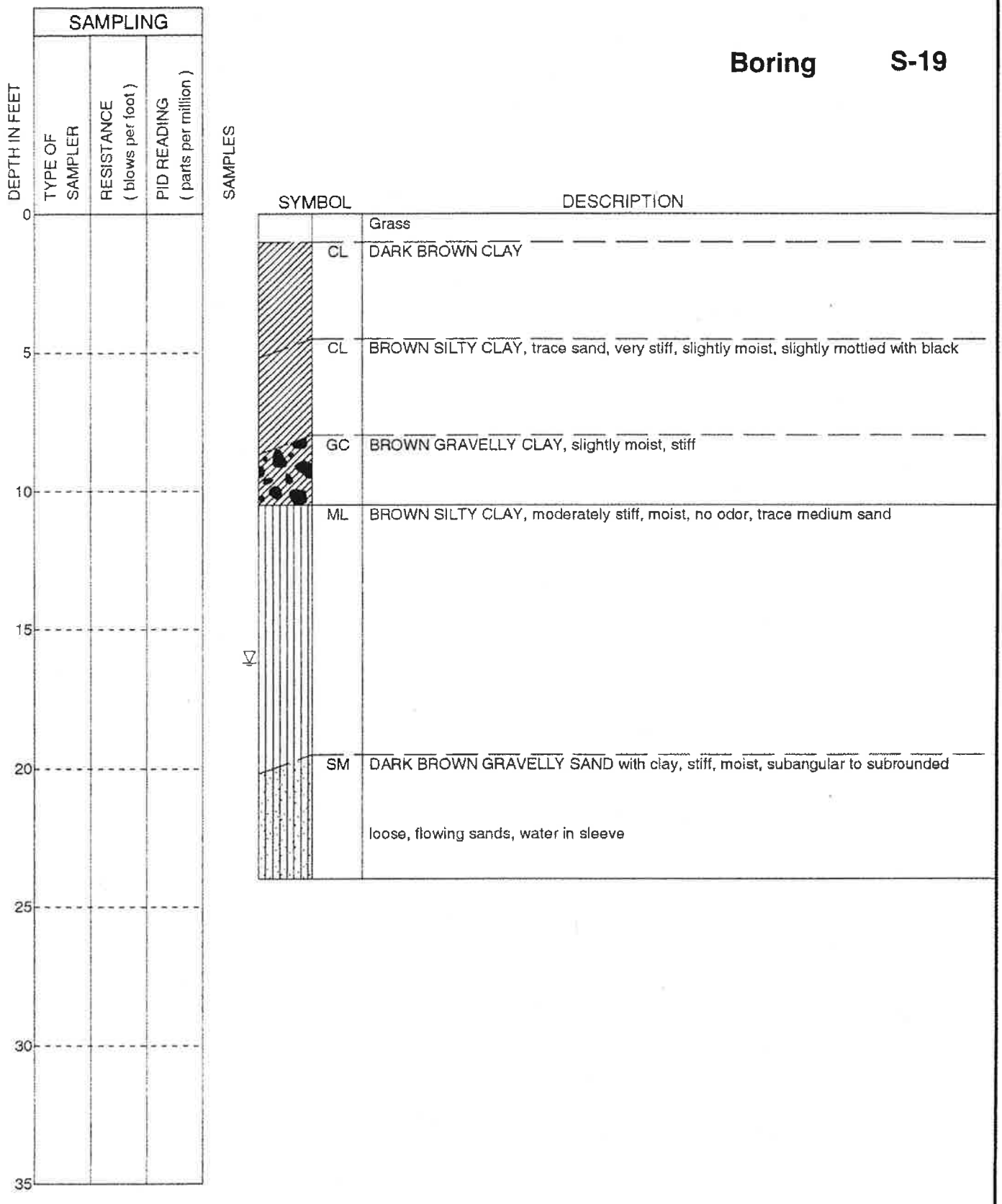
Boring S-18



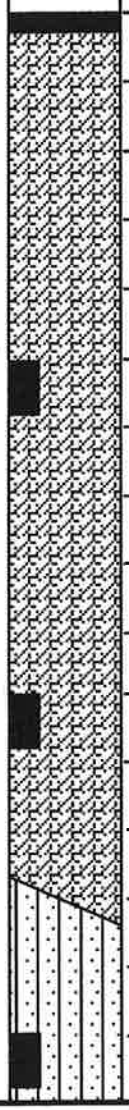
SYMBOL		DESCRIPTION
		Grass
	CL	DARK BROWN CLAY
	GC	BROWN CLAYEY GRAVEL, dry, stiff, no odor, no stain, fine, angular gravel
		same as above, loose gravel
	ML	BROWN SANDY SILT, moist, moderately hard
	GC	BROWN CLAYEY GRAVEL with coarse sand, moist, subangular to subrounded fine gravel, no odor
		same as above, very moist to wet
		yellowish-red gravel

Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-18	URS	Log of Boring
Date Completed: 4/23/04 Boring Depth: 20.0 ft.	Driller: Gregg Drilling Logged by: S. McKnight Drilling Method: HSA Continuous Core	Location: Oakland, California

Boring S-19



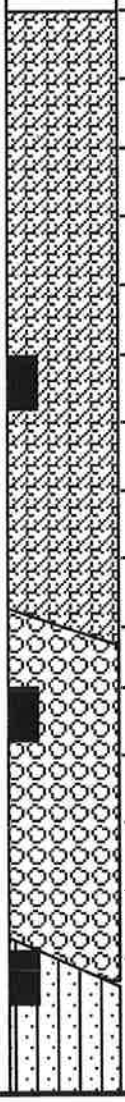
Job No: 28066716.30000 Pt. ID: LUCKYA-1.GPJ / S-19	URS	Log of Boring
Date Completed: 4/22/04 Boring Depth: 24.0 ft.	Driller: Gregg Drilling Drilling Method: HSA Continuous Core Logged by: S. McKnight	Location: Oakland, California

Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
					0	2 inches sidewalk concrete 4 inches sidewalk sub-grade gravel
		Terrace Deposits to 13 ft				brown silty clay with some angular gravel
						alternating layers of fine grained silts and clays with layers of coarser grained clayey, sandy gravels and gravelly sandy clays. Layers range from inches to about 0.5 feet
9795-GP1-5.0			0807		5	
9795-GP1-10.0			0813		10	
						Highest unstabilized Groundwater depth at 12.41 feet bgs
		ML				brown fine sandy silt, wet, to saturated.
9795-GP1-15.0			0822			

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Casing installed and highest GW level was 12.41 ft bgs. Boring terminated at 16 feet. Groundwater sample 9795-GP1-W taken at 1400. Casing removed and GP grouted with neat cement.

JOHN CARVER CONSULTING 415 235 4648	BORING LOG GP1 3884 Martin Luther King Way Oakland, California

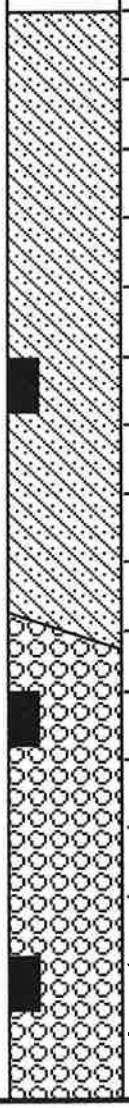
Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 12

Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
		Terrace Deposits to 9 ft			0	soil in planter area brown silty clay with some angular gravel alternating layers of fine grained silts and clays with layers of coarser grained clayey, sandy gravels and gravelly sandy clays. Layers range from inches to about 0.5 feet
9795-GP2-5.0			0900		5	
9795-GP2-10.0		GC	0904		10	brown silty clayey sandy GRAVEL
						Highest unstabilized Groundwater depth at 13.36 feet bgs
9795-GP2-14.0		ML	0910		15	brown clayey silt, wet, to saturated.

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Casing installed and highest GW level was 13.36 ft bgs. Boring terminated at 16 feet. Groundwater sample 9795-GP2-W taken at 1410. Casing removed and GP grouted with neat cement.

JOHN CARVER CONSULTING 415 235 4648	BORING LOG GP2 3884 Martin Luther King Way Oakland, California

Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 13

Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
		CL			0	soil in planter area brown silty clay with some minor gravel various inclusions of sands and gravels . Inclusions rance from less than one ince to 3 or 4 inches.
9795-GP3-5.0			0954		5	
9795-GP3-10.0		GM	0956		10	brown silty clayey sandy GRAVEL
9795-GP3-14.0			1003		15	Highest unstabilized Groundwater depth at 15.54 feet bgs

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Casing installed and highest GW level was 15.44 ft bgs. Boring terminated at 16 feet. Groundwater sample 9795-GP3-W taken at 1420. Casing removed and GP grouted with neat cement.

JOHN CARVER CONSULTING 415 235 4648	BORING LOG GP3 3884 Martin Luther King Way Oakland, California

Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 14

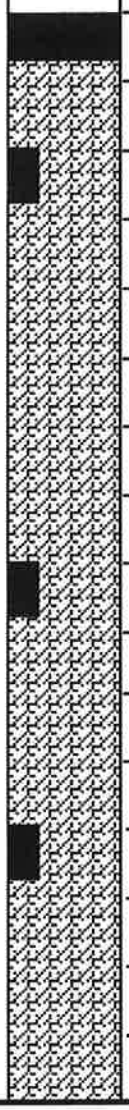
Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
					0	2 inches of asphalt over 4 inches of base rock
		CL				brown silty clay with some minor gravel
						various inclusions of sands and gravels . Inclusions rance from less than one ince to 3 or 4 inches.
9795-GP4-5.0			1028		5	
						Highest unstabilized Groundwater depth at 10.60 feet bgs
9795-GP4-10.0			1035		10	
		GM				brown silty clay to sandy clay with gravel inclusions
9795-GP4-14.0			1040		15	

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Casing installed and highest GW level was 10.60 ft bgs. Boring terminated at 16 feet. Groundwater sample 9795-GP4-W taken at 1430. Casing removed and GP grouted with neat cement.

JOHN CARVER CONSULTING
415 235 4648

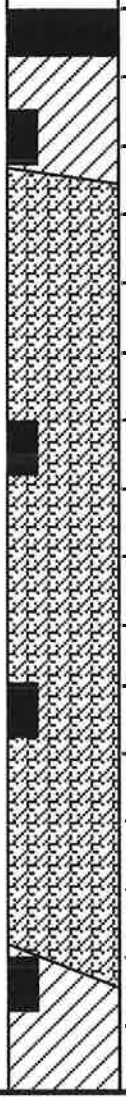
BORING LOG GP4
3884 Martin Luther King Way
Oakland, California

Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 15

Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
					0	2 inches of asphalt over 4 inches of base rock
9795-GP5-2.0		Terrace Deposits to 16 feet	1102		5	grey silty clay with many inclusions and layers of gravel. Appears to be Terrace deposits extending to the full depth. Gravel size ranges up to 2 inches.
9795-GP5-8.0			1120		10	
9795-GP5-12.0			1130		15	

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Boring terminated at 16 feet and grouted with neat cement.

JOHN CARVER CONSULTING 415 235 4648	BORING LOG GP5 3884 Martin Luther King Way Oakland, California			
Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 16

Sample Number	Blows per foot	Soil Type	Time	Log	Depth in feet	DESCRIPTION
					0	2 inches of asphalt over 4 inches of base rock
9795-GP6-1.5		CL	1140			dark brown silty clay
		Terrace Deposits to 16 feet			5	
9795-GP6-6.0			1145			brown silty clay with layers of gravel. Appear to be Terrace deposits. Gravel size ranges up to 1 inch.
9795-GP6-10.0			1150		10	
9795-GP6-14.0		CL	1155		15	brown silty clay, wet to saturated

Drilled February 21, 2006 using Geoprobe percussion technology. No groundwater indications during drilling. Boring terminated at 16 feet and grouted with neat cement.

JOHN CARVER CONSULTING 415 235 4648	BORING LOG GP6 3884 Martin Luther King Way Oakland, California

Project No. 9795	By: jnc	Not To Scale	March 2006	Figure 17