Vignes Street Ramps Improvement and Utility Installation Project Los Angeles, California

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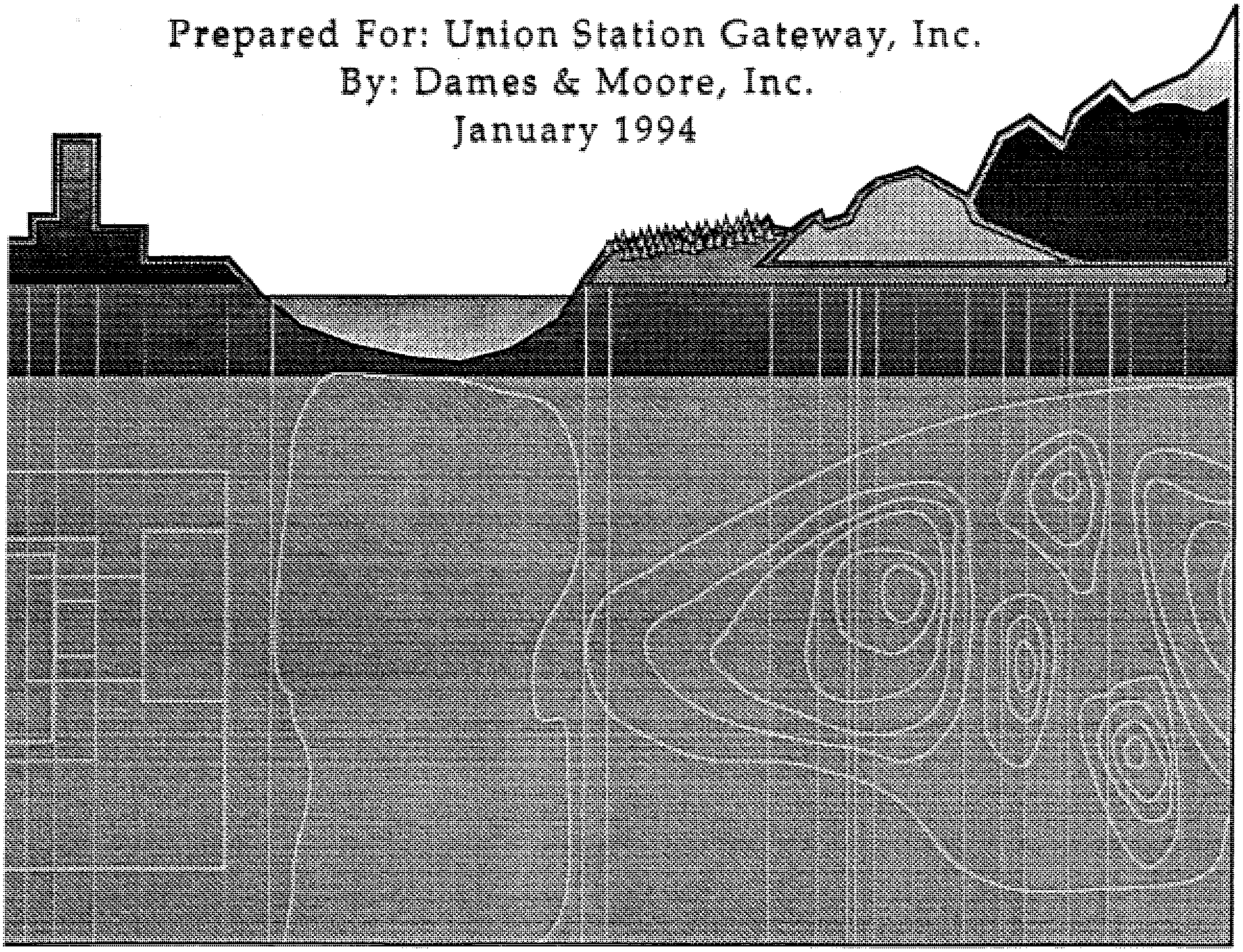
Prepared For: Union Station Gateway, Inc.
By: Dames & Moore, Inc.
January 1994



DAMES & MOORE

DRAFT

FOCUSED REMOVAL ACTION IMPLEMENTATION DESIGN
UNION STATION GATEWAY
VIGNES STREET RAMPS
IMPROVEMENT AND UTILITY INSTALLATION PROJECT

LOS ANGELES, CALIFORNIA

January 25, 1994

TABLE OF CONTENTS

Section Page

1.0 INTRODUCTION 1

2.0 REMOVAL ACTION STRATEGY. 1
  2.1 GEOTECHNICAL INVESTIGATION 1
  2.2 HEALTH RISK AND STATISTICAL EVALUATION 3

3.0 SCOPE OF REMOVAL ACTION ACTIVITIES 4
  3.1 SITE PREPARATION 4
  3.2 FILLS AND BACKFILLS 5
  3.3 TEMPORARY EXCAVATIONS 6
  3.4 PAVEMENT DESIGN RECOMMENDATIONS. 6
  3.5 CONSTRUCTION MONITORING 7
  3.6 SOIL SCREENING 7
  3.7 POST EXCAVATION CONFIRMATORY SAMPLING AND TESTING . . . 8
  3.8 OFFSITE TRANSPORATION AND TREATMENT 9
    3.8.1 Potentially Contaminated Soils 9
    3.8.2 Non-Contaminated Soils 10
    3.8.3 Asphalt and Concrete Debris 10

4.0 HEALTH & SAFETY 10

5.0 PERMITTING REQUIREMENTS 12

6.0 PROJECT MANAGEMENT PLAN 13

1.0 INTRODUCTION

This Focused Removal Action Implementation Design (FRAID) documents and provides guidance for the implementation of the removal actions for the Union Station Gateway, Vignes Street Ramps Improvement and Utility Installation Project. The FRAID follows an Engineering Evaluation/Cost Analysis (EECA) developed in compliance with National Contingency Plan (NCP) requirements for removal actions.

Union Station Gateway Incorporated (USG) was formed as a joint effort between the Los Angeles County Metropolitan Transportation Authority (MTA) and Catellus Development Corporation (Catellus), to develop an area located at the easter edge of Union Station in Los Angeles, California (Figure 1). USG is the designer/builder of the project to construct the Gateway Transit Center and MTA headquarters (USG Center). The USG Center includes various buildings, parking structures and off-rite roadway, ramp and utility improvements. This FRAID applies to the "site" defined by the ramp and utility improvement portions of the USG Center Project. The area delineated by the location of the ramp improvements (e.g., Parcels A and B on Figures 2 and 3) and trench excavation for utility relocation (shown on Figure 4) is thereby defined as the site.

The ramp and utility improvements are located in an area that includes or borders the much larger site of former coal gasification and butadiene production facilities (the gas plant site) where contaminated soils are most likely be encountered during excavation. The site removal action will be performed following the requirements of the National Contingency Plan (NCP) (EPA, 1990) and implemented under critical time constraints imposed by the construction of the USG Center. The FRAID applies to the removal action planned for soils excavated from Parcels A/B and utility trenches.

2.0 REMOVAL ACTION STRATEGY

2.1 GEOTECHNICAL INVESTIGATION

The temporary pavement section, to be installed over Parcels A/B, has been specified by the California Department of Transportation (Caltrans) and will consist of 8 inches of asphaltic concrete over 10 inches of aggregate base material. The temporary pavement is anticipated to remain in place for about 1 year or longer, then it will be demolished and replaced with permanent paving. The temporary construction will be a part of the adjacent and on-going Gateway and Transit Parking Garage project for which a detailed geotechnical investigation was performed by Law/Crandall, Inc. The results of Law/Crandall's investigation (which reported the presence of fills in the upper 6 to 11 feet along Vignes Street) are summarized in their report dated Decembere 13, 1991.

The following geotechnical recommendations are related to construction of the temporary pavements only. These recommendations should not be extrapolated to other areas or used for design of any permanent pavements without prior review.

The following tasks were performed as part of the geotechnical investigation:

- Site reconnaissance and reports review by a geotechnical engineer;
- Compaction testing on representative soils obtained from Parcels A and B, per ASTM D-1557 and performing a California Bearing Ratio Test (CBR) to evaluate compaction and bearing characateristics, respectively;
- Engineering analyses upon which to base our recommendations for design and construction of the geotechnical aspects of the project; and
- Preparation of this report containing specific recommendations for site preparation and grading, material selection and construction monitoring.

Logs of previous borings drilled within the site vicinity were reviewed. The site is known to be immediately underlain by fill soils consisting of fine to medium silty sands, placed during previous grading activities. Adjacent to the Denny's Restaurant, the near surface fill soils contain miscellaneous debris, indicating that they are potentially unengineered. Several large slabs and footings are also present at the site, below the surface.

Since no record of fill placement is available for review some subgrade preparation involving minor overexcavation will be required prior to pavement construction. It is anticipated that the existing fill soils would provide adequate support for the temporary pavement provided that recommendations, included in Section 3, be incorporated into the plans and specifications. It should be noted however that construction of any structure over undocumented or unengineered fills would require permitting from governing agencies. Excavated surficial fill materials will not be suitable for reuse as engineered fill for environmental reasons and should be properly treated/recycled off-site. Detailed recommendations are provided in Sections 3.

2.2 HEALTH RISK AND STATISTICAL EVALUATION

The USG site encompasses parcels that were part of a former town gas plant site, and sampling of soils has documented the presence of carcinogenic and noncarcinogenic polyaromatic hydrocarbons (PAHs) in various locations at the site. This site is to be developed as a ramp for the adjoining freeway and health concerns from exposure to contaminants in soil are restricted to construction workers who would be involved in developing the ramp.

A risk-based approach was used in accordance with the National Contingency Plan (NCP), administered by the EPA, and with the California Department of Toxic Substances Control (DTSC) guidelines in order to determine if contaminated soils pose an unacceptable risk (as defined by EPA) and therefore warrant remediation. A streamlined risk evaluation, based on the Removal Preliminary Assessment results (Dames & Moore, 1993) concluded that soils excavated as part of the ramp improvement and utility installation may present a health risk to current and future construction workers. The risks levels were initially defined as one in a million (10^{-6}) excess cancer risk for the site. However, the risk evaluation assumptions were refined after consideration of additional analytical data from shallow soil samples obtained as part of the Removal Site Inspection (Dames & Moore, 1994) and in response to comments received on the Draft EECA.

Based on conservative assumptions provided in Appendix A, the refined risk based goal for carcinogenic PAHs was established at 35 mg/Kg.

The site data were conservatively evaluated assuming that all of the soil that may be contacted is from the 0-6 foot depth interval, where most of the contamination was detected. Further, prior to excavation for the freeway ramp, the top 2.5 feet of soil will be removed from the site and replaced with clean soil as part of site overexcavation. In addition, a strong correlation between dark staining of soil and elevated concentrations of PAHs was confirmed as part of the utility trench "hot spot" confirmation sampling. Therefore, in addition to the top 2.5 feet that will be removed as part of the ramp improvement project, dark soil exposed by the Parcels A/B overexcavation will also be excavated and transported offsite for treatment/recycling. This will reduce the average concentration in the 0-6 foot depth interval. Nevertheless, the carcinogenic PAH concentrations detected in the 2-6 foot depth interval were compared to the risk-based goal of 35 mg/Kg.

Exploratory boring and trench data from the site were evaluated to determine whether the remedial goal of 35 mg/Kg carcinogenic PAHs is likely to be exceeded in site soils. For Parcel A and Parcel B combined, average concentrations of carcinogenic PAHs in soil from depths of 1, 2-3, 5-6, and more than 6 feet were calculated at 115, 9, 13, and 5 mg/Kg, respectively, using the data presented in Table 1. The average concentration of PAHs remaining on Parcel A after overexcavation of the top 2.5 feet was calculated at 19.34 mg/Kg for depths from 3 to 6 feet. Similarly, the average concentration of PAHs remaining on Parcel B after overexcavation of the top 2.5 feet was calculated at 0.62 mg/Kg for depths from 5 to 6 feet.

Maps were prepared to evaluate the spatial distribution of carcinogenic PAH concentrations detected in the 2-6 foot depth interval. Concentrations of 46 to 70 mg/Kg (up to two times the risk-based goal) were detected in limited areas from the 2-3 foot depths and from the 5-6 foot depths (Figures 2 and 3). However, the data indicate an apparent gradient of decreasing concentrations from these locations and, at both depths, most of the carcinogenic PAH concentrations are well below the remedial goal of 35 mg/Kg. Average concentrations at both depths are one-third to one-quarter of the remedial goal.

Therefore it appears unlikely that the average carcinogenic PAH concentration in site soils would exceed the remedial goal of 35 mg/Kg. Therefore, this health risk evaluation concludes that it does not appear necessary to remove soil deeper than 2.5 feet for the site overexcavation in order to achieve risk based goals. In addition, dark stained areas of soil exposed by the overexcavation will be removed. Therefore, after completion of the ramp improvement and utility installation project, the top 6 feet of soils in Parcel A and Parcel B will have concentrations of PAHs that do not pose a threat to future construction workers undertaking normal maintenance activities.

3.0 SCOPE OF REMOVAL ACTION ACTIVITIES

3.1 SITE PREPARATION

Site preparation will include demolition and removal of existing pavements and some minor site grading. Prior to site grading, any remaining debris or deleterious material from the site demolition activities should be removed and disposed of outside the construction limits. If applicable, all active or inactive utilities influenced by grading within the construction areas should be relocated or abandoned. Pipes to be abandoned in-place should be filled with a sand/cement slurry after review of their location and approval by the geotechnical engineer.

To provide uniform support for pavements it is recommended that the upper 12 inches of the subgrade be removed and replaced with properly compacted fill. Therefore, the top 2.5 feet of Parcels A/B soil will be removed to allow for the installation of the 18"-section of the temporary pavement. If existing footings and slabs preclude construction of the 12-inch thick compacted fill, they may be left in place provided they are stable and competent for support of the temporary pavement. The geotechnical engineer should observe the footings/slabs exposed during construction to evaluate their stability and so that additional recommendations may be formulated, as necessary.

The overexcavated materials will not be suitable for reuse as fill. Therefore, the materials will be transported offiste for treatment/recycling. Soil excavated from areas that do not require personal protective equipment for construction workers and does not show evident traces of contamination will also be transported offsite for treatment/recycling. Following overexcavation, all areas to receive fill should be proofrolled or probed as appropriate. All observed loose or soft zones should be moisture conditioned as necessary and compacted in-place or excavated and replaced with properly compacted backfill. It is anticipated that additional overexcavations would not exceed 4½ feet below the finished asphaltic concrete surface. However, unforeseen subsurface conditions may warrant overexcavation in excess of the maximum anticipated depth. In this case, we recommend that the geotechnical engineer reevaluate the subsurface conditions so that appropriate recommendations may be formulated to minimize the amount of overexcavation.

Upon completion of proofrolling and any required overexcavation, backfill may be placed in accordance with the recommendations presented in the following sections.

3.2 FILLS AND BACKFILLS

All fills beneath temporary pavements should be placed in loose lifts not exceeding 8 inches in thickness, brought to near-optimum moisture content in-place, and compacted to at least 90 percent of the maximum dry density per ASTM D-1557 using mechanical compaction equipment or per Caltran's minimum compaction specifications.

All fill and backfill materials should be predominately granular in nature, (no more than 35 percent mostly non-plastic fine materials passing the No. 200 sieve is recommended), less than 3 inches in any dimension, and free of organic and inorganic debris. All imported fill materials should be observed and tested by the geotechnical engineer prior to their use in order to evaluate their suitability.

3.3 TEMPORARY EXCAVATIONS

All excavations shall comply with the current California or Federal OSHA requirements, as applicable. All cuts greater than 5 feet in depth shall be sloped and/or shored. Temporary excavations may be sloped at 2(h):1(v) or flatter, up to a maximum depth of 10 feet below surrounding grade. Flatter slopes may be required if clean and/or loose sandy soils are encountered along the slope face. Steeper cuts may be utilized for cuts less than 5 feet deep depending on the strength and homogeneity of the soils as observed in the field.

During wet weather, runoff water should be prevented from entering the excavation, and collected and disposed of outside the construction limits. To prevent runoff from adjacent areas from entering the excavation, a perimeter berm may be constructed at the top of the slope. Heavy construction equipment, building materials, stockpiles of excavated soil and vehicle traffic should not be allowed near the top of the slope within a horizontal distance equal to the depth of the excavation.

3.4 PAVEMENT DESIGN RECOMMENDATIONS

A maximum dry density of 129 pounds per cubic foot (pcf) at an optimum moisture content of about 9 percent was obtained for the on-site fill soil. When compacted to 90 percent of the maximum dry density the on-site soils yielded a CBR of 15. This CBR corresponds to an R-value of about 45.

For imported soils meeting the recommended gradation and compaction requirements, a CBR of 10 may be assumed for design purposes. Although this value is conservative, it should be confirmed by the geotechnical engineer during construction. Aggregate base should meet Caltrans Class II gradation and material requirements and should have a minimum R-value of 78. The above gradation and R-value should also be confirmed by the geotechnical engineer during construction. All aggregate base materials should be compacted to a minimum of 95 percent of the maximum dry density per ASTM D-1557 or per Caltran's minimum compaction specifications for aggregate base.

We have performed engineering analyses (pavement design) to back-calculate the subgrade support requirements for the given temporary pavement section and a Traffic Index of 9. The results of our analyses generally indicate that the subgrade, if prepared and constructed in accordance with the preceding recommendations, should provide adequate support for the specified temporary pavement section.

3.5 CONSTRUCTION MONITORING

We recommend that all earthwork construction be monitored by a qualified engineer/technician including:

- Site preparation -- site stripping, overexcavation, and recompaction;
- Placement of all compacted fill and backfill; and
- Construction of pavement subgrades.

The engineer/technician should be present to observe the soil conditions encountered during construction, to evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and to recommend appropriate changes in design or construction if conditions differ from those described herein.

3.6 SOIL SCREENING

Soil vapors will be monitored for the purpose of screening excavated soils so that the soils can be segregated either for treatment, recycling, or disposal. During the course of the excavation activities, soil vapors will be monitored using a portable field organic vapor analyzer (OVA) (Photovac Microtip or Foxboro OVA) and recorded on the daily field log. Field instruments will be calibrated to standards at the beginning and end of each working day at a minimum.

Soils will be segregated in the field using one or all of the following criteria:

Odor - If the soils encountered have a noticeable odor they will be removed for treatment or recycling.

Black staining - Dark or black stained soils that may indicate the presence of coal tar will be removed for treatment or recycling.

OVA measurements - Soils with OVA measurements of at least 50 ppm that are sustained for several seconds above background levels will be removed for treatment or recycling. Soils that have sustained OVA measurements of less than 50 ppm but are odorous or dark in color will also be removed for treatment or recycling. Monitoring of soil excavation activities will occur simultaneously with the excavation and offsite removal of the soils. Field monitoring with the OVA will take place by placing the tip of the instrument within 3 inches of the surface of the soil.

Soils that do not exhibit any of the above criteria will be transported offsite for treatment/recycling. The facility listed in Section 3.8 will be responsible for reusing the above described soil in accordance with applicable regulations.

Any residues such as lampblack, coal tar, and sludges that may be encountered as part of the dismantling of underground utilities will be segregated and containerized in a covered bin. USG will be immediately notified of the presence of such materials for disposal/treatment in a Class I hazardous waste landfill and in accordance with the recommendations made in the Waste Management Plan (Appendix B).

3.7 POST EXCAVATION CONFIRMATORY SAMPLING AND TESTING

Post excavation confirmatory sampling and testing of removed soils will be performed as a check on the chemical characteristics of soils sent for offsite treatment or recycling. It is anticipated that up to 11 soil samples will be analyzed for VOCs using EPA method 8260, SVOCs using EPA Method 8270, and total lead using ICPMS.

Soils will be randomly sampled for analysis from stockpiles or trucks and from field identified "hot spots", if present. These locations may represent either "clean" or potentially contaminated soil. Soil samples will be collected by placing the soil into a clean glass jar or a stainless steel sleeve. The recovered stainless steel sleeves or jars of soil will be covered on each end with Teflon sheeting, fitted with plastic end caps, and labeled. Sealed and labeled samples will be shipped or delivered immediately to the analytical laboratory for analysis.

Surficial asphalt and concrete debris will not be sampled for analysis. It is expected that these materials are not in contact with potentially contaminated soils and will be disposed of at an appropriate or recycling facility, as described in Section 3.8.

3.8 OFFSITE TRANSPORATION AND TREATMENT

3.8.1 Potentially Contaminated Soils

Contaminated soil will be loaded onto 23 ton end dump trucks and transported to a non-hazardous waste treatment facility in Irwingdale, California. The Landmark facility was selected on a cost-effectiveness and implementability basis and consideration of Interstate 5 closure due to the recent earthquake in Los Angeles.

A non-hazardous manifest form must be completed for each load of soil transported. This form documents the transfer and receival of the load of soil and is designed so that the waste shipment can be tracked from generator to treatment facility. The generator, the transporter and the receiving facility all must sign and date a certification statement on the form in the order that they handled the material, each retaining a copy for their files. In addition to the signatures, the form must include the net weight, a description of the material and information such as company name, address, telephone number, and vehicle identification. A copy of a blank non-hazardous manifest is included in Appendix C of this report.

After the excavated soil is loaded, the transport haul trucks travel approximately 15 one-way miles to the Landmark Treatment Facility (Landmark). This facility, located in California, is permitted for the treatment of non-hazardous waste. A site soil profile will be submitted to Landmark for approval. A waste discharge permit will be submitted to the Regional Water Quality Control Board (RWQCB) for approval. The name of the contact person for disposal at Landmark is Susan Reynolds with Allied Environmental who can be reached at (800) 394-7645.

Prior to any delivery of soil, a letter was sent to Landmark informing that soil would be transported to their facility for treatment and certifying that it is non-hazardous. In addition to the letter, a profile sheet and analytical data were sent to support the non-hazardous material designation. At the facility, the driver will provide the non-hazardous manifest to the acceptance technician. After the truck load is processed, the acceptance technician will direct the driver where to off-load the material.

Soil is introduced to the screening operation where oversized rocks, plastic, etc. are removed. A hammermill breaks up all clods and the material is vibrated over a one-inch screen. A silo allows blending of soil stabilizers in the hammermill/shredder. Soil is moved via a stacking conveyor where it is met with measured amounts of aggregate supplied by a second stacking conveyor. Analytical may be performed to ensure that specifications are met for a particular class of base material. As required, monitoring reports are flied with LARWQCB including copies of manifests and weight tickets. Other materials may be added and blended depending on the specifications of the end product. The treated soils may then be recycled as road base or engineered fill.

3.8.2 Non-Contaminated Soils

Non-contaminated soils are defined as soils that have been designated as such by the Dames & Moore field geologist. The Dames & Moore field geologist will use the criteria described in Section 3.8 to make this evaluation.

Non-contaminated soils will be reused by Landmark located in Irwingdale, California. The contact person for reuse of non-contaminated soils is also Susan Reynolds with Allied Environmental who can be contacted at (800) 394-7645.

3.8.3 Asphalt and Concrete Debris

Asphalt and concrete debris that will be generated as part of the overexcavation will be disposed at the Aggregate Recycling Systems facility located in Huntington Park, California. Preferably asphalt and concrete debris will be segregated at the time of stockpiling/loading. The contact person for disposal at this facility is also Susan Reynolds with Allied Environmental who can be contacted at (800) 394-7645.

Aggregate Recycling Systems, located in Huntington Park, is a materials recycler. Material accepted for processing includes concrete, asphalt and non-hazardous petroleum contaminated soil. Concrete and asphalt is mechanically crushed for reuse in aggregate products which are sold in bulk for fill or base materials. Concrete and asphalt can be accepted in mixed loads, however, it is preferred if the material be segregated. Concrete and asphalt should be in 2' x 3' chunks; larger pieces are accepted on a case by case basis.

4.0 HEALTH & SAFETY

The Site Health & Safety Plan (SHSP) developed as part of the Soil Sampling and Analysis Plan also covers excavation activities and utility installation. However, several abandoned and

- Limit pipe cutting activities to personnel with current training on Hazard Communication, respiratory protection, confined space entry, and other applicable regulations.
- Place two fully charged 20 pound ABC fire extinguishers in the immediate work area.
- Place all combustible materials at least 35 feet away from work area.
- Limit access in the work area to "Authorized Personnel Only".
- Determine if contents of pipe are likely to spill to ground upon cutting of pipe. If spills are likely, cease work and collect sample of contents for laboratory analysis.
- If contents of pipe are not likely to spill to ground upon cutting, protect the soil beneath the pipe with plastic in the event solid or liquid product is released while cutting the pipe.
- Immediately cap the open ends of the pipe that remain in the ground with suitable metal covers or plugs.
- Wrap removed section of pipe in plastic and dispose of as hazardous waste, as deemed necessary by evaluation of analytical data.

5.0 PERMITTING REQUIREMENTS

Permitting requirements for the Vignes Street Ramps Site include air quality and offsite recycling. The reason for the air quality permit was the presence of volatile organic compounds (VOC) found in the soil. The South Coast Air Quality Management District (SCAQMD) regulates sources of emissions that emit non-attainment pollutants. Non-attainment pollutants are those air contaminants that do not meet the National Ambient Air Quality Standards (NAAQS) or the California Ambient Air Quality Standards (CAAQS).

The South Coast Air Basin, including the city of Los Angeles, is a non-attainment region for ozone (O3). Precursors to non-attainment pollutants are also considered non-attainment for regulatory purposes of the SCAQMD review. Therefore, SCAQMD considers VOCs as a precursor to O3 to be non-attainment also.

SCAQMD Rule 1166 provides provisions to minimalize the emissions of VOCs during excavation activity. These provisions require notification procedures to the SCAQMD when VOC contaminated soil is found during excavating activities, the application of Best Available Control Technology (BACT), restrict on-site or offsite spreading of soil, and define VOCs and VOC contaminated soil.

potentially active utility pipe exist at the Vignes Street Ramps Site. Each of these abandoned pipes are expected to potentially contain natural gas or other hydrocarbon products and, therefore, all workers handling such pipe are required to do so with caution. The following procedures have been developed to specifically address the removal of the 60" pipe located within the utility trench at the rear of the Denny's parking lot. However, these general principles should be followed when removing any pipe from utility trenches.

- Monitor interior of pipe for flammable gas/vapor with combustible gas indicator (CGI) to determine percent lower explosive limit (LEL).

- Evaluate those data in light of the action levels provided below.

Contaminant	Monitoring Location	Monitoring Device	Action Level (Above Background)	Action
Flammable gas/vapor	Inside pipe	CGI	<1% Lower explosive limit	Continue pipe cutting operations
Flammable gas/vapor	Inside pipe	CGI	≥1% to ≤10% Lower explosive limit	Inert pipe atmosphere (with dry ice or equivalent), cut pipe using engineering controls
Flammable gas/vapor	Inside pipe	CGI	>10% to <20% Lower explosive limit	Cease pipe cutting operations, reduce LEL by all available means
Flammable gas/vapor	Inside pipe	CGI	≥20% Lower explosive limit	Cease all operations, notify Fire Department

- Require the use of Self-Contained Breathing Apparatus or supplied-air respirator while cutting the pipe.

- Use cold cutting procedures whenever possible.

- Use non-sparking alloy tools only.

- Obtain "Hot Work" permit prior to hot work activities. Complete, sign and post near trench entrance. Issue new permit for each work shift.

- Obtain "Confined Space Entry" permit prior to pipe removal activities regardless of cutting method utilized. Complete, sign and post near trench entrance. Issue new permit for each work shift.

To comply with SCAQMD Rule 1166, a Rule 1166 Contaminated Soil Mitigation Plan (Mitigation Plan) Application was submitted to the SCAQMD prior to excavation. The information provided in the Mitigation Plan application included data concerning the company (applicant), the facility (site), the equipment or operation, the operating schedule, the potential air toxic emissions (AB 2588 Air Toxics Summary), the volume of soil to be excavated, an excavation description, the proposed mitigation measures and the location of the treatment facility. The Mitigation Plan application was submitted to the SCAQMD on November 5, 1993.

The Mitigation Plan was approved by the SCAQMD on November 12, 1993. On November 23, 1993, a letter was sent to the SCAQMD requesting a modification to the Mitigation Plan Condition 13B. This modification request was to be able to stockpile contaminated soils instead of containment bins. The modification to the Mitigation Plan was approved on the same day. On January 14, 1994, another modification was requested to be allowed to excavated an additional 4500 cubic yards of VOC contaminated soils. This modification was approved on January 21, 1994.

In addition, since the selected treatment/recycling facility is located in Los Angeles County, a waste discharge permit is required by the Regional Water Quality Control Board (RWQCB). This permit was approved by the RWQCB on __________. A copy of the permit is attached as Appendix D.

6.0 PROJECT MANAGEMENT PLAN

An organization chart showing project implementation and a decision tree are provided as Figures 5 and 6. Dames & Moore will provide consulting services to Union Station Gateway so that Pankow, the general contractor, can effectively implement the scope of the Removal Action.

TABLES

TABLE 1
CONCENTRATIONS (MG/KG) OF CARCINOGENIC PAHS IN SITE SOILS, PARCELS A AND B

BORING LOCATION

Depth (ft)	DM1	DM2	DM3	DM4	DM5	DM6	DM7	DM8	DM9	DM10	BH12	BH13	BH14	BH15	BH2	BH3	BH8A
1																	
2	3.96	46.30	10.73	1.10	6.45	0.23	0.30	16.20	3.76	9.26							
3																	2.07
5											3.81	35.59				0.60	
6	0.06	0.06	0.06	0.06	2.90	0.06	58.70	16.20	2.59	4.17			0.38	69.79			
10												10.51			0.60		
11											0.34		0.34	3.41			2.07
15												0.45					
16														0.34			
20												0.34					
21											0.34			0.34			2.07
22													0.34				
25																0.60	
26														0.34			
30															0.60		
35																	
40																	
45																	

NOTE:

TO CALCULATE CONCENTRATIONS, "NONDETECTS" WERE SET EQUAL TO ONE-HALF THE REPORTE DETECTION LIMIT.

FIGURES

REFERENCE: USGS
Los Angeles, California

N

0 2000

Scale in Feet

FIGURE 1

SITE LOCATION MAP

Denny's Site Parcel "A"
Los Angeles, CA

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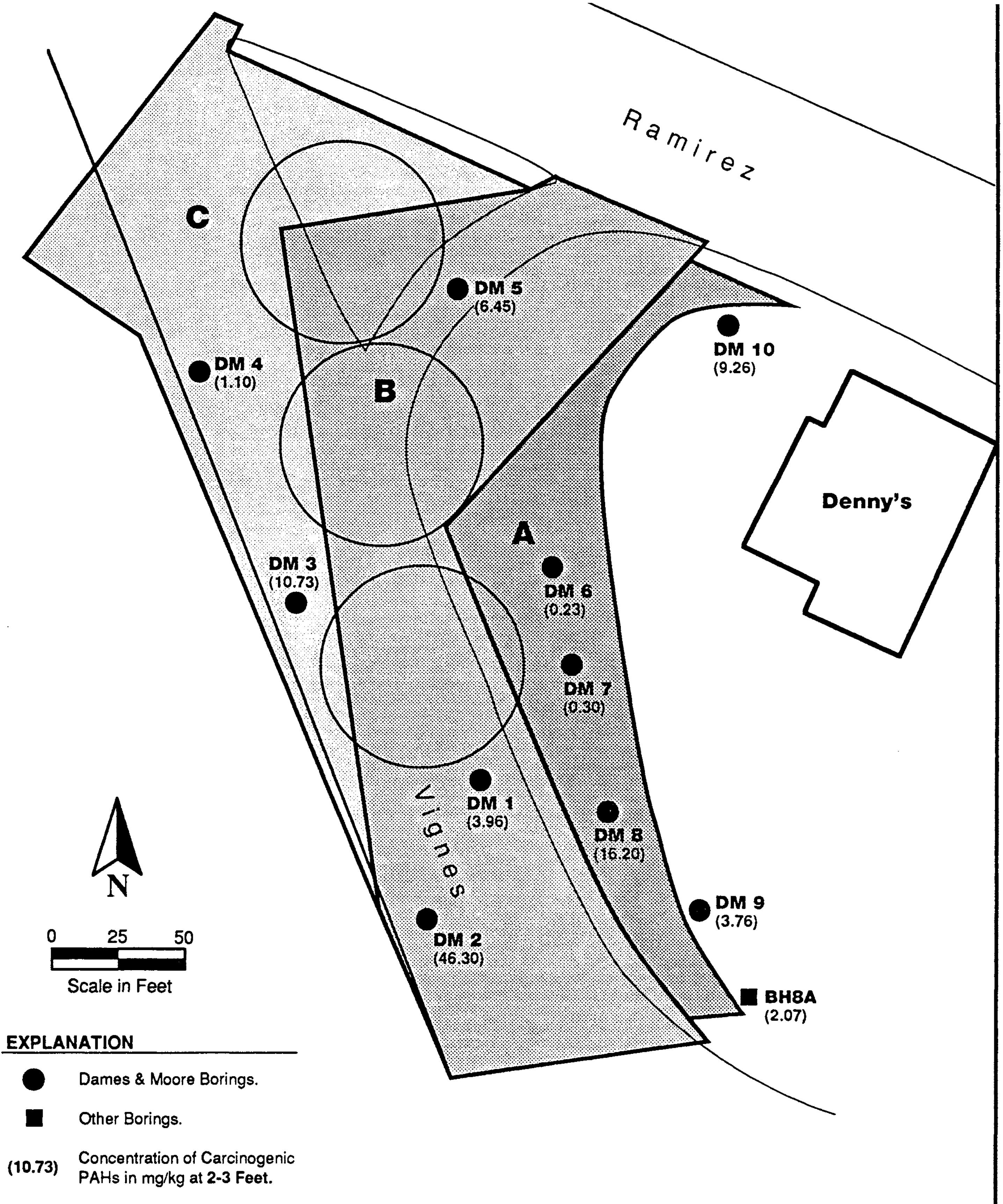


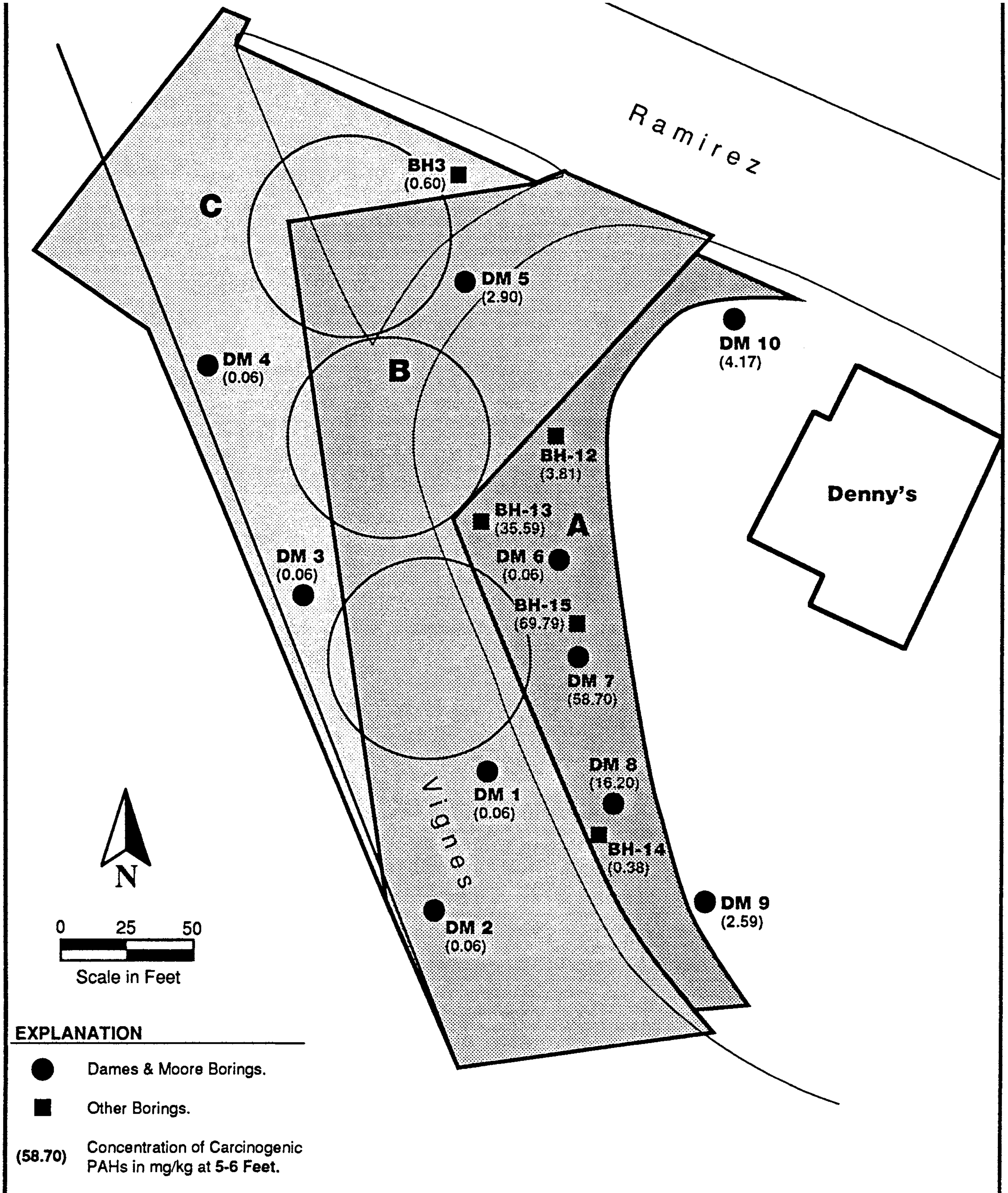
SOILS INVESTIGATION

VIGNES STREET RAMPS
IMPROVEMENT PROJECT
Los Angeles, California

For Union Station Gateway, Inc.

Dames & Moore
FIGURE 2

Enviro 2

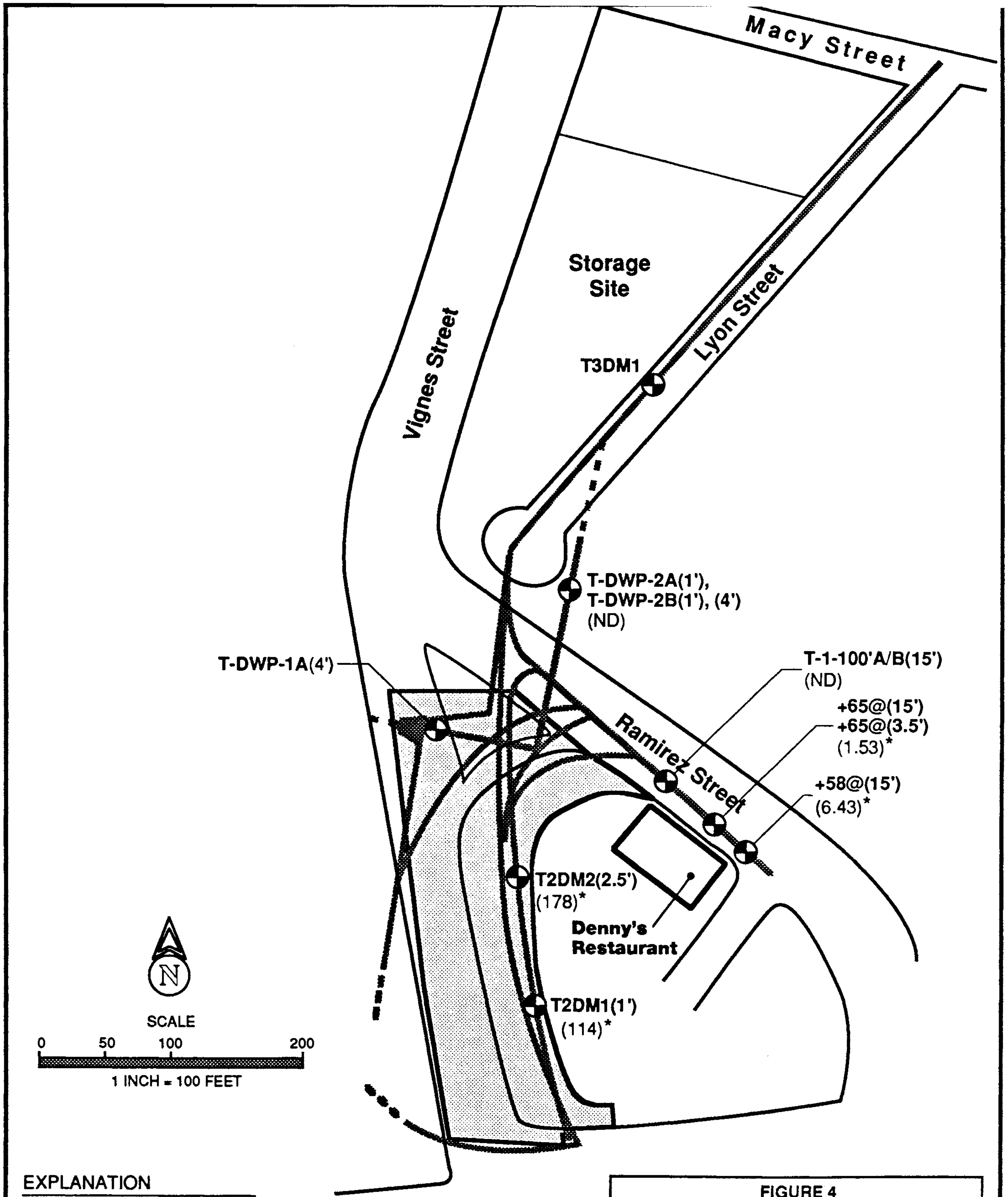


SOILS INVESTIGATION
VIGNES STREET RAMPS IMPROVEMENT PROJECT
Los Angeles, California

For Union Station Gateway, Inc.

Dames & Moore
FIGURE 3

Enviro 2



EXPLANATION

▨ Site Boundary

▬ Utility Trench

● Sample Location **(Depth In Feet)**

(178)* Concentration of Carcinogenic PAHs,
* Denotes "Hot Spot" Sampling.

FIGURE 4

Vignes Street Ramps Site
Utility Trench Verification
Sampling and Analyses

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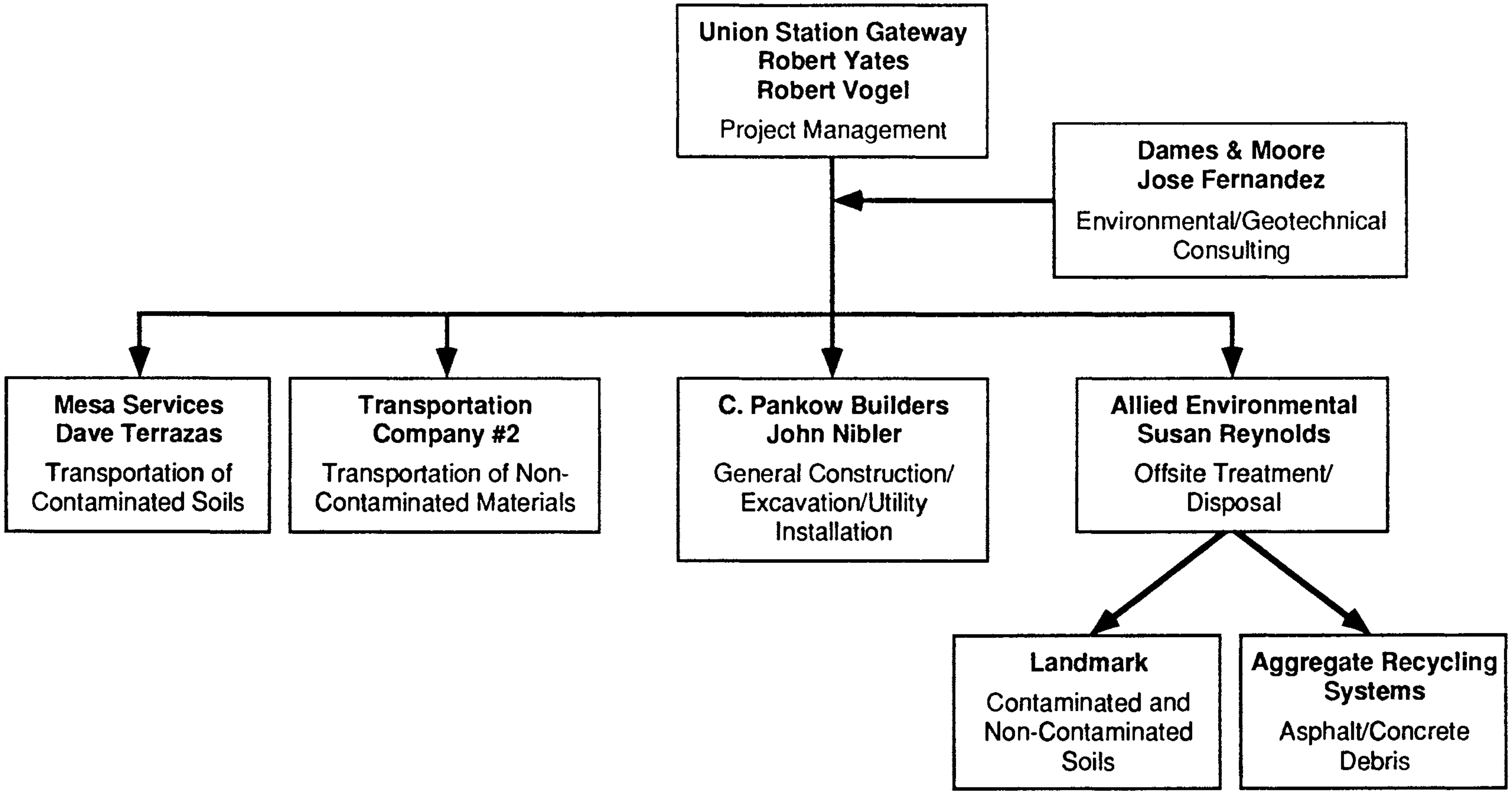
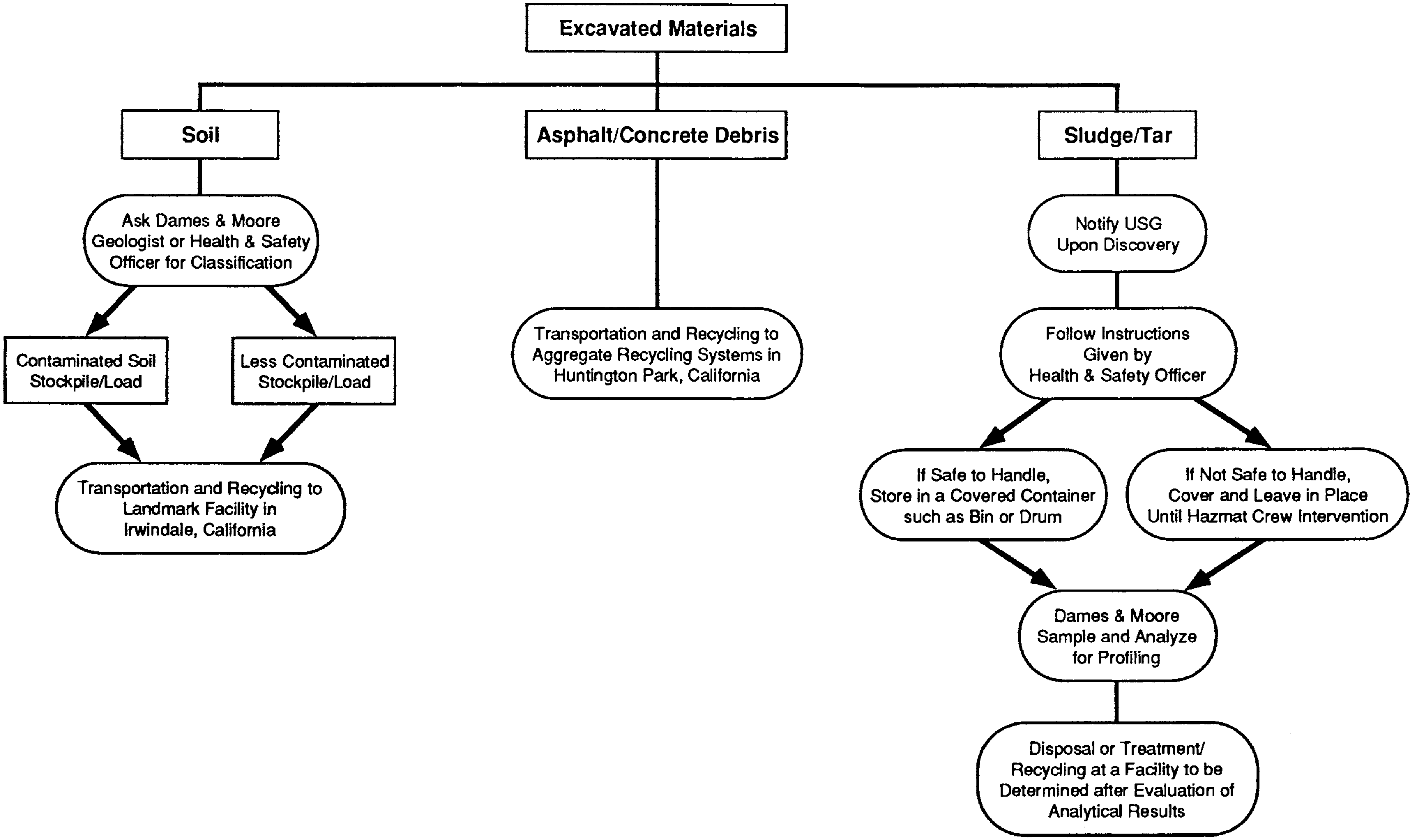


PROJECT IMPLEMENTATION FLOWCHART
VIGNES STREET RAMPS AND UTILITY INSTALLATION PROJECT
UNION STATION GATEWAY
LOS ANGELES, CALIFORNIA

Dames & Moore
FIGURE 5



DECISION TREE FOR REMOVAL ACTION
VIGNES STREET RAMPS IMPROVEMENT AND UTILITY INSTALLATION PROJECT
UNION STATION GATEWAY
LOS ANGELES, CALIFORNIA

Dames & Moore
FIGURE 6

APPENDIX A

RATIONALE FOR SELECTION OF RISK-BASED REMEDIAL GOALS FOR CARCINOGENIC POLYAROMATIC HYDROCARBONS AT THE USG SITE

Summary

The USG site encompasses parcels that were part of a former towne gas plant site. Sampling of soils has documented the presence of carcinogenic and noncarcinogenic polyaromatic hydrocarbons (PAHs) at the site. This site is to be developed as a ramp for the adjoining freeway and health concerns from exposure to the contaminants in soil are restricted to construction workers who would be involved in developing the ramp.

A risk-based approach was used in accordance with the National Contingency Plan (NCP) administered by the EPA, and with the California Department of Toxic Substances Control (DTSC) guidelines in order to determine if contaminated soils posed an unacceptable risk (as defined by the EPA) and, therefore, warranted remediation.

Assumptions Used in the Derivation of Risk-Based Remedial Goals

As recommended in the EPA guidance (Risk Assessment Guidance for Superfund, EPA, 1989; 1991a), workers at the USG site were assumed to be exposed to the chemicals of potential concern for 60 days over one year, a conservative estimate of the duration for the excavation part of the construction of the ramp. All other exposure parameters used were default parameters (reasonable maximum exposure assumptions) recommended by the EPA.

1. **EPA Policy on Remediation:** As a preliminary estimate of cancer risks, the EPA and DTSC recommend using the one excess cancer per one million potentially exposed people (written as 1.0 x 10^{-6}). However, decisions to remediate contaminants under the NCP are typically taken when the cancer risks exceed the range of 10^{-6} to 10^{-4}. For nonresidential land uses (i.e., when children and other especially sensitive populations are not likely to be exposed to the contaminants of concern) remediation decisions are taken when risks are estimated to be greater than one in one hundred thousand (1.0 x 10^{-5}) as suggested by the following text from an EPA memo entitled, "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions" by Don R. Clay (EPA, 1991b: A copy of the complete text of the memo is attached):

    > *The upper boundary of the risk range is not a discrete line at 1 x 10^{-4}, although EPA generally uses 1 x 10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions.*
    >
    > *Generally, where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 10^{-4} lifetime excess cancer risk end of the risk range, action under CERCLA is generally warranted at the site. For sites where the cumulative site risk to an individual based on reasonable maximum exposure for both current and future land*

use is less than 10^{-4}, action generally is not warranted, but may be warranted if a chemical specific standard that defines acceptable risk is violated or unless there are noncarcinogenic effects or an adverse environmental impact that warrants action. A risk manager may also decide that a lower level of risk to human health is unacceptable and that remedial action is warranted where, for example, there are uncertainties in the risk assessment results. Records of Decision for remedial actions taken at sites posing risks within the 10^{-4} to 10^{-6} risk range must explain why remedial action is warranted.

EPA uses the general 10^{-4} to 10^{-6} risk range as a "target range" within which the Agency strives to manage risks as part of a Superfund cleanup. Once a decision has been made to take an action, the Agency has expressed a preference for cleanups achieving the more protective end of the range (i.e., 10^{-6}), although waste management strategies achieving reductions in site risks anywhere within the risk range may be deemed acceptable by the EPA risk manager. Furthermore, the upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risks. Therefore, in certain cases EPA may consider risk estimates slightly greater than 1×10^{-4} to be protective.

However, the NCP also states that "the assumption of future residential land use may not be justifiable if the probability that the site will support residential use in the future is small." Sites that are surrounded by operating industrial facilities can be assumed to remain as industrial area unless there is an indication that this is not appropriate. Other land uses, such as recreational or agricultural, may be used, if appropriate. When exposures based on reasonable future land use are used to estimate risk, the NCP preamble states that the ROD "should include a qualitative assessment of the likelihood that the assumed future land use will occur" (55 Fed. Reg. at 8710).

2. **Examples of Risk-Based Remedial Actions at Superfund Sites:** The following illustrations from the Record of Decision (ROD) for Superfund sites document EPA's approval of cleanup at or above the 10^{-5} risk range for nonresidential sites:

Region:	5
Site Name:	Acme Solvent Reclaiming, Inc.
Location:	Winnebago, IL
NTIS Report #:	EPA/ROD/R05-91/168
ROD Date:	12/31/90

The 20-acre Acme Solvent Reclaiming Site is a former industrial disposal site in Winnebago County, Illinois. Land use in the area is mixed agricultural and residential.

Performance standards or goals: Chemical-specific cleanup goals for soil are based on a lifetime excess cancer risk of 1×10^{-5}.

Region: 9
Site Name: FMC Corporation (Fresno Plant)
Location: Fresno, CA
NTIS Report #: EPA/ROD/R09-91/060
ROD Date: 06/28/91

The 17-acre FMC (Fresno Plant) Site is an active pesticide manufacturing facility in Fresno, California. Surrounding land use is primarily industrial, but several residential areas are within 1 kilometer of the site.

Performance standard or goals: Clean-up standards for soil are based on a carcinogenic risk level of 1 x 10^{-4}.

Region: 5
Site Name: Folkertsma Refuse
Location: Grand Rapids, MI
NTIS Report #: EPA/ROD/R05-91/158
ROD Date: 06/28/91

The 8-acre Folkertsma Refuse Site is an inactive industrial landfill in Walker, Kent County, Michigan. Surrounding land use is primarily industrial with a few private residences in the vicinity.

Performance standards or goals: Reduce the excess lifetime cancer risk to the 1 x 10^{-4} to 10^{-6} level.

Region: 5
Site Name: Main Street Well Field
Location: Elkhart, IN
NTIS Report #: EPA/ROD/R05-91/156
ROD Date: 03/29/91

The 48-acre Main Street Well Field (MSWF) Site is in Elkhart, Elkhart County, Indiana. The well field provides the primary water supply for the 44,000 city residents. Adjacent to the site are several industrial properties.

Performance standards or goals: Performance standards for soil and groundwater are based on 1 x 10^{-5} excess lifetime cancer risk.

Region: 5
Site Name: Summit National
Location: Deerfield, OH
NTIS Report: EPA/ROD/R05-91/154
ROD Date: 11/02/90

The 11.5 acre Summit National Liquid Disposal Service Site is a former liquid waste disposal facility in rural Deerfield Township, Ohio. The site contains two ponds, an inactive incinerator, and several vacant buildings. Surrounding the site are several residences, two landfills, light industries, and farmland.

Performance standards or goals: Soil cleanup will attain a 2 x 10^{-5} cancer risk level.

3. **California Guidance:** The DTSC recommends an initial calculation of excess cancer risks based on a 10^{-6} *de minimis* level but acknowledges the use of 10^{-5} risk for remediation decisions at sites where only workers might be exposed to carcinogens for a limited period such as potential exposure to carcinogenic PAHs at the USG site (Personal Communication with Dr. Steven DiZio, Office of Science Advisor, DTSC, January 21, 1994). Also, existing regulations such as Proposition 65, require notification at workplaces where chemical releases present an excess cancer risk to workers or the public at 10^{-5} or greater.

4. **Occupational Safety and Health Administration (OSHA) Guidelines:** Most occupational exposure standards for carcinogens are based on a cancer risk greater than 10^{-5}, using standard risk assessment methodology.

5. **Development of Refined Risk Based Goal:** A concentration goal of 0.49 for any single PAH compound or 3.5 mg/Kg for the sum of the seven carcinogenic PAHs was calculated as a point-of-departure in the Removal Preliminary Assessment and Streamlined Risk Evaluation (Dames & Moore, 1993). Because health risks have a linear relationship to the exposure concentration, a concentration of 3.5 mg/Kg total carcinogenic PAHs would correspond to a lifetime excess cancer risk of 10^{-6} (one excess cancer per million individuals exposed). Since a lifetime excess cancer risk of 10^{-5} was selected for risk evaluation, the refined risk based goal is 3.5 x ($10^{-5} \div 10^{-6}$) = 35 mg/Kg.

   A lower concentration goal of 0.43 per PAH compound was also calculated for Parcels A/B, assuming that bis(2-ethylhexyl)phthalate (BEHP) would also contribute 1/8 of the risk. However, BEHP is likely to be a laboratory contaminant and, in any case, was not detected at concentrations that would contribute significantly to risk. The maximum detected concentration was 5 mg/Kg BEHP; this is less than 0.2 percent of 3,332, which is the concentration goal associated with 1/8 of a 10^{-6} risk. Therefore, BEHP was not considered to be a significant factor in calculating the risk-based goal for carcinogenic PAHs. The final risk based goal is 35 mg/Kg for total carcinogenic PAHs.

6. **Conservative Assumptions:** Some of the data represent redundant sampling: Boring DM-5 was sampled to verify the previous result from Boring BH-12; Boring DM-7 to verify the result from Boring BH-15; and Boring DM-8 to verify the result from Boring BH-14. The bias caused by

redundant sampling in the more contaminated portion of the site can be corrected for by calculating an area-weighted average for the site. The area-weighted average would be lower than the simple arithmetic average evaluated here.

Finally, since inferences must be made from the data to unsampled locations, there is uncertainty in any estimate of the average concentration. To evaluate this uncertainty it is important to consider how the sample locations were chosen, and therefore how representative the data are of the site as a whole. At the USG site, a number of samples were collected in the area of former site features including the oil scrubbers and gas purifier tanks. These are the locations where the highest PAH concentrations would be expected. Moreover, concrete footings are believed to extend across large portions of the site, which were less frequently sampled due to boring refusals. For these reasons, it appears likely that the data are representative of the higher soil concentrations present on the site.

APPENDIX B

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

TABLE OF CONTENTS

Section . . . . Page

1.0 INTRODUCTION 1

2.0 CLASSIFICATION AND MANAGEMENT 1
  2.1 PRELIMINARILY CLASSIFIED AS NON-HAZARDOUS 2
  2.2 PRELIMINARILY CLASSIFIED AS HAZARDOUS 2
  2.3 GENERATION 3
  2.4 TRANSPORTATION 4
  2.5 RECONTAINERIZATION AND TEMPORARY STORAGE 4

3.0 SAMPLE PROCEDURES 5
  3.1 SAMPLE COLLECTION PROCEDURES 5
  3.2 SAMPLE DOCUMENTATION PROCEDURES 7
    3.2.1 Chain-of-Custody Records 7
    3.2.2 Sample Identification / Analysis Request 7

4.0 ANALYTICAL TESTING PROCEDURES 7
  4.1 TOXICITY 8
    4.1.1 Organic Compounds 9
    4.1.2 Inorganic Compounds 10
    4.1.3 Fish Bioassay 11
  4.2 IGNITABILITY 11
  4.3 CORROSIVITY 11
  4.4 REACTIVITY 12
  4.5 OTHER APPLICABLE TESTING 12

5.0 WASTE MANAGEMENT 12
  5.1 HAZARDOUS WASTE 13
  5.2 NON-HAZARDOUS WASTE 14

LIST OF TABLES

Table No.

1 WASTE SAMPLING AND ANALYSIS PROCEDURES
2 SAMPLE IDENTIFICATION/ANALYSIS REQUEST
3 CANDIDATE WASTE MANAGEMENT FACILITIES

LIST OF FIGURES

Figure No.

1 SITE LOCATION MAP
2 VIGNES STREET RAMPS SITE
3 VIGNES STREET RAMPS SITE AND APPROXIMATE LOCATION OF UTILITY TRENCHES
4 WASTE DRUM/CONTAINER LABEL
5 WASTE COLLECTION FORM
6 PROPOSITION 65 WARNING
7 WASTE TRANSFER FORM
8 HAZARDOUS WASTE STORAGE AREA INSPECTION FORM
9 WASTE DISPOSITION FORM
10 CHAIN OF CUSTODY FORM

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

This Waste Management Plan (Plan) discusses procedures for managing wastes generated at the Vignes Street Ramps Site. Figure 1 shows a "Site Location Map". Figure 2 shows the "Vignes Street Ramps Site" and Figure 3 shows the "Vignes Street Ramps Site and Approximate Locations of Utility Trenches".

Removal Action activities may include intrusive investigations or excavations that will result in the generation of various solid and liquid wastes. The primary goal of the Waste Management Plan is to establish procedures to ensure that wastes generated are classified and managed in accordance with the applicable regulatory requirements. Proper management includes the identification and implementation of waste minimization activities, where practicable. This Plan provides guidance on the proper management of wastes including potentially contaminated excavated soil, drilling mud, soil cuttings, well purge/development water, used personal protective equipment (PPE), decontamination fluids, disposable sampling equipment (DE), and other solid or liquid wastes.

2.0 CLASSIFICATION AND MANAGEMENT

At the time waste is generated at the Vignes Street Ramps Site (Facility), a preliminary suspected contaminated or suspected uncontaminated designation will be made by the parties involved based on their best professional judgement and the data available. To make this differentiation, field personnel may rely on their knowledge of the site history, field organic vapor analyzer measurements, visual/olfactory observations, and/or other analytical screening results. This differentiation will aid in the initial segregation and grouping of wastes. Suspected uncontaminated materials will be designated as Category "A". Suspected contaminated materials will be designated as Category "B". This categorization may be used to segregate and group materials for management activities including sampling and recontainerization. The categories are recorded on the container label (Figure 4) and the criteria for these categories are described on the Waste Collection Form (Figure 5). The data will also be used to make a preliminary judgement as to whether a waste would meet the criteria of a hazardous waste or whether it would be classified as a non-hazardous waste. Depending on the preliminary classification, the wastes will be managed as described below.

2.1 PRELIMINARILY CLASSIFIED AS NON-HAZARDOUS

If a waste stream is known (based on previous analytical testing) or expected to be non-hazardous, it will be transported to the Staging Area where it will be stored in the original container or combined with similar materials (by category) in bulk containers. The Staging Area is located at 729 North Vignes Street in Los Angeles.

If previously tested and classified as non-hazardous, the waste will not be resampled and will be managed in an appropriate manner until it is sent offsite. If a waste stream has not been previously tested and classified, a sample will be collected and submitted to a laboratory for analysis within *four* weeks from the time it was generated. Records will be maintained to show adherence to the four week schedule.

If the analytical data indicates that the waste is non-hazardous the waste will be managed onsite in an appropriate manner until it is sent offsite. If the analytical data indicates that the waste is either a RCRA or a California hazardous waste, procedures will be implemented to transport the waste to an offsite Treatment, Storage, or Disposal Facility (TSDF) within 90 days from receipt of the data.

In cases where the same or essentially the same hazardous waste has been generated previously and has already been accepted (profiled) at an offsite facility, the waste will be transported offsite within 90 days. In cases where the waste has not been accepted, profiling will be expedited to obtain acceptance at an appropriate facility. While onsite, wastes classified as hazardous will be managed in accordance with the applicable portions of 22 CCR 6262.34 (generator requirements).

2.2 PRELIMINARILY CLASSIFIED AS HAZARDOUS

If a waste is known, based on previous analytical testing, or is expected to be either a RCRA or a California hazardous waste, it will managed accordingly. If it is essentially the same as a waste that has been generated previously and has been accepted (profiled) at a TSDF, then it may be either temporarily stored onsite or transported offsite. If it is a new waste stream, it will be managed onsite until samples are collected and analyzed and it is profiled. While managed onsite, the waste may be stored in the original container or combined with similar materials in a bulk container (waste treatment will not be conducted). Based on the definition of "onsite" (22 CCR 66261.10), the hazardous waste may be managed within the Vignes Street Ramps Site boundary for up to 90 days without a permit provided the requirements of 22 CCR 66262.34 are met.

Wastes managed onsite may be temporarily stored in one or more locations, but will typically be moved to the Staging Area. Waste management areas at the Facility will be selected to ensure that the wastes can be properly managed and that procedures protective of health and the environment can be implemented. Wastes managed onsite may include solids, liquids and sludges. Wastes found to be non-hazardous, based on analytical results, will remain onsite for temporary storage and will be managed as described above.

2.3 GENERATION

The waste generated will be managed at the point of generation and/or onsite as follows:

- Labeled roll-off bins with removable covers (tarps).
- Inert materials (concrete, asphalt, metal, etc.) may be placed on an asphalt pad.
- Labeled open-top (DOT 17H) 55-gallon drums will be used to collect soil cuttings.
- Labeled closed-top (DOT 17E) 55-gallon drums will be used to collect liquids or a vacuum truck may be used to collect and transport the liquids.
- Drilling muds will be allowed to accumulate in a mud tank (or lined pit) adjacent to the well during the drilling activity and will be removed from the tank/pit using a vacuum truck or may be transferred to drums.
- Used PPE and DE will be double-bagged in plastic bags or managed in a similar manner.
- Liquids removed from wells may be stored in appropriate containers and be managed by one of the methods listed above.

Labels will be available to label the waste containers. The information recorded on the labels may include the container (drum) number, generation location, contents, and appropriate information. Figure 4 provides an example drum/container label. The storage area will be provided with a means to deter unauthorized entry such as a fence or barricades. Appropriate warning signs, including Proposition 65 as necessary, will be provided. An example Proposition 65 sign is shown in Figure 6.

2.4 TRANSPORTATION

Prior to transport, the containers will be properly sealed, checked for appropriate labeling, and inspected for leaks. Container handling and transportation services will be provided by onsite by the excavation contractor and transport offsite will be conducted by Mesa Services Inc. (Mesa) or other California-registered waste hauler. As required, transportation procedures will comply with requirements set forth in 49 CFR Part 173, Subparts C, D, and E which address shipping papers, markings, and labeling, respectively. Management of the containerized waste will be documented on the Waste Collection (Figure 5) and Waste Transfer (Figure 7) forms.

2.5 RECONTAINERIZATION AND TEMPORARY STORAGE

As appropriate, wastes may be recontainerized from 55-gallon, or other size drums, into bulk storage containers at the Staging Area. Bulk container types may include labeled, 4-20 cubic yard covered bins for excavated soils and soil cuttings; portable, plastic closed-top tanks provided with top inlets for liquids; similar tanks with removable covers for drilling muds; or other appropriate containers. Separate containers will be used to segregate materials by classification and category. The recontainerization activities will be conducted by Mesa or other qualified personnel who will provide the necessary equipment. Empty containers may be reused, returned to the supplier or a reconditioner, or managed as scrap metal.

At the Staging Area, containers may be placed on an asphalt paved storage area. The area will not be bermed or otherwise enclosed, thereby facilitating movement of the containers. The storage area may be enclosed by chain-link fencing or other device to deter unauthorized entry to the area. Security personnel may periodically monitor the area during non-working hours. Spill control equipment, fire extinguishers, and personal protective equipment will be provided, as required. The Staging Area will be marked using signs, including "Danger Hazardous Waste Storage Area—Only Authorized Personnel Allowed" and "No Smoking", as appropriate. Equivalent wording may be used in some locations. Figures 1, 2, and 3 provide plot plans of the facility and the vicinity.

Containers used to manage hazardous waste will be labeled as shown in Figure 4. Proper waste codes, identified during the analytical data review, and a start-storage date will be recorded on the label. An inventory of the waste containers in the storage areas at the Facility will be maintained by the Waste Management Custodian. The areas will be periodically inspected. At a minimum, weekly inspections of the hazardous waste storage areas will be documented. Figure 8 provides a Hazardous Waste Storage Inspection Form, identifying the types of items that will be evaluated. When wastes are transported offsite, they will be accompanied by a Uniform Hazardous Waste Manifest (UHWM) or appropriate shipping papers. Waste disposition will be recorded on the Waste Disposition Form (Figure 9).

3.0 SAMPLE PROCEDURES

This section describes sample collection and documentation procedures.

3.1 SAMPLE COLLECTION PROCEDURES

The primary objective when sampling a waste stream is to obtain a sample that is representative of the entire volume of waste to be managed. The sample must be collected, preserved, and managed according to agency-approved methods. A summary of the sampling procedures is provided in Table 1 and general information is provided below.

- If the waste is homogeneous, then the entire sample may be collected from one location. If the properties of the waste vary with location in the waste container being sampled, then multiple samples from several locations (within a given bulk container, within a container of multi-phase material, or from multiple containers that have been grouped together for sampling) should be collected and sent to the laboratory where a composite sample will be prepared. In either case, multiple sample containers may be used to collect the total required volume of Sample. The individual sample container expected to contain the "average" concentration of volatiles and semivolatiles of all of the material in the Sample should be marked as the container from which the lab will extract an aliquot to conduct the volatile and/or semi-volatile tests. This aliquot shall be taken prior to any compositing of containers that may be required.

- The equipment used to collect the sample (coliwasa, auger, weighted bottle, scoop, etc.) must be clean. Common equipment used to collect samples of more than one waste stream should be cleaned between uses. The equipment used to collect samples should be similar to that used to collect field samples.

- For most samples, a clean glass bottle should be used. Bottles should be obtained from the laboratory. When possible, the bottle cap should be teflon lined and the sample container should be filled to the top to minimize headspace. Typical sample volumes required by the analytical laboratory are two liters for solids and three liters for liquids or sludges. More material may be required if special tests will be conducted; check with the lab if there are questions. Note - in addition to the volume of Sample required by the laboratory, two liters of sample (solid or liquid) will also need to be collected for use by the TSDF to run "fingerprint" tests. If the individual sample containers will be composited prior to analysis, then the material intended to be sent to the TSDF should be included in the laboratory compositing process and then sent to the TSDF by the lab in order to better assure that the material sent to the TSDF is the "same" as the material analyzed by the lab.

- After the sample container has been filled, the cap should be put on firmly. As appropriate, a security seal may be used. A label should be attached to the bottle and include the same information as used for field sample identification. As appropriate, the sample container should be placed in a zip-lock bag to contain the material if the sample leaks or the bottle is broken to prevent contamination of the other samples and the ice chest.

- The Samples should be identified using the procedures and nomenclature identified below:

  Sample Location - If all of the sample containers comprising the Sample are filled from the same waste container, regardless of whether they will be composited, each sample container will be labeled with the exact same Sample Location as is written on the container label (a two letter designator followed by a four digit number). If the sample containers comprising the Sample are filled from different waste containers each of which has a unique container label, then the Sample Location shall be designated as "**DRMCOMP**" on each of the individual sample container labels.

  Sample Number - Regardless of the number of locations within a waste container or the number of waste containers involved in a grouping, each of the sample containers comprising the Samples will be identified by the same seven digit Sample ID that is unique to that Sample (waste stream). This ID will include a two character alphabetic designator and a five digit sequential number. The alphabetic designator applicable to waste samples are:

  - **WS** = Waste Soil
  - **WW** = Waste Water

Note - if samples are collected from a multi-phase waste and the individual phases will be classified and managed separately, then each Sample shall be given a unique Sample Number (e.g., if the water phase and solid phase in a container were going to be separated and managed differently, then the water phase would have a different Sample Number than the solid phase). If the multiple phases will be homogenized and managed as a single waste stream, then only one Sample Number would be assigned and it would be written on all sample containers comprising the Sample.

- As soon as possible, the Sample should be placed in a cold ice chest or a refrigerator until it can be picked-up or delivered to the analytical lab.

3.2 SAMPLE DOCUMENTATION PROCEDURES

3.2.1 Chain-of-Custody Records

When a Sample of a waste is collected, a sample Chain-Of-Custody (COC) record form must be completed. The COC will be signed by each individual who takes possession of the sample containers. This form documents information about the sample including the time and date the sample was collected, who collected it, where it was collected, provides the sample identity, and specifies the analytical tests to be performed for each sample. For waste Samples, the generic COC shall be used (Figure 10) and the note "See Attached Sample Identification/Analysis Request" (or SIAR) should be entered in the *Comments* section.

3.2.2 Sample Identification / Analysis Request

In addition to the COC, a Sample Identification/Analysis Request (SIAR) should be completed for each Sample. Table 2 provides an example SIAR. The completed SIAR should accompany the Sample and COC to the laboratory. The laboratory should be requested to return a copy of the SIAR with the analytical test results and completed COC to the data management coordinator.

4.0 ANALYTICAL TESTING PROCEDURES

In order to properly manage wastes, it is necessary to establish, via analytical testing or generator knowledge, which of the waste streams contain contaminants at sufficient levels to require the waste to be classified and managed as a hazardous waste. The California regulatory definition of a hazardous waste is provided in 22 CCR 66261 which includes the RCRA criteria for hazardous waste classification. A waste is classified as hazardous if it exhibits one or more of the hazardous characteristics of toxicity, ignitability, corrosivity, or reactivity or if it is a RCRA listed waste. Wastes which do not exhibit any of the hazardous characteristics and are not RCRA listed are classified as non-hazardous wastes. None of the wastes at the Site are known to be RCRA listed. However, the wastes may exhibit a RCRA hazardous characteristic.

This section discusses the procedures that will be used to identify the potential hazardous characteristics of the waste to facilitate waste management (i.e., treatment, recycle, disposal) and to profile the waste prior to managing the waste, as applicable. Combined, these activities will be referred to as the waste classification phase. The guidelines for determining the appropriate analytical tests to be performed are based on the waste characterization requirements for hazardous waste generators (22 CCR 66261, Article 3) and waste management facility specific acceptance requirements. Although the guidelines summarized below will provide useful assistance, the final decision regarding which analytical tests will be needed will be made by a person knowledgeable of the site history and who has expertise in the area of hazardous waste classification.

Analytical data for the sample should be reviewed to assess the need for additional sampling and/or analytical testing in order to properly classify and/or manage the wastes. Analytical testing of soil and/or groundwater for VOCs, SVOCs, (including all analytes addressed by the TCLP method), CCR Title 22 metals, cyanide, and pesticides/PCBs may be conducted during the investigative and waste management activities, as necessary. Analytical testing for selected hazardous waste characteristics, such as ignitability, corrosivity, reactivity, and toxicity or waste-management-facility specific tests or notification/certification of applicable treatment standards for land disposal may be required to supplement existing data. Sections 4.1 through 4.4 describe each of these characteristics and analytical procedures for evaluating wastes. Section 4.5 describes the other potentially applicable analytical tests/requirements.

4.1 TOXICITY

One of the characteristics that causes a waste to be classified as hazardous is toxicity. Toxicity is defined in CCR 22-66261.24. The following subsections discuss the organic and inorganic analytes that will be evaluated to assess the toxicity of the waste.

4.1.1 Organic Compounds

Analytical laboratory tests for detecting the total concentration of individual organic compounds will be conducted initially for a representative sample of each waste stream (bulk container or group of smaller containers holding similar material) awaiting classification unless current analytical data already exists which is representative of the waste. As appropriate, the sample should be tested and the results evaluated by one or more of the methods identified in the following paragraphs.

If the total concentration of an individual organic analyte in a solid or liquid sample is greater than its corresponding hazardous (CCR 22-66261.24(a)(2)) or extremely hazardous (CCR 22-66261.113) Total Threshold Limit Concentration (TTLC) value, then the waste is hazardous or extremely hazardous, respectively, exhibits the characteristic of toxicity, and will be managed appropriately. If there is an applicable hazardous waste treatment standard requiring the extractable concentration of the analyte to be known for land disposal restriction compliance (22 CCR 66268), then the waste sample should be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP).

If the total concentration of an individual organic analyte in a solid sample is equal to or greater than 20 times its corresponding TCLP value, then the waste sample should be analyzed by the TCLP to assess whether it exhibits the hazardous characteristic of toxicity for that compound. For the organic compounds that have a Soluble Threshold Limiting Concentration (STLC) regulatory limit, if the total concentration of the compound in the sample is equal to or greater than 10 times its corresponding STLC value, then the waste sample should be analyzed by the Waste Extraction Test (WET) to evaluate whether the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual organic analyte in a liquid sample (less than one percent nonfilterable suspended solids) is greater than its corresponding STLC or TCLP value, then the concentration detected may be assumed to be equal to the concentration of an extract prepared by the applicable extraction methodology. This concentration should be compared directly to the STLC and TCLP regulatory limits and if the concentration exceeds the limit, then the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual organic analyte in a liquid sample (greater than one percent nonfilterable suspended solids) is equal to or greater than its corresponding STLC or TCLP regulatory limits, then the waste sample may be analyzed by the WET or TCLP, respectively, to assess whether it exhibits the hazardous characteristic of toxicity, or it may be assumed that the concentration detected in the waste sample is greater than the regulatory limit and that the waste exhibits the hazardous characteristic of toxicity.

4.1.2 Inorganic Compounds

Analytical laboratory tests for detecting the total concentration of individual inorganic compounds (e.g., metals) will be conducted initially for a representative sample of each waste stream awaiting classification unless current analytical data already exists which is representative of the waste. As appropriate, the sample should be tested and the results evaluated by one or more of the methods identified in the following paragraphs.

If the total concentration of an individual inorganic compound in a solid or liquid sample is greater than its corresponding hazardous or extremely hazardous TTLC value, then the waste is hazardous or extremely hazardous, respectively, exhibits the characteristic of toxicity, and will be managed appropriately. If there is an applicable hazardous waste treatment standard requiring the extractable concentration of the analyte to be known for land disposal restriction compliance, then the waste sample should be analyzed by the TCLP if it is a federal listed compound or by the WET if it is a California-only listed compound.

If the total concentration of an individual compound in a solid sample is equal to or greater than 20 times its corresponding TCLP value, then the waste sample should be analyzed by the TCLP to assess whether the waste exhibits the hazardous characteristic of toxicity. Similarly, if the total concentration of an individual compound in a solid sample is equal to or greater than 10 times its corresponding STLC value, then the waste sample should be analyzed by the WET to assess whether the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual compound in a liquid sample (less than one percent nonfilterable suspended solids) is greater than its corresponding STLC or TCLP value, then the concentration detected may be assumed to be equal to the concentration of an extract prepared by the applicable extraction methodology. This concentration should be compared directly to the STLC and TCLP regulatory limits and if the concentration exceeds the limit, then the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual compound in liquid sample (greater than one percent nonfilterable suspended solids) is equal to or greater than its corresponding STLC or TCLP regulatory limits, then the waste sample may be analyzed by the WET or TCLP, respectively, to assess whether the waste exhibits the hazardous characteristic of toxicity, or it may be assumed that the concentration detected in the waste sample is greater than the regulatory limit and that the waste exhibits the hazardous characteristic of toxicity.

If the total lead concentration in a sample is equal to or greater than 100 mg/kg or mg/l, then the waste sample should be analyzed for organic lead and the resultant concentration compared to the hazardous or extremely hazardous TTLC values for organic lead to assess whether the waste exhibits the hazardous characteristic of toxicity.

4.1.3 Fish Bioassay

Fish bioassay tests are conducted to assess California hazardous waste toxicity characteristics (CCR 22-66261.24(a)(6)). Results are dependent on the combined effect of the constituents in the waste. Fish bioassay testing should be conducted initially as part of the first few classification events for waste generated during the investigation. Results of the tests should be reviewed in conjunction with the constituents detected and trends, if any, should be noted to assess the need for future fish bioassay testing.

4.2 IGNITABILITY

In addition to toxicity, one of the characteristics that can cause a waste to be classified as hazardous is ignitability. Ignitability is defined in 22 CCR 66261.21. A representative sample should be collected and submitted for a flashpoint analysis (EPA Test Method 1010) for tanks of liquid waste (including stirrable sludges) generated during the investigations, and thereafter, as necessary for waste classification and profiling purposes.

4.3 CORROSIVITY

A third characteristic that can cause a waste to be classified as hazardous is corrosivity. Corrosivity is defined in 22 CCR 66261.22. A representative sample should be collected for each of the waste streams to be classified during the investigation and analyzed for pH (EPA Test Methods 9040 or 9045), and thereafter, as necessary for waste classification and profiling purposes.

4.4 REACTIVITY

The fourth characteristic that can cause a waste to be classified as hazardous is reactivity. Reactivity is defined in 22 CCR 66261.23. Total sulfides and total cyanides (EPA Test Methods 9030 and 9010) should be conducted initially for the waste samples collected for the first few classification events during the investigation, and thereafter, as necessary for waste classification and profiling purposes. If the total sulfide concentration is equal to or greater than 500 mg/kg or mg/l, then the waste sample should be analyzed for reactive sulfides as described in Chapter 7 of SW-846. Similarly, if the total cyanide concentration is equal to or greater than 250 mg/kg or mg/l, then the waste sample should be analyzed for reactive cyanides to assess whether the waste exhibits the hazardous characteristic of reactivity.

4.5 OTHER APPLICABLE TESTING

Requests for additional analytical testing may include specific analyses required by the Class I Treatment, Storage, and Disposal Facilities (TSDFs) or other waste management facilities as part of the waste profiling and facility acceptance procedures.

Proper waste management must include consideration of the hazardous waste treatment standards for compliance with land disposal restrictions. To identify the applicable treatment standard, the liquid wastes may need to be classified as wastewater or non-wastewater based on results from a Total Suspended Solids (TSS) test and Total Organic Carbon (TOC) test. As necessary, a representative sample of aqueous wastes will be collected and tested for TSS and TOC. In addition, solid wastes that may contain free liquids must be analyzed by the paint filter test to evaluate the presence of free liquids.

5.0 WASTE MANAGEMENT

After the waste has been classified as hazardous or non-hazardous at the Staging Area, activities will be initiated to transport the waste to an appropriate offsite waste management facility. Once classified, the available waste management options will be identified (e.g., Class III landfill, Class I landfill, treatment or recycling facility). The following subsections describe these activities for hazardous and non-hazardous wastes, respectively.

5.1 HAZARDOUS WASTE

After a waste has been classified as hazardous, the containerized waste may be moved to a separate area of the Staging Area and the generator requirements (22 CCR 66262.34) will be met.

The use and management of containers will comply with Title 22, Article 9 of Chapter 15 and for tanks Article 10 of Chapter 15. When identified as hazardous, the containers will be labeled with a hazardous waste label. Information recorded on the label may include the following:

- the name of the waste
- hazardous properties/appropriate waste codes
- the start date of storage
- proper DOT shipping name
- the words "Hazardous Waste"
- waste composition and physical state
- name/address of company generating the waste
- the wording "State and Federal Law prohibits improper disposal. If found, contact the nearest police or public safety authority, the U.S. EPA, or the Cal-EPA Department of Toxic Substances Control"

The offsite transport of waste will be documented on the Waste Transfer Form (Figure 7).

An assessment of whether the hazardous waste (non-liquid only) can be landfilled will be made prior to identifying a hazardous waste treatment, storage, or disposal facility (TSDF). This assessment will be consistent with the land disposal restriction requirements. If the waste has not yet been profiled with the TSDF or cannot be managed using an existing profile, then a completed waste profile application form will be submitted to the TSDF with a representative sample of the waste. Authorizations are typically valid for a period of one year. Each inherently different waste stream will be profiled separately. If the waste can be managed using an existing profile, then transportation of the waste to the TSDF will be scheduled in a timely manner. To facilitate receipt at the TSDF, the TSDF will be notified of the impending waste shipment at least 24 hours prior to transportation time, when practicable.

A California Uniform Hazardous Waste Manifest (UHWM) will be completed and will accompany the wastes sent to an in-state TSDF. Wastes sent out of state, if any, will be accompanied by a manifest from the state in which the receiving facility is located. Prior to any offsite shipment of hazardous waste to an out-of-state management facility, a written notification to the appropriate state environmental official in the receiving state and to DTSC's/EPA's Designated Project Coordinator will be provided, if required.

The wastes will typically be transported in bulk, either in covered storage bins (solids) or in vacuum trucks (liquids). However, a situation may occur where the waste will be transported in DOT-approved containers other than bins or vacuum trucks. For example, if the drummed waste was not recontainerized at the staging area for segregation purposes, then the waste will be transported in DOT-approved drums. The UHWMs will be completed by a USG representative or by a party approved to complete the documents. Transportation of wastes offsite will be documented on the Waste Disposition Form as described in the Data Management Plan. An example Waste Disposition Form is provided as Figure 9.

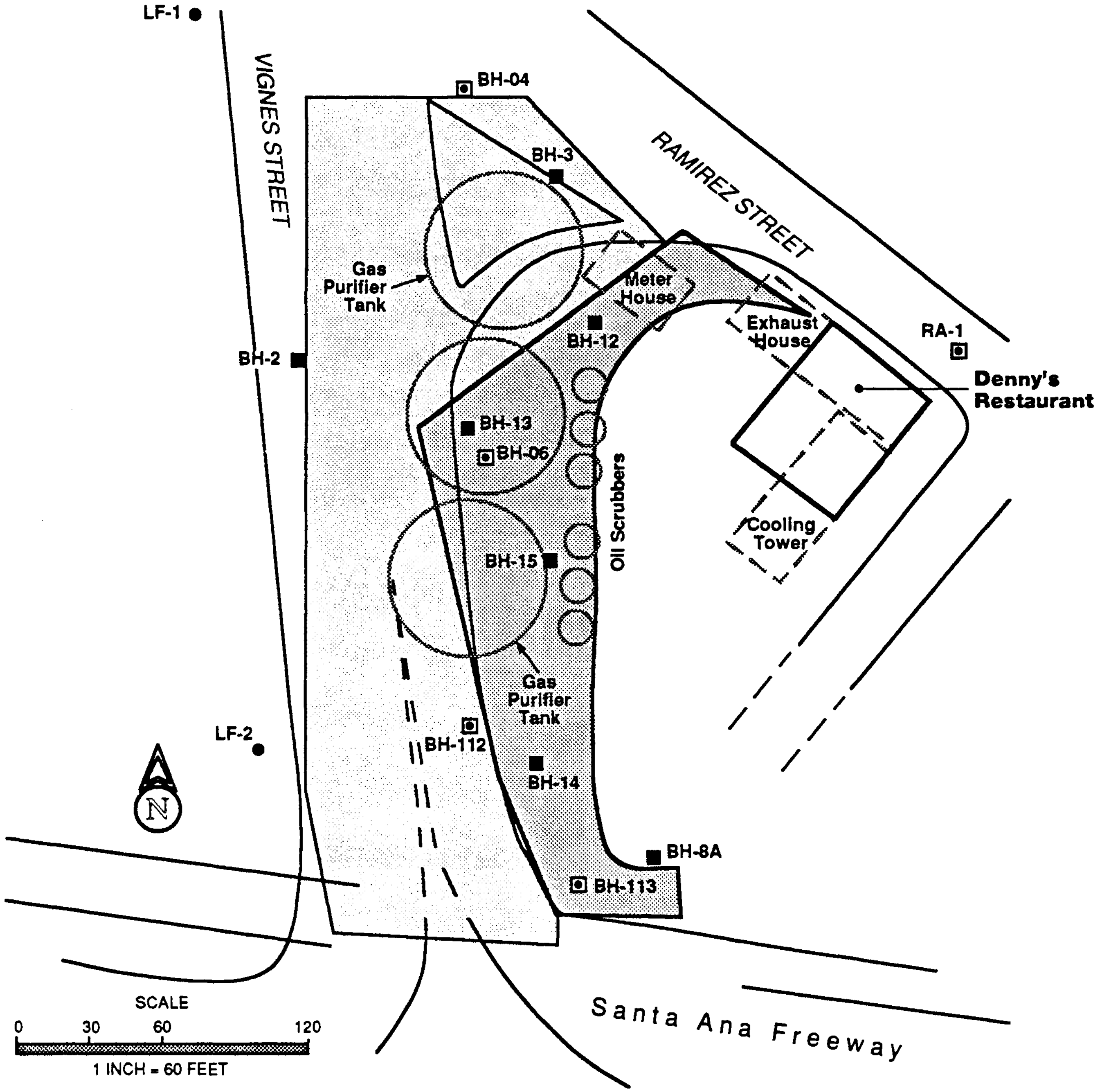
In addition to the UHWM, the transport of waste meeting specific criteria may need to be accompanied by a California Extremely Hazardous Waste (EHW) Permit. If a waste is classified as extremely hazardous per the criteria identified in 22 CCR 66261.110 or .113, then a completed application for an EHW permit will be submitted to the Cal-EPA, Department of Toxic Substances Control (DTSC). A copy of the permit issued by the DTSC will accompany the [illegible] TSDF.

M[illegible] (Mesa) or other California-registered hazardous waste transporter, will tr[illegible] waste to the designated TSDF. Table 3 provides a list of candidate Cl[illegible] may be used. Other facilities may be used throughout the project. The w[illegible] visually monitored by the transporter and compared to the information p[illegible] manifest. Upon arrival at the designated TSDF, a TSDF representative may c[illegible] waste and conduct a screening analysis on the sample. If the screening a[illegible] the waste is the same as that represented on the manifest, then the waste lo[illegible] If the screening analysis indicates that the waste is different than that r[illegible] manifest, then the waste load will be rejected and the waste may be tr[illegible] point of origin.

5[illegible]OUS WASTE

A[illegible] classified as non-hazardous, the following waste management procedures w[illegible] communication with the appropriate waste management facilities (treatment, r[illegible] be established to understand the proper waste approval procedures for e[illegible] managed. In most cases, the candidate receiving facility will require a letter requesting approval for the waste and a copy of the analytical data representative of the waste. If the waste is disposed of in a landfill, or otherwise applied to land, the Regional Water Quality Control Board (RWQCB) may need to be involved in approving the disposal or placement of the waste. Because the recommended management practice for PPE/DE does not include analytical testing, the letter should describe the procedures used to minimize potential contamination of the PPE/DE. Table 3 provides a list of the candidate facilities.

A non-hazardous waste shipping paper will be completed and will accompany the waste to the non-hazardous waste management facility. The waste may be transported in bulk, either in the covered storage bins (solids) or in vacuum trucks (liquids). Appropriate shipping papers will be completed by a USG party representative or by a party approved to complete the documents. Transportation of wastes offsite will be documented on the Waste Disposition Form as described in the Data Management Plan. An example Waste Disposition Form is provided as Figure 9.



EXPLANATION

BH-3 ■ Approximate Levine•Fricke Soil Boring Location

LF-1 ● Approximate Monitoring Well Location

BH-04 ▣ Approximate Earth Technology Corp. Soil Boring Location

▱ ○ Approximate Former Coal Gasification Plant Areas

— Approximate Site Boundary

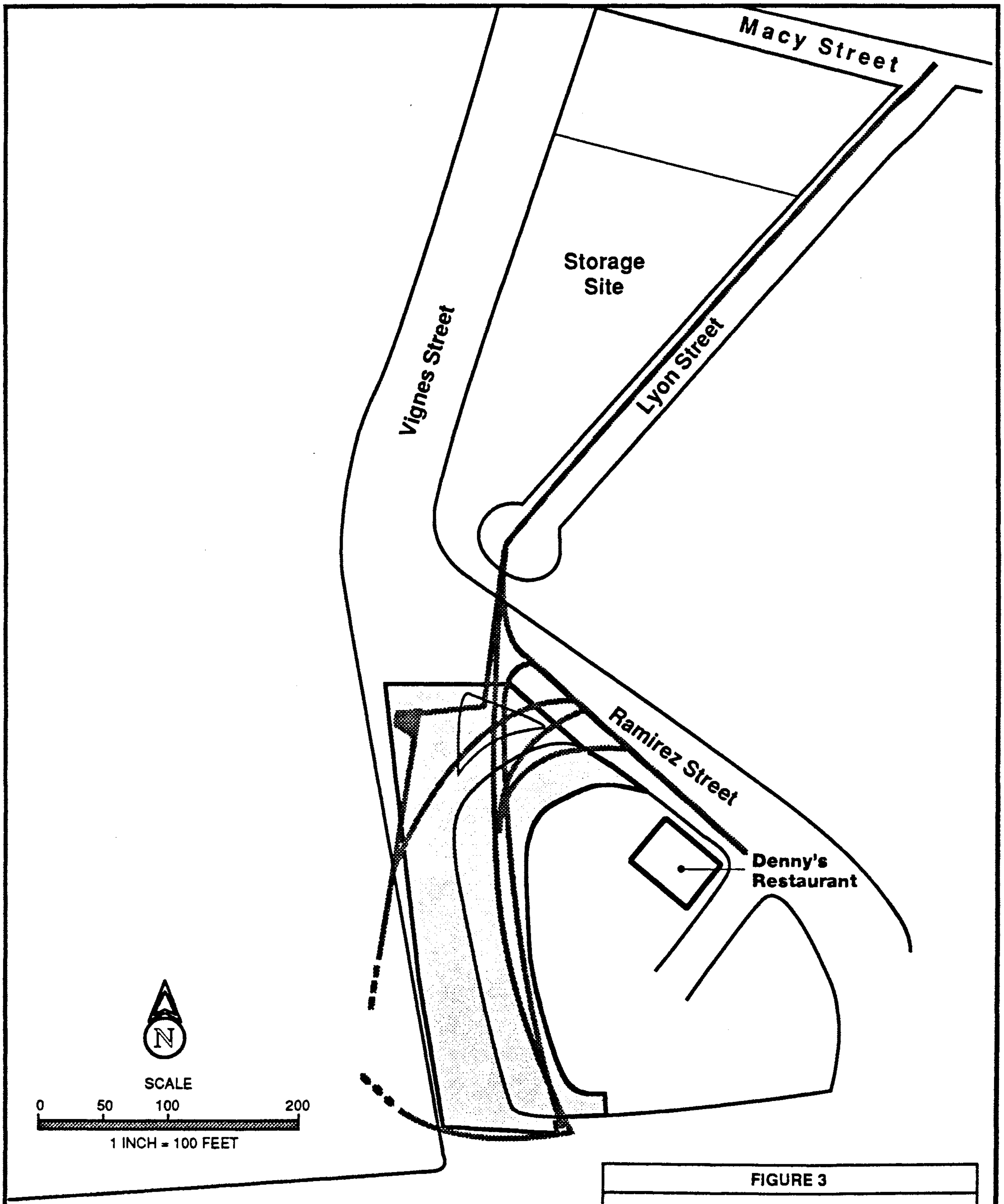
▨ Parcel A

☐ Parcel B

FIGURE 2

Vignes Street Ramps Site Former Coal Gasification Plant and Approximate Soil Boring Locations

Dames & Moore



EXPLANATION

▭ Site Boundary

▬ Utility Trench

FIGURE 3

Vignes Street Ramps Site and Approximate Location of Utility Trenches In City of LA Public Right of Way

Dames & Moore

TABLE 1
WASTE SAMPLING AND ANALYSIS PROCEDURES

Issue	Bulk Solid	Drummed Solid	Bulk Liquid	Drummed Liquid
Number of Sample Containers (Note - Each Sample will consist of multiple sample containers full of material. Each sample container that is part of a given Sample shall be labeled with the same Sample ID Number even though each sample container may contain material from different waste containers.)	If the material to be sampled is homogeneous, a single representative Sample may be collected (i.e., all sample containers filled from the same location within the bulk container). If the material is non-homogeneous, fill sample containers from approximately 2-4 different locations within the bulk container. The sample containers comprising the Sample should be composited by the lab prior to analysis.	Premise - one or more waste containers are grouped together for analysis. If the material in all of the waste containers is similar and homogeneous, the Sample may be comprised of sample containers collected from a single waste container that is representative of the material in all of the waste containers. If the material in the waste containers is non-similar and/or non-homogenous, then sample containers should be collected from (A) at least 50% of the waste containers if there are less than 10 in the group, (B) at least 35% of the waste containers if there are between 10 and 20 in the group, and (C) at least 20% of the waste containers if there are more than 20 in the group. The sample containers comprising the Sample should be composited by the lab prior to analysis.	If the material to be sampled is homogeneous, a single representative Sample may be collected (i.e., all sample containers filled from the same location within the bulk tank). If the material is non-homogeneous (multi-phase) and will be homogenized prior to management as a waste, fill sample containers from approximately 2-4 different locations within the bulk tank. The sample containers comprising the Sample should be composited by the lab prior to analysis. If the material is non-homogeneous (multi-phase) and the phases will be managed separately, collect a Sample from each phase and identify the Samples for the different phases with different Sample Numbers.	Premise - one or more waste containers are grouped together for analysis. If the material in all of the waste containers is similar and homogeneous, the Sample may be comprised of sample containers collected from a single waste container that is representative of the material in all of the waste containers. If the material in the waste containers is non-similar and/or non-homogenous, then sample containers should be collected from (A) at least 50% of the waste containers if there are less than 10 in the group, (B) at least 35% of the waste containers if there are between 10 and 20 in the group, and (C) at least 20% of the waste containers if there are more than 20 in the group. Follow the procedures for "Bulk Liquid" regarding whether the phases will be homogenized or managed separately. The sample containers comprising the Sample should be composited by the lab prior to analysis.
Equipment	See 3.0	See 3.0	See 3.0	See 3.0
Quantity (total volume of Sample to be collected. May either be all from one location or the total volume of the containers to be composited. See SW-846.	Total of 4 liters per Sample. Typically 2 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 4 liters per Sample. Typically 2 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 5 liters per Sample. Typically 3 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 5 liters per Sample. Typically 3 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".

Labeling	See 3.0	See 3.0	See 3.0	See 3.0
Chain of Custody	Complete using same procedures as site samples.	Complete using same procedures as site samples.	Complete using same procedures as site samples.	Complete using same procedures as site samples.
Analytical Tests	See 4.0	See 4.0	See 4.0	See 4.0
Sample Identification/Analysis Request	See 4.0	See 4.0	See 4.0	See 4.0

TABLE 2
SAMPLE IDENTIFICATION / ANALYSIS REQUEST (SIAR)

Sampled By ______________________________ Sample Date ______________
Sample ID ____
Waste Container ID (if composite, list all waste container IDs represented by the composite)________
____
Free Liquids Present: Yes _____ No ________
Sample of: Liquid _____ Solid _____ Sludge ______ Drilling Mud ______
Is Waste Homogeneous? Yes _____ No ______ (If "No", will it be composited? Yes _____ No _______)

CHECK THOSE ANALYTICAL TESTS TO BE RUN:

Corrosivity (acids/bases)	____	pH (EPA 9045 or 9040 depending on matrix)
Ignitability	____	Flash Point (EPA 1010) (liquid/stirable solids only)
"CCR" metals	____	TTLC and STLC as required (22 CCR 66261.24(2))
Aquatic Toxicity	____	Fathead Minnow Bioassay (22 CCR 66261.24(b))
TCLP	____	TCLP Metals, as required (22 CCR 66261)
	____	TCLP Volatiles, as required (EPA 8240) (22 CCR 66261)
	____	TCLP Semivolatiles, as required (EPA 8270) (22 CCR 66261)
	____	TCLP Pesticides
	____	TCLP Herbicides
Reactivity	____	Total Sulfide (EPA 9030) and Total Cyanide (EPA 9010)
Reactivity	____	Rx. Sulfide (EPA ____) and Rx. Cyanide (EPA ____)
Oil and Grease	____	Oil and Grease (EPA 9071 or 413.1)
TPH	____	Total Pet. Hydrocarbon (TPH) (ASTM 418.1)
Other	____	B.T.X.E (EPA 8015M)
	____	Total Organic Halogens (TOX) (EPA 9020)
	____	BTU (heat content)
	____	PCBs (EPA 8080)
	____	Organic Lead if TTLC >100 ppm
	____	Specific Gravity
	____	Free liquids (paint filter test)
	____	TSS (total suspended solids)
	____	TOC (total organic carbon)
	____	BOD /COD (405.1 / 410.4)
	____	Fluorides (340)
	____	Other ______________________________

Note: Samples should be kept on ice for shipment.

TABLE 3

CANDIDATE WASTE MANAGEMENT FACILITIES

FACILITY[a]	LOCATION	WASTE TYPES ACCEPTED
Land Disposal and Incineration		
Treatment, Recycle, Fuel Blending		
Landmark[b]	Los Angeles, CA	Asphalt (non-haz)
TPS Technologies Inc.[b]	Victorville, CA	Thermal Desorption (non-haz)
Gibson Oil[b]	Los Angeles, CA	Asphalt Road Base (non-haz)

[a] Other waste management facilities will be evaluated on an as needed basis.

[b] Preferred waste management facilities.

FIGURE 4
WASTE DRUM/CONTAINER LABEL

USG VIGNES STREET RAMPS SITE

WASTE DRUM/CONTAINER LABEL

Container ID: ____________________ Percent Full: __________

Name: ____________________ Date: __________

Location ID: ____________________ Interval: __________

Waste Type: ____________________ Source: __________

Suspected Contaminant: ______________________________

Comments: ____________________

____

____

Category

FIGURE 5
WASTE COLLECTION FORM

USG VIGNES STREET RAMPS SITE
WASTE COLLECTION FORM NO. _____

Name: ______________	Date: ___________	Site Description: ___________________	Location ID: ___________

Container ID	Container Type	Percent Full	Waste Type	Waste Source	Depth	PID/OVA Max Resp. ppm	Odor Y/N/NA	Stain/ Sheen Y/N/NA	Category A or B	Suspected Contaminant(s) Comments

Definitions:
1. Odor: Yes, No, Not Available
2. Stain: Yes, No, Not Available
3. Category: A = PID/OVA < 20 ppm and/or the waste has no discernable odor or stain/sheen
   B = PID/OVA ≥ 20 ppm and/or the waste has a discernable odor or stain/sheen

FIGURE 6.
PROPOSITION 65 WARNING

WARNING

DETECTABLE AMOUNTS OF CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS, OR OTHER REPRODUCTIVE HARM ARE FOUND IN AND AROUND THIS AREA. CHEMICALS INCLUDE:

- **Lead**
- **Toluene**
- **Benzo(a)anthracene**
- **Benzo(a)pyrene**
- **Bis(2-ethylhexyl)phtalate**
- **Chrysene**
- **Dibenzo(a,h)anthracene**
- **Indeno(1,2,3)pyrene**

AVISO

SE AVISA QUE HAY DETECCION DE QUIMICAS QUE EL ESTADO DE CALIFORNIA SABE SON RELACIONADOS A CAUSAR CANCER, DEFECTOS DE NACIMIENTO Y OTROS HORRORES REPRODUCTIVOS QUE SE ENCUENTRAN ACQUI Y EN EL AREA. ESTAS QUIMICAS INCLUYEN:

- **Plomo**
- **Toluene**
- **Benzo(a)anthracene**
- **Benzo(a)pyrene**
- **Bis(2-ethylhexyl)phtalate**
- **Chrysene**
- **Dibenzo(a,h)anthracene**
- **Indeno(1,2,3)pyrene**

FIGURE 7
WASTE TRANSFER FORM

USG VIGNES STREET RAMPS SITE

WASTE TRANSFER FORM NO. _____

Name: ____________________

Date: ____________________

Container Number	Transferred From	Transferred To	Transfer Type	Time	Container Still Used?

Comments: ____

____

Version: 11/22/93

FIGURE 8

HAZARDOUS WASTE STORAGE AREA INSPECTION FORM
(TO BE CONDUCTED ON A WEEKLY BASIS)

Inspector's Name/Title ______________________________ Date of Inspection __

Time of Inspection _________________________________ (AM/PM)

Item	Specifics (if applicable)	Status		Recommended Remedial Action	Date Remedial Action Completed
		Acceptable	Not Acceptable		
CONTAINER PLACEMENT	Drums on pallets; sufficient aisle space; limit of 2 drum pallets per stack				
CONTAINER CONDITION	No leaks or rust; sealed bungs and lids; no liquid/residue on containers				
LABELING OF CONTAINERS	Proper identification and accumulation date; internal log number;				
GROUNDING STRAPS	Flammables connected to ground				
SEGREGATION OF INCOMPATIBLE MATERIALS/WASTES	Acids/caustics separate; flammables/combustibles together				
PALLETS	Not damaged (eg. broken wood, warping, nails missing)				
FENCE, GATE, LOCK	Area locked if unattended; no visible corrosion or damage				
FIRE EXTINGUISHER	Unobstructed access; charged; signs indicating location				
SPILL CONTROL EQUIPMENT	Absorbent; shovel available				
SHOWER/EYE WASH	Functioning properly; unobstructed access				
LABELING STORAGE AREAS	Hazards; no smoking signs; hazardous waste storage area				
PERSONAL PROTECTIVE AND OTHER EQUIPMENT	Gloves; goggles; apron; bung wrench				

FIGURE 9
WASTE DISPOSITION FORM

USG VIGNES STREET RAMPS SITE

WASTE DISPOSITION FORM

Waste Custodian: ____________________ Date & Time: ______________

Waste Destination: ____

Transport Company: ____

Vehicle Type: ____

☐ Non-Hazardous ☐ Hazardous Bill of Lading / Manifest No.: ______________

Container Number	Storage Location	Percent Full	Estimated Volume	Profile Number	Container Taken?

Comments: ____

____

____

HAIN-OF-CUSTODY RECORD

W COPY - Original (Accompanies Samples)   YELLOW COPY - Collector   PINK - Project Manager

Boring or Well Number	Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES																				FIELD NOTES:	Total Number Of Containers	Laboratory Note Number
						VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (M)	TITLE 22 METALS	WET Test	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TCLP	pH	ASBESTOS	.	.	.	.	.			

RELINQUISHED BY: (Signature)   DATE/TIME   RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature)   DATE/TIME   RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature)   DATE/TIME   RECEIVED BY: (Signature)

ANALYTICAL LABORATORY: ______

LABORATORY CONTACT: ______

D&M CONTACT: ______ PHONE: ______

DAMES & MOORE
911 WILSHIRE BOULEVARD, SUITE 700
LOS ANGELES, CALIFORNIA 90017
(213) 683-1560 FAX NO. (213) 628-0015

LABORATORY NOTES:

JOB NO.: ______ SHEET ______ OF ______

PROJECT ______

LOCATION ______

COLLECTOR ______ DATE OF COLLECTION ______

A
P
P
E
N
D
I
X

C

Allied Environmental Services West

77 Mark Drive
Suite 21
San Rafael CA 94903

Log Number: ____________________

800 989 3478.
415 492 9030.
(Fax) 415 479 5013.

NON-HAZARDOUS MANIFEST

GENERATOR

Generator Name ____________________ **Shipping Location** ____________________

Address ____________________ **Address** ____________________

____

Phone No. ____________________ **Phone No.** ____________________

Approval Number
16668

Gross Weight (Pounds)

Tare Weight (Pounds)

Net Weight (Pounds)

Net Weight (Tons)

Description of Material

Non-Regulated Petroleum
Contaminated Soil

Non DOT/RCRA Regulated

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

____
Signature   Generator Authorized Agent Name   Shipment Date

TRANSPORTER

Transporter Name ____________________ **Driver Name** ____________________

Address ____________________ **Vehicle License No./State** ____________________

Truck Number ____________________

I hereby certify that the above named material was picked up at the generator site listed above.

I hereby certify that the above named material was delivered without incident to the destination listed below

____
Driver Signature   Shipment Date   Driver Signature   Delivery Date

DESTINATION

Facility Name ____________________ **Phone No.** ____________________

Address ____________________

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

____
Signature   Authorized Agent Name   Receipt Date

DRAFT
ENGINEERING EVALUATION/COST ANALYSIS
UNION STATION GATEWAY
VIGNES STREET RAMPS
IMPROVEMENT AND UTILITY INSTALLATION PROJECT

LOS ANGELES, CALIFORNIA

DECEMBER 29, 1993

ENGINEERING EVALUATION/COST ANALYSIS
UNION STATION GATEWAY
VIGNES STREET RAMPS
IMPROVEMENT AND UTILITY INSTALLATION PROJECT

TABLE OF CONTENTS

Section — Page No.

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 5
  1.1 PURPOSE OF THE REPORT 6
  1.2 REPORT ORGANIZATION 6

2.0 SITE CHARACTERIZATION 7
  2.1 SITE DESCRIPTION 7
  2.2 SITE HISTORY AND BACKGROUND 7
  2.3 SITE CHARACTERIZATION 8
    2.3.1 Removal Preliminary Assessment 8
    2.3.2 Removal Site Inspection 9
    2.3.3 Site Geology 9
  2.4 STREAMLINED RISK EVALUATION 10
  2.5 JUSTIFICATION OF REMOVAL ACTION 11

3.0 REMOVAL ACTION OBJECTIVES 11
  3.1 REMOVAL ACTION SCOPE 11
  3.2 REMOVAL ACTION SCHEDULE 12
  3.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) 12
    3.3.1 Chemical-Specific ARARs 12
    3.3.2 Location-Specific ARARs 12
    3.3.3 Action-Specific ARARs 12
    3.3.4 Others 13

4.0 REMOVAL ACTION ALTERNATIVES 13
  4.1 Alternative 1: Containment of Impacted Soil 14
  4.2 Alternative 2: Bioremediation of Impacted Soil 15
  4.3 Alternative 3: Off Site Thermal Desorption 15
  4.4 Alternative 4: Cold Batch Mixing 16
  4.5 Alternative 5: Landfill Disposal 17

5.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES 17
  5.1 SCREENING AND ANALYSIS CRITERIA 18
    5.1.1 Effectiveness 18
    5.1.2 Implementability 20
    5.1.3 Cost 23

6.0 COMPARATIVE ANALYSIS OF ALTERNATIVES 25

7.0 PROPOSED REMOVAL ACTION 26

8.0 REFERENCES 27

ENGINEERING EVALUATION/COST ANALYSIS
UNION STATION GATEWAY
VIGNES STREET RAMP
IMPROVEMENT AND UTILITY INSTALLATION PROJECT

EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EECA) document has been prepared By Dames & Moore for Union Station Gateway Incorporated (USG). It provides a comparative analysis of removal action alternatives considered for the Union Station Gateway, Vignes Street Ramps Improvement and Utility Installation area (the site) of the Union Station Gateway Center project located in Los Angeles, California.

A removal action, as it applies to the site, is defined as the actions undertaken to prevent, minimize or mitigate impact to human health and the environment from contaminated soils excavated as part of the ramps improvement and utility installation. An EECA must be completed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as required by section 300.415(b)(4)(i) of the National Contingency Plan (NCP). The proposed removal action will also comply with NCP requirements.

The site is located in central Los Angeles, east of Union Station. Portions of the site are located on two parcels of land that will be owned by the California Department of Transportation at the completion of the USG Center Project. Portions of these parcels are used as parking areas for a Denny's restaurant at 530 Ramirez street, others are located in Vignes Street North of the Santa Ana freeway. Excavation for utility trenches will extend beyond the parcels boundaries in Vignes, Ramirez and Lyon streets in City of Los Angeles Public Right of Way. The Metro Rail Subway corridor is located diagonally across and buried beneath the southern portion of the USG Center and to the south of the site. Metro Rail Public Transit Improvements (PTIs) are located adjacent to the USG Center and consist of various approved mitigation elements in support of the Metro Rail Line Station at the USG Center.

The ramp improvements and utility relocation areas include or border the site of a former coal gasification and butadiene plants (gas plant site) where contaminated soils are most likely to be encountered during excavation. The primary byproducts from the coal gasification and butadiene manufacturing processes are coal tar, an oily sludge-like residue that can contain significant concentrations of semi volatile compounds such as polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals (such as lead). Since 1986, numerous environmental investigations have been conducted at the gas plant site. The results of these studies have been summarized in a Removal Preliminary Assessment (RPA) conducted as part of a Removal Site Evaluation. The RPA concluded that the site has been impacted by contaminants typically associated with coal gasification and butadiene production activities.

A streamlined risk evaluation, based on the RPA results concluded that soils excavated from the site as part of the USG Center Project, may present a health risk to current and future construction workers. A Health & Safety Plan was prepared and implemented for the workers currently operating on site. This EECA makes recommendation for a removal action that will be protective of human health and the environment on a long-term basis. It should be noted that the scope of the removal action is limited to contaminated soils excavated as part of the ramp improvement and utility relocation and does not apply to contaminated soils present at the larger gas plant site in general.

Five alternatives were considered for the removal action at the site. These alternatives were evaluated under common technical requirements imposed by the site conditions and the stringent schedule of the USG Center construction project. These requirements can be summarized as follows:

- Because of poor geotechnical properties of site soils, utility trenches must be backfilled with a hard slurry in order to provide for worker safety by preventing risk of cave-ins and for stable support of the utility conduits

- There is no long term storage space at the site, nor site areas requiring fill

- Ramp improvement and utility relocation activities must be complete by February 28, 1994 to prevent USG Center project delays and freeway and street traffic disruption

- Ramp improvements and utility relocation areas will be paved with asphalt regardless of contamination as part of the USG Center project

Removal action alternatives can be described as follows:

- **Alternative 1: Containment.**

As part of this alternative, excavated soils showing traces of contamination would be backfilled in trenches or other areas requiring fill.

- **Alternative 2: Bioremediation.**

As part of this alternative, excavated soils would be stockpiled onsite. Bioremediation in stockpiles would be promoted by adding nutrients to stockpiled soils. Once remediation is complete in stockpiles, treated soils would be disposed in a permitted landfill.

- **Alternative 3: Thermal desorption.**

As part of this alternative, excavated soils would be stockpiled or loaded directly onto trucks and transported offsite to a thermal desorption facility where contaminants would be separated from the soils in a low temperature thermal chamber and destroyed in vapor phase in a high temperature burner. Treated soils would be disposed of in a permitted landfill.

- **Alternative 4: Cold batch mixing.**

As part of this alternative, excavated soils would be would be stockpiled or loaded directly onto trucks and transported offsite to a cold batch mixing facility where contaminants would be stabilized in an aggregate binder and recycled as road base materials.

- **Alternative 5: Landfill disposal.**

As part of this alternative, excavated soils would be would be stockpiled or loaded directly onto trucks and transported offsite to a permitted landfill facility.

These alternatives were evaluated on the basis of effectiveness (short- and long-term), implementability (technical and administrative) and cost (direct and indirect).

Although On-Site Containment of the impacted soils was considered in this document, it was determined that this approach is not feasible, due to the alternative's lack of ability to protect human health and the environment and its inability to be implemented at the site. Similarly, the poor technical and administrative implementability of onsite bioremediation as well as its poor short-term effectiveness resulted in not retaining this removal action alternative for further consideration.

Three treatment or disposal alternatives for excavated soils remained: Off-Site Thermal Desorption; Off-Site Cold Batch Mixing; and Off-Site Land Disposal. Off-site land disposal was mainly discarded on a cost and administrative implementability basis since this alternative would be less cost effective than treatment options such as thermal desorption or cold batch mixing and would not fulfill the CERCLA legislative mandate for reduction of toxicity, mobility or volume through treatment. Thermal desorption was also discarded on the basis of cost effectiveness and because of the fact that it would not reduce or immobilize lead or other metal compounds in treated soil.

Off-Site Cold Batch Mixing was selected as the preferred Removal Action because it is considered to be effective in protecting the public health and the environment, is technically and administratively implementable, has predictable performance and is cost-effective in comparison with the other feasible alternatives.

The removal action will be implemented on a accelerated schedule after the draft EECA Public review period. Ramp area over excavation is scheduled to commence mid January 1994. Trenching activities commenced on November 1, 1994. It is estimated that the removal and recycling of soils excavated from the site will take approximately 24 working days.

1.0 INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) document provides a comparative analysis and selection of removal action alternatives considered for the Union Station Gateway, Vignes Street Ramps Improvement and Utility Installation Project.

Union Station Gateway Incorporated (USG) was formed as a joint effort between the Los Angeles County Metropolitan Transportation Authority (MTA) and Catellus Development Corporation (Catellus), to develop an area located at the eastern edge of Union Station in Los Angeles, California (Figure 1). USG is the designer/builder of the project to construct the Gateway Transit Center and MTA headquarters (USG Center). The USG Center includes various buildings, parking structures and off-site roadway, ramp and utility improvements. This EE/CA applies to the "site" defined by the ramp and utility improvement portion of the USG Center Project. The area delineated by the location of the ramp improvements (e.g., Parcels A and B on Figure 2) and trench excavation for utility relocation (shown on Figure 3) is thereby defined as the site.

The ramp and utility improvements are located in an area that includes or borders the much larger site of former coal gasification and butadiene production facilities (the gas plant site) where contaminated soils are most likely be encountered during excavation. The EECA process to evaluate and select a removal action for the site, is used to fulfill the requirements of the National Contingency Plan (NCP). The site removal action will be performed following the requirements of the NCP (EPA, 1990) and implemented under critical time constraints imposed by the construction of the USG Center.

The Metro Rail Subway corridor is located diagonally across and buried beneath the southern portion of the USG Center and to the south of the site. Metro Rail Public Transit Improvements (PTIs) are located adjacent to the USG Center and consist of various required mitigation elements in support of the Metro Rail Line Station at the USG Center. These previously-approved mitigation measures include: the integration of existing local and express bus routes with the Metro Rail to provide transit riders with improved access and expedited service; station support elements such as bus layover areas, bus turn-out lanes, and bus boarding facilities; improvement of existing roadways in the vicinity, including the realignment of Vignes Street, reconfiguration of the existing El Monte busway, and creation of exclusive busway lanes; and the provision of public parking facilities for transit users (Park-N-Ride). These measures are approved mitigations to Metro Rail construction as identified in SCRTD Metro Rail NEPA/CEQA documentation (U.S. Department of Transportation, 1983; SCRTD, 1989) and CEQA documentation (SCRTD 1991a and 1991b).

1.1 PURPOSE OF THE REPORT

This report was prepared in accordance with the NCP, 400 CFR Part 300. The intent of this EECA is to provide a methodology for evaluating and selecting a removal action alternative and to provide documentation for removal action selection.

1.2 REPORT ORGANIZATION

This report is organized as follows:

Section 2 presents the site characteristics, including a brief description of the site, its history and background, and a justification of the removal action. In the context of the removal action, this section also presents a summary of the risk evaluation for the site.

Section 3 lays the foundation of the report by discussing the removal action objectives. This includes the scope of the removal action and applicable or relevant and appropriate requirements.

Section 4 presents the various removal alternatives evaluated for the removal action.

Section 5 presents the analysis and screening of the removal action alternatives. It briefly discusses the criteria used for the evaluation and screening and presents the results of the analysis.

Section 6 presents a comparative analysis of the alternatives considered for the removal action.

Section 7 presents the proposed removal action for the site. The justification for the selection of the removal action is also provided in this section.

Section 8 present the references used to prepare this report.

2.0 SITE CHARACTERIZATION

2.1 SITE DESCRIPTION

The object of this EE/CA is defined by the area affected by the ramp and utility improvements performed as part of the USG Center construction. The site is located in central Los Angeles, east of Union Station and the Metro Rail Station (Figure 1). Ramp improvments are located in Vignes Street in the City of Los Angeles Public Right of Way (Parcels A and B in Figure 2). Portions of the current Vignes street will be realigned to accommodate the ramps. The Vignes Street off and on-ramps will be constructed on these two parcels of land, while the excavation for the utility trenches will extend beyond the parcels boundaries in the city of Los Angeles Right of Way (Figure 3).

At the time of completion of the USG Center, Parcels A and B will be owned by the California Department of Transportation (CALTRANS). Trenches will be located in public right of way under City of Los Angeles or CALTRANS ownership, whereas utility easements will be owned by the Department of Water and Power (DWP).

Land use in the site vicinity consists of industrial plants, a City of Los Angeles Technical center, a train and metro station and a Denny's Restaurant located at 530 Ramirez Street.

2.2 SITE HISTORY AND BACKGROUND

Historical data on the site indicates that the southern portion of the site, south of Ramirez street, and the site vicinity to the east was previously occupied by a coal gasification plant site from as early as 1870 through 1941. Land use information is not available for the site vicinity area priort to 1870. Scattered data suggest that, from 1870 to 1941, the Southern California Gas Company and a predecessor, the Los Angeles Gas and Electric Company used a portion of the land on Aliso Street for coal/oil gas generation. In 1943, the Southern California Gas Company ceased the gas generation operation and converted the plant to a butadiene production facility (The Earth Technology Corp., 1987) Based on historical aerial photographs the plant facilities consisted of three gas purification tanks and six oil scrubber tanks located on the ramp improvement area of the site. A cooling water tower, pump and meter houses and a exhaust house existed on the other side of the site (Levine-Fricke,1989).

The principal raw materials used in the manufacture of coal gas production are coal and residual oil from crude. The process consisted of heating coal and subsequently quenching the heated coal with water or oil. Upon quenching, light petroleum hydrocarbon fractions volatilized and were captured as a source of fuel gas. The primary byproducts from the process are lampblack, coal tar and an oily sludge-like residue that can contain significant concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs). Inorganic sulfur, nitrogen complexes and metals are also generally found in the residues.

Butadiene gas was produced through a thermal "cracking" process. This process consisted of mixing oil distillates with steam and heating the mixture in gas generators. Liquid from the condensed gas was piped to the Shell Chemical Company in Torrance for purification. The Southern California Gas Company ceased production of the butadiene gas around 1946. Southern California Gas Company sold the property about 36 years ago, and there is no available data on the use of the buildings or land after 1946 (Earth Technology Corp., 1987) Numerous soil and ground water investigations have been conducted in this area. From these studies it was concluded that PAHs, VOCs and inorganic compounds are present in the soil and groundwater, that the materials in the soil are the likely result of coal gasification and butadiene plants operation, and that the ramp improvement and utility relocation areas have been impacted.

2.3 SITE CHARACTERIZATION

2.3.1 Removal Preliminary Assessment

The results of previous investigations and an assessment of the nature and extent of contamination at the site is described in the Removal ~~Site~~ Preliminary Assessment (Dames & Moore, 1993a). The findings of previous investigations can be summarized as follows:

Since 1986, a total of 13 borings were drilled in the site vicinity. Soil samples were taken at depths ranging from two to 45 feet below ground surface (bgs). Analytical data are summarized in Tables 2-1 through 2-5. Laboratory analysis of soil samples show an average concentration of PAHs in soil to be approximately 26 milligrams per kilogram (mg/kg), with a maximum detected concentration of 360 mg/kg. Carcinogenic PAHs concentrations was approximately 5.7 mg/kg in average with a maximum value of 70 mg/kg. The average concentration of Total Recoverable Petroleum Hydrocarbon (TRPH) detected was 852 mg/kg, with a maximum value of 8,400 mg/kg in a trench located in Ramirez Street. VOC concentrations averaged 0.71 mg/kg with a maximum detected at 21 mg/kg. Lead was analyzed in nine samples from three borings. Average concentration of lead averaged 37 mg/kg with a maximum of 190 mg/kg in one sample. The regulatory threshold for lead is 1000 mg/kg (Total Threshold Limit Concentration) or 5 milligrams per liter (mg/L) in the liquid extract (Soluble Threshold Limit Concentration).

Groundwater beneath the site was encountered between 25 to 29 feet bgs. The average concentration of PAHs in groundwater was 0.1 mg/L, with a maximum concentration of 0.5 mg/L. TPH concentrations averaged 2.3 mg/L, with a maximum concentration of 9 mg/L. VOCs were detected in groundwater at an average concentration of 0.1 mg/L with a maximum of 0.3 mg/L. Benzene was detected in one groundwater sample at a maximum concentration of 0.004 mg/L. The scope of the ramp improvement and utility relocation activities will not encounter groundwater.

2.3.2 Removal Site Inspection

Analysis of previous investigations delineated the need for further characterization of Parcels A & B as well as trench soils. A soil sampling plan, including a health and safety plan, a quality assurance project plan, and a waste management plan (Dames & Moore, 1993b) was prepared to collect additional samples at the USG site including utility trench locations. The results of these investigations will be presented in a document titled "Union Station Gateway - Vignes Street Ramp Improvement Project and Utility Installation - Removal Site Inspection. This document will be completed in January, 1994. In addition, a contaminated area of a utility trench located in Ramirez Street was sampled and analyzed with the objective of assessing the potential for hazardous waste classification of the USG site soils and conducting a preliminary evaluation of removal alternatives (e.g., soil profiling for offsite treatment/disposal). Analyses included testing for pH, sulfides, flash point, Title 26 metals, Phenols, TRPH, VOCs, PAHs, Polychlorobiphenyls (PCBs) and aquatic toxicity. When compared to the regulatory threshold, the results of the analytical testing indicated that the USG site soils would not be classified as hazardous waste. These results will be incorporated in the Removal Site Inspection Report.

2.3.3 Site Geology

The geology of the USG site and vicinity was interpreted by Levine-Fricke (Levine-Fricke, 1989) based on sediments encountered during the site investigations. Sediments encountered beneath the site consisted typically of silty sand from ground surface to approximately 25 feet bgs with medium to coarse grain sand occurring from approximately 25 feet bgs to a total drill depth of approximately 31 feet. Trace silts and gravel were encountered sporadically beneath the site and vicinity.

Saturated sediments were encountered during drilling between approximately 27 feet bgs and 30 feet bgs. These sediments were typically odorous with a grayish, oxidized appearance.

2.4 STREAMLINED RISK EVALUATION

A risk evaluation was performed as part of the Preliminary Site Assessment. The basic steps of the streamlined risk evaluation included:

- *Identification of chemicals of potential concern in soils and groundwater* - Any chemical found in detectable levels in soil or groundwater at the site was considered a chemical of potential concern.
- *Identification of potentially exposed populations* - Future construction workers were identified as the most likely exposed population.
- *Identification of exposure pathways of potential concern* - Inhalation of particulates, dermal contact with soil and incidental soil ingestion were considered complete exposure pathways.
- *Derivation of risk-based goals (RBGS) for soils* - A three step process using risk assessment methodologies was used to develop cleanup goals for the site. The site was delineated into Parcels A/B and Utility Lines. Separate risk-based goals were calculated for each portion. Levels of lead were not considered hazardous at the site. The RBGs are summarized in Table 2-6 of the document.
- *Evaluation of uncertainties in the risk assessment* - The RBGs were derived consistent with California Environmental Protection Agency Department of Toxic Substances Control (DTSC) policies associated with carcinogenic PAHs. The use of the Region IX, EPA toxicity equivalency factors could increase the RBGs for carcinogenic PAHs by 1 to 2 orders of magnitude.

The evaluation of RBGs indicated that soils in the vicinity of BH-13 and BH-15 (Figure 2) contain carcinogenic PAHs above the RBGs at 5 and, in some cases, at 10 feet bgs. In addition soils taken from a utility trench in Ramirez Street contained indeno (1,2,3-cd)pyrene, a carcinogenic PAH, above the RBG. Therefore the streamlined risk evaluation concluded that excavated soils must be managed according to specific requirements and precautions that apply to contaminated media. The soils excavated as part of the ramp improvement and utility relocation cannot be redeposited without potentially impacting human health and the environment.

2.5 JUSTIFICATION OF REMOVAL ACTION

Since impacted soils have been found in areas that are intended for construction of the on and off-ramp and areas intended for utility installation, the streamlined risk evaluation determined that steps will have to be taken to protect current and future workers in utility trenches and potential off site receptors from the contaminated soil. Keeping contaminated soil stored on site for prolonged period of time will potentially impact the surrounding areas and on site workers. For this reason a removal action as defined by the NCP is recommended for the site.

3.0 REMOVAL ACTION OBJECTIVES

3.1 REMOVAL ACTION SCOPE

CERCLA and the NCP defined removal action to include "the cleanup or removal of released hazardous substances from the environment, such as actions that may be necessarily be taken in the event of the threat of release of hazardous substances in the environment, such actions as may be necessary to monitor, assess and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or the threat of a release."

The scope of the site removal action consists of the actions undertaken to prevent, minimize or mitigate impact to human health and the environment from contaminated soils excavated as part of the ramp improvement and utility installation activities of the USG Center Project. It should be emphasized that the "release" or "threat of a release", with respect to USG Center activities, applies to contaminated soils excavated by USG and not to contaminated soils present at the gas plant site in general. More specifically, this removal action applies to the soil on Parcels A and B that will be removed as part of the over-excavation for the construction of the freeways ramps (approximately 3,000 cubic yards), and soils that will be removed as part of trench excavation (approximately 4,500 cubic yards). Volume estimates assume the removal (overexcavation) of the top two feet over Parcels A and B (35,000 square feet) and excavation of 2,000 feet of four foot wide and fifteen-foot deep trenches.

3.2 REMOVAL ACTION SCHEDULE

The removal action will be implemented on an accelerated schedule after the draft EECA is finalized after the Public review period. Trenching activities for utility relocation commenced on November 1, 1993. Over-excavation activities in the Vignes Street realignment area are expected to commence in mid-January 1994. It is estimated that the removal and recycling of soils excavated from the site will take approximately 24 working days.

3.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

3.3.1 Chemical-Specific ARARs

Chemical-specific ARARs consist of health- or risk-based concentrations of specific constituents in specific media. Table 3-1 is a table of chemical-specific ARARs for the site. A preliminary assessment has also been made as to whether these ARARs would be applicable or relevant and appropriate. If the ARAR is a non-enforceable requirement, it has been identified as information to be considered.

3.3.2 Location-Specific ARARs

Location-specific ARARs set restrictions on activities or limits on contaminant levels depending on the characteristics of a site or its immediate environs. Table 3-2 is a table of location-specific ARARs for the USG site. A preliminary assessment has also been made as to whether these ARARs would be applicable or relevant and appropriate.

3.3.3 Action-Specific ARARs

Action-specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular removal activities that are selected to accomplish a remedy. Since contaminated materials present at the site are expected to be non-hazardous and no onsite treatment will occur, no action-specific ARARs have been identified.

3.3.4 Others

In addition to legally binding laws and regulations, many Federal and State environmental and public health programs also develop criteria, advisories, guidance and proposed standards which may provide useful information and recommended procedures. These are not potential ARARs, but are to be considered (TBC) and evaluated along with ARARs. TBCs are included in Tables 3-1 and 3-2.

4.0 REMOVAL ACTION ALTERNATIVES

Several alternatives were considered for the removal action at the site. Each alternative is a combination of technologies that are potentially applicable as a removal action. These alternatives include a containment, an onsite and/or offsite treatment and an offsite land disposal option. Each alternative applies to the soils excavated as part of the ramp area overexcavation and utility trenching. Technical requirements imposed by the type of work to be conducted and site conditions will apply to all alternatives under consideration. These technical requirements can be summarized as follows:

- A common construction practice is to backfill soil in trenches to 95% of the maximum density of materials found in the excavation. Preliminary work conducted at the site demonstrated that soils at the site have poor geotechnical properties and that trenches are subject to significant cave-ins and other stability problems. The installation of utility lines requires that a stable bed with minimum settling be provided to maintain the structural integrity of the conduits in the trench. For this reason, the trenches need to be backfilled with a hard slurry that will maintain the trench wall stability. Slurry-backfilled trench can then be re-excavated with minimum structural risk to the workers and utility conduits.

- There is no long-term storage space available at the site. The ramp improvement area will be completely dedicated to traffic improvement and cannot be utilizied for other purposes. A parcel of land, owned by USG and located in the immediate vicinity of the site northwest of Lyons Street may be utilized for short term storage of limited quantities of contaminated materials.

- The USG Center project imposes a very stringent schedule upon ramp improvement and utility relocation activities occurring at the site. More specifically, these activities must be complete by February 28, 1994 in order to minimize freeway and surface street traffic disruption in the area.

- The asphalt cap proposed for this site may consist of multiple layers such as an asphalt layer, followed by a concrete layer on top of the contaminated soil. Flexible synthetic membranes may also be used between the layers in order to enhance protection against rainwater infiltration. Bituminous asphalt paving and concrete are vulnerable to cracking and chemical deterioration, but the cracks can be exposed, cleaned and repaired.

To prevent ponding of water on the cap, surface water controls are implemented, usually by sloping the cap surface and directing runoff to a stormwater collection system.

In Section 4.0 the removal actions considered are briefly described. Removal action alternatives are evaluated against effectiveness, implementability and cost in Section 5.0.

4.1 Alternative 1: Containment of Impacted Soil

Containment alternatives are designed to reduce the mobility of contaminants within a given environmental medium (such as soil), or from one environmental medium to another (such as soil to groundwater). These measures also limit the direct contact with and ingestion of the soil and also substantially reduce inhalation of airborne dust and vapors.

Alternative 1 would consist of the following elements:

- Characterization of excavated soils

- Backfilling the excavated soil in trench excavation after installation of utility lines and placing excess soil from ramp overexcavation in an adjacent area

- Managing clean soils as part of the USG Center construction activities.

4.2 Alternative 2: Bioremediation of Impacted Soil

Biodegradation processes include the enhancement of naturally existing microorganisms or the introduction of bacteria culture, nutrients, and/or an oxygen source. Nitrate has been used along with oxygen, allowing soil microbes to gain the energy required to grow rapidly and degrade contaminants.

Alternative 2 would consist of the following elements:

- Characterization and onsite storage of excavated soil
- Stockpiling excavated soil
- Treatment of soil stockpiles by bioremediation
- Offsite disposal of treated soil in a landfill
- Managing clean soils as part of the USG Center construction activities.

This alternative requires testing for biodegradation potential (biodegradability) of the contaminated soil. If tests are positive then steps will be taken to enhance bioremediation (i.e., injection of nutrients and/or oxygen). Once the soil is excavated it will be stockpiled on the site and bioremediation will be enhanced until the organic material is degraded. Metal contaminants will not be affected by this method, therefore the treated soil may have to be disposed in a permitted landfill. If the concentrations of specific metals are above regulatory limits, some pretreatment to stabilize the metals may be required prior to landfilling.

4.3 Alternative 3: Off Site Thermal Desorption

The thermal desorption process removes VOCs and PAHs from soil using heat energy to volatilize the compounds from the soil matrix. Offsite permitted treatment units are available to treat contaminated materials excavated soils which are loaded continuously into the unit's feeder, and passed through to an indirect fired desorption chamber. Temperatures inside the chamber reach well above the boiling point of organic compounds, typically in the range of 950°F to 1,200°F. VOCs and PAHs are separated from the solids by a purge gas which may be air, a combustion gas, nitrogen, or other inert gas. After the purge gas exits the unit, it is treated by an off-gas treatment system and be removed by activated carbon adsorption or destroyed in an afterburner at temperatures that could exceed 2,000°F. Particulates are collected by a cyclone, baghouse or wet scrubber. Commercial thermal desorption units vary in allowable capacity from 125 to 150 tons of soil per day, although efficiency can be limited by certain physical/chemical soil characteristics such as clay and moisture content.

Alternative 3 would consist of the following elements:

- Characterization and offsite transportation of impacted soils
- Offsite treatment by thermal desorption
- Landfill disposal or recycling of treated soil (offsite)
- Managing clean soils as part of the USG Center construction activities.

Metal contaminants will not be removed by thermal treatment. For this reason treated soils may have to be disposed of in a permitted landfill. Whether the disposal is to a hazardous (Class I) or non-hazardous (Class III) landfill would depend on the type and concentrations of the metals in the treated soil. In some cases pretreatment may be required prior to landfilling.

4.4 Alternative 4: Cold Batch Mixing

The cold batch mixing process consists of blending the impacted excavated soils with a variety of aggregates and a binder. Typical aggregates may include crushed rock, crushed concrete, asphalt, and sand. Typical mixing equipment consists of loaders, a pre-screening unit, and a mixing plant. The excavated soils are fed into the pre-screening unit by the loaders and transported to the mixing plant via a conveyor. At a mixing plant, the aggregate and binder are added and mixed until all particles are thoroughly coated with binder so that it is chemically and physically stabilized.

Alternative 4 would consist of the following elements:

- Characterization and offsite transportation of impacted soils.
- Offsite treatment by cold batch mixing.
- Recycling of treated soils (offsite).

Metal contaminants are stabilized by the fixation process and can be chemically stabilized within the aggregate matrix. After testing and confirmation sampling, treated soils may be recycled as road base or disposed in a non-hazardous waste landfill.

4.5 Alternative 5: Landfill Disposal

Landfill disposal transfers contaminated materials from a site to a controlled environment where migration of contaminants is significantly reduced and closely monitored.

Alternative 5 would consist of the following elements:

- Characterization and offsite transportation of impacted soils
- Offsite disposal in a permitted landfill. (Offsite pretreatment for metals may be required before disposal.)
- Managing clean soils as part of the USG Center construction activities.

5.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The alternatives discussed in section 4.0 of this report are evaluated in terms of their short and long term aspects of the following three criteria: effectiveness, implementability and cost. These evaluation criteria serves as tools for the elimination from consideration, alternatives that are considered unlikely to satisfy the criteria.

5.1 SCREENING AND ANALYSIS CRITERIA

The following sections describes the screening criteria and evaluation procedure employed as part of this study.

5.1.1 Effectiveness

The effectiveness criteria refers to the ability of the alternative to meet the removal action objectives. These objectives are discussed within the context of protectiveness of public health and the environment. The sub categories of the effectiveness criteria are: overall protection of public health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility or volume of contaminants, and short-term effectiveness.

The five alternatives described in section 4.0 were evaluated in terms of effectiveness as described above as follows:

Alternative 1 : Containment of Impacted Soil

Alternative 1 assumes that backfilling impacted soils in the excavated trenches and other areas requiring fill would be protective of human health and the environment since an asphalt/concrete cap over the backfilled materials would greatly reduce the risk of exposure to the most likely receptors. Alternative 1 however does not make provisions for preventing future workers from exposure or the need to wear protective equipment upon discovery of contamination. In addition Alternative 1 would include the backfilling of soils potentially exceeding the RBGs described in Section 2.4 and may not comply with certain rules such as California Occupational Safety and Health Act (Cal/OSHA), South Coast Air Quality Management District (SCAQMD) and Regional Water Quality Control Board (RWQCB) relevant and appropriate requirements (ARARs are presented in Tables 3-1 and 3-2). Since Alternative 1 would not reduce the volume and toxicity of contaminants at the site, it would have a poor long term effectiveness.

Alternative 2 : Bioremediation of Impacted Soil

Alternative 2 assumes that stockpiling impacted soils onsite and enhancing biodegradation by adding nutrients would be protective of human health and the environment over a period of time, since the contaminants of concern (with the exception of lead), would be reduced below the RBGs and would no longer present a risk to potential receptors. Biodegradation, however, has been best demonstrated on light hydrocarbons such as VOCs, whereas the effectiveness on PAHs needs to be confirmed by extensive and time consuming treatability studies. Furthermore, bioremediation would not be effective in removing lead from impacted soils. Therefore, although biodegradation of stockpiled soils may be effective in reducing VOC concentrations, other contaminants would remain after treatment, thus requiring disposal in a permitted landfill where further treatment may be necessary prior to final disposal. In addition, the short term effectiveness of Alternative 2 is limited by the fact that excavated soil piles containing VOCs and PAHs with very strong odors may have to remain onsite for a period of several months. Beside the nuisances to the nearby restaurant and workers at the City of Los Angeles maintenance center, several ARARs such as Cal/OSHA and SCAQMD relevant and appropriate requirements may not be met. An alternative to the onsite option would be to relocate bioremediation treatment at an off site facility. The time frame and regulatory complexity of permitting such a facility however, make this option non viable.

Alternative 3 : Off Site Thermal Desorption

Under Alternative 3, impacted soils would be removed from the site and treated by thermal desorption at a permitted offsite facility which will be responsible for final disposal or recycling. Because Alternative 3 would involve minimum site removal activities (e.g loading and transportation only) and reduce the volume, mobility and toxicity of contaminants through treatment, it would have a good long term effectiveness. Short term effectiveness would be impacted by dust generation during loading of trucks and increased vehicular traffic at the site. However, with the implementation of proper mitigation measures such as water or foam/sealant spraying for dust/vapor control, and truck staging, the short term impact is expected to be minimal. Under Alternative 3, all the ARARs presented in Section 3.4 would be met.

Alternative 4 : Cold Batch Mixing

Under Alternative 4, impacted soils would be removed from the site and treated by cold batch mixing at a permitted offsite facility which will be responsible for recycling . Because Alternative 4 would involve minimum site removal activities (e.g loading and transportation only) and reduce the volume, mobility and toxicity of contaminants through treatment (including immobilization of metals), it would have a good long term effectiveness. Short term effectiveness would be impacted by dust generation during loading of trucks and increased vehicular traffic at the site. However, with the implementation of proper mitigation measures such as water or foam/sealant spraying for dust/vapor control, and truck staging, the short term impact is expected to be minimal. Under Alternative 4, all the ARARs presented in Section 3.4 would be met.

Alternative 5 : Landfill Disposal

Under Alternative 5, impacted soils would be removed from the site and disposed offsite in a permitted landfill. Offsite pretreatment prior to disposal may be required. Because Alternative 5 would involve minimum site removal activities (e.g loading and transportation only) and reduce the volume, mobility and toxicity of contaminants present at the site, it would have a good long term effectiveness. This alternative would not however, fulfill the CERCLA Legislative Mandate to use treatment methods for contaminated materials rather than landfill disposal whenever practicable. Short term effectiveness would be impacted by dust generation during loading of trucks and increased vehicular traffic at the site. However, with the implementation of proper mitigation measures such as water or foam/sealant spraying for dust/vapor control, and truck staging, the short term impact is expected to be minimal. Under Alternative 5, all the ARARs presented in Section 3.4 would be met.

5.1.2 Implementability

The implementability criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. This criterion also addresses state acceptability, if the regulatory agency taking the lead on this project is the EPA. Community acceptability is also taken into account in this evaluation criterion.

The five alternatives for this removal action were evaluated in terms of their implementability as follows:

Alternative 1 : Containment of Impacted Soil

On a technical basis, Alternative 1 would not be implementable for the following reasons:

- As per the technical requirements identified in Section 4.0, the poor geotechnical properties of the soil (regardless of the state of contamination) encountered in the trenches during preliminary work dictate the need for backfilling the trench excavation with a hard slurry to maximize workers safety by preventing the risk of cave-ins and to provide a stable support for utility conduits.

- Impacted soils from trenches and Parcels A and B could not be backfilled onsite since no fill area, other than the trench excavation, is available at the site.

On an administrative basis, CALTRANS the owner of Parcels A & B at the time of completion of the USG Center, the City of Los Angeles and the Department of Toxic Substances Control of the California Environmental Protection Agency (DTSC) are not likely to accept or approve the re-disposal onsite of impacted soils with concentration of contaminants that may exceed RBGs.

Alternative 2 : Bioremediation of Impacted Soil

On a technical basis, Alternative 2 would not be implementable for the following reason:

- As per the technical requirements identified in Section 4.0, there would be no space onsite to stockpile large quantities of impacted soils or build bioremediation cells for long term treatment since the ramp improvment area will be dedicated to vehicular traffic structures An alternate treatment site is not available.

- Bioremediation is a slow process that would not comply with the stringent requirements of the USG Center construction schedule.

On an administrative basis, the nuisances created by vapors emanating from stockpiles and their impact on the nearby restaurant and the City of Los Angeles maintenance center workers, would most likely result in a permit denial from SCAQMD.

Alternative 3 : Off Site Thermal Desorption

This alternative is technically implementable, and the equipment necessary to process the waste is available in the general area of the site. The excavated waste will have to be transported off site for treatment. The off site facilities undertaking this effort are all permitted to handle non-hazardous material, so the soil must be classified as non-hazardous for it to be accepted by the facility. The non-hazardous classification was confirmed by verification sampling and analysis. The transportation will be undertaken by a licensed waste hauler. Since the contaminated material will be removed from the site, the surrounding community may be more willing to support this action. On an administrative basis, the implementation of this alternative is expected to have full support from state agencies.

Alternative 4 : Cold Batch Mixing

This alternative is technically implementable, and the equipment necessary to process the waste is available in the general area of the site. The excavated waste will have to be transported off site for treatment. The off site facilities undertaking this effort are all permitted to handle non-hazardous material, so the soil must be classified as non-hazardous for it to be accepted by the facility. The non-hazardous classification was confirmed by verification sampling and analysis. The transportation will be undertaken by a licensed waste hauler. Since the contaminated material will be removed from the site, the surrounding community may be more willing to support this action. On an administrative basis, the implementation of this alternative is expected to have full support from state agencies.

Alternative 5 : Landfill Disposal

This alternative is technically implementable, and the equipment necessary to process the waste is available in the general area of the site. The excavated waste will have to be transported off site for treatment. The off site facilities undertaking this effort are all permitted to handle non-hazardous and hazardous materials, so the soils may be classified as non-hazardous or hazardous for it to be accepted by the facility. The transportation will be undertaken by a licensed waste hauler. Since the contaminated material will be removed from the site, the surrounding community may be more willing to support this action. On an administrative basis, the implementation of this alternative is expected to have less support from state agencies since it does not fulfill the CERCLA legislative mandate to select treatment options over landfill disposal when practicable.

5.1.3 Cost

The cost criteria refers to the Net Present Worth (NPW) of the implementation of each alternative. The NPW evaluation considers the Direct Capital Costs, Indirect Capital Costs, and Annual Post Removal Site Control (PRSC) costs. Capital costs are considered in terms of present costs and the PRSC costs are discounted to a NPW, based on a 5% annual net cost of capital.

The analysis discussed herein is based on a comparison of the ***net*** costs of each alternative. As such, similar items such as excavation, backfilling, and paving are not considered. Otherwise, the costs consider variable cost factors.

Table 5-1 identifies the itemized cost factors for each alternative. These cost factors were developed by contacting treatment vendors and the consideration of past experiences with each of the removal technologies.

Alternative 1 : Containment of Impacted Soil

A cost estimate for this alternative was not developed because it was previously determined that it is not feasible to implement because of geotechnical worker safety and administrative (i.e., CALTRANS requirements) considerations.

Alternative 2 : Bioremediation of Impacted Soil

Costs for this alternative include the installation of ten biocells and operation for a period of three years. Design and permitting costs were assumed to be 25% due to the expected difficulties in permitting biotreatment. Treatment costs including analytical monitoring are assumed to be approximately $17,500 per month, based on prior experience with the operation of similar biocells.

Upon treatment to acceptable levels of contaminants, as confirmed by analytical testing, it is assumed that the soil can be used elsewhere on the project site or sold as fill at little or no cost. The total NPW cost to implement this alternative is approximately $700,000. This cost estimate does not include the purchase or rental of additional land to perform bioremediation of impacted soils.

Alternative 3 : Off-Site Thermal Desorption

Costs for this alternative include transportation and off-site thermal desorption of the impacted soils. Analytical testing costs for the preparation of a Certificate of Destruction are included. The costs associated with this alternative are based on vendor quotes. The total NPW cost to implement this alternative is approximately $1,200,000.

Alternative 4 : Cold Batch Mixing

Costs for this alternative include transportation and off-site cold batch mixing of the impacted soils, for use in road mix. Analytical testing costs for the preparation of a Certificate of Destruction are included. The costs associated with this alternative are based on vendor quotes. The total NPW cost to implement this alternative is approximately $760,000.

Alternative 5 : Landfill Disposal

Costs for this alternative include transportation and off-site land disposal of the impacted soils. Analytical testing costs for acceptance of the soil at the landfill are included. The costs associated with this alternative are based on vendor quotes. The total NPW cost to implement this alternative is approximately $2,500,000.

6.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The following table presents a comparative analysis of the five alternatives considered for the removal action.

Alternatives	Effectiveness	Implementability	Cost
Alternative 1 Containment	• Poor long-term effectiveness. • Contaminants above PRGs remain on site. • Potential impact to future workers in trenches.	• Technically not implementable because of structural requirements for worker safety. • Administratively affected by CALTRANS, City of LA and DTSC requirements.	NA (not technically implementable)
Alternative 2 Bioremediation	• Provides long-term effectiveness by degrading VOCs. • Ineffective for metals and PAHs contaminants. • Poor short term effectiveness due to odors and vapor emissions.	• Technically not implementable due to the lack of space for treatment. • Not implementable under stringent timeline constraints • Technical implementability depends on the results of soil testing. • Administratively affected by SCAQMD requirements.	$700,000(*) (not technically implementable)
Alternative 3 Thermal Desorption	• Provides good long-term effectiveness by removing the contaminated soil and removing organic contaminants. • Ineffective for metal contaminants. • Good short term effectiveness.	• Technically implementable. • Administratively implementable only if soil is classified as non-hazardous (which has been confirmed by verification sampling)	$1,200,000
Alternative 4 Cold Batch Mixing	• Provides good long-term effectiveness by immobilizing all types of contaminants. • Good short term effectiveness.	• Technically implementable • Administratively implementable only if soil is classified as non-hazardous (which has been confirmed by verification sampling)	$760,000
Alternative 5 Landfill Disposal	. Provides good long-term effectiveness by removing contaminated media from the site to a controlled environment. • Good short term effectiveness.	• Technically implementable. • Administratively implementable but less desirable since CERCLA legislative mandated is not fulfilled.	$2,500,000

(*) Does not include purchase or rental of additional land.

7.0 PROPOSED REMOVAL ACTION

The removal actions considered in this document are focused upon the containment, treatment or disposal of the soils excavated as part of utility trenching and Parcels A and B overexcavation. As previously discussed, the subject soils from the Vignes Street Ramp Improvement Area are being removed as a part of site preparation for the freeway access ramps and were not intended for re-use at the site since no fill area is currently available. Likewise, the subject soils from the Utility Installation Project Area are being removed and can not be re-used at the site because of geotechnical and worker safety considerations relating to the trench excavation. Although On-Site Containment of the impacted soils was considered in this document, it was determined that this approach is not feasible, due to the alternative's lack of ability to protect human health and the environment and its inability to be implemented at the site. Similarly, the poor technical and administrative implementability of onsite bioremediation as well as its poor short-term effectiveness resulted in not retaining this removal action alternative for further consideration.

Three treatment or disposal alternatives for excavated soils remained: Off-Site Thermal Desorption; Off-Site Cold Batch Mixing; and Off-Site Land Disposal. Off-site land disposal was mainly discarded on a cost and administrative implementability basis since this alternative would be less cost effective than treatment options such as thermal desorption or cold batch mixing and would not fulfill the CERCLA legislative mandate for reduction of toxicity, mobility or volume through treatment. Thermal desorption was also discarded on the basis of cost effectiveness and because of the fact that it would not reduce or immobilize lead or other metal compounds in treated soil.

Off-Site Cold Batch Mixing was selected as the preferred Removal Action because it is considered to be effective in protecting the public health and the environment, is technically and administratively implementable, has predictable performance and is cost-effective in comparison with the other feasible alternatives.

8.0 REFERENCES

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SCRTD, 1991a.

SCRTD, 1991b.

U.S. Department of Transportation, 1983, Environmental Impact Report, Final.

FIGURES

REFERENCE: USGS
Los Angeles, California

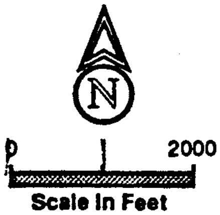
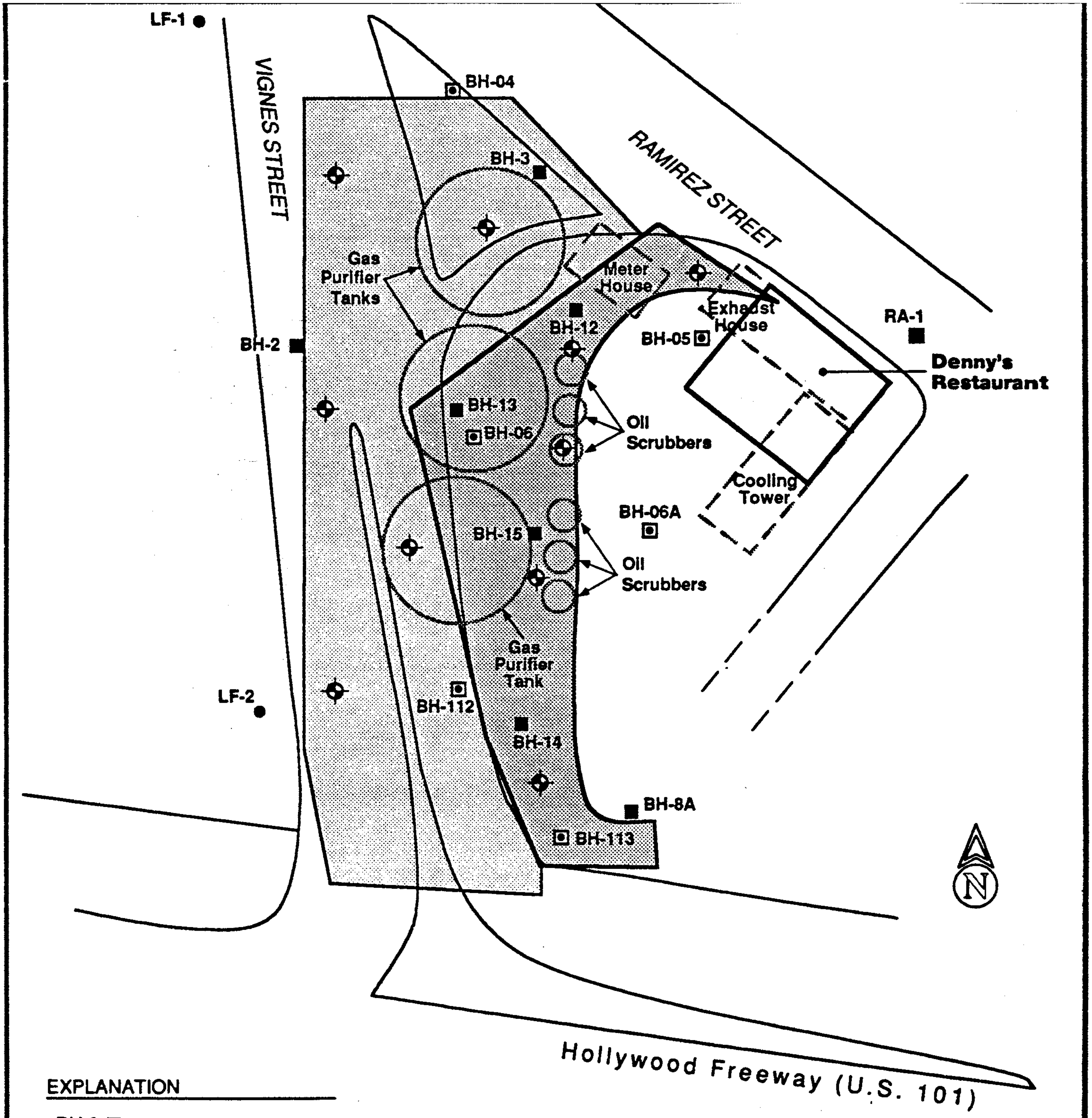


FIGURE 1

SITE LOCATION MAP

Denny's Site Parcel "A"
Los Angeles, CA

Dames & Moore



EXPLANATION

BH-3 ■ Levine•Fricke Soil Borings

LF-1 ● Monitoring Wells

BH-04 ⊡ Earth Technology Corp. Soil Borings

⌖ Borings Proposed for Removal Site Inspection (RSI)

▭ ○ Approximate Former Coal Gasification Plant Areas and Features

— Approximate Site Boundaries

▨ Parcel A

░ Parcel B

SCALE

0 30 60 120

1 INCH = 60 FEET

FIGURE 2

Vignes Street Ramps Site, Former Coal Gasification Plant, and Soil Boring Locations

Dames & Moore

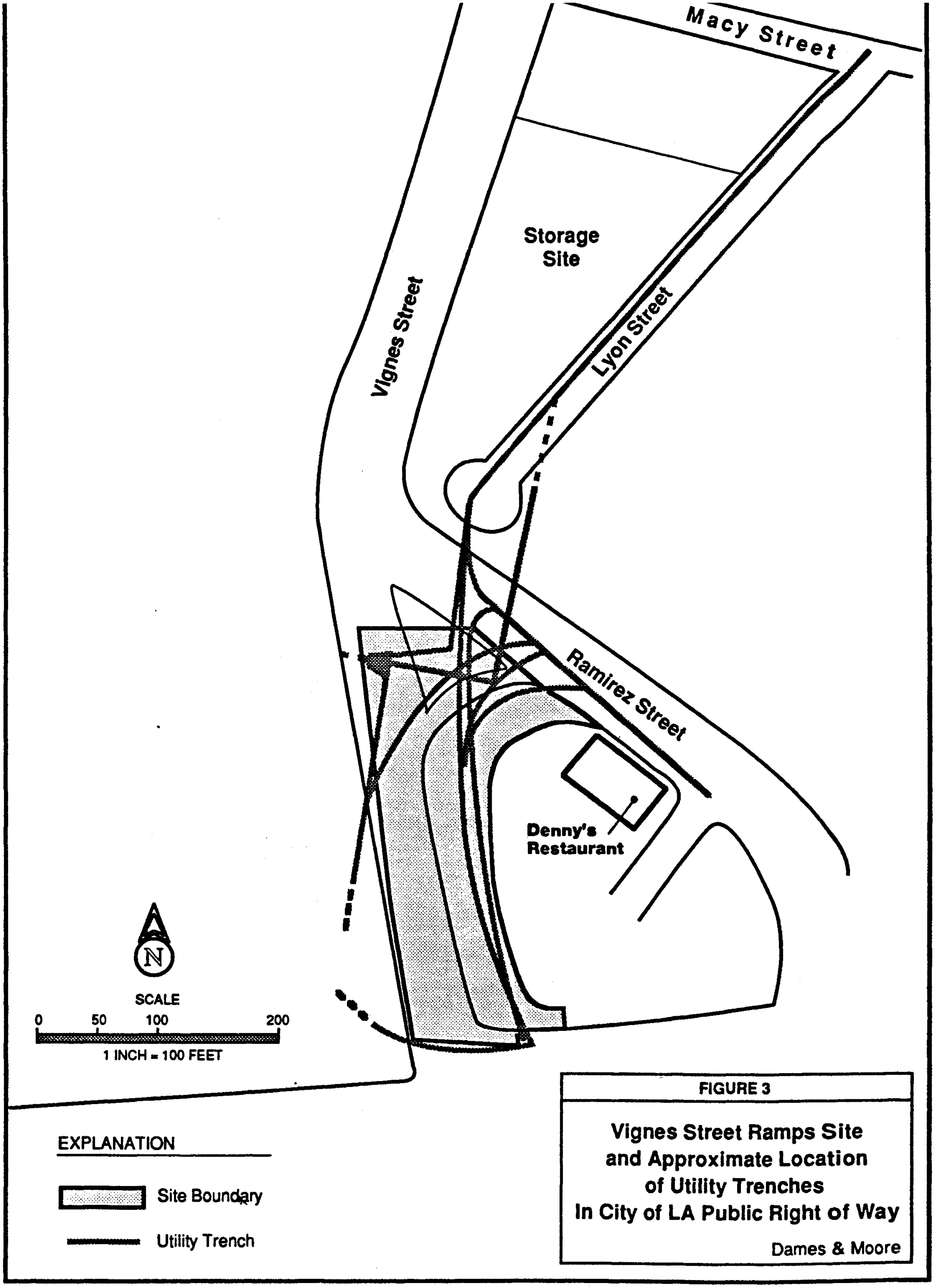


FIGURE 3

Vignes Street Ramps Site and Approximate Location of Utility Trenches In City of LA Public Right of Way

Dames & Moore

TABLES

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-1. CONCENTRATIONS (MG/KG) OF PAHs AND TRPH IN SITE SOILS

Sample ID	Depth (ft)	Carc. PAHs	Total PAHs	TRPH	Reference	Comment
RA-1	2	7	137.5	8400	LF: 11/2/93	
BH-3	5	ND	ND	20	LF:7/16/93(LF 91)	Table 1
BH-3	25	ND	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-04	25	ND	1.7	3	LF:7/16/93(ET 86)	Table 1
BH-05	35	ND	6	32	LF:7/16/93(ET 86)	Table 2
BH-05	40	ND	360	40	LF:7/16/93(ET 86)	Table 2
BH-05	45	ND	24	10	LF:7/16/93(ET 86)	Table 2
BH-06	30	ND	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-6A	35	ND	0.7	NA	ET: 11/ 86	Table 3
BH-8A	3	ND	ND	NA	LF:7/16/93	Fig.3
BH-8A	10.5	ND	ND	NA	LF:7/16/93(LF 93)	Table 2
BH-8A	20.5	ND	ND	NA	LF:7/16/93(LF 93)	Table 2
BH-12	5	0.79	0.79	NA	LF:7/16/93	Table 5
BH-12	10.5	ND	ND	NA	LF:7/16/93	Table 5
BH-12	20.5	ND	ND	NA	LF:7/16/93	Table 5
BH-13	5	35.5	69.6	NA	LF:7/16/93	Table 5
BH-13	10	10.09	17.29	NA	LF:7/16/93	Table 5
BH-13	15	0.156	0.39	NA	LF:7/16/93	Table 5
BH-13	20	ND	ND	NA	LF:7/16/93	Table 5
BH-14	5.5	0.077	0.152	NA	LF:7/16/93	Table 5
BH-14	10.5	ND	ND	NA	LF:7/16/93	Table 5
BH-14	21.5	ND	ND	NA	LF:7/16/93	Table 5
BH-15	5.5	69.7	126.85	NA	LF:7/16/93	Table 5
BH-15	10.5	2.25	10.65	NA	LF:7/16/93	Table 5
BH-15	16	ND	ND	NA	LF:7/16/93	Table 5
BH-15	20.5	ND	ND	NA	LF:7/16/93	Table 5
BH-15	25.5	ND	0.24	NA	LF:7/16/93	Table 5
BH-112	45	ND	ND	5	ET: 4/24/87	Table 2
BH-113	40	ND	ND	6	ET: 4/24/87	Table 2
Average		5.73	26.06	851.90	—	—
Maximum		69.7	360	8400	—	—

PAHs: Polycyclic Aromatic Hydrocarbons
TRPH: Total Recoverable Petroleum Hydrocarbons
ND: Non Detected
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.
EC: Ecology & Environment, Inc.

Notes:
ND was taken as half the detection limit
NA was not taken into consideration in average calculation

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-2. CONCENTRATIONS (MG/KG) OF VOCs IN SITE SOILS

Sample ID	Depth (ft)	Benzene	Total VOCs	Reference	Comment
RA-1	2	ND	21	LF:11/2/93	MC in Blank
BH-3	5	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-3	25	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-04	25	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-05	35	ND	ND	LF:7/16/93(ET 86)	Table 2
BH-05	40	ND	0.3	LF:7/16/93(ET 86)	Table 2
BH-05	45	ND	ND	LF:7/16/93(ET 86)	Table 2
BH-06	30	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-06A	30	ND	ND	ET: 11/86	Table 3
BH-12	2.5	ND	ND	LF:7/16/93	Table 4
BH-12	5	ND	ND	LF:7/16/93	Table 4
BH-12	10.5	ND	ND	LF:7/16/93	Table 4
BH-12	20.5	ND	ND	LF:7/16/93	Table 4
BH-13	2.5	ND	ND	LF:7/16/93	Table 4
BH-13	5	ND	ND	LF:7/16/93	Table 4
BH-13	10	ND	ND	LF:7/16/93	Table 4
BH-13	20	ND	ND	LF:7/16/93	Table 4
BH-14	3	ND	ND	LF:7/16/93	Table 4
BH-14	5.5	ND	ND	LF:7/16/93	Table 4
BH-14	10.5	ND	ND	LF:7/16/93	Table 4
BH-14	21.5	ND	ND	LF:7/16/93	Table 4
BH-15	3	ND	0.068	LF:7/16/93	Table 4
BH-15	5.5	ND	ND	LF:7/16/93	Table 4
BH-15	10.5	ND	ND	LF:7/16/93	Table 4
BH-15	16	ND	ND	LF:7/16/93	Table 4
BH-15	20.5	ND	ND	LF:7/16/93	Table 4
BH-112	45	ND	ND	ET: 4/24/87	Table 2
BH-113	40	ND	ND	ET: 4/24/87	Table 2
BH-112	45	ND	ND	ET: 4/24/87	Table 2
BH-113	40	ND	ND	ET: 4/24/87	Table 2
Average		0.00	0.71		
Maximum		0	21		

VOCS: Volatile Organic Compounds
ND: Non Detected. ET: Earth Technology, Inc.
NA: Not Analyzed
LF: Levine-Fricke

Notes: MC: Methylene Chloride
ND was taken as half the detection limit

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-3: CONCENTRATIONS (MG/KG) OF LEAD IN SITE SOILS

Sample ID	Depth (ft)	Lead	Reference	Comment
BH-13	5	28	LF:7/16/93	Table 6
BH-13	10	37	LF:7/16/93	Table 6
BH-13	20	6.15	LF:7/16/93	Table 6
BH-14	5.5	190	LF:7/16/93	Table 6
BH-14	10.5	2.2	LF:7/16/93	Table 6
BH-14	21.5	1.8	LF:7/16/93	Table 6
BH-15	5.5	40	LF:7/16/93	Table 6
BH-15	10.5	30	LF:7/16/93	Table 6
BH-15	20.5	2.3	LF:7/16/93	Table 6
Average		37.5	—	—
Maximum		190	—	—

LF: Levine-Fricke

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-4. CONCENTRATIONS (MG/L) OF PAHs IN GROUNDWATER SAMPLES

Boring ID	Depth (ft)	Carc.PAHs	Total PAHs	TRPH	Reference	Comment
BH-04	57	ND	0.1	ND	LF:7/16/93 (ET 86)	Table 3
BH-05	45	ND	0.5	9	LF:7/16/93 (ET 86)	Table 3
BH-06	55	ND	ND	NA	LF:7/16/93 (ET 86)	Table 3
LF-2	NR	ND	ND	ND	LF:7/16/93 (LF 91)	Table 3
LF-2-1	NR	NR	NR	ND	TERRA THON LABS (91)	—
LF-2-2	NR	ND	ND	NR	TERRA THON LABS (91)	—
LF-6	NR	ND	ND	ND	LF:7/16/93 (LF 91)	Table 3
BH-112	45	NA	NA	6	ET: 4/24/87	Table 3
BH-113	40	NA	NA	4	ET: 4/24/87	Table 3
Average		0.00	0.12	2.25		
Maximum		0	0.5	9		

PAHs: Polycyclic Aromatic Hydrocarbons
ND: Non Detected
NR: Not Reported
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.

Notes:
ND was taken as half the detection limit
NA & NR were not taken into consideration in average calculation

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-5. CONCENTRATIONS (MG/L) OF VOCS IN GROUNDWATER SAMPLES

Boring ID	Depth (ft)	Benzene	Total VOCs	Reference	Comment
BH-04	57	ND	ND	LF:7/16/93 (ET 86)	Table 3
BH-05	45	ND	0.006	LF:7/16/93 (ET 86)	Table 3
BH-06	55	ND	0.119	LF:7/16/93 (ET 86)	Table 3
LF-2	NR	0.004	0.316	LF:7/16/93 (LF 91)	Table 3
Average		0.00	0.11	LF:7/16/93 (LF 91)	Table 3
Maximum		0.004	0.316	LF:7/16/93 (LF 91)	Table 3

PAHs: Polycyclic Aromatic Hydrocarbons
ND: Non Detected
NR: Not Reported
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.

Notes:
ND was taken as half the detection limit
NA & NR were not taken into consideration in average calculation

TABLE 2-6

SUMMARY OF RISK-BASED GOALS (RBGS) FOR THE SITE

Chemical	RBG Utility Trench (mg/kg)	RBG Parcel A/B (mg/kg)
Carcinogens		
Benzo(a)anthracene	0.49	0.43
Benzo(b)fluoranthene	0.49	0.43
Benzo(k)fluoranthene	0.49	0.43
Benzo(a)pyrene	0.49	0.43
Di-2-ethylhexyl phthalate	475	416
Chrysene	0.49	0.43
Dibenzo(a,h)anthracene	NA	0.43
Indeno(1,2,3-cd)pyrene	0.49	0.43
Noncarcinogens		
Acenaphthylene	3952	2372
Anthracene	NA	17792
Benzo(ghi)perylene	3952	2372
Cyanide	1979	NA
Di-n-butylphthalate	NA	6664
Naphthalene	3952	2372
Phenanthrene	3952	2372
Pyrene	2964	1779
Toluene	NA	13349
Ethylbenzene	NA	6675
Xylene	NA	133490

TABLE 3-1

CHEMICAL SPECIFIC ARARS

ARAR	Requirement	A/RA[1]
EPA PRG[2]	PRGs are health-based concentrations to be used for risk screening purposes, and may be used as starting points for determining site-specific cleanup goals.	TBC
Aniline	5.9E+02 mg/kg (industrial soil)	
Lead	5.0E+02 mg/kg (residential soil)	
Benzene	4.6E+00 mg/kg (industrial soil)	
Ethylbenzene	6.8E+01 mg/kg (industrial soil)	
Toluene	2.8E+02 mg/kg (industrial soil)	
Xylene (mixed)	9.9E+01 mg/kg (industrial soil)	
NESHAPs[3] 40 CFR 61.340 - 359	This NESHAP is for fugitive equipment leaks. Applicable to the following sources that are intended to operate in benzene service: pumps, compressors, pressure relief devices, sampling connections, systems, valves, etc.	RA
Benzene	No detectable emissions or <500 ppm above background.	
RCRA Treatment Standards for LDRs[4] 22 CCR 66268.43	Restricted wastes and the concentrations of their associated hazardous constituents which may not be exceeded by the waste or treatment residual for the allowable land disposal of such waste or residual.	RA
	Wastewaters (mg/l) Nonwastewaters (mg/kg)	
Benzene (U019)	0.14 36	
Benzo-a-pyrene (U022)	0.061 8.2	
Chrysene (U050)	0.059 8.2	
Fluoranthene (U120)	0.068 8.2	
Toluene (U220)	0.080 28	
Xylene (U239)	0.32 28	
Hazardous Wastes with VOCs 22 CCR 66268.32	Hazardous wastes containing more than 1% by weight of VOCs must be incinerated or treated in a way which protects the environment.	RA
CA ALs[5]	Als are non-enforceable health-based guidance numbers which have been provided by the Cal-EPA to serve as interim guidance for "safe" levels of contaminants in drinking water.	TBC
	Toluene 0.10 mg/l	

TABLE 3-1 (Continued)

CHEMICAL SPECIFIC ARARS

<table>
<tr><th>ARAR</th><th colspan="4">Requirement</th><th>A/RA[1]</th></tr>
<tr><td rowspan="13">CA AALs[6]</td><td colspan="4">AALs are state-wide limits that are pollutant- and receptor-specificc and used as a starting point for establishing cleanup levels. AALs are not promulgated in the CCR (i.e., not a statute or regulations) so they are considered guidance.</td><td rowspan="13">TBC</td></tr>
<tr><td></td><td>water
ug/l</td><td>air
ug/m^3</td><td>soil contact
mg/kg</td></tr>
<tr><td>Benzene (aquatic receptor)</td><td>1</td><td></td><td></td></tr>
<tr><td>Benzene (human receptor)</td><td>0.2</td><td>0.07</td><td></td></tr>
<tr><td>Benzo-a-pyrene (human receptor)</td><td>0.09</td><td>0.009</td><td></td></tr>
<tr><td>Ethylebenzene (human receptor)</td><td>2000</td><td>100</td><td></td></tr>
<tr><td>Fluoranthene (humna receptor)</td><td>20</td><td>2</td><td></td></tr>
<tr><td>Lead (freshwater) (aquatic receptor)</td><td>10</td><td></td><td></td></tr>
<tr><td>Lead (saltwater) (aquatic receptor)</td><td>4</td><td></td><td></td></tr>
<tr><td>Pyrene (human receptor)</td><td>20</td><td>2</td><td></td></tr>
<tr><td>Toluene (human receptor)</td><td>2000</td><td>200</td><td></td></tr>
<tr><td>Toluene (aquatic receptor)</td><td>90</td><td></td><td></td></tr>
<tr><td>Xylenes (all isomers) (humna receptor)</td><td>2000</td><td>400</td><td>30000</td></tr>
<tr><td rowspan="2">Cal/OSHA PEL, PEL ceiling and STEL values[7]
8 CCR 5155</td><td colspan="4">Worker exposure guidelines for chemical contaminants.</td><td rowspan="7">A</td></tr>
<tr><td>PEL</td><td>PEL ceiling</td><td colspan="2">STEL</td></tr>
<tr><td>Benzene</td><td>1 ppm</td><td></td><td colspan="2">5 ppm</td></tr>
<tr><td>Ethylbenzene</td><td>100 ppm</td><td></td><td colspan="2">125 ppm</td></tr>
<tr><td>p-nitroaniline</td><td>3 mg/M^3</td><td></td><td colspan="2"></td></tr>
<tr><td>Toluene</td><td>100 ppm</td><td>500 ppm</td><td colspan="2">150 ppm</td></tr>
<tr><td>Xylene</td><td>100 ppm</td><td>300 ppm</td><td colspan="2">150 ppm</td></tr>
</table>

---

[1] Requirement is Applicable (A), Relevant and Appropriate (RA) or To Be Considered (TBC) because it is not an enforceable standard, but is instead nonenforceable criteria or guidance.

[2] U.S. EPA Preliminary Remediation Goal (PRG). These levels are in draft format and were published May 5, 1993.

[3] National Emission Standards for Hazardous Air Pollutants (NESHAPs).

[4] Land Disposal Restrictions (LDRs)

[5] Action Level (AL).

[6] Applied Action Level (AAL).

[7] Permissible exposure limit (PEL) is the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant. PEL ceiling is the maximum concentration of an airborne contaminant to which an employee may be exposed at any time. Short Term Exposure Limit (STEL) is a 15 minute time-weighted average exposure which is not to be exceeded at any time during a workday even if the 8-hour time-weighted average is below the PEL.

TABLE 3-2

LOCATION-SPECIFIC ARARS

ARAR	Requirement	A/RA[1]
SCAQMD Rule 402[2] Nuisance	A person shall not discharge from any source such quantities of air contaminants or other material which may cause a nuisance.	A
SCAQMD Rule 403 Fugitive Dust	Excavation, grading and clearing of land shall not cause particulate matter to exceed 100 ug/m^3	A
SCAQMD Rule 1150 Excavation at Landfill Sites	An Excavation Management Plan must be filed and approved prior to the excavation of an active or inactive landfill.	TBC
SCAQMD Rule 1166 VOC Emissions from Soil Decontamination	A person treating VOC-contaminated soil shall notify the SCAQMD, implement mitigation measures which result in BACT, and not allow on- or off-site spreading of VOC-contaminated soil.	RA
Los Angeles RWQCB[3] Discharge Requirements	Regional boards may prescribe individual or general waste discharge requirements for discharges of site-specific, contaminant-specific, or inert wastes.	RA
LACSD[4] Wastewater Ordinance, 4/1/72 (as amended 11/1/89)	No person shall discharge to LACSD facilities wastewater containing constituents in excess of effluent limitations defined by the LACSD in its wastewater ordinances. Total identifiable chlorinated hydrocarbons (TICHs) allowed: "essentially none".	RA
Division 91.0301, Item C of the Los Angeles Building Code, Building Permit	An excavation permit application form must be completed and feed paid prior to issuance of a permit by Cal/OSHA. Cal/OSHA may deny the issuance of a permit if, in the agencies opinion, the site conditions, practices, operations, or proposed processes do not provide a safe and healthful workplace.	A

[1] Requirement is Applicable (A), relevant and appropriate (RA) or to be considered (TBC) because it is not an enforceable standard, but is instead nonenforceable criteria or guidance.

[2] South Coast Air Quality Management District (SCAQMD) rules and regulations.

[3] Regional Water Quality Control Board (RWQCB).

[4] Los Angeles County Sanitation District (LACSD).Section 300.415(i) of the NCP requires that Superfund financed removal actions under Section 104 of CERCLA and removal actions pursuant to Section 106 of CERCLA attain applicable or relevant and appropriate requirements (ARARs) under federal or state environmental laws, to the extent practicable.

TABLE 5-1
Comparative Cost Analyses
Page 1 of 4

ITEM	UNIT	$/UNIT	UNITS	COST
ON-SITE BIOREMEDIATION				
Capital Costs				
Biocell Installation	cell	$6,000	10	$60,000
Analytical Testing	ls			$25,000
Subtotal(*)				$85,000(*)
Indirect Costs				
Design/Permitting (25%)				$21,250
Construction Oversight (20%)				$17,000
Subtotal				$38,250
PRSC Costs				
Maintenance ($17,500/mo, 3 yrs, 5% NPW)				$571,872
Total NPW for On-Site Bioremediation				$695,122(*)

(*) Does not include the cost of purchasing or leasing additional land to perform bioremediation.

TABLE 5-1
Comparative Cost Analyses
Page 2 of 4

ITEM	UNIT	$/UNIT	UNITS	COST
OFF-SITE THERMAL DESORPTION				
Capital Costs				
Transport Thermal Treatment	ton	$75	11,250	$843,750
Analytical Testing	ls			$12,000
Subtotal				$855,750
Indirect Capital Costs				
Design/Permitting (15%)				$128,362
Construction Oversight (20%)				$171,150
Subtotal				$299,512
PRSC Costs (none)				
Total NPW Off-Site Thermal Desorption				$1,155,262

TABLE 5-1
Comparative Cost Analyses
Page 3 of 4

ITEM	UNIT	$/UNIT	UNITS	COST
OFF-SITE COLD BATCH MIXING				
Capital Costs				
Transport	ton	$8	11,250	$90,000
Treatment	ton	$40	11,250	$450,000
Analytical Testing	ls			$20,000
Subtotal				$560,000
Indirect Capital Costs				
Design/Permitting (15%)				$84,000
Construction Oversight (20%)				$112,000
Subtotal				$196,000
PRSC Costs (none)				
Total NPW for Off-Site Cold Batch Mixing				$756,000

TABLE 5-1
Comparative Cost Analyses
Page 4 of 4

ITEM	UNIT	$/UNIT	UNITS	COST
OFF-SITE LAND DISPOSAL				
Capital Costs				
Transport	ton	$12	11,250	$135,000
Analytical Testing	ls	$150	11,250	$20,000
Disposal	ton	$300	543	$1,687,500
Subtotal				$1,842,500
Indirect Capital Costs				
Design/Permitting (15%)				$276,375
Construction Oversight (20%)				$368,500
Subtotal				$644,875
PRSC Costs (none)				
Total NPW for Off-Site Disposal				$2,487,375

Direct Capital Costs include:
- Construction Costs
- Equipment and Material Costs
- Land and Site Acquisition Costs
- Building and Services Costs
- Relocation Costs
- Disposal Costs
- Transportation Costs
- Analytical Costs
- Contingency Allowances
- Operating Cost (<1 year)

Indirect Capital Costs include:
- Engineering Expenses
- Design Expenses
- Legal Fees
- License or Permit Costs
- Start-up Costs

PRSC Costs include:
- Operational Costs
- Maintenance Costs
- Auxiliary Materials and Energy
- Disposal of Residues
- Monitoring Costs
- Support Costs

REMOVAL PRELIMINARY ASSESSMENT REPORT
UNION STATION GATEWAY
VIGNES STREET RAMPS IMPROVEMENT AND UTILITY INSTALLATION PROJECT
LOS ANGELES, CALIFORNIA

DAMES & MOORE PROJECT NO. 27721-003-131
DECEMBER 30, 1993

LOS ANGELES, CALIFORNIA

TABLE OF CONTENTS

Title	Page
1.0 INTRODUCTION	1
2.0 BACKGROUND AND SITE DESCRIPTION	1
3.0 SITE ENVIRONMENTAL CHARACTERIZATION	2
4.0 RECOMMENDATIONS	4
5.0 REFERENCES	4

APPENDICES

Appendix A -- Soil Boring and Monitoring Well Installation Logs.
Appendix B -- Streamlined Risk Evaluation.

TABLES

Table 2-1 -- Concentrations of PAHs in Site Soils
Table 2-2 -- Concentrations of VOCs in Site Soils
Table 2-3 -- Concentrations of PAHs in Groundwater Samples
Table 2-4 -- Concentrations of VOCs in Groundwater Samples
Table 2-5 -- Concentrations of Lead in Site Soils

FIGURES

Figure 1 -- Site Location Map
Figure 2 -- Vignes Street Ramps Site, Former Coal Gasification Plant, and Approximate Soil Boring Locations
Figure 3 -- Approximate Location of Utility Trenches

REMOVAL PRELIMINARY ASSESSMENT REPORT
UNION STATION GATEWAY
VIGNES STREET RAMP IMPROVEMENT AND UTILITY INSTALLATION PROJECT
LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of a Removal Preliminary Assessment (RPA) of an area associated with the Union Station Gateway Center (USG Center), Vignes Street Ramps Improvement and Utility Installation Project. This project is being undertaken by Union Station Gateway Inc. (USG) - a joint effort between the Los Angeles County Metropolitan Transportation Authority (MTA) and Catellus Development Corporation (Catellus). The areas of construction for this project are known to include or border the site of a former coal gasification and butadiene production plant. In this area, soils contaminated with chemical by-products have been encountered during construction excavation activities. Evaluation and removal of these soils from the project area is therefore necessary before further construction activities can proceed.

This RPA has been prepared as an integral part of the overall procedure for conducting a Removal Site Evaluation (RSE), described in Section 300.410 of the National Contingency Plan (NCP). This RPA was developed through a review of available documentation on the site, including previous consultant's reports and analytical test data. These resources are referenced throughout this report, and in a reference list in the final section of the report. Under the NCP guidelines, this RPA is considered part of the Removal Action that will be performed under the Vignes Street Ramps Improvement and Utility Installation Project.

2.0 BACKGROUND AND SITE DESCRIPTION

The site consists of an area located in central Los Angeles, east of Union Station (Figure 1). The site is basically flat, and is covered to a large extent by asphalt surfaces. Portions of the site area are currently occupied by a City of Los Angeles technical center, a Denny's restaurant, parking areas, and public streets. The site has been separated into two property parcels, Parcel A and Parcel B (Figure 2). At the time of project completion, these parcels will be owned by Caltrans. The Vignes Street freeway on and off ramps will be constructed on these two parcels of land, while the utility trench excavations, also a part of the overall project, will extend beyond the two parcels into the City of Los Angeles Right-of-Way (Figure 3).

Historical data on the site indicates that the southern portion of the site south of Ramirez Street, and portions of the site vicinity to the east, was occupied by a coal gasification plant from about 1870 to 1943. The operator of the facility was the Southern California Gas Company and its predecessor company, the Los Angeles Gas and Electric Company. In 1943, Southern California Gas Company ended gas generation operations and converted the facility to a butadiene production plant (Earth Technology Corporation, 1987). Southern California Gas Company ended butadiene gas production about 1946. Southern California Gas Company subsequently sold the property about 1957.

Based on review of historical aerial photographs, the coal plant consisted of three gas purification plants and six oil scrubber tanks, a cooling water tower, pump and meter houses, and an exhaust house (Levine Fricke, 1989a). The approximate former locations of these features with respect to the site area are shown on Figure 2. The principal raw materials used at the former coal gassification plant were coal and residual oil from crude. The basic process consisted of heating coal and quenching with water or petroleum. Upon quenching, light petroleum hydrocarbon fractions volatilized and were captured as a source of fuel gas. The primary by-products from the process were lampblack, coal tar, and sludge residue containing volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), inorganic sulfur, nitrogen complexes, and trace metals. The butadiene gas was subsequently produced in a thermal 'cracking' process whereby oil distillates were heated and mixed with steam in gas generators. Liquid from the resulting condensed gas was piped to the Shell Chemical Company facility in Torrance, California, for further purification.

As the USG Center project and associated construction activities are taking place in the vicinity of the former coal gas/butadiene production plant, several soil and groundwater investigations have been conducted at the site to assess the nature and extent of environmental contamination in the area (Earth Technology Corporation, 1986, 1987a, 1987b, 1987c; Ecology and Environment Inc., 1991; Levine Fricke, 1989a, 1989b, 1990, 1991a, 1991b). The previous studies as well as the preliminary utility trenching activities generally indicate that detectable concentrations of PAHs, VOCs, metals, and inorganic compounds such as cyanides are present in site soils.

3.0 SITE ENVIRONMENTAL CHARACTERIZATION

The general character of the subsurface geology at the site has been interpreted based on review of previous environmental investigations. Approximate locations of known previous soil test borings and monitoring wells are shown on Figure 2.

Geologic materials underlying the site area consist primarily of unconsolidated, fine-grained sedimentary deposits. Sands and silty sands of varying densities extend from the surface to depths of about 25 feet, coarsening below that level with depth. Locally throughout the area, cobbles, river gravels, and clay lenses occur, but may be of more limited vertical and lateral extent. Bedrock formations underlying the site are the Fernando and Puente Formations. These units are exposed at the surface in northwest and northeast of the site in the Elysian and Repetto

Hills. The most important surface water course in the area is the north-south trending Los Angeles River, which passes the site area approximately 1000 feet to the east.

The site area is located in the northern portion of the Central Groundwater Basin of the Coastal Plain of Los Angeles County. Shallow groundwater in the vicinity of the site is generally unconfined, and occurs at a depth of about 30 feet below ground surface (Ecology and Environment Inc., 1991). The primary groundwater aquifer underlying the site area is the Gaspur aquifer. The Gaspur aquifer is approximately 75 feet thick in the vicinity of the site, consisting generally of clastic sediments ranging from fine sands to boulders. Though affected by dewatering operations, the general direction of groundwater movement across the site is from the northwest to the southeast (Ecology and Environment, 1991). Soil boring logs and monitoring well installation logs of test borings and wells shown on Figure 2 are included in Appendix A. These logs illustrate the subsurface geologic materials and groundwater levels encountered in the immediate vicinity of property Parcels A and B.

Tables 2-1 through 2-5 summarize analytical test data from several previous environmental site investigations performed by other consultants. Since 1986, 14 soil test borings were drilled at the site or in the immediate vicinity. Soil samples have been obtained from these borings at various depths ranging from 2 feet to 45 feet below ground surface (bgs). As shown on Table 2-1, of 39 sample analyses reviewed, PAH concentrations in site soils averaged 21 milligrams per kilogram (mg/Kg), with a maximum concentration of 360 mg/Kg obtained from one sample in boring BH-05 at a depth of 40 feet (Figure 2). Carcinogenic PAHs averaged 4.3 mg/Kg, with a maximum concentration of 69.7 mg/Kg from one sample in boring BH-15 at a depth of 5.5 feet. As shown on Table 2-2, of 40 sample analyses reviewed, VOC concentrations averaged 0.53 mg/Kg, with a maximum concentration of 21 mg/Kg from boring RA-1 at a depth of 2 feet. As shown on Table 2-5, of 12 sample analyses reviewed, lead concentrations averaged 30 mg/Kg, with a maximum concentration of 190 mg/Kg from boring BH-14 at a depth of 5.5 feet.

As shown on Table 2-3, of 9 sample analyses reviewed, PAH concentrations in area groundwaters averaged 0.1 milligrams per liter (mg/L), with a maximum concentration of 0.5 mg/L in one sample from boring BH-05. As shown on Table 2-4, of 5 sample analyses reviewed, VOC concentrations in groundwater averaged 0.19 mg/L, with a maximum concentration of 0.487 mg/L in one sample from location LF-6. Benzene was detected in one groundwater sample at a maximum concentration of 0.004 mg/L.

It is worth noting that in some of the previous sample analyses included reviewed for this report, the compound methylene chloride was detected in samples and in laboratory blank samples. As methylene chloride was used by the laboratory as an extractant in the analytical testing process, these results are concluded to represent laboratory cross-contamination, rather than actual site conditions.

Based on the data reviewed for this report, a preliminary public health risk evaluation was performed. This document, entitled 'Streamlined Risk Evaluation, Vignes Street Ramp Improvement and Utility Installation Project', is included in Appendix B. In summary, this evaluation: identified the compounds of potential concernin site soils and groundwater; identified the potentially exposed populations; identified potential exposure pathways; derived risk based clean-up goals for the site; and provided an evaluation of the uncertainties in the risk evaluation. Based on the data, the streamlined risk evaluation concluded that soils excavated from the site should be managed according to specific requirements and precautions that apply to contaminated media. The soils excavated as a part of the ramp improvement project cannot be redeposited at the site without a potential threat to human health and the environment.

4.0 RECOMMENDATIONS

The preceeding discussion does include analytical test data from shallow soils on property parcels A and B, or soils in utility trench excavations. Such data have not been generated to date for the site, and are important to the development of a more complete evaluation of the aerial distribution of soil contamination at the site, for the purposes of the RSE. This additional data is also necessary to update and refine the streamlined risk evaluation as it applies to the immediate area of property Parcels A and B. For this reason, we recommend that a Removal Site Inspection (RSI) be undertaken at the site. The RSI will provide the required data to complete the RSE, in accordance with the procedures outlined in the NCP.

5.0 REFERENCES

The following references were used for the preparation of this report:

Earth Technology Corporation, 1986, 'The Subsurface Investigation at the Metro-Rail A-130 Corridor', Report prepared for Metro Rail Transit Consultants, December 22, 1986.

Earth Technology Corporation, 1987a, 'Phase I Subsurface Investigation at the Metro-Rail A-130 Corridor', Report prepared for Metro Rail Transit Consultants, Sept. 4, 1987.

Earth Technology Corporation, 1987b, 'The Phase III Subsurface Investigation Near the Metro-Rail A-130 Corridor', Report prepared for Metro Rail Transit Consultants, April 24, 1987.

Earth Technology Corporation, 1987c, 'The Phase IV Subsurface Investigation Near the Metro-Rail A-130 Corridor', Report prepared for Metro Rail Transit Consultants, April 24, 1987.

Ecology and Environment Inc., 1991, 'CERCLA Listing Site Inspection, Southern California RTD Busway', Report prepared for US EPA Region IX, April 15, 1991.

Levine Fricke Inc., 1989a, 'Preliminary Environmental and Geotechnical Assessment of Los Angeles Union Passenger Terminal', Report prepared for Catellus Development Corp., July 21, 1989.

Levine Fricke Inc., 1989b, 'Phase I Soil and Groundwater Investigation, Los Angeles Union Passenger Terminal', Report prepared for Catellus Development Corp., December 20, 1989.

Levine Fricke Inc., 1990, 'Environmental Assessment, Los Angeles Union Passenger Terminal', Report prepared for Catellus Development Corp., July 30, 1989.

Levine Fricke Inc., 1991a, 'Phase II Soil and Groundwater Investigation, Los Angeles Union Passenger Terminal', Report prepared for Catellus Development Corp., January 15, 1991.

Levine Fricke Inc., 1991b, 'Addendum to the Phase II Soil and Groundwater Investigation, Los Angeles Union Passenger Terminal', Report prepared for Catellus Development Corp., May 22, 1991.

Levine Fricke Inc., 1993, 'Phase II Environmental Site Assessment, Vignes Street Realignment Site', Report prepared for Catellus Development Corp., July 16, 1993.

FIGURES

REFERENCE: USGS
Los Angeles, California

N

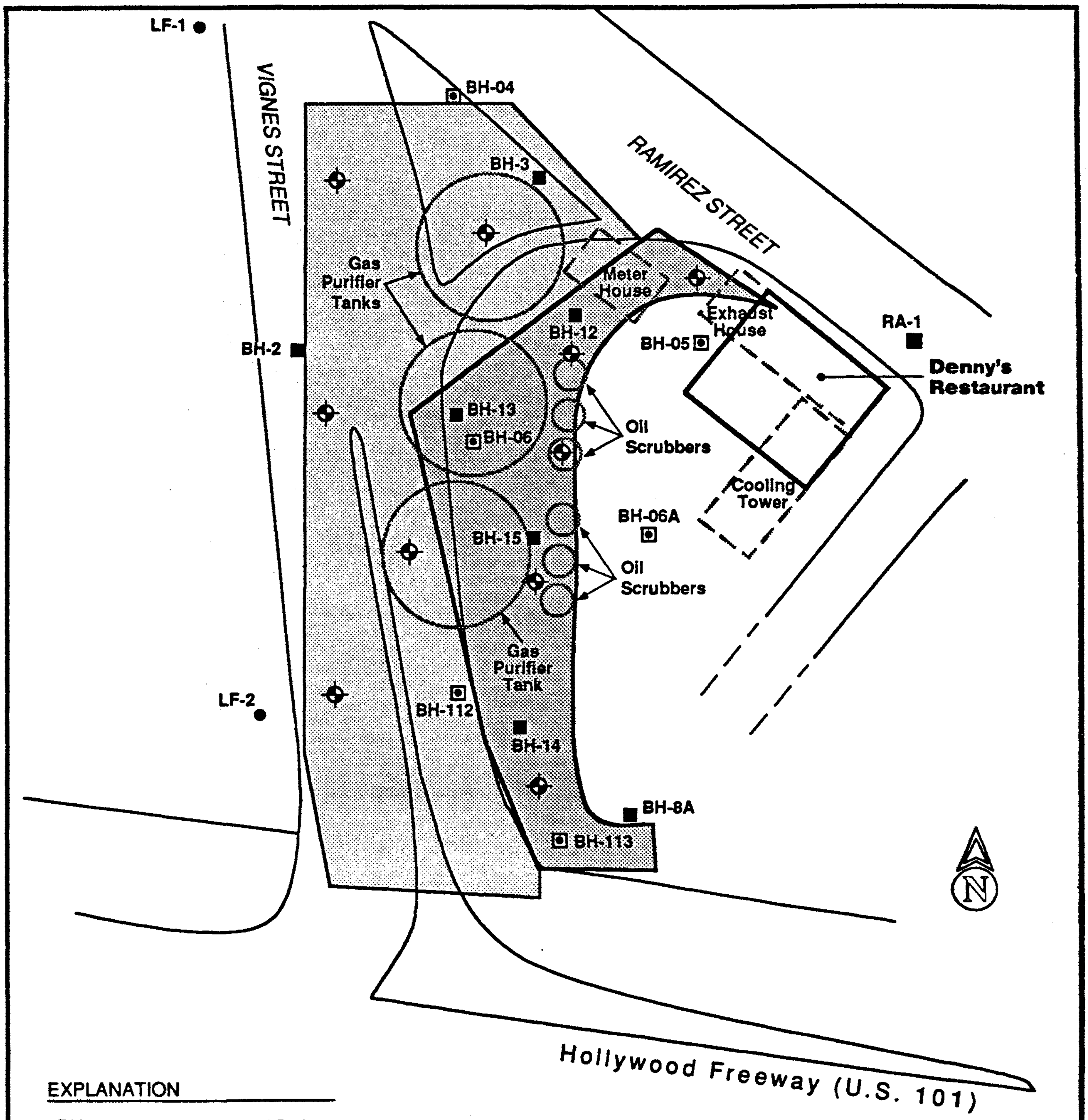
0 2000
Scale In Feet

FIGURE 1

SITE LOCATION MAP

Denny's Site Parcel "A"
Los Angeles, CA

Dames & Moore



EXPLANATION

BH-3 ■ Levine•Fricke Soil Borings

LF-1 ● Monitoring Wells

BH-04 ▣ Earth Technology Corp. Soil Borings

⌖ Borings Proposed for Removal Site Inspection (RSI)

▭ ○ Approximate Former Coal Gasification Plant Areas and Features

— Approximate Site Boundaries

▨ Parcel A

░ Parcel B

SCALE

0 30 60 120

1 INCH = 60 FEET

FIGURE 2

Vignes Street Ramps Site, Former Coal Gasification Plant, and Soil Boring Locations

Dames & Moore

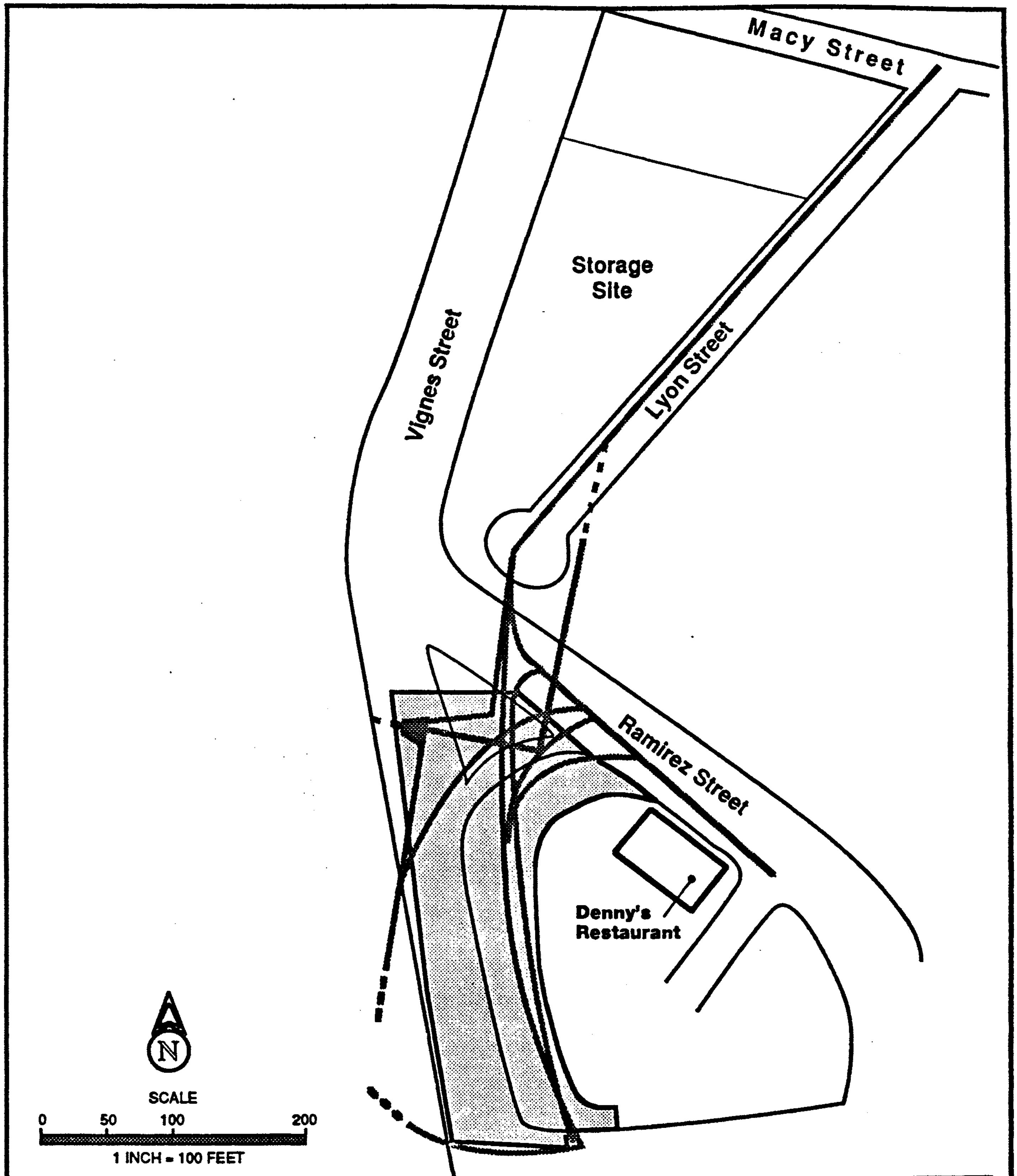


FIGURE 3

Vignes Street Ramps Site and Approximate Location of Utility Trenches in City of LA Public Right of Way

Dames & Moore

T
A
B
L
E
S

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-1. CONCENTRATIONS (MG/KG) OF PAHs AND TRPH IN SITE SOILS

Sample ID	Depth (ft)	Carc. PAHs	Total PAHs	TRPH	Reference	Comment
RA-1	2	7	137.5	8400	LF: 11/2/93	
BH-3	5	ND	ND	20	LF:7/16/93(LF 91)	Table 1
BH-3	25	ND	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-04	25	ND	1.7	3	LF:7/16/93(ET 86)	Table 1
BH-05	35	ND	6	32	LF:7/16/93(ET 86)	Table 2
BH-05	40	ND	360	40	LF:7/16/93(ET 86)	Table 2
BH-05	45	ND	24	10	LF:7/16/93(ET 86)	Table 2
BH-06	30	ND	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-6A	35	ND	0.7	NA	ET: 11/ 86	Table 3
BH-8A	3	ND	ND	NA	LF:7/16/93	Fig.3
BH-8A	10.5	ND	ND	NA	LF:7/16/93(LF 93)	Table 2
BH-8A	20.5	ND	ND	NA	LF:7/16/93(LF 93)	Table 2
BH-12	5	0.79	0.79	NA	LF:7/16/93	Table 5
BH-12	10.5	ND	ND	NA	LF:7/16/93	Table 5
BH-12	20.5	ND	ND	NA	LF:7/16/93	Table 5
BH-13	5	35.5	69.6	NA	LF:7/16/93	Table 5
BH-13	10	10.09	17.29	NA	LF:7/16/93	Table 5
BH-13	15	0.156	0.39	NA	LF:7/16/93	Table 5
BH-13	20	ND	ND	NA	LF:7/16/93	Table 5
BH-14	5.5	0.077	0.152	NA	LF:7/16/93	Table 5
BH-14	10.5	ND	ND	NA	LF:7/16/93	Table 5
BH-14	21.5	ND	ND	NA	LF:7/16/93	Table 5
BH-15	5.5	69.7	126.85	NA	LF:7/16/93	Table 5
BH-15	10.5	2.25	10.65	NA	LF:7/16/93	Table 5
BH-15	16	ND	ND	NA	LF:7/16/93	Table 5
BH-15	20.5	ND	ND	NA	LF:7/16/93	Table 5
BH-15	25.5	ND	0.24	NA	LF:7/16/93	Table 5
BH-112	45	ND	ND	5	ET: 4/24/87	Table 2
BH-113	40	ND	ND	6	ET: 4/24/87	Table 2
Average		5.73	26.06	851.90	—	—
Maximum		69.7	360	8400	—	—

PAHs: Polycyclic Aromatic Hydrocarbons
TRPH: Total Recoverable Petroleum Hydrocarbons
ND: Non Detected
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.
EC: Ecology & Environment, Inc.

Notes:
ND was taken as half the detection limit
NA was not taken into consideration in average calculation
Maximum Laboratory Detection Limits:
TPRH (418.1) - 1.0 mg/Kg
Carc. PAH - 0.170 mg/Kg

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-2. CONCENTRATIONS (MG/KG) OF VOCs IN SITE SOILS

Sample ID	Depth (ft)	Benzene	Total VOCs	Reference	Comment
RA-1	2	ND	21	LF:11/2/93	MC in Blank
BH-3	5	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-3	25	ND	ND	LF:7/16/93(LF 91)	Table 1
BH-04	25	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-05	35	ND	ND	LF:7/16/93(ET 86)	Table 2
BH-05	40	ND	0.3	LF:7/16/93(ET 86)	Table 2
BH-05	45	ND	ND	LF:7/16/93(ET 86)	Table 2
BH-06	30	ND	ND	LF:7/16/93(ET 86)	Table 1
BH-06A	30	ND	ND	ET: 11/86	Table 3
BH-12	2.5	ND	ND	LF:7/16/93	Table 4
BH-12	5	ND	ND	LF:7/16/93	Table 4
BH-12	10.5	ND	ND	LF:7/16/93	Table 4
BH-12	20.5	ND	ND	LF:7/16/93	Table 4
BH-13	2.5	ND	ND	LF:7/16/93	Table 4
BH-13	5	ND	ND	LF:7/16/93	Table 4
BH-13	10	ND	ND	LF:7/16/93	Table 4
BH-13	20	ND	ND	LF:7/16/93	Table 4
BH-14	3	ND	ND	LF:7/16/93	Table 4
BH-14	5.5	ND	ND	LF:7/16/93	Table 4
BH-14	10.5	ND	ND	LF:7/16/93	Table 4
BH-14	21.5	ND	ND	LF:7/16/93	Table 4
BH-15	3	ND	0.068	LF:7/16/93	Table 4
BH-15	5.5	ND	ND	LF:7/16/93	Table 4
BH-15	10.5	ND	ND	LF:7/16/93	Table 4
BH-15	16	ND	ND	LF:7/16/93	Table 4
BH-15	20.5	ND	ND	LF:7/16/93	Table 4
BH-112	45	ND	ND	ET: 4/24/87	Table 2
BH-113	40	ND	ND	ET: 4/24/87	Table 2
BH-112	45	ND	ND	ET: 4/24/87	Table 2
BH-113	40	ND	ND	ET: 4/24/87	Table 2
Average		0.00	0.71		
Maximum		0	21		

VOCS: Volatile Organic Compounds
ND: Non Detected. ET: Earth Technology, Inc.
NA: Not Analyzed
LF: Levine-Fricke

Notes: MC: Methylene Chloride
ND was taken as half the detection limit
Maximum Laboratory Detection Limits:
Benzene - 0.0040 mg/Kg
VOCs (8240) - 0.0080 mg/Kg

USG VIGNES STREET RAMP IMPROVEMENT PROJECT
AND UTILITY INSTALLATION

TABLE 2-3: CONCENTRATIONS (MG/KG) OF LEAD IN SITE SOILS

Sample ID	Depth (ft)	Lead	Reference	Comment
BH-13	5	28	LF:7/16/93	Table 6
BH-13	10	37	LF:7/16/93	Table 6
BH-13	20	6.15	LF:7/16/93	Table 6
BH-14	5.5	190	LF:7/16/93	Table 6
BH-14	10.5	2.2	LF:7/16/93	Table 6
BH-14	21.5	1.8	LF:7/16/93	Table 6
BH-15	5.5	40	LF:7/16/93	Table 6
BH-15	10.5	30	LF:7/16/93	Table 6
BH-15	20.5	2.3	LF:7/16/93	Table 6
Average		37.5	—	—
Maximum		190	—	—

LF: Levine-Fricke

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-4. CONCENTRATIONS (MG/L) OF PAHs IN GROUNDWATER SAMPLES

Boring ID	Depth (ft)	Carc. PAHs	Total PAHs	TRPH	Reference	Comment
BH-04	57	ND	0.1	ND	LF:7/16/93 (ET 86)	Table 3
BH-05	45	ND	0.5	9	LF:7/16/93 (ET 86)	Table 3
BH-06	55	ND	ND	NA	LF:7/16/93 (ET 86)	Table 3
LF-2	NR	ND	ND	ND	LF:7/16/93 (LF 91)	Table 3
LF-2-1	NR	NR	NR	ND	TERRA THON LABS (91)	—
LF-2-2	NR	ND	ND	NR	TERRA THON LABS (91)	—
LF-6	NR	ND	ND	ND	LF:7/16/93 (LF 91)	Table 3
BH-112	45	NA	NA	6	ET: 4/24/87	Table 3
BH-113	40	NA	NA	4	ET: 4/24/87	Table 3
Average		0.00	0.12	2.25		
Maximum		0	0.5	9		

PAHs: Polycyclic Aromatic Hydrocarbons
ND: Non Detected
NR: Not Reported
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.

Notes:
ND was taken as half the detection limit
NA & NR were not taken into consideration in average calculation

Maximum Laboratory Detection Limits:
Carc. PAH - 0.020 mg/Kg
TRPH (418.1) - 1.0 mg/Kg

USG VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION

TABLE 2-5. CONCENTRATIONS (MG/L) OF VOCS IN GROUNDWATER SAMPLES

Boring ID	Depth (ft)	Benzene	Total VOCs	Reference	Comment
BH-04	57	ND	ND	LF:7/16/93 (ET 86)	Table 3
BH-05	45	ND	0.006	LF:7/16/93 (ET 86)	Table 3
BH-06	55	ND	0.119	LF:7/16/93 (ET 86)	Table 3
LF-2	NR	0.004	0.316	LF:7/16/93 (LF 91)	Table 3
Average		0.00	0.11	LF:7/16/93 (LF 91)	Table 3
Maximum		0.004	0.316	LF:7/16/93 (LF 91)	Table 3

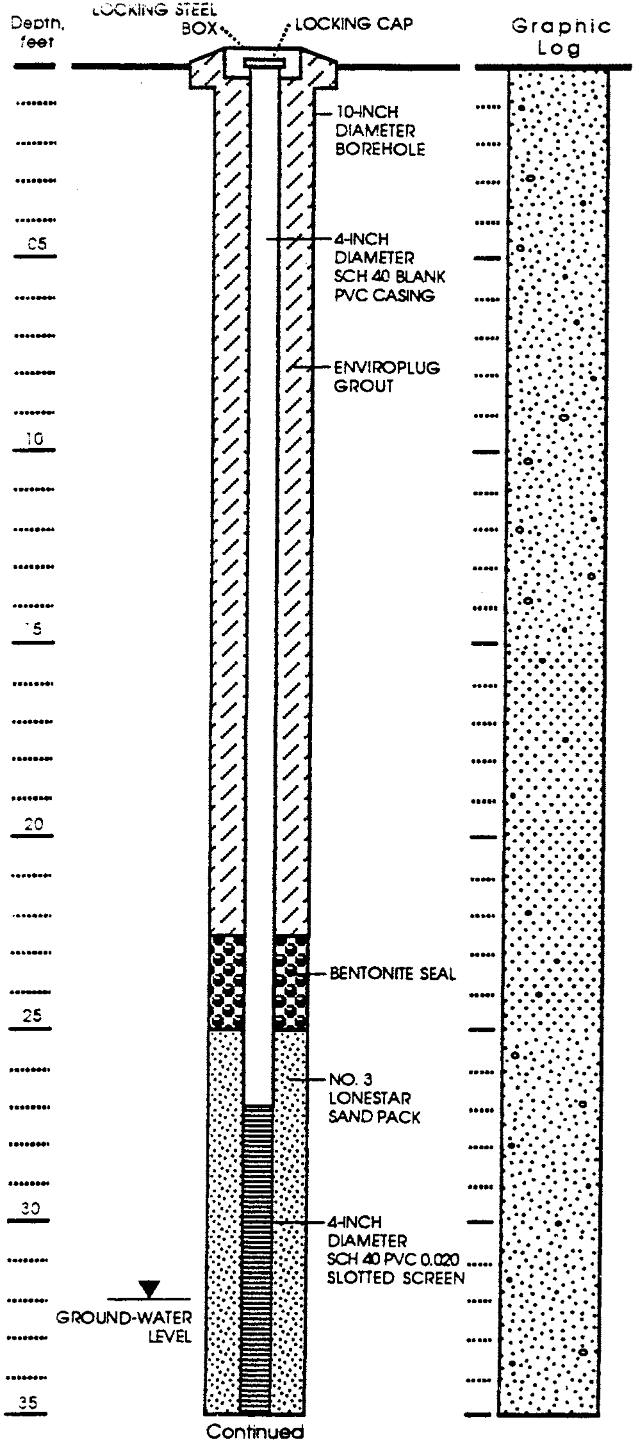
PAHs: Polycyclic Aromatic Hydrocarbons
ND: Non Detected
NR: Not Reported
NA: Not Analyzed
LF: Levine-Fricke
ET: Earth Technology, Inc.

Notes:
ND was taken as half the detection limit
NA & NR were not taken into consideration in average calculation

Maximum Laboratory Detection Limits:
Benzene - 0.005 mg/Kg
VOCs (8240) - 0.005 mg/Kg

APPENDIX A

WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLE DATA**



Depth, feet	Description	Penetration Rt. (Blows/Ft.)/ P I D (ppm)
05	SAND (SP), brown, slightly moist, medium loose, fine to very fine, trace silt.	14/0
10	-light brown, fine, trace pebbles	20/0
15	GRAVELLY SAND (SW), yellowish brown, slightly moist, very dense, very fine to coarse, well graded, and gravel.	50-6"/ 0
20	-less fines, less gravel	50-6"/ 0
25	SAND (SP), yellowish brown, slightly moist, medium loose, little coarse, little silt (lenses), some iron staining.	25/0
30	GRAVELLY SAND (SP), gray, very moist, dense, coarse, and gravel, some clay (lenses).	36/0
35	-wet	

EXPLANATION

- ▤ Clay
- ▤ Silt
- ▨ Sand
- ▨ Gravel
- ▨ Interval Sampled
- ■ Sample Retained

Date well drilled: 12/04/91

L•F Geologist/Engineer: S.E. Martin

Approved by: SM

WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-1

Project No. 2443
Catellus-RTD Site

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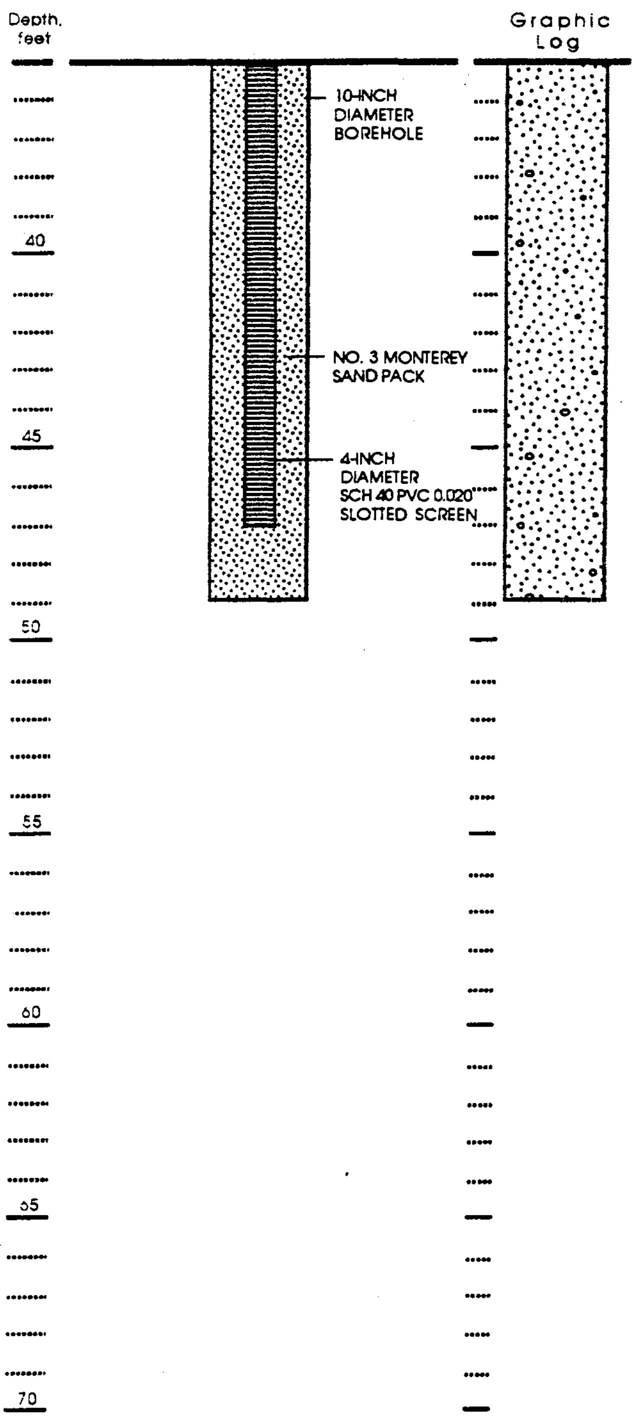
ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

WELL CONSTRUCTION / LITHOLOGY / SAMPLE DATA



Description	Sample No. and Interval	Penetration Rt. (Blows/Ft.)/ P I D (ppm)
GRAVELLY SAND (SP), gray, wet, very dense, coarse, and gravel, some clay (lenses).		50-6"/ 0
-sand, cobbles, boulders		
Bottom of boring at 49 feet.		

EXPLANATION

☰	Clay
▤	Silt
░	Sand
⁘	Gravel
▨	Interval Sampled
■	Sample Retained

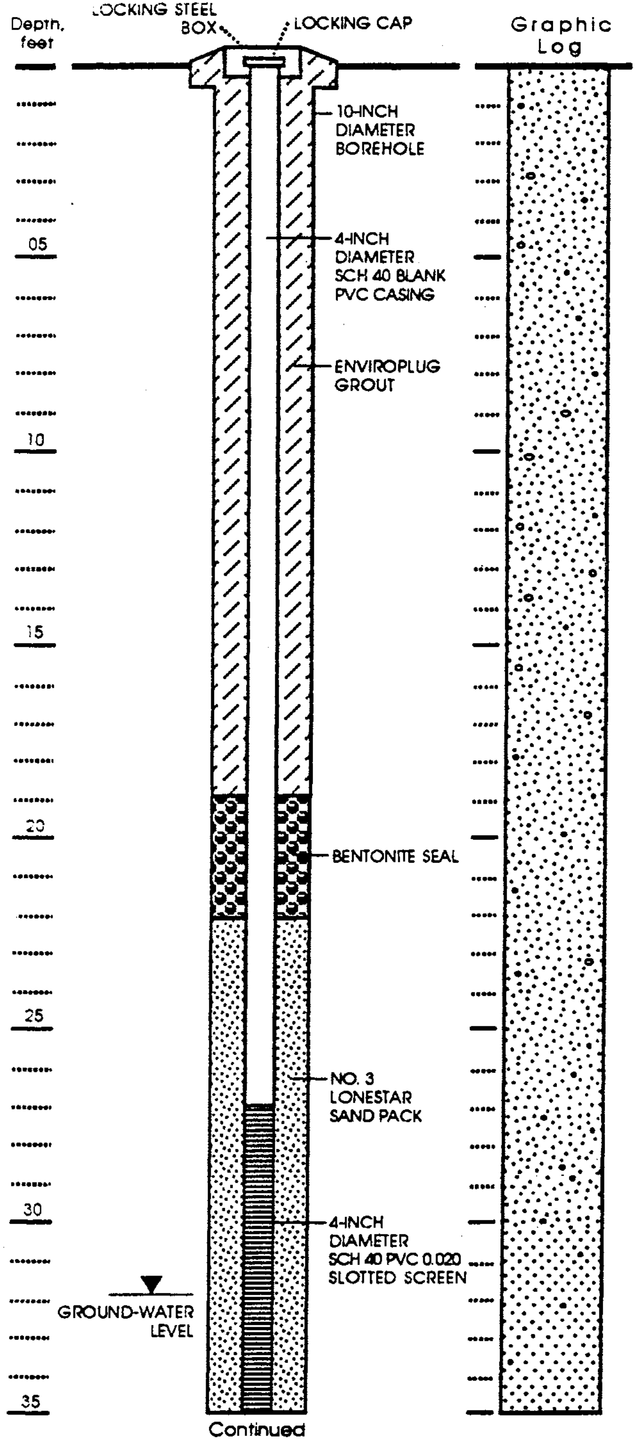
Date well drilled: 12/04/91

L•F Geologist/Engineer: S.E. Martin

Approved by:

WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-1 (CONTINUED)

WELL CONSTRUCTION	LITHOLOGY	SAMPLE DATA	



Depth, feet	Description	Sample No. and Interval	Penetration Rt. (Blows/Ft.)/ P I D (ppm)
05	SILTY SAND (SP), brown, slightly moist, medium loose, fine to medium, little gravel, and silt (layer of white clay like substance, smells like a bathroom tile grout).		13/0
10	-white clay like substance (like tile grout), moist, loose, high plasticity, trace pebbles, pieces of wire		8/0
15	SAND (SP), yellowish brown, slightly moist, medium loose, coarse, little medium, poorly graded, trace clay (lenses).	▨ ■ ▨	15/0
20	-dense, increasing gravel content		50/0
25	-very dense, decreasing coarse fraction, little gravel		50-6"/ 0
30	SAND (SW), gray, moist, dense, fine to coarse, well graded, little gravel clay lenses.		40/0
35	-wet, fine to medium, little gravel		

EXPLANATION

- ☰ Clay
- ▤ Silt
- ⁘ Sand
- ⁙ Gravel
- ▨ Interval Sampled
- ■ Sample Retained

Date well drilled: 12/02/91

L•F Geologist/Engineer: S.E. Martin

Approved by: SJT

WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-2

Project No. 2443
Catellus-RTD Site

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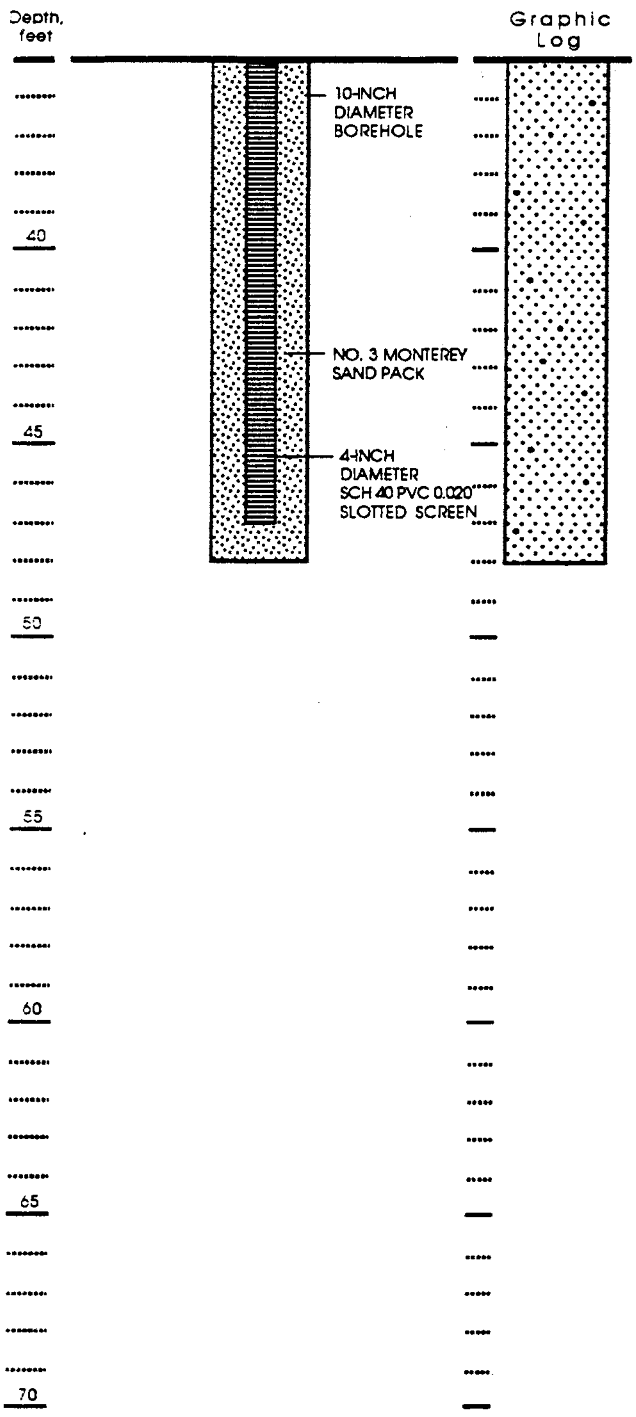
WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLE DATA**



Description	Sample No. and Interval	Penetration Rt. (Blows/Ft.)/ P I D (ppm)
SAND (SW), gray, wet, medium loose, fine to medium, well graded, little gravel.		28/0
Bottom of boring at 48 feet.		

Date well drilled: 12/02/91

L•F Geologist/Engineer: S.E. Martin

Approved by:

EXPLANATION

- ▤ Clay
- ▤ Silt
- ░ Sand
- ○ Gravel
- ▨ Interval Sampled
- ■ Sample Retained

WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-2 (CONTINUED)

Project No. 2443
Catellus-RTD Site

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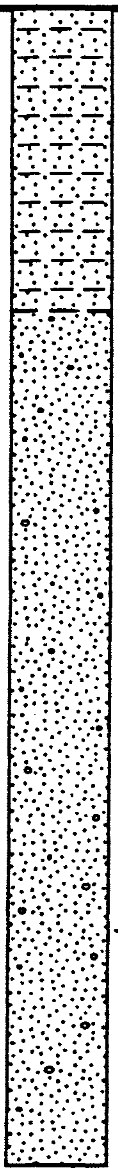
LITHOLOGY | SAMPLE DATA



Depth, feet	Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	HNU Values (ppm)
	SILTY SAND (SM), medium brown, slightly moist, medium loose, very fine to fine, subangular, silt <15%.			
05			11	ND
	SAND (SP), dark brown/gray, slightly moist, medium loose, fine, no silt.			
10		BH-2-10	17	ND
15	-very fine, trace silt <5%		12	ND
20	-gray, moist, very dense, trace gravel	BH-2-20	80	6
25	-fine to medium, very dense, no silt		66	5
30	-saturated	BH-2-30	86	10
	Bottom of boring at 30 feet. Backfilled with bentonite chips.			
35				

EXPLANATION

☰ Clay
▤ Silt
⁙ Sand
⁘ Gravel
▨ Interval Sampled
■ Sample Retained

Date boring drilled: 12/03/91

L•F Geologist/Engineer: S. A. Armstrong

Approved by:

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-2

Project No. 2443
Catellus-RTD Site

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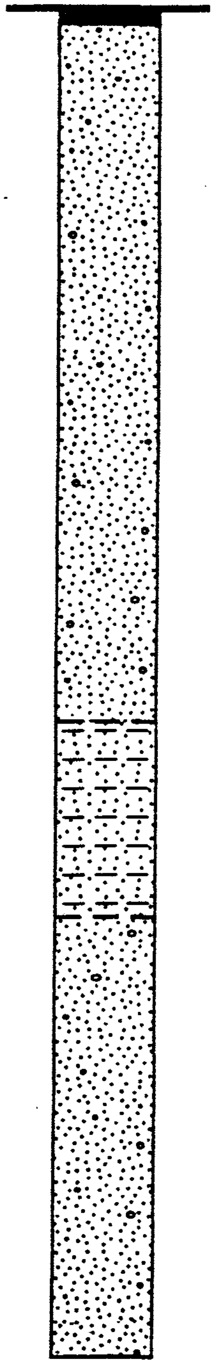
122691SGT/ldr

LITHOLOGY | SAMPLE DATA



Depth, feet	Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	HNU Values (ppm)
	6-inch Asphalt			
	SAND & GRAVEL			
05	SAND (SP), medium brown, slightly moist, medium loose, very fine, trace silt <5%.	BH-3-5	18	100
10	-dark brown		8	4
15	-orange, moist, fine to medium, rounded, no silt -poor recovery	BH-3-15	17	200
20	SILTY SAND (SM), gray, moist, medium loose, fine, silt <30%.		50	100
25	SAND (SP), gray, moist, very dense, fine.	BH-3-25	78	400
30	-wet		70	250
35	-saturated Bottom of boring at 35 feet.	BH-3-35	51	250

EXPLANATION

- ▤ Clay
- ▤ Silt
- ▨ Sand
- ▨ Gravel
- ▨ Interval Sampled
- ■ Sample Retained

Date boring drilled: 12/03/91

L•F Geologist/Engineer: S. A. Armstrong

Approved by:

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-3

Project No. 2443
Catellus-RTD Site

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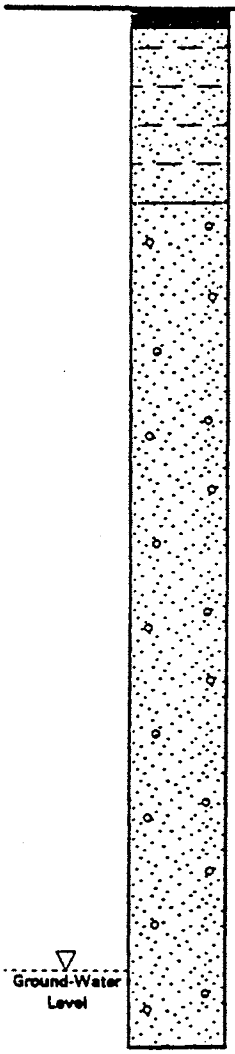
	LITHOLOGY		SAMPLING DATA		
Depth, feet	Graphic Log	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	O V A Values (ppm)
0		Asphalt parking lot			
		SILTY SAND (SM), dark olive (5Y 2.5/2), moist, 75-80% medium to coarse sand, 15% silt, trace gravels. Slight odor at 2.5 feet, medium dense.		18	110
5		SAND (SP), dark olive gray (5Y 3/2), moist, loose, 85-90% medium sand, 10% silt, trace gravel		10	2055
10		-very pale brown (10YR 7/3), moist, dense, 95% very coarse sand to gravel, trace silts.		30	102
15		-olive yellow (2.5Y 6/8), slightly moist, very dense, medium-coarse sand, trace gravel		50	93.7
20		-light yellowish brown (2.5Y 3/2), moist, 90% medium to coarse sand, 5% silt, trace gravel.		103	2705
25		-very dark grayish brown (2.5Y 3/2), saturated, 90% medium to coarse sand, trace silt, interbeds of light gray weathered sand, strong odor		81	451



Ground water encountered at 25 feet.
Bottom of boring at 27 feet.

Date boring drilled: 02/09/93 -
L• F Geologist/Engineer: S.A. Friet
Approved by: # 5526

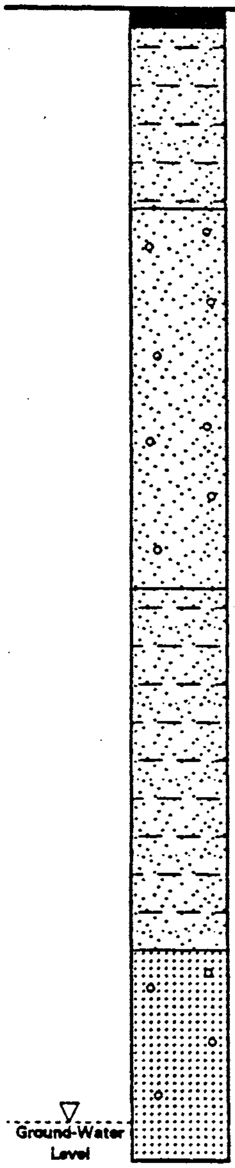
EXPLANATION

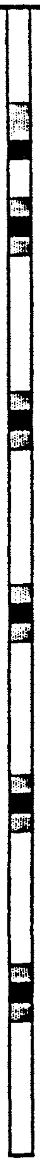
- ▭ Clay
- ▤ Silt
- ▨ Sand
- ◌ Gravel
- ▨ - Interval Sampled
- ■ - Sample Retained

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-12

Project No. 2822
Catellus-Union Station Gateway

LEVINE • FRICKE
ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS





Depth, feet	LITHOLOGY Visual Description	SAMPLING DATA Sample No. and Interval	Penetration Rate (Blows/ft.)	OVA Values (ppm)
	Asphalt Parking Lot			
	SILTY SAND (SM), dark olive brown (2.5Y 3/3), moist, medium dense, 70% fine sand, 20% silt, trace miscellaneous building materials.		14	46
5	-void encountered at 5 feet SAND (SP), gray brown (2.5 Y 5/2), moist, loose, 85% fine sand, 10% silt, trace building materials	5	7	73
10	-brownish yellow (10YR 6/6), moist, dense, 90% medium to coarse sand, trace silt, trace gravel.	10	47	10
15	SILTY SAND (SM), light yellow brown (2.5Y 6/4), moist, very dense, 75% coarse sand, 15% silt, 10% gravel.	15	90-11"	9
20	-yellow brown (2.5Y 6/3), moist	20	75	8
25	SAND (SW), dark gray (2.5Y N/4), saturated, very dense, medium-coarse sand, trace gravel, strong odor.	25	100-11"	330
	Ground water encountered at 29 feet.			
30	Bottom of boring at 30 feet.	30		

EXPLANATION

▭ Clay
▤ Silt
▨ Sand
○ Gravel

▨ - Interval Sampled
■ - Sample Retained

Date boring drilled: 02/09/93 -
L• F Geologist/Engineer: S.A. Friet
Approved by: #5526

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-13

Project No. 2822
Catellus-Union Station Gateway

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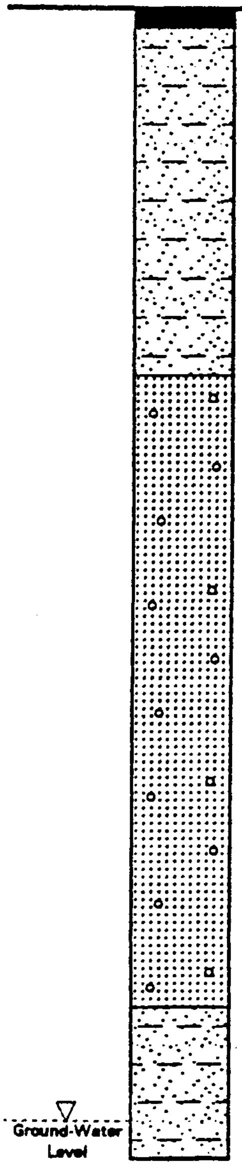
LITHOLOGY | SAMPLING DATA



Depth, feet	Visual Description	Penetration Rate (Blows/ft.)	OVA Values (ppm)
	Asphalt Parking Lot		
	SILTY SAND (SM), black (10Y 2/1)		
	-brown (10YR 4/3), moist, medium dense, 70-75% fine to medium sand, 20-25% silt	13	205
5	-olive brown (2.5Y 4/4), moist, 70% fine sand, 30% silt, trace roots, abundant thin clay interbeds	10	160
10	SAND (SW), light yellow brown (2.5YR 6/4), moist, dense, coarse to very coarse sand, trace gravel.	34	85
15	-light yellow brown (2.5Y 6/3), moist, very dense, very coarse sand to fine gravel, trace cobble	76	20
	-light gray sand with gravels		
20	-rock at 20 feet		
	-olive yellow (2.5Y 6/8), moist, medium sand with trace silt	95	836
25			
	SILTY SAND (SM), dark gray brown (2.5Y 4/2), saturated, very dense, 55% very fine sand, 45% silt.	90	180
	Ground water encountered at 29 feet.		
30	Bottom of boring at 30 feet.		

EXPLANATION

▭ Clay
▭ Silt
▨ Sand
○ Gravel
▨ Interval Sampled
■ Sample Retained

Date boring drilled: 02/09/93 -

L• F Geologist/Engineer: S.A. Friet

Approved by: #5526

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-14

Project No. 2822
Catellus-Union Station Gateway

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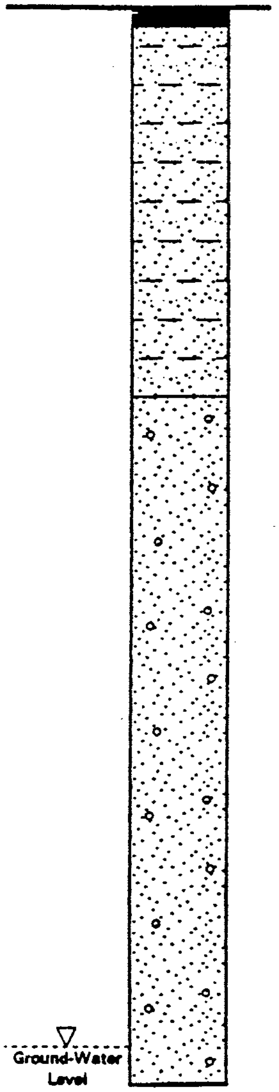
	LITHOLOGY	SAMPLING DATA	
Depth, feet	Visual Description	Penetration Rate (Blows/ft.)	O V A Values (ppm)
	Asphalt Parking Lot SILTY SAND (SM), very dark gray brown (2.5Y 3/2), slightly moist, very dense, 75% medium-coarse sand, 15% silt, 10% gravel. -gravel content raised blow count		
		88-9"	138
5	-medium dense	18	74
10	SAND (SP), olive brown (2.5Y 4/4), moist, 85% medium-coarse to very coarse sand, 10% silt, trace gravel	22	43
15	-light olive brown (2.5Y 5/4), moist, 80% medium-coarse sand, 10% silt, 10% gravel	25	21.5
20	-dark yellow brown (10YR 4/4), moist, very dense, 85% coarse to very coarse sand, 10% gravel, trace silt	50-4"	55
25	-gray (2.5Y N/5), saturated, very dense, 90% coarse to very coarse sand, 10% gravel, strong odor.	92-11"	115

Graphic Log



Sample No. and Interval

Bottom of boring at 28 feet.
Ground water encountered at 27 feet.

EXPLANATION

- ▭ Clay
- ▤ Silt
- ▨ Sand
- ⁘ Gravel
- ▨ Interval Sampled
- ■ Sample Retained

Date boring drilled: 02/09/93 -
L• F Geologist/Engineer: S.A. Friet
Approved by: # 5526

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING BH-15

Project No. 2822
Catellus-Union Station Gateway

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The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0002 Field Log of Boring Number: BH-06 Sheet 1 of 2

Boring Location: BH-06 Denny's parking lot - rear		Elevation and Datum: 277	
Drilling Agency: Drill Line	Driller: Greg Deluca John Hale	Date Started: 9/25/86	Date Finished: 9/25/86
Drilling Equipment: B-53		Completion: Depth (feet) 55 feet	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 6"		Number of Samples: 3 ¦ Dist.: --	Undist.: 8 ¦ Core: --
Borehole Size:		Water Depth (ft): 30 ¦ First:	Compl.: ¦ 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By:	Checked by:
Type of Seal: 5% bentonite cement grout		Barbara Fontes BF	Allison Urbon

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	Baseline OVA reading @ 2.0ppm
	0-0.5' Black asphalt	AS					10:20	
	0.5' Dry, brown medium-coarse grain size sand with pea size gravel.	SP FILL						
5	4'-5.5' Dry, brown, silty fine - medium grain size sand with a thin lense of plastic clay	SP/SM	4	1	⧄	4/5/6		Very fine layer of black crunching material ¼" thick.
10	9'-10.5' Dry, light brown, coarse sand with small size gravel	SP	4	2	⧄	20/40/43		
15	14'-15.5' Change in color to dark brown. Material same as above and is moist	SP	4	3	⧄	17/40/50		
20	19'-20.5' Dry, red-brown, coarse sand with small size gravel.	SP	3	4	⧄	30/38/40		
25	24'-25.5' Very moist, gray, coarse sand with small size gravel	SP	7	5	⧄	20/40/43		
▼ 30	29'-30.5' Wet, dark gray, fine - medium grain size sand, w/very thin clay lense	SP/SC	32-18	6	⧄	7/20/50		Sample is coated with clear colored oily like film.

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0002 Field Log of Boring Number: BH-06 Sheet 2 of 2

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
	Groundwater encountered at approximately 29 feet.	SP						
35	34'-35' Wet, light gray, fine - medium grain size sand		9	7		23/50		
		GW						
40	39'-40.5' Same as above. No recovery.			-		7/15/38		
	41'-42' Cobble							
45	44'-45.5' Wet, light gray, fine - medium grain size sand. At 45.5 feet the sand is very fine	SP	8	8		13/27/50		Sand contains abundant mica at 45.5 feet and the sand becomes very fine. OVA reading in the hole is 4ppm
50	49'-50.5' No recovery			-		NOTE		
55	Same as above. End of borehole.							NOTE: Blow count not recorded.
60								
65								
70								

The Earth Technology
Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0002 Field Log of Boring Number: BH-06A Sheet 1 of 2

Boring Location: BH-06A rear parking lot at Denny's	Elevation and Datum: 277
Drilling Agency: Drill Line Driller: Greg Deluca John Hale	Date Started: 9/26/86 Date Finished: 9/26/86
Drilling Equipment: B-53	Completion: Depth (feet) 35.5 Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 6"	Number of Samples: 7 Dist.: -- Undist.: 7 Core: --
Borehole Size:	Water Depth (ft): 27.5 First: Compl.: 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack	Logged By: Barbara Fontes BF Checked by: Allison Urbon
Type of Seal: 5% bentonite cement grout	

Depth (feet)	Description	Graphic Log Lithology	Graphic Log OVA (ppm)	Samples Number	Samples Type	Samples Blow Count	Samples Drilling Rate/Time	Remarks
								Baseline OVA reading at 2ppm
0	0-0.5' Black asphalt.	AS					11:00	
	0.5' Dry, brown, medium-coarse grain size sand	SP FILL						
5	4'-5.5' Dry, brown, medium - coarse grain size sand	SP	2	1		5/7/19	11:22	
10	9'-10.5' Dry, light brown, medium - coarse grain size sand	SP	3	2		9/16/24		Last 6" of sample is dark brown, silty coarse sand
	13' Hit large cobble	GW						
15	14'- 14.3' Dry, light brown to gray sand w/ cobble		3	3		50 for 4"		
20	19' - 20' Dry, brown, medium - coarse grain size sand with pea size gravel	SP	3	4		20/50		
	23' Cobble, gravel							
25	24'-25'. Moist, light brown, medium - coarse grain size sand Groundwater encountered at approximately 27.5 feet.	SP	2	5		24/50		
▼								
30	29'-30.5' Wet, gray, medium - coarse grain size sand	SP	16	6		26/24/50		Quartz sand "salt & pepper"

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0002 Field Log of Boring Number: BH-06A Sheet 2 of 2

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
35	34'-35.5' Wet, gray, medium grain size sand. End of borehole	SP	12	7	⧄	17/26/32		
40								
45								
50								
55								
60								
65								
70								

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-112 Sheet 1 of 2

Boring Location: Back portion of Denny's parking lot		Elevation and Datum: 277	
Drilling Agency: Drill Line	Driller: G.Deluca J.Hale	Data Started: 11/25/86	Data Finished: 11/25/86
Drilling Equipment: B-53		Completion Depth (feet) 45.5	Rock Depth: (feet)
Method of Drilling: Hollow Stem Auger Dia. 8"		Number of Samples: 10 ¦ Dist.:	Undist.: 9 ¦ Core:
Borehole Size:		Water Depth (ft): 30 ¦ First:	Compl.: ¦ 24 hrs.
Type of Perforation Backfill: #3 Monterey Sand Pack		Logged By: Allison Urbon	Checked by: Barbara Fontes
Type of Seal: 5% bentonite cement grout			

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
	0-0.5' Asphalt	AS					9:40	OVA Background (BG) reading = 4ppm
	0.5' Dry, brown, silty sand, well sorted	SP						
	4.0-5.0' Same as above							
5	5.0-5.5' Dry, light brown, fine-medium grain size sand w/some silt, well sorted	SP		1		10/9/8	9:42	
10	9.0-10.5' Dry, light brown, medium-coarse sand w/gravel, poorly sorted, qtz sand	SP	BG	2		20/13/7	9:45	
15	14.0-15.5' Dry, light brown, medium-coarse sand w/gravel and cobbles	SP/SC	BG	3		50/50	9:52	OVA @ BG downhole Thin clay layer @ 14.5'
20	19.0-20.5' Dry, light brown, fine-medium sand, well sorted	SP	BG	4		28/48/50	9:56	OVA @ BG
25	24.0-24'9" Damp, light brown, fine-medium sand, well sorted	SP	BG	5		25/50	10:03	Tar-like odor detected
	24'9" Change in color to gray and coarser sand							
30	29.0-30.5' Wet, gray, medium-coarse sand, well sorted, qtz sand	SP	BG	6				BG OVA @ 5ppm OVA @ BG in air and near drill hole - water @ 30ft

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-112 Sheet 2 of 2

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
35	34.0-35.5' Same as above	SP	>4	7				
	37' Cobble gravel							
40	39.0-40.5' Wet, gray, medium sand w/coarse sand, gravel, & cobbles, poorly sorted	SW	>4	8		20/34/50	10:35	OVA @ 7ppm downhole 10:46am BG OVA @ 8ppm
45	44.0-45.5' Wet, gray, medium sand w/coarse sand, well sorted End Hole	SP	>4	9		9/21/23	10:51	11:05am BG OVA @ 9ppm
50							11:10	Water sample taken at 45' depth 11:17am BG OVA @ 7ppm
55								
60								TEMP. = X pH = X σ = 1530 μmhos
65								
70								

The Earth Technology Corporation

BORING LOG

Project Name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-113 Sheet 1 of 2

Boring Location: Howard street & Denny's back lot

Elevation and Datum: 276

Drilling Agency: Drill Line

Driller: G. Deluca
J. Hale

Data Started: 11/25/86

Data Finished: 11/25/86

Drilling Equipment: B-53

Completion: Depth (feet) 40.5

Rock Depth: (feet)

Method of Drilling: Hollow Stem Auger Dia "8"

Number of Samples: 7

Dist.:

Undist.: 7

Core:

Borehole Size:

Water Depth (ft): 30

First:

Compl.:

24 hrs.

Type of Perforation Backfill: #3 Monterey Sand Pack

Type of Seal: 5% bentonite cement grout

Logged By: B. Fontes

Checked by: A. Urbon

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
	0-0.5' Black asphalt	AS					1:00	OVA Background (BG) reading = 4ppm
	0.5' Dry, dark brown, silty fine-medium sand, well sorted	SP						
5	4.0-5.5' Dry, brown, silty fine-medium sand, well sorted	SP		1	⧄			
10	9.0-10.5' Thin layers of _sandy clay	SC		2	⧄			
15	14.0-15.5' Brown, silty, fine-medium sand, well sorted	SP		3	⧄			End of augers is wet
	18.0' Gravel/cobble	GP						
20	19.0-20.5' Moist, brown, fine-medium sand, well sorted	SP		4	⧄		1:18	
25	24.0-25.5' Same as above	SP		5	⧄			
30	29.0-30.5' Wet, gray, medium-coarse sand, well sorted	SP		6	⧄		1:26	Water @ ~30' depth OVA >10ppm

The Earth Technology Corporation

BORING LOG

Project name: Metro Rail Transit

Project Number: 87-600-0022 Field Log of Boring Number: BH-113 Sheet 2 of 2

Depth (feet)	Description	Graphic Log		Samples				Remarks
		Lithology	OVA (ppm)	Number	Type	Blow Count	Drilling Rate/Time	
							1:32	OVA @ 10ppm
	34.0-35.5' No recovery							
35								
		SP/GP						
	38-39' Gravel/cobble							
40	39-40.5' Wet, gray, medium-coarse sand			7		23/36/50	1:39	Water sample taken at 40'
	End Hole							
							2:10	Complete
45								
50								
55								
60								TEMP. = X pH = X σ = 1550 µmhos
65								
70								

APPENDIX B

STREAMLINED RISK EVALUATION

EXECUTIVE SUMMARY

This streamlined risk evaluation was performed as part of the Removal Preliminary Assessment (RPA) for the Union Station Gateway Vignes Street Ramp Improvement and Utility Installation Project site located in Los Angeles, California. The basic steps of the streamlined risk evaluation include:

1) *Identification of chemicals of potential concern in soils and groundwater* - Any chemical found in detectable levels in soil or groundwater at the site was considered a chemical of potential concern.

2) *Identification of potentially exposed populations* - Future construction workers were identified as the most likely exposed population.

3) *Identification of exposure pathways of potential concern* - Inhalation of particulates, dermal contact with soil and incidental soil ingestion were considered complete exposure pathways.

4) *Derivation of risk-based goals for soils* - A three step process using risk assessment methodologies was used to develop cleanup goals for the site. The site was delineated into Parcels A/B and Utility Lines. Separate risk-based goals were calculated for each portion. Levels of lead were not considered hazardous at the site. The RBGs are summarized in Table 6 of the document.

5) *Evaluation of uncertainties in the risk assessment* - The RBGs were derived consistent with DTSC policies associated with carcinogenic PAHs. The use of the Region IX, EPA toxicity equivalency factors could increase the RBGs for carcinogenic PAHs by 1 to 2 orders of magnitude.

Implementation of Risk Based Goals (RBGs). The calculation of RBGs serves as a bridge between risk assessment and risk management. While the numerical RBGs are important components of the remediation process, other pertinent factors influence the interpretation of these remedial goals and the subsequent management of risk (*e.g.*, size of exposed population, established regulatory criteria, *etc.*). Risk management decisions are typically performed under guidance by the California Environmental Protection Agency Department of Toxic Substance Control (DTSC).

Soils in the vicinity of BH-13 and BH-15 (Parcel A) contain carcinogenic PAHs above the RBGs at 5 feet and, in some cases, at 10 feet. Soils taken from bin 2 contained indeno(1,2,3-cd)pyrene above the RBG.

1.0 INTRODUCTION

The streamlined risk evaluation describes the methods used to evaluate potential health risks associated with soils excavated as part of the Vignes Street Ramps Improvement and Utility Installation Project. In general, the site is delineated into Parcels A and B (Figure 2 of the RPA) and utility lines (Figure 3 of the RPA). However, for the purposes of the risk evaluation, the site was characterized into Parcels A/B (combined) and the utility lines. Construction activities will involve the removal of the upper two feet of soil at Parcels A & B and excavation of 15-foot deep trenches for utility installation. During the initial phase of construction, workers will follow a health and safety plan. Risk-based goals that are protective of future workers involved in construction activities at the site were derived. These criteria were developed using guidelines outlined by the U.S. Environmental Protection Agency (EPA) in the following documents:

- EPA. 1989. Risk Assessment Guidance for Superfund. Human Health Evaluation Manual Part A. Interim Final. Office of Solid Waste and Emergency Response. OSWER Directive 9285.701A.
- EPA. 1991. Risk Assessment Guidance for Superfund: Vol. 1. Human Health Evaluation Manual. Supplemental Guidance "Standard Default Exposure Factors." Draft Final. March 25, 1991. OSWER Directive 9285.6-03
- Cal-EPA. Department of Toxic Substances Control (DTSC). 1992. Cancer Potency Factors. Memo from: CAL-EPA to Standards and Criteria Work Group. July, 1992.

2.0 CHEMICALS OF POTENTIAL CONCERN

Soil

Since the site is located in the immediate vicinity of a former coal gasification plant site, the primary chemicals of concern are petroleum hydrocarbons, particularly polynuclear aromatic hydrocarbons (PAHs), cyanide and lead.

Because petroleum hydrocarbons vary in chemical composition from product to product and are composed of a large number of constituents, the toxicity of these hydrocarbons is generally addressed by considering the most toxic individual components. Specifically, benzene, toluene, ethylbenzene, xylene, and PAHs. Benzene has been detected below or just above the detection limit in site soils. Toluene, ethylbenzene and xylene were only detected in one soil sample and at very low concentrations (<1 mg/kg). PAHs were found in composite samples taken from trenching areas as well as in Parcel A. Although total recoverable petroleum hydrocarbons (TRPH) have been detected in Parcel B, no PAHs have been found. In general, PAHs were found at 5 or 10 feet below ground surface (bgs), but not in soils in the region above the groundwater table (20 to 25 feet bgs).

Bis-2-ethylhexyl phthalate, which has been identified as a carcinogen by the EPA was detected in some soil samples in Parcels A and B. Although this compound was also detected in the laboratory blank in samples collected by Levine-Fricke, it was selected as a chemical of concern, since it was detected in subsequent samples taken by Dames and Moore, but not in laboratory blanks.

The chemicals of potential concern in soil for each site area are identified in the following table.

Parcel A/B	Utility Trenches
PAHs	
Acenaphthylene	Acenaphthylene
Anthracene	Benzo(a)anthracene
Benzo(a)anthracene	Benzo(b)fluoranthene
Benzo(b)fluoranthene	Benzo(k)fluoranthene
Benzo(k)fluoranthene	Benzo(ghi)perylene
Benzo(ghi)perylene	Benzo(a)pyrene
Benzo(a)pyrene	Chrysene
Chrysene	Fluoranthene
Dibenzo(a,h)anthracene	Indeno 1,2,3-cd pyrene
Fluoranthene	Pyrene
Indeno 1,2,3-cd pyrene	
Phenanthrene	
Pyrene	

Parcel A/B	Utility Trenches
Other Chemicals	
Lead	Cyanide
Bis 2-ethylhexyl phthalate	Bis 2-ethylhexyl phthalate
Di-n-butyl	
Toluene	
Ethylbenzene	
Xylene	

Groundwater

Groundwater is located at 25 to 29 feet bgs. Several VOCs including benzene, toluene, ethylbenzene, xylene and chlorinated solvents, and selected PAHs were detected in groundwater. The groundwater in the area of the site is part of a regional groundwater plume and is not currently used as a drinking water source. Groundwater will not be encountered during the Vignes Street Ramps Improvement and Utility Installation Project activities.

3.0 EXPOSURE ASSESSMENT

This section describes the assumptions, data and methods used to evaluate the potential for human exposure to chemicals found at the site.

The components of exposure assessment included in this evaluation are:

- Identification and characterization of potentially exposed populations; and
- Identification and evaluation of potentially significant pathways to exposed populations.

Receptors of Potential Concern

The site is located in an industrial area of Los Angeles, California, near the corner of Vignes and Ramirez Street. The southern border of the site abuts the Santa Ana Freeway. The nearest off-site building is a Denny's Restaurant, which is located approximately 60 feet to the east of

Parcel A. The nearest off-site residents are approximately one mile from the site. The Gateway Transit Center will consist of buildings, parking structures, an off-site roadway ramp and utility improvements. Parcels A and B, will be completely paved as part of the roadway construction. Similarly, the trench areas will be completely paved after the installation of the utility lines. Therefore, the potential for exposure to human and environmental receptors will be virtually nonexistent. However, short-term exposure may be possible for future construction workers repairing the utility lines or performing other subsurface activities. As such, the only receptors of potential concern would be workers involved in subsurface activities at the site.

Ecological impacts are not expected from site-related chemicals given 1) the industrial setting of the site area, 2) the limited opportunity for exposure, and 3) the lack of surface water bodies in the vicinity of the site. Therefore, impacts to ecological receptors are not considered further in this assessment.

Exposure Pathways

Once the Vignes Street Ramps Improvement and Utility Installation Project is completed, the site will be completely covered with asphalt or concrete pavement. The only volatile chemicals found at the site were toluene, ethylbenzene and xylene. These chemicals were found infrequently and at low concentrations (< 1 mg/kg) and are not expected to pose a health hazard at these concentrations, even if the soil were not covered by concrete. Therefore, the only complete exposure pathways considered were for workers involved in subsurface activities. The potentially complete exposure pathways for the construction worker include inhalation of particulate, incidental soil ingestion, and dermal contact. Because the only volatile chemicals found in the soils were non-carcinogenic and were found in low concentrations, this pathway was not evaluated. The inhalation of particulates pathway was assumed to be the dominant inhalation pathway for semi-volatile chemicals. Therefore, vapor inhalation was also not evaluated for these chemicals. Regional contamination of groundwater has occurred historically and groundwater at the site is not utilized as a drinking water source. In addition, due to the depth of groundwater (25 to 29 feet bgs), it is unlikely workers will encounter groundwater when repairing utility lines.

4.0 POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Chemical concentrations of contaminants of concern were compared to Applicable or Relevant and Appropriate Requirements (ARARs). National and California Ambient Air Quality Standards (NAAQS) for ambient may be considered ARARs. Because lead is the only chemical found at detectable levels in soil for which NAAQS (1.5 $\mu g/m^3$ - calendar quarter) or CAAQS (1.5 $\mu g/m^3$ - 30-day average) have been established, these criteria were not included.

Potential ARARs may not be appropriate for every site. For example, NAAQS may not be considered ARARs for the site since the presence of the buildings and roadways will result in the suppression of particulate emissions. In addition, since no surface water is found on-site, Federal Ambient Water Quality Criteria were also not considered relevant to the site. There are currently no ARARs for direct contact with soil. Therefore, risk-based goals were calculated for chemicals in soil at the site based on predicted worker exposure scenarios. A more detailed evaluation will be presented in the Engineeringi Evaluation/Cost Analysis (EECA) that will be prepared as part of the Removal Action .

5.0 METHODOLOGY FOR CALCULATING RISK-BASED GOALS IN SOIL (RBGS)

RBGs were developed for the organic chemicals in a three step process. First, excess cancer risks or noncarcinogenic hazards for each chemical were developed simultaneously for all three exposure pathways by assuming a 1 mg/kg chemical concentration in soil. Secondly, because health risks have a linear relationship to the exposure concentration, by defining an allowable excess cancer risk level of one-in-a-million for carcinogenic chemicals or a hazard index of 1 for noncarcinogenic chemicals, a RBG can be calculated using a simple ratio equation. Thirdly, the individual RBGs were further adjusted to account for the presence of multiple chemicals on the site. Each of these steps are described below:

Step 1.0

This step involves calculating intake rates for a worker and comparing these intake rates with regulatory toxicity criteria (either EPA or DTSC slope factors or EPA reference doses depending on the chemicals ability to elicit carcinogenicity).

The intake equations to be used for each exposure pathway in this risk assessment are presented below. Depending on the chemical, intake rates will be calculated slightly differently. Intake rates for non-cancer endpoints are calculated as an average daily exposure (ADD), while carcinogenic chemicals are calculated over a lifetime (LADD). The dose from dermal contact with soil can be estimated from the following equation:

$$Intake = \frac{(C_S)\ (F)\ (SA)\ (AF)\ (ABS)\ (EF)\ (ED)\ (10^{-6})}{(BW)\ (AT)} \tag{1}$$

where,

Intake = ADD or LADD (mg/kg/day)
C_S = Soil concentration of chemical (mg/kg)
F = Fraction from chemical-containing soil (unitless)
SA = Surface area of exposed skin (cm^2)
AF = Soil adherence factor ($mg/cm^2/day$)
ABS = Absorption factor (unitless)
EF = Exposure frequency (days/years)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)
10^{-6} = Conversion factor (kg/mg)

The equation to calculate intake from the ingestion of soil will be expressed as:

$$Intake = \frac{(C_S)\ (F)\ (Is)\ (EF)\ (ED)\ (10^{-6})}{(BW)\ (AT)} \tag{2}$$

where,

Intake = ADD or LADD (mg/kg/day)
C_S = Soil concentration of chemical (mg/kg)
F = Fraction from chemical-containing soil (unitless)
Is = Soil ingestion rate (mg/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)

AT = Averaging time (days)
10^{-6} = Conversion factor (kg/mg)

The equation for on-site particulate exposure is expressed as:

$$Intake = \frac{(C_S)\ (F)\ (PM_{10})\ (Br)\ (Pd)\ (ET)\ (EF)\ (ED)\ (10^{-6})}{(BW)\ (AT)} \quad (3)$$

where,

Intake = ADD or LADD (mg/kg/day)
C_S = Concentration of chemical in soil (mg/kg)
F = Fraction from chemical-containing soil (unitless)
PM_{10} = Particulate matter less than 10 microns (mg/m^3)
Br = Breathing rate (m^3/hour)
Pd = Particulate deposition to lung (unitless)
ET = Exposure time (hours/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)
10^{-6} = Conversion factor (kg/mg)

The parameters used in the above equations are presented in Table 1. Once the intake rate from each pathway is developed, the potential for chemicals to elicit adverse effects is interpreted through the use of toxicity criteria derived by the DTSC and the EPA. Toxicity criteria used in the risk assessment were obtained from these sources:

- CAL-EPA Cancer Potency Factors (DTSC, 1992).
- The Integrated Risk Information System (IRIS), a database available through by the EPA Environmental Criteria and Assessments Office (ECAO) in Cincinnati, Ohio (EPA, 1993a). IRIS, prepared and maintained by EPA, is an electronic database containing health risk and EPA regulatory information on specific chemicals.
- The Health Effects Assessment Summary Tables (HEAST), provided by the EPA Office of Solid Waste and Emergency Response (OSWER) (EPA, 1993b,c;

1992a). HEAST is a compilation of toxicity criteria published in health effects documents issued by EPA. HEAST is for use in Superfund and RCRA programs.

In accordance with DTSC guidance for risk assessment, DTSC potency factors were given higher priority than criteria from IRIS which, in turn, were given higher priority than those from HEAST. Table 2 presents the toxicity criteria used in the development of risk-based goals.

For noncarcinogenic chemicals, the estimated intake of a chemical for a particular pathway can be compared mathematically to the RfD by calculating the *hazard quotient* (HQ):

$$HQ = \frac{ADD}{RfD} \tag{4}$$

where,

HQ = Hazard Quotient (unitless)
ADD = Average Daily Dose (mg/kg/day)
RfD = Reference Dose (mg/kg/day)

For carcinogenic chemicals, the cancer risk associated with the lifetime intake can be estimated from the following equation:

$$ECR = LADD \times SF \tag{5}$$

where,

ECR = Noncumulative cancer risk
$LADD$ = Lifetime Average Daily Dose (mg/kg/day)
SF = Slope Factor $(mg/kg/day)^{-1}$

Step 2.0

For carcinogenic chemicals, because the relationship between the excess cancer risk and the soil concentration is linear, a preliminary RBG can be calculated using the following equation:

$$\frac{ECR}{C_{s_1}} = \frac{ECR}{C_{s_2}}$$

Where ECR_1 represents the excess cancer risk associated with the assumed chemical concentration in soil (C_{S1}) of 1 mg/kg and ECR_2 represents the allowable risk level, in this case, one-in-a-million. Because C_{S1} is always 1 mg/kg, and by re-arranging the equation, the RBG (C_{S2}) was calculated by dividing one-in-a-million (ECR_2) by ECR_1 . Similarly, RGBs for noncacinogenic chemicals can be calculated using a hazard index of 1.0 and the following equation.

$$\frac{HI_1}{Cs_1} = \frac{HI_2}{Cs_2}$$

Table 3 presents the risk-based goals for noncarcinogenic chemicals. Table 4 presents the risk-based goals for carcinogenic chemicals.

Step 3.0

Because a construction worker can be exposed to multiple chemicals simultaneously, the preliminary RBGs from Step 2.0 may need to be adjusted. There are numerous methods to adjust RBGs. In this case, risk levels were defined as a one-in-a-million excess cancer risk for the site. Risk levels were evenly allocated to each chemical (*e.g.*, for two chemicals, each chemical would be allowed 50% of the risk 5×10^{-7}). Because the number of chemicals vary between the utility lines and Parcel A/B, the final cleanup levels vary for some chemicals between areas. Tables 3 and 4 presents the risk-based goals adjusted for the presence of multiple chemicals for noncarcinogenic nad carcinogenic chemicals, respetively for each site area. Table 5 summarizes the risk-based goals calculated for soils in each of the two site areas.

6.0 LEAD

A RBG was not calculated for lead. Rather, the evaluation of potential health effects associated with exposure to lead was performed using the DTSC Lead Spreadsheet Model Version 1.1 (DTSC, 1992). The EPA and the DTSC regard 10 μg/dL as a blood-lead level of concern in young children. However, the DTSC also regards10 μg/dL blood-lead to be a level of concern for adults. DTSC recommends that no more than one percent of potentially exposed children or adults exceed a blood-lead level of 10 μg/dL.

The lead model estimates blood-lead concentrations resulting from the intake of lead from dietary sources, drinking water, and the ingestion, dermal contact and inhalation of soil and dust. Each of these pathways represents an incremental increase in blood-lead based on a concentration in a medium and contact rates. The contributions of these pathways are summed to arrive at an estimate of median blood-lead concentration resulting from multi-pathway exposure. The default parameters supplied with the model were used to estimate intake of lead through 1) drinking water (0.015 mg/L), since municipal water could contain this level, 2) air (0.18 $\mu g/m^3$; CARB, 1991), and 3) the diet (10.2 μg/kg). The arithmetic mean lead concentration in soil and a site-specific PM_{10} value were used in the model. The predicted blood lead levels were below the 10 μg/dL criterion (Table 6). Therefore, a risk-based goal for lead was not calculated.

7.0 IMPLEMENTATION OF RBGS

The calculation of risk-based goals serves as a bridge between risk assessment and risk management. RBGs are intended to ensure that, on average, any human exposure that will be left will be less than the risks associated with the RBG concentration. Statistical evaluation can be used to identify selected areas where remediation would be needed to achieve the risk-based remedial goals. The statistical evaluation can consist of the following steps:

- A direct comparison of the detected concentrations of each carcinogenic and non-carcinogenic PAH, as well as the other chemicals, to the risk-based goals; and
- Evaluation of the spatial distribution of the data.

Two types of sampling have been performed at the site. Discrete samples have been collected by Levine-Fricke and Earth Technology Corporation. Four samples from Parcel A and one discrete sample in the utility trench area. In addition, composite samples from soil along the trench lines in two bins have been taken by Dames and Moore. Soils in the vicinity of BH-13 and BH-15 (Parcel A) contain carcinogenic PAHs above the RBGs at 5 feet and, in some cases, at 10 feet. Soils taken from bin 2 contained indeno(1,2,3-cd)pyrene above the RBG.

Additional analytical sampling is planned for the site. Once this sampling is completed, the appropriateness of utilizing statistical methods to implement the RBGs will be further evaluated.

Specific steps in the statistical evaluation could include:

1) Evaluate the spatial distribution of chemicals in Parcel A/B and along the utility lines.
2) Calculate the average chemical concentrations by depth interval onsite.
3) Provide an estimate of the uncertainty. Conservative upper bound estimates of the standard error (*i.e.*, the standard deviation of the arithmetic average) and 95 percent Upper Confidence Limit (UCL) could be calculated by treating the data as a random sample.
4) Investigate the effect of remediating hot spots.

While the numerical RBGs are important components of the remediation process, other pertinent factors may also influence the interpretation of these remedial goals and the subsequent management of risk (*e.g.*, size of exposed population, established regulatory criteria, *etc.*). Risk management decisions are typically performed under guidance by the DTSC.

8.0 UNCERTAINTY

Uncertainty can result in either overestimation or underestimation of health risks, and will also impact calculated risk-based goals. One approach to addressing uncertainty in estimating risks is to use health-protective assumptions when site-specific information is unavailable. Uncertainties in the this assessment include:

- The RBGs for the PAHs were developed in accordance with DTSC guidance which considers all carcinogenic PAHs as potent as benzo(a)pyrene. Alternatively, EPA Region IX uses a toxicity equivalency factor approach (EPA, 1993d). This approach could increase the RBGs for some of the carcinogenic PAHs by one to two orders of magnitude.

- The risks for lead were evaluated using the DTSC lead model. The majority of the risk from lead exposure (85%) was from drinking water and the diet which is unrelated to the lead found at the site.
- Several assumptions were made regarding the rate of soil ingestion and breathing rates of workers. These assumptions tend to represent upper-bound estimates of exposure and may overestimate the extent of exposure.
- Considerable uncertainty surrounds the estimates of dermal exposure and risk (EPA, 1992b).
- SFs are based on the assumption of linear extrapolation from high to low doses. Low-level exposures may not induce cancer and, as such, risk-based numbers may be over-protective.
- Extrapolating inhalation RfDs to oral RfDs and visa versa may underestimate or over-estimate the magnitude of the risk-based goals.

9.0 REFERENCES

The following references were utilized for this steam-lined risk evaluation.

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Table 1
Summary of Exposure Assumptions and Parameter Values

PATHWAY	PARAMETER VALUE	RATIONALE/SOURCE
GENERAL PARAMETERS		
Body weight (BW)	70 kg	Default value (EPA, 1991)
Fraction from on-site source (F)	1	Health-protective assumption
Exposure frequency (EF)	60 days/year	Estimated time spent in trench
Exposure duration (ED)	1 year	Utility line repairs expected to be infrequent.
Averaging time (AT)		
Carcinogenic	25550 days	70-year lifetime (EPA, 1989)
Noncarcinogenic	365 days	Period of exposure equivalent to ED (EPA, 1989)
PATHWAY-SPECIFIC PARAMETERS		
Dermal Contact with Soil		
Absorption factor (ABS)		
PAHs	0.15	(DTSC, 1993a)
All other organic chemicals	0.10	
Skin surface area (SA)	3,160 cm^2	Upperbound estimate, surface area of exposed head, hands and forearms (EPA, 1992b)
Soil to skin adherence factor (AF)	0.5 $mg/cm^2/day$	(EPA, 1992b)
Inhalation of Particulates		
Respirable fraction (PM_{10})	0.152 mg/m^3	PM_{10} estimates based on maximum value for N. Main St. in Los Angeles County (CARB, 1990)
Particulate deposition (Pd)	1	Health protective assumption
Breathing rate (Br)	0.83 m^3/hour	Equivalent to 20 m^3 per 8-hour day (EPA, 1991)
Exposure time (ET)	8 hours/day	Normal working hours
Soil Ingestion		
Ingestion rate (Is)	480 mg/day	Default value for construction workers (EPA, 1991)

TABLE 2
TOXICITY CRITERIA FOR THE CHEMICALS OF POTENTIAL CONCERN AT THE USG SITE

Chemical	Carcinogenic Effects Slope Factor (SF)a		Weight of Evidence Classificaltion for Carcinogens	Chemical	Noncarcinogenic Effects Chronic Reference Dose (RfD)	
	Oral (mg/kg/day)^-1	Inhalation (mg/kg/day)^-1			Oral (mg/kg/day)	Inhalation (mg/kg/day)
Carcinogens				**Noncarcinogens**		
Benzo(a)anthracene	12	12	B2	Acenaphthylene	--(b)	--
Benzo(b)fluoranthene	12	12	B2	Anthracene	0.3	--
Benzo(k)fluoranthene	12	12	B2	Benzo(ghi)perylene	--(b)	--
Benzo(a)pyrene	12	12	B2	Cyanide	0.02	--
Di-2-ethylhexyl phthalate	0.014 (c)	NA(c)	B2	Di-n-butylphthalate	0.1	--
Chrysene	12	12	B2	Naphthalene	0.04(d)	--
Dibenzo(a,h)anthracene	12	12	B2	Phenanthrene	--(b)	--
Indeno(1,2,3-cd)pyrene	12	12	B2	Pyrene	0.03	--
Lead	NA(e)	NA(e)	B2	Toluene	0.2	0.1
				Ethylbenzene	0.1	0.29
				Xylene	2	4

All values obtained from IRIS, unless otherwise noted.

--Data not available; oral RfDs used as surrogates for inhalation pathway.

a Cal EPA CPF, unless otherwise noted.
b Reference dose for naphthalene used as surrogate.
c EPA CPF, oral value used as surrogate for inhalation pathway.
d HEAST (1992)
e Risks to be addressed using the DTSC lead uptake model.

Table 3: Predicted RBGs Based on Noncarcinogenic Hazards at the Site

Inhalation of Particulates

Chemical	Cs (mg/kg)	F (U)	Pd (U)	PM10 (mg/m3)	Br (m3/hr)	ET (hr/d)	EF (d/yr)	ED (yr)	CF (kg/mg)	AT (d)	BW (kg)	ADD (mg/kg/d)	RfD (mg/kg/d)	HQ
Acenaphthylene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.04	5.93E-08
Anthracene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.3	7.90E-09
Benzo(ghi)perylene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.04	5.93E-08
Di-n-butylphthalate	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.1	2.37E-08
Naphthalene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.04	5.93E-08
Phenanthrene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.04	5.93E-08
Pyrene	1	1	1	0.152	0.83	8	60	1	1.0E-06	365	70	2.4E-09	0.03	7.90E-08

Dermal Contact

Chemical	Cs (mg/kg)	F (U)	ABS (U)	AF mg/cm2/d	SA cm2	EF (d/yr)	ED (yr)	CF (kg/mg)	AT (d)	BW (kg)	ADD (mg/kg/d)	RfD (mg/kg/d)	HQ
Acenaphthylene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.04	1.4E-05
Anthracene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.3	1.9E-06
Benzo(ghi)perylene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.04	1.4E-05
Cyanide	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.02	2.8E-05
Di-n-butylphthalate	1	1	0.1	0.5	3160	60	1	1.0E-06	365	70	3.7E-07	0.1	3.7E-06
Naphthalene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.04	1.4E-05
Phenanthrene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.04	1.4E-05
Pyrene	1	1	0.15	0.5	3160	60	1	1.0E-06	365	70	5.6E-07	0.03	1.9E-05
Toluene	1	1	0.1	0.5	3160	60	1	1.0E-06	365	70	3.7E-07	0.2	1.9E-06
Ethylbenzene	1	1	0.1	0.5	3160	60	1	1.0E-06	365	70	3.7E-07	0.1	3.7E-06
Xylene	1	1	0.1	0.5	3160	60	1	1.0E-06	365	70	3.7E-07	2	1.9E-07

Table 3: Predicted RBGs Based on Noncarcinogenic Hazards at the Site

Ingestion

Chemical	Cs	F	B	Is	ED	CF	AT	BW	ADD	RfD	HQ
	(mg/kg)	(U)	(U)	(mg/d)	(yr)	(kg/mg)	(d)	(kg)	(mg/kg/d)	(mg/kg/d)	
Acenaphthylene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.04	2.8E-05
Anthracene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.3	3.8E-06
Benzo(ghi)perylene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.04	2.8E-05
Cyanide	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.02	5.6E-05
Di-n-butylphthalate	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.1	1.1E-05
Naphthalene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.04	2.8E-05
Phenanthrene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.04	2.8E-05
Pyrene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.03	3.8E-05
Toluene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.2	5.6E-06
Ethylbenzene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	0.1	1.1E-05
Xylene	1	1	1	480	60	1.0E-06	365	70	1.1E-06	2	5.6E-07

Chemical	Ttl HI	RBG	RBG	RBG
		(Individ)	(Utl T)	(P A/B)
Acenaphthylene	4.2E-05	2.4E+04	3952	2372
Anthracene	5.6E-06	1.8E+05	NA	17792
Benzo(ghi)perylene	4.2E-05	2.4E+04	3952	2372
Cyanide	8.4E-05	1.2E+04	1979	NA
Di-n-butylphthalate	1.5E-05	6.7E+04	NA	6664
Naphthalene	4.2E-05	2.4E+04	3952	2372
Phenanthrene	4.2E-05	2.4E+04	3952	2372
Pyrene	5.6E-05	1.8E+04	2964	1779
Toluene	7.5E-06	1.3E+05	NA	13349
Ethylbenzene	1.5E-05	6.7E+04	NA	6675
Xylene	7.5E-07	1.3E+06	NA	133490

RBG = Risk-Based Goal
Utl. T = Utility Trench
P A/B = Parcel A/B

Table 4: Predicted RBGs Based on Carcinogenic Risk at the Site

Inhalation of Particulates

Chemical	Cs (mg/kg)	F (U)	Pd (U)	PM10 (mg/m3)	Br (m3/hr)	ET (hr/d)	EF (d/yr)	ED (yr)	CF (kg/mg)	AT (d)	BW (kg)	LADD (mg/kg/d)	SF mg/kg/d-1	ECR
Benzo(a)anthracene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Benzo(b)fluoranthene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Benzo(k)fluoranthene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Benzo(a)pyrene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Di-2-ethylhexyl phthalate	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	0.014	4.7E-13
Chrysene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Dibenzo(a,h)anthracene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10
Indeno(1,2,3-cd)pyrene	1	1	1	0.152	0.83	8	60	1	1.0E-06	25550	70	3.4E-11	12	4.1E-10

Dermal Contact

Chemical	Cs (mg/kg)	F (U)	ABS (U)	AF mg/cm2 /d	SA (cm2)	EF (d/yr)	ED (yr)	CF (kg/mg)	AT (d)	BW (kg)	LADD (mg/kg/d)	SF (mg/kg/ d)-1	ECR
Benzo(a)anthracene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Benzo(b)fluoranthene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Benzo(k)fluoranthene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Benzo(a)pyrene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Di-2-ethylhexyl phthalate	1	1	0.1	0.5	3160	60	1	1.0E-06	25550	70	5.3E-09	0.014	7.4E-11
Chrysene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Dibenzo(a,h)anthracene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08
Indeno(1,2,3-cd)pyrene	1	1	0.15	0.5	3160	60	1	1.0E-06	25550	70	8.0E-09	12	9.5E-08

Table 4: Predicted RBGs Based on Carcinogenic Risk at the Site

Ingestion

Chemical	Cs (mg/kg)	F (U)	Is (mg/d)	EF (d/yr)	ED (yr)	CF (kg/mg)	AT (d)	BW (kg)	LADD (mg/kg/d)	SF (mg/kg/d)-1	ECR
Benzo(a)anthracene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Benzo(b)fluoranthene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Benzo(k)fluoranthene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Benzo(a)pyrene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Di-2-ethylhexyl phthalate	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	0.014	2.3E-10
Chrysene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Dibenzo(a,h)anthracene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07
Indeno(1,2,3-cd)pyrene	1	1	480	60	1	1.0E-06	25550	70	1.6E-08	12	1.9E-07

Chemical	Ttl ECR	RBG (Individ) (mg/kg)	RBG (Utl. T) (mg/kg)	RBG (P A/B) (mg/kg)
Benzo(a)anthracene	2.89E-07	3.46	0.49	0.43
Benzo(b)fluoranthene	2.89E-07	3.46	0.49	0.43
Benzo(k)fluoranthene	2.89E-07	3.46	0.49	0.43
Benzo(a)pyrene	2.89E-07	3.46	0.49	0.43
Di-2-ethylhexyl phthalate	3.00E-10	3332	475	416
Chrysene	2.89E-07	3.46	0.49	0.43
Dibenzo(a,h)anthracene	2.89E-07	3.46	NA	0.43
Indeno(1,2,3-cd)pyrene	2.89E-07	3.46	0.49	0.43

RBG = Risk-Based Cleanup Goal
Utl. T = Utility Trench
P A/B = Parcel A/B

Table 5: Summary of Risk-Based Goals (RBGs) for the Site

Chemical	RBG Utility Trench (mg/kg)	RBG Parcel A/B (mg/kg)
Carcinogens		
Benzo(a)anthracene	0.49	0.43
Benzo(b)fluoranthene	0.49	0.43
Benzo(k)fluoranthene	0.49	0.43
Benzo(a)pyrene	0.49	0.43
Di-2-ethylhexyl phthalate	475	416
Chrysene	0.49	0.43
Dibenzo(a,h)anthracene	NA	0.43
Indeno(1,2,3-cd)pyrene	0.49	0.43
Noncarcinogens		
Acenaphthylene	3952	2372
Anthracene	NA	17792
Benzo(ghi)perylene	3952	2372
Cyanide	1979	NA
Di-n-butylphthalate	NA	6664
Naphthalene	3952	2372
Phenanthrene	3952	2372
Pyrene	2964	1779
Toluene	NA	13349
Ethylbenzene	NA	6675
Xylene	NA	133490

TABLE 6: LEAD SPREADSHı FOR GATEWAY SITE
DTSC Lead Risk Assessment Spread Sheet Version 1.1

INPUT DATA

EXPOSURE MEDIUM	LEVEL
LEAD IN AIR* (ug/m3)	0.18
LEAD IN SOIL (ug/g)	30
LEAD IN WATER** (ug/L)	15
PLANT UPTAKE? 1=Yes 0=No	1
AIRBORN DUST*** (ug/m3)	152

RECEPTOR BLOOD LEAD CONCENTRATIONS (ug/dL) BY PERCENTILE

		50t	90th	95th	98th	99th
BLOOD Pb, ADULT	(ug/dl)	2.1	3.2	3.7	4.2	4.7
BLOOD Pb, CHILD	(ug/dl)	3.6	5.6	6.3	7.3	8.0
BLOOD Pb, CHILD (Pica)	(ug/dl)	5.1	8.0	9.1	10.5	11.5

EQUATIONS (BY PATHWAY AND RECEPTOR)

	Blood Pb (ug/dL)	=	Route-specific Constant	X	Medium Concentration	X	Contact Rate	percent of total
ADULTS								
SOIL CONTACT:	0.01	=	1E-04 (ug/dl)/(ug/day) *		30 ug/g *		1.85 g soil/day (5 g/m^2 * 0.37 m^2)	0%
SOIL INGESTION:	0.01	=	0.018 (ug/dl)/(ug/day) *		30 ug/g *		0.03 g soil/day	1%
INHALATION:	0.30	=	1.64 (ug/dl)/(ug/m^3) *		0.18 ug/m^3			15%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day) *		15 ug/l *		1.4 l water/day	41%
FOOD INGESTION:	0.90	=	0.04 (ug/dl)/(ug/day) *		10.2 ug Pb/kg diet *		2.2 kg diet/day	44%
CHILDREN (TYPICAL)								
SOIL CONTACT:	0.00	=	1E-04 (ug/dl)/(ug/day) *		30 ug/g *		1.4 g soil/day (5 g/m^2 * 0.28 m^2)	0%
SOIL INGESTION:	0.12	=	0.07 (ug/dl)/(ug/day) *		30 ug/g *		0.06 g soil/day	3%
INHALATION:	0.35	=	1.92 (ug/dl)/(ug/m^3) *		0.18 ug/m^3			10%
WATER INGESTION:	0.96	=	0.16 (ug/dl)/(ug/day) *		15 ug/l *		0.4 l water/day	27%
FOOD INGESTION:	2.12	=	0.16 (ug/dl)/(ug/day) *		10.2 ug Pb/kg diet *		1.3 kg diet/day	60%
CHILDREN (PICA)								
SOIL CONTACT:	0.00	=	1E-04 (ug/dl)/(ug/day) *		30 ug/g *		1.4 g soil/day (5 g/m^2 * 0.25 m^2)	0%
SOIL INGESTION:	1.66	=	0.07 (ug/dl)/(ug/day) *		30 ug/g *		0.79 g soil/day	33%
INHALATION:	0.35	=	1.92 (ug/dl)/(ug/m^3) *		0.18 ug/m^3			7%
WATER INGESTION:	0.96	=	0.16 (ug/dl)/(ug/day) *		15 ug/l *		0.4 l water/day	19%
FOOD INGESTION:	2.12	=	0.16 (ug/dl)/(ug/day) *		10.2 ug Pb/kg diet *		1.3 kg diet/day	42%

EQUATIONS, DIETARY LEAD

TOTAL DIETARY LEAD = 0 .945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.2 ug/kg
LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead d = 13.5 ug/kg

* Default value
** Default vaule = 15
*** Site-specific value. (default = 50)

SOIL SAMPLING AND ANALYSIS PLAN
VIGNES STREET RAMP
IMPROVEMENT PROJECT AND UTILITY INSTALLATION
VIGNES AND RAMIREZ STREETS
LOS ANGELES, CALIFORNIA
FOR UNION STATION GATEWAY, INC.
DAMES & MOORE JOB NO. 27721-003-131

DECEMBER 29, 1993

LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

This Soil Sampling and Analysis Plan (SAP) has been prepared by Dames & Moore Inc., for Union Station Gateway, Inc. (USG). A Removal Action of impacted soils is being performed by USG from areas that are a part of the construction of the Gateway Transit Center and Metropolitan Transit Authority Headquarters. Impacted soils have been found in areas that are intended for a freeway on and off-ramp (Parcels A and B) and areas that are intended for underground utility installation (Utility Trench Locations). A site location map is presented on Figure 1.

USG has proposed to perform this Removal Action in accordance with the National Contingency Plan requirements.

The purpose of this SAP is to provide further characterization of the nature and extent of impacted soil at Parcels A and B, and at the Utility Trench Locations. Upon completion of the activities identified in this SAP, a Removal Site Inspection (SI) Report will be prepared to summarize the results of this investigation.

An Engineering Evaluation and Cost Analysis (EECA), in accordance with the requirements of the National Contingency Plan, will be finalized after evaluation of the Removal SI Report.

2.0 PRE-INVESTIGATION ACTIVITIES

PERMITTING

Class A and excavation permits and a project work order will be obtained from the City of Los Angeles Department of Public Works. These permits will be necessary to work in the roadway of Vignes Street. Fees required by The City of Los Angeles for bonds and/or deposits will be paid directly by USG. Dames & Moore will assist in obtaining and processing the paperwork necessary for the bonds and/or deposits.

MODIFICATION OF THE HEALTH AND SAFETY PLAN

The existing Health and Safety Plan for work in the Vignes Street area has been modified to meet the needs of the activities performed under this plan. The modified Health and Safety Plan is presented in Appendix A.

UTILITY MAP AND TRAFFIC CONTROL

Dames & Moore will obtain available utility maps of the vicinity of the proposed investigation. These will be submitted to the City of Los Angeles, along with permit applications showing proposed boring locations. Dames & Moore will also provide a traffic control plan for the proposed investigation.

LIMITED GEOPHYSICAL SURVEY

Underground Service Alert will be notified of the proposed investigation prior to beginning any intrusive field activities. In addition, a limited subsurface geophysical survey will be performed to identify underground utilities or other subsurface obstructions in the immediate vicinity of each test boring.

3.0 DRILLING AND SAMPLING OF SOIL BORINGS

Five exploratory soil test borings will be drilled on each parcel (A and B), at the approximate locations shown on Figure 2 (10 total). The purpose of these borings will be to evaluate the possible presence of soil contamination within approximately the upper most six feet of soil. The proposed sample locations have been selected with consideration of prior soil sampling locations and analytical results, and the location of the former coal gasification plant process units, and the needs of the earthwork involved in the proposed realignment.

A truck-mounted, hollow steam auger drilling rig will be used to perform each of the proposed soil test borings. Two soil samples will be collected from each boring at depths of 2 feet and 6 feet.

Boring logs will be completed for each boring by a Dames & Moore field geologist. Soil descriptions will be provided in accordance with the Unified Soil Classification System (USCS). Logs will also include notations of field OVA readings, sample recovery information, and other field notes as appropriate. Finished copies of the boring logs will be included in the final report.

During drilling, relatively undisturbed soil samples will be collected using a modified California split-spoon sampler. The sampler will be fitted inside with four 2.5-inch diameter, 3-inch long stainless steel sample rings. The sampler will be driven 18 inches (or until refusal) with a 30-inch drop of a 140-pound hammer. Hammer blow counts will be recorded every 6 inches over the 18-inch interval.

Following retrieval and removal from the sampler, the exposed soil at the end of each sample ring will be covered with teflon sheeting and fitted with a plastic end caps. Samples will be labeled with the following information: boring number, sample number, depth, data, collector name, owner, and time of collection. The sample sleeves will be stored in a properly chilled ice chest, for shipment to a California state-certified analytical laboratory.

During drilling, a field photoionization detector (PID), or organic vapor analyzer (OVA) will be used to screen soil samples, and monitor the presence and level of organic vapors present. The PID and OVA will be calibrated to the appropriate gas standards before use each day. The samples will be monitored by disaggregating a small portion of the sample in a sealed container.

Instrument readings will be obtained by inserting the field instrument probe into the end of the sealed container. The field instruments will also be used to monitor the cuttings and the breathing space.

Following completion of soil sampling, the borings will be backfilled with cement/bentonite grout, and completed with approximately 4 inches of cold-patch asphalt or concrete, as appropriate. Chain-of-custody procedures will be maintained for all samples collected, and copies will be included in the report.

All sampling equipment will be thoroughly cleaned between sampling events using a dilute solution of non-phosphate detergent, followed by double rinsing with fresh water followed by distilled water. The sampler will be allowed to air dry before reuse. Soil cuttings generated during drilling will be temporarily stored onsite in 55-gallon Department of Transportation (DOT)-approved steel drum. The drum will be labeled with the date, boring numbers, and soil depth interval. Disposal of the drums will be performed after receipt of the analytical results. A Waste Management Plan detailing the procedures for handling and management of all investigation-derived waste is included in Appendix C.

4.0 CHEMICAL ANALYSES - BORINGS

All samples obtained from the soil test borings will be submitted to a California state certified analytical laboratory for the following analyses:

- Volatile Organic Compounds (VOCs), by EPA Method 8240.
- Dicyclopentadiene and Dihydrodicyclopentadiene, by EPA Method 8240, as modified. Note: these analyses will only be requested when field OVA readings exceed 100 ppm.
- Semi-Volatile Organic Compounds (SVOCs), by EPA Method 8270.
- Total Lead, by EPA Method 6010/7000.

This SAP assumes that 10 samples from each parcel, or a total of 20 samples will be analyzed. Samples will be submitted to the laboratory within 24 hours of collection and analyzed on a standard 14-day turnaround basis.

5.0 UTILITY TRENCH SAMPLING

Figure 3 indicates the areas at the site that are designated for installation of underground utilities. For characterization of soils within the utility trenches, soil samples will be collected along and/or within the trenches at 20 randomly determined locations, and from other areas where sustained field OVA readings exceed 100 parts per million (ppm). In addition, for discontinuous or shorter length trenches, samples will be obtained at regularly spaced intervals of 100 feet.

Trench samples will be collected using a manually-driven drive sampler operated from the edge of the trench, or directly from the bucket of a backhoe. An onsite geologist will note field conditions such as odors or discolored soil. The drive sampler will be fitted with 2.5-inch diameter, 2-inch long stainless steel sample sleeves. Bucket samples (if collected) will also be placed into stainless steel sleeves. The samples will be handled in the same manner as previously described for samples from borings.

6.0 CHEMICAL ANALYSES - UTILITY TRENCHES

All soil samples from the utility trenches will be submitted to a California state certified analytical laboratory for the following analyses.

- Volatile Organic Compounds (VOCs), by EPA Method 8240.

- Dicyclopentadiene and Dihydrodicyclopentadiene, by EPA Method 8240, as modified. These analyses will only be requested when field OVA readings exceed 100 ppm.

- Semi-Volatile Organic Compounds (SVOCs), by EPA Method 8270.

- Total Lead, by EPA Method 6010/7000.

For the purposes of this SAP, it has been assumed that samples will be collected from 5 locations where OVA readings exceed 100 ppm.

7.0 DATA EVALUATION AND REPORT PREPARATION

Following receipt by Dames & Moore of all analytical data, a Removal SI Report will be prepared that summarizes the investigation performed under this Soil Sampling and Analysis Plan. The Removal SI Report will include the following elements:

- Description of work completed.
- Field methods.
- Field observations.
- Lithologic soil boring logs.
- Summary and discussion of geotechnical and analytical laboratory results.
- Laboratory data and chain-of-custody documents.

-oOo-

REFERENCE: USGS
Los Angeles, California

0 2000
Scale in Feet

FIGURE 1

SITE LOCATION MAP

Denny's Site Parcel "A"
Los Angeles, CA

Dames & Moore

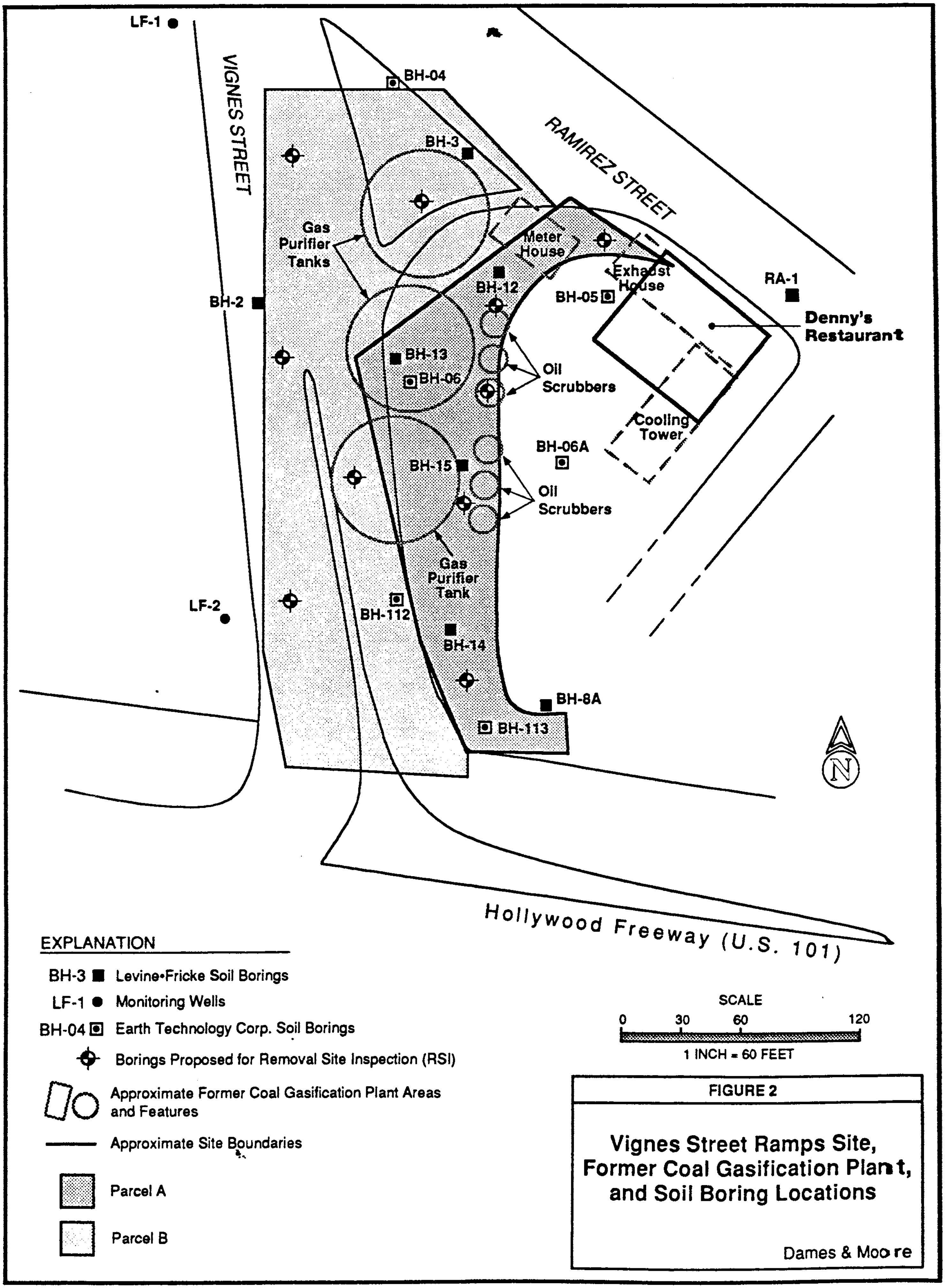
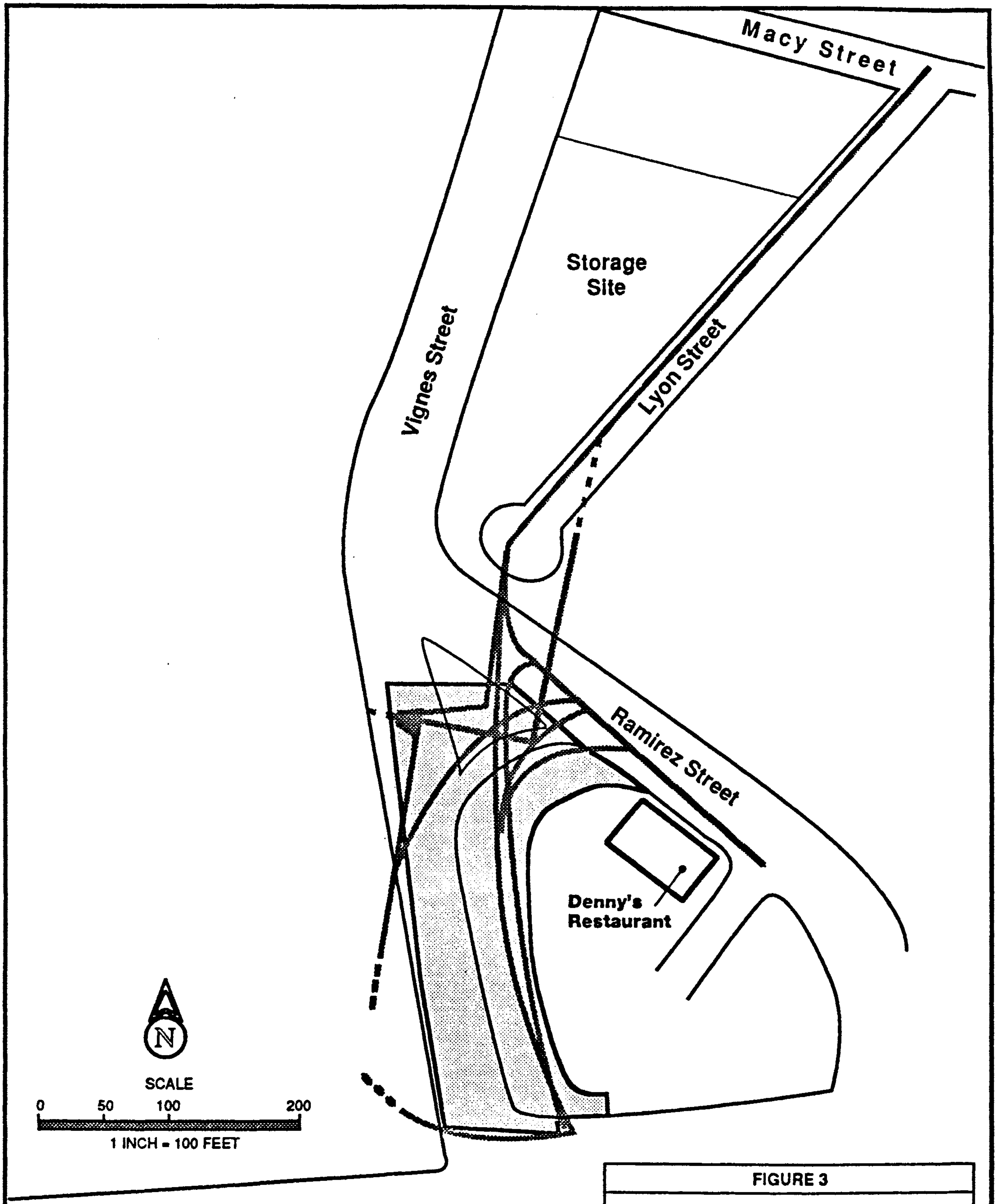


FIGURE 2

Vignes Street Ramps Site, Former Coal Gasification Plant, and Soil Boring Locations

Dames & Moore



EXPLANATION

▨ Site Boundary

━ Utility Trench

FIGURE 3

Vignes Street Ramps Site and Approximate Location of Utility Trenches In City of LA Public Right of Way

Dames & Moore

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APPENDIX A

APPENDIX A

HEALTH AND SAFETY PLAN

ENVIROHEALTH, INC.

SITE HEALTH AND SAFETY PLAN
VIGNES STREET RAMPS SITE
UNION STATION GATEWAY
LOS ANGELES, CALIFORNIA

PREPARED FOR:

DAMES & MOORE
LOS ANGELES, CALIFORNIA

PREPARED BY:

ENVIROHEALTH, INC.
LAKEWOOD, CALIFORNIA

NOVEMBER, 1993

3950 PARAMOUNT BOULEVARD, SUITE 105, LAKEWOOD, CA 90712 • (310) 421-2025 • FAX (310) 421-6445

SITE SAFETY AND HEALTH PLAN

TABLE OF CONTENTS

SECTION	TITLE	PAGE
	OVERVIEW	ii
1.0	FACILITY BACKGROUND	1
2.0	KEY PERSONNEL/HEALTH AND SAFETY RESPONSIBILITIES	1
3.0	JOB HAZARD ANALYSIS	3
4.0	RISK ASSESSMENT SUMMARY	8
5.0	EXPOSURE MONITORING PLAN	8
6.0	PERSONAL PROTECTIVE EQUIPMENT	11
7.0	WORK ZONES AND SECURITY MEASURES	14
8.0	DECONTAMINATION MEASURES	14
9.0	GENERAL SAFE WORK PRACTICES	16
10.0	SANITATION	17
11.0	STANDARD OPERATING PROCEDURES	18
12.0	CONTINGENCY PLANS	20
13.0	TRAINING REQUIREMENTS	22
14.0	MEDICAL SURVEILLANCE PROGRAM	23
15.0	RECORDKEEPING	24
Appendix A:	Primary Health Hazard Summaries Air Monitoring Action Levels	
Appendix B:	Site to Hospital Route Map and Site Work Zones	
Appendix C:	Supporting Analytical Data	

SITE HEALTH AND SAFETY PLAN

OVERVIEW

This Site Health and Safety Plan (SHSP) has been developed specifically concerning the trenching, soil excavation, and soil sampling operations anticipated in connection with sewer and other utility line work at Vignes Street Ramps site at the Union Station Gateway near Vignes and Ramirez Streets in Los Angeles, California. The purpose of this document is to provide detailed information regarding anticipated site health and safety matters, and to establish policies and procedures adequate to protect workers, the public and the environment from the predicted site hazards. This SHSP is based, in part, on the best available health hazard information to date, as well as site investigation information and the proposed activities as provided by Dames & Moore, Catellus Development, Southern California Rapid Transit District, Levine - Fricke, and Charles Pankow Builders, Ltd. EnviroHealth, Inc. recognizes that one or more sections of this SHSP may not apply or may require modifications in the event the anticipated conditions at the subject site do not exist or change. A copy of this SHSP will be available at the site for the duration of all phases of work involving contaminated or potentially contaminated soils.

The following documents were used in preparing this Plan:

1) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and U.S. Environmental Protection Agency (EPA), Publication No. 85-115, October, 1985.

2) Draft Site Safety Plan Outline and Guidance for Site Assessment or Site Mitigation Project, Department of Health Services, Toxic Substances Control Division (DHS, TSCD), August, 1988.

3) U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Hazardous Waste Operations and Emergency Response; Final Rule, 29 CFR, Part 1910.120 (March 6, 1989).

4) U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Code of Federal Regulations, Title 29 (29 CFR), Labor, Part 1910.

    - Subpart C--General Safety and Health Provisions
    - Subpart E--Means of Egress
    - Subpart G--Occupational Health and Environmental Control
    - Subpart H--Hazardous Materials
    - Subpart I--Personal Protective Equipment
    - Subpart K--Medical and First Aid
    - Subpart L--Fire Protection
    - Subpart Z--Toxic and Hazardous Substances

OVERVIEW (CONTINUED)

5) State of California, Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA), California Code of Regulations (CCR), Title 8, General Industry Safety Orders:

   - Section 5155--Airborne Contaminants
   - Section 3215--Means of Egress
   - Section 3203--Injury and Illness Prevention Program
   - Section 3301--Use of Compressed Air or Gas
   - Section 4650--Storage, Handling, and Use of Cylinders
   - Section 5097--Allowable Exposure (Noise)
   - Section 5141--Control of Harmful Exposure to Employees
   - Section 5144--Respiratory Protective Equipment
   - Section 5192--Hazardous Waste Operations and Emergency Response
   - Article 10--Personal Safety Devices and Safeguards

6) State of California, Department of Industrial Relations, Division of Industrial Safety, California Code of Regulations (CCR), Title 8, Tunnel Safety Orders.

7) Registry of Toxic Effects of Chemical Substances 1981-1982 with subsequent supplements, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health.

8) Dangerous Properties of Industrial Materials, Sixth Edition, 1984, N. Irving Sax.

9) Handbook of Toxic and Hazardous Chemicals, 1981, Marshall Sittig.

10) Casarett and Doull's Toxicology, The Basic Science of Poisons, 1986, Curtis D. Klaassen, Ph.D., et al.

11) Threshold Limits Values and Biological Exposure Indices for 1992-1993, American Conference of Governmental Industrial Hygienists.

12) Documentation of Threshold Limit Values, 1986, American Conference of Governmental Industrial Hygienists.

13) Hamilton and Hardy's Industrial Toxicology, 1983, Asher J. Finkel.

14) Chemical Hazards of the Workplace, 1988, Nick H. Proctor, Ph.D. and James P. Hughes, M.D.

15) U.S. EPA Standard Operating Safety Guides, EPA Office of Emergency Response, Hazardous Response Support Division, Edison, New Jersey.

OVERVIEW (CONTINUED)

16) Guidelines for the Selection of Chemical Protective Clothing, American Conference of Governmental Industrial Hygienists, A.D. Little, et. al., 1983.

17) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, October, 1985.

18) Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, June, 1990.

19) Levine - Fricke correspondence dated November 2, 1993 (08:00) with an attached report showing soil sample data for total petroleum hydrocarbons, carbon chain and semi-volatile organic compound analyses.

20) Levine - Fricke correspondence dated November 2, 1993 (14:00) with an attached report showing soil sample data for volatile organic compound and tentatively identified semi-volatile organic compound analyses.

21) Levine - Fricke correspondence dated November 3, 1993 (14:45) with an attached report showing soil sample data for volatile organic compound and tentatively identified semi-volatile organic compound analyses.

1.0 FACILITY BACKGROUND

EnviroHealth Inc. was informed that contaminated soils were encountered during soil excavation work at the Vignes Street Ramps site near Union Station Gateway at Vignes and Ramirez Streets in Los Angeles, California. Specifically, the contaminated soil was identified in the number one southbound lane of Ramirez Street near the intersection with Vignes Street. The excavation work was performed in connection with a project involving installation of approximately 400 feet of sewer line.

EnviroHealth, Inc. was also informed that historical information showed that the location was formerly a portion of a coal gasification site. The coal gasification process was introduced in California during the period from 1899 to 1902, and was primarily employed at varying sites near the Pacific coastline. The principal raw materials used in manufactured gas production were coal and residual oil from crude. The primary by-products produced during the process were lampblack, tar, and naphthalene. In recent years, studies have been conducted at such sites in order to determine the extent of soil and groundwater contamination from the process by-products and other hazardous substances. Predictably, numerous polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), metals, and inorganic compounds have been identified at or have been known to migrate from manufactured gas production sites.

On October 28, 1993, Levine - Fricke representatives collected soil samples from the Ramirez Street excavation. Those samples were analyzed for total petroleum hydrocarbons, carbon chain hydrocarbons, and semi-volatile organic compounds. Additional analyses were performed to determine the tentatively identified compounds by EPA 8270 and volatile organic compounds. The data showed that the soil contained a wide range of carbon chain and cyclo petroleum hydrocarbons. The highest concentration of carbon chain organics was in the C_8 to C_9 range. Several PAHs were also identified, including benzo(a)pyrene. The analytical reports are provided with this SHSP in Appendix C.

2.0 KEY PERSONNEL/HEALTH AND SAFETY RESPONSIBILITIES

2.1 Project Manager: To be determined.

The Project Manager is responsible for the overall performance and compliance with applicable regulations and procedural guidelines as specified in this SHSP. This individual will be responsible for the performance of all personnel at the site. With assistance from the Site Safety Officer, the Project Manager will generate written documentation regarding health and safety matters at the subject site. In the event the Project Manager becomes aware of a deficiency in implementation of the SHSP, this individual may recommend changes to the Plan, or recommend changes in the interpretation of the Plan, and shall take appropriate action by consulting with the project Site Safety Officer or Certified Industrial Hygienist (CIH). The Project Manager will also provide all Contractor senior management with written documentation of deficiencies or changes when they apply to Contractor's work. In addition, the Project Manager will maintain a record of all logs and a copy of the SHSP.

2.0 KEY PERSONNEL/HEALTH AND SAFETY RESPONSIBILITIES (CONTINUED)

2.2 Site Safety Officer:

Timothy J. Morrison, CIH, EnviroHealth, Inc.
3950 Paramount Boulevard, Suite 105
Lakewood, California 90712
Telephone: (310) 421-2025
FAX: (310) 421-6445
Pager: (310) 501-2225

The Site Safety Officer will make assessments of health and safety practices at the site, and shall be present during all work activities. The Site Safety Officer shall maintain employee illness/injury records and exposure monitoring results. This individual will conduct health and safety inspections on a daily basis during which he shall observe personnel and authorized visitors for indications of impaired health due to contaminant exposure, heat stress or other stressor; he shall evaluate whether site conditions present hazards not previously predicted; he shall inspect personal protective equipment, and verify its use, maintenance, and decontamination; and he shall evaluate site conditions and work practices in light of current applicable regulations and sound health and safety principals. The Site Safety Officer shall determine the need for additional safety equipment to be used on site. The Site Safety Officer will conduct safety meetings involving persons who are permitted to enter the site and control entry and exit, recording names and job assignments of personnel entering. The Site Safety Officer shall have the authority to cease operations if infractions of the SHSP are observed. The Site Safety Officer shall ensure that air monitoring is conducted in accordance with the schedules outlined in this Plan. As deemed appropriate, this individual shall document all work progress, keep a log of field activities, and shall be responsible for decontamination procedures, and execution of the SHSP. This individual is responsible for controlling access to the site, and shall be responsible for maintaining communications and visual contact with work parties and, as needed, obtain emergency assistance. This individual has the authority to prohibit individuals from continuing on-site work due to safety infractions, and to upgrade or downgrade the use of personal protective equipment.

2.3 Consulting Industrial Hygiene Services:

Brian P. Daly, CIH, EnviroHealth, Inc.
Pager: (310) 501-4512

The industrial hygienists selected to provide health and safety services are, or shall work under the direction of industrial hygienists who are, certified in comprehensive practice by the American Board of Industrial Hygiene. Brian P. Daly, CIH, has provided and signed this SHSP. If deemed necessary, modifications to this SHSP shall be made with the approval of the consulting CIH. The CIH shall review any information and reports provided by the Project Manager, as needed. In such case, the CIH shall advise the Project Manager concerning the resultant analytical data, interpretations, evaluations, conclusions, and recommendations, as needed.

2.0 KEY PERSONNEL/HEALTH AND SAFETY RESPONSIBILITIES (CONTINUED)

2.4 Work Parties: To be determined.

Each member of the work parties has the responsibility to read the SHSP and understand their assigned tasks and how to perform such tasks in accordance with SHSP. The work party members shall inform their supervisors of any unforeseen health and/or safety hazards, symptoms of exposure, malfunctioning equipment, changes in terrain, identification of previously unknown or unanticipated waste or contamination, or other unanticipated conditions.

The safe and efficient implementation of this SHSP requires teamwork and the cooperation of all employees. Employees who refuse or fail to follow the standards set forth in this SHSP are subject to disciplinary action, which may include discharge from the site. In all cases not specifically mentioned, employees are expected to use good judgment and shall refer all questions to appropriate supervisors and health and safety personnel.

2.5 Subcontractors: To be determined.

Individual subcontractors are responsible for assigning specific duties to their employed persons determined to be qualified for the assignments and for allocating the time, facilities, equipment and funds necessary for the successful and safe completion of the project in accordance with this SHSP. Senior management of each subcontractor shall conduct sufficient project oversight to assure that their personnel are adequately performing their assignments and that the allocated resources are sufficient to allow the project to be completed in a safe manner. Whenever deficiencies are noted, the subcontractor shall take appropriate corrective and/or disciplinary action. Each subcontractor also has the responsibility to ensure that all of their employees are properly trained in accordance with all applicable regulations.

3.0 JOB HAZARD ANALYSIS

During the predictable site operations which would include asphalt breaking, trenching, soil excavation, soil stockpiling, and soil sampling, the following job classifications will be present:

- Foreman (Site Supervisor)
- General laborer
- Backhoe operator
- Truck driver
- Geologist
- Site Safety Officer
- Management representatives of engineering firms, owner, and regulatory agencies

3.0 JOB HAZARD ANALYSIS (CONTINUED)

3.1 Primary Health Hazards

This subsection contains information concerning the primary health hazards of the chemical substances known or suspected to exist on the subject site. Each of the job classification indicated above may potentially be exposed to one or more of the health hazards listed during the course of work. The primary health hazard(s) associated with exposure to these substances are provided in the tables which appear in Appendix A. Applicable employee 8-hour permissible exposure limits and threshold limit values (TLVs) are also indicated in these tables.

Note that preparation of this SHSP was based, in part, on the chemical compounds identified in the reports included in Appendix C and the predictable by-product compounds and other hazardous materials were are known to exist on former coal gasification sites. If other chemical substances are later identified on the site, then additional health hazard summary information shall be included with this Plan as an addendum.

The applicable permissible exposure limits are defined by the State of California, Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA), in the volume identified as the California Code of Regulations (CCR), Title 8, General Industry Safety Orders, Section 5155, or other sections. The majority of permissible exposure limits represent time-weighted average values based on an 8-hour work day, 40 hour work week. Other exposure limits are expressed as short term exposure limit (STEL) values which, generally, represent limits not to be exceeded for times periods longer than 15 minutes. Certain substances have a "Skin" notation following the exposure limit which dictates that the overall exposure to a substance is enhanced by skin, mucous membrane and/or eye contact exposure. Some substances have a ceiling limit, designated by the letter "C" which shall not be exceeded at any time during a work shift.

The TLVs listed in the tables are recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). TLVs refer to airborne concentrations of substances and represent conditions during which it is believed that nearly all workers may be repeatedly exposed, eight hours per day, day after day, for a 40 year working lifetime, without adverse effect. Because of a wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort to chemical substances at concentrations equal to or below the TLV. A still smaller percentage of persons may be affected more seriously from exposures at or below the TLV due to aggravation of a pre-existing condition or by development of an occupational illness. TLVs are based on the best available information from industrial experience, from experimental human and animal studies, and when possible, from a combination of the three sources. Similar to the Cal-OSHA permissible exposure limits, TLV are expressed as 8-hour time-weighted averages (TLV-TWA), short term exposure limits (TLV-STEL), ceiling values (TLV-C), and a portion of which carry the "Skin"notation.

3.0 JOB HAZARD ANALYSIS (CONTINUED)

3.2 Physical Hazards

This subsection contains information concerning the primary safety issues posed by known or potential physical hazards on the subject site. Each of the job classification indicated above may potentially be exposed to one or more of these physical hazards listed during the course of work. Many of these hazards will appear obvious to experienced site personnel and, therefore, exhaustive explanations of each have not been provided with this SHSP. Brief descriptions of the expected primary physical hazards are provided below with personal protective equipment or other control requirements and applicable Cal-OSHA regulation citations.

3.2.1 Eye/Face Protection

Impact resistant safety glasses shall be worn as necessary to protect against flying particulates or projections. Appropriately shaded lenses shall be used to protect against injurious rays (T8, CCR, § 1516 and 3382). If appropriate, chemical goggles or faceshields shall be worn during sample collection activities to protect against splashing liquids.

3.2.2 Head Protection

Hard hats shall be worn during activities involving overhead hazards.

3.2.3 Foot Protection

During all phases of work, boots or shoes having steel reinforced toe and shank shall be worn to protect against falling objects and crushing or penetrating actions. Metatarsal guards may be worn if protection to top of foot is required. Other types of foot protection may be required for work in wet locations.

3.2.4 Heavy Equipment Operation

Seat belts shall be provided on all equipment where rollover protection is installed and employees shall be instructed in their use. Only those individuals trained in safe operation and authorized by the employer may operate such equipment. All heavy equipment operators shall provide proof of current applicable certification/license (T8, CCR, § 3653, 3660, 3664).

3.2.5 Equipment Failure

All equipment shall be inspected and tested before use. All equipment shall be maintained by qualified persons in accordance with manufacturer's specifications. Any modifications shall be made in accordance with good engineering practice. Malfunctioning equipment shall

3.0 JOB HAZARD ANALYSIS (CONTINUED)

3.2.5 Equipment Failure (Continued)

be tagged and locked until repairs can be made. Machinery and equipment components shall be designed, secured, or covered to minimize hazards caused by breakage, release of mechanical energy, or other condition which may cause injury (T8, CCR, § 3328).

3.2.6 Underground Utility Lines

The Project Manager may require contact with Underground Service Alert to define utility locations or may require the use of ground penetrating radar (or equivalent) prior to drilling or excavating in order to avoid utility line contact.

3.2.7 Excavation

All excavation work shall be performed in compliance with the regulations on excavations, trenches, and earthwork, defined in T8, CCR, Article 6 of the Construction Safety Orders.

3.2.8 Confined Space Entry

All trenches on site shall be considered confined spaces and shall entered only following the protocols identified in the Occupational Safety and Health Administration (OSHA) confined space entry regulation found in Title 29, Code of Federal Regulations, Part 1910.146.

3.2.9 Protection from Moving Machinery/Parts

Guards are required on machines, parts, and components which create hazardous revolving, reciprocating, running, shearing, punching, pressing, squeezing, drawing, cutting, rolling, mixing, or similar action, including pinch points and shear points, if not guarded by the frame or the machine or by location. All machine guards shall be appropriate for the hazards involved, secured in place, constructed of substantial material, and have surfaces free of hazardous projections; guards shall be provided with hinged or removable sections where it is necessary to change belts, make adjustments, or for the administration of lubricants. In addition, personnel shall restrain, loose clothing, jewelry, and long hair to prevent entanglement.

Machinery or equipment capable of movement shall be stopped and the power source de-energized or disengaged, and if necessary, the movable parts shall be mechanically blocked or locked to prevent inadvertent movement during cleaning servicing, or adjusting operations; if machinery must be able to move during servicing, use extension tools to protect employees from the movement; controls shall be locked in the "off" position and marked with accident prevention signs and/or tags (T8, CCR, § 3314).

3.0 JOB HAZARD ANALYSIS (CONTINUED)

3.2.10 Slips, Trips, Falls

Personnel shall attempt to minimize the potential for slips, trips, falls by providing clear footing. They shall be aware of uneven terrain and existing ground level piping and conduit, maintain good housekeeping in the area. Permanent roadways, walkways, and material storage areas shall be maintained free of dangerous depressions, obstructions, and debris (T8, CCR, § 3273).

3.2.11 Back Injury

Extreme caution shall be exercised during operations involving the manual handling or lifting of heavy objects. Employees shall be instructed to follow the "How to Lift" guidelines found in T8, CCR, § 1938 of the Construction Safety Orders.

3.2.12 Fire

Tobacco smoking shall be limited to a designated smoking area determined by the Project Manager or Site Safety Officer. Smoking shall be prohibited during fueling operations, if any. Hot work, including welding, shall not be performed in potentially flammable atmospheres without prior monitoring using a combustible gas indicator (CGI). Instrumentation used in potentially flammable atmospheres shall be rated intrinsically safe for Class I atmospheres. Equipment shall be shut down during fueling and, as appropriate, equipment shall have spark arrestors.

3.2.13 Compressed Gas Cylinders

Such vessels, if required, shall be secured and used with the manufacturer's recommended valves and fittings; unused cylinders shall be secured and capped.

3.2.14 Noise

Equipment shall be properly maintained in order to minimize noise at the source. Employees shall use hearing protection as necessary.

3.2.15 Heat Stress

At elevated ambient temperatures, workers, particularly those wearing protective clothing, may experience varying degrees of heat stress, if prudent precautions are not taken. Recognized forms of heat stress and the associated symptoms are:

- Heat Rash can be caused by continuous exposure to hot and/or humid air. The condition is characterized by a localized red skin rash and reduced sweating.

3.0 JOB HAZARD ANALYSIS (CONTINUED)

3.2.15 Heat Stress (Continued)

- Heat Cramps can be caused by profuse perspiration with inadequate fluid intake and salt replacement. This condition is characterized by muscle spasm and pain in the extremities and abdomen.

- Heat Exhaustion, a mild form of shock, can be caused by substantial physical activity in heat and profuse perspiration without adequate fluid and salt replacement. The symptoms include weak pulse; shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and fatigue.

- Heat Stroke, the most severe form of heat stress, can be fatal. The symptoms include red, hot, dry skin; body temperature of 105°F or greater; no perspiration; nausea; dizziness and confusion; strong rapid pulse; coma; and death.

4.0 RISK ASSESSMENT SUMMARY

To date, EnviroHealth, Inc. has not been provided with airborne contamination analytical data concerning current or past activities at the subject site and therefore it is not possible to assess with confidence the potential risk factors and impact on receptors, including workers and communities at or near the site, or to the environment, during the proposed work activities.

5.0 EXPOSURE MONITORING PLAN

This section of the SHSP outlines the air monitoring strategies and analytical methods which will be employed to determine potential baseline airborne concentrations of contaminants. All monitoring and air sampling shall be performed by the Site Safety Officer, the consulting CIH, or other qualified industrial hygienist. Industrial hygiene sampling techniques may also be used for perimeter monitoring in order to quantify migration of airborne contaminants to off-site locations.

All laboratory analysis of industrial hygiene samples shall be performed at laboratories that are accredited by the American Industrial Hygiene Association (AIHA) and that participate in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) program and are deemed proficient. Until such time as worker and community exposures are established with confidence, all samples collected using industrial hygiene procedures shall be analyzed on a priority turnaround time basis. At the discretion of the Site Safety Officer or consulting CIH, turnaround times may lengthened but may not exceed appropriate holding time limits. All monitoring and sampling procedures and data shall be recorded in a bound log or field notebook. All samples submitted for analysis shall be accompanied by "Chain-of-Custody" and "Request for Analysis" forms.

5.0 EXPOSURE MONITORING PLAN (CONTINUED)

5.1 Direct-Reading Instrumentation

Direct-reading instrumentation, such as a flame ionization detector (FID) or photoionization detector (PID) will be used initially and at regular intervals thereafter, to determine airborne concentrations of organic compounds. Properly equipped, the FID is capable of measuring airborne concentrations of many organic vapors between 0.1 to 1000 parts per million (ppm). The PID is capable of detecting many organic vapors between 1 and 2000 ppm. Background air monitoring data will be collected and recorded for future comparison. At a minimum, such monitoring shall be performed at the excavation edge, in the worker breathing zone, at the Exclusion Zone perimeter. Readings shall be recorded generally every 15 minutes at each of the target locations, or more frequently if deemed necessary by the Site Safety Officer or consulting CIH. All readings should be documented in the field logbook. All readings shall be compared to the action levels which appear in Appendix A.

A combustible gas indicator shall be used to determine airborne concentrations of flammable gases/vapors at grade and within the excavation. Readings shall be recorded generally every 15 minutes at each of the target locations, or more frequently if deemed necessary by the consulting CIH. All readings should be documented in the field logbook. These data shall also be compared to the action levels which appear in Appendix A.

5.2 Industrial Hygiene Sample Collection and Analysis

Samples shall be collected in employee breathing zones for the purposes of determining employee exposures to airborne selected volatile organic compounds, including but not limited to aromatics (such as benzene, ethylbenzene, toluene and xylenes) and selected polycyclic aromatic hydrocarbons (such as benzo(a)pyrene). Employee exposure determinations for each job classification shall be made as frequently as deemed necessary by the CIH.

Selection of respiratory protection for site personnel shall be made, in part, through evaluation of all industrial hygiene data recorded. If any analytical results exceed the applicable Cal-OSHA permissible exposure limits (independent of respiratory protection factors), the Project Manager shall be notified immediately.

Organic vapor samples shall be collected using personal sampling pumps calibrated to flow rates from 0.05 to 0.2 liters per minute (LPM) and equipped with charcoal sorbent tubes, or other appropriate collection media, in accordance with applicable NIOSH or OSHA methods. Analysis shall be performed by gas chromatography with mass spectrometry detection (if volatile organic hydrocarbon screening is required) or by gas chromatography with flame ionization detection in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method 1501 or equivalent. All such work shall be performed in a laboratory accredited by the American Industrial Hygiene Association (AIHA).

5.0 EXPOSURE MONITORING PLAN (CONTINUED)

5.2 Industrial Hygiene Sample Collection and Analysis (Continued)

Polycyclic aromatic hydrocarbon (PAH) samples shall be collected using personal sampling pumps calibrated to a flow rate of 2 LPM and equipped with a 37-millimeter diameter PTFE filter having a pore size of 2 micrometers (first stage) connected in series with a washed XAD-2 sorbent tube (second stage). Analysis shall be performed in an AIHA-accredited laboratory by either high pressure liquid chromatography according to NIOSH Method 5506, or by gas chromatography, with a capillary column and flame ionization detector, according to NIOSH Method 5155.

5.3 Site Perimeter Sample Collection and Analysis

As required by the consulting CIH, samples shall be collected at site perimeter locations for determination of airborne levels of selected volatile organic compounds, and PAHs. The collection and analytical methods used shall be comparable to those described above.

5.4 Miscellaneous Other Laboratory Analyses

At the discretion of the consulting CIH, air samples for determination of other analytes, including but not limited to, metals, cresol isomers, phenol, and cyanide, may be collected at varying locations. In all such instances, the sampling techniques and analytical methods shall be performed in accordance with the applicable NIOSH or other appropriate methods.

5.5 Noise

In the absence of a body of data which quantifies employee noise exposure, noise exposure determinations should be performed by an industrial hygienist using audio dosimeters or sound level meters. A sufficient number of readings shall be made in order to accurately quantify 8-hour time-weighted average and peak noise exposure levels for each employee job classification. In accordance with Cal-OSHA regulations (T8, CCR, Article 105), employees exposed to noise levels higher than 90 dBA for eight hours are required to wear hearing protection. For the purposes of this project, hearing protection shall be worn when levels exceed the "action level" of 85 dBA. As a minimum, hearing protection will be required for persons in close proximity to heavy equipment operations.

5.6 Heat Stress

If conditions require the use of personal protective equipment and/or the Site Safety Officer determines that a heat stress potential exists, then a shielded dry bulb thermometer, or equivalent, shall be used to determine heat stress potentials. Such determinations shall be made at representative site locations at least once per hour throughout the work shift(s) when heat stress potentials are expected to exist.

5.0 EXPOSURE MONITORING PLAN (CONTINUED)

5.6 Heat Stress (Continued)

Air temperature monitoring may be performed at the discretion of the Site Safety Officer during routine work activities not requiring protective clothing. The data shall be given in units of degrees centigrade (°F) which shall then be used to assign work/rest schedule regimens in accordance with the table found in Section 11.0, Standard Operating Procedures, of this Plan. As an alternative, heart rate (pulse) determinations may be made as each worker leaves his/her work area and again one minute following exit. The heart rate determinations shall be compared to the criteria found in Section 11.0 of this Plan in order to evaluate the adequacy of the work/rest regimen schedule.

5.7 Maintenance and Calibration of Monitoring Equipment

All monitoring equipment shall be maintained in accordance with the manufacturer's recommendations and shall be calibrated on a daily basis. Both the FID and PID shall be calibrated to a known concentration of hexane (in range of less than 100 ppm). The calibration of the combustible gas indicator shall be performed using a known concentration of flammable gas (in percent of the lower explosive limit). Calibration of the direct-reading field instruments shall be performed by the Site Safety Officer. Calibration of all industrial hygiene equipment will be performed immediately before and after use by the Site Safety Officer.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment and safety requirements shall be appropriate to protect against the known and potential health hazards that may be encountered during routine sampling and operation and maintenance of the remediation system. Protective equipment will be selected based on the contaminant type(s), concentration(s) in air (if any), standing liquid (if any), or other applicable matrix, and the known route(s) of entry into the human body. In situations where the type of materials, their concentrations, or exposure potentials are unknown, a subjective decision regarding the assignment of personal protective equipment will be made by the Site Safety Officer or consulting CIH. The Site Safety Officer or consulting CIH may choose to upgrade or downgrade the required personal protective equipment, depending on work area conditions, airborne concentrations of contaminants, air temperature, or other factors.

The U.S. EPA levels of protection shall be described as follows:

Level A:	The highest level of respiratory, skin and eye protection.
Level B:	The highest level of respiratory protection, but a lesser level of skin protection.
Level C:	The same level of skin protection as Level B, but a lower level of respiratory protection.
Level D:	No respiratory protection and minimal skin protection.

6.0 PERSONAL PROTECTIVE EQUIPMENT (CONTINUED)

Based on available information, the airborne concentrations of volatile organic compound contaminants which may be encountered within the Exclusion Zone(s) during the various phases of work will likely exceed the respiratory protection volatile organic compound upgrade action level of 5 ppm sustained above background, and may, at times, exceed the respiratory protection upgrade action level of 50 ppm sustained above background. Therefore, the following protocols shall be in effect:

- At a minimum, Level C personal protective equipment shall be worn by all persons entering the site Exclusion Zone(s). The type of air-purifying respirator used by such personnel shall be dictated by direct-reading air monitoring data.

- All workers and visitors shall maintain, as a minimum, Level D personal protection while outside and upwind of active Exclusion Zone(s).

- If direct-reading instruments show sustained organic airborne contaminant concentrations of greater that 250 ppm above background in employee breathing zones, then affected site personnel shall maintain Level B protection, which includes a full-face pressure-demand supplied air respirator. Downgrading to lesser protection levels may be authorized by the consulting CIH.

- All persons who have the potential for direct contact with contaminated wastes, water, soils, or equipment shall be required to wear appropriate skin protection, in addition to the respiratory protective equipment which may be required. As appropriate, skin protection may include, but not be limited to, Tyvek® polyethylene-coated spunbonded polyolefin coveralls (or equivalent), nitrile gloves, and neoprene boots. Personal protective equipment openings shall be taped to provide closure at all times.

- All workers whose predictable 8-hour time-weighted average exposure to noise equals or exceeds the Cal-OSHA action level of 85 dBA shall be provided and required to wear hearing protection during all operations where excessive sound levels are generated.

- Due to changes in airborne concentrations of contaminants, changes in terrain, moisture content in soil, heat stress potentials, or other health or safety stressor/hazard, levels of protection may be upgraded or downgraded by the consulting CIH. In such circumstances, levels of protection shall be assigned on a case by case basis. Changes of protection levels shall be documented with supporting rationale.

- Parachute harnesses and lines shall be used by all persons entering trench confined spaces.

- A minimum of one self-contained breathing apparatus shall be available for emergency procedures at all times while work is performed on site.

6.0 PERSONAL PROTECTIVE EQUIPMENT (CONTINUED)

The Level B equipment shall include:

- Boots or work shoes (with steel toe and shank)
- Boots (neoprene with steel toe and shank, if high direct contact potential exists)

- Protective gloves, inner (surgical latex, if high direct contact potential exists)
- Protective gloves, outer (nitrile, if high direct contact potential exists)
- Protective gloves, (leather, permissible if high direct contact potential does not exist)

- Coveralls (polyethylene-coated spunbonded polyolefin, if high direct contact potential exists)
- Hard hat
- Full-face pressure demand air-supplied respiratory protection

The Level C equipment shall include:

- Boots or work shoes (with steel toe and shank)
- Boots (neoprene with steel toe and shank, if high direct contact potential exists)

- Protective gloves, inner (surgical latex, if high direct contact potential exists)
- Protective gloves, outer (nitrile, if high direct contact potential exists)
- Protective gloves, (leather, permissible if high direct contact potential does not exist)

- Coveralls (polyethylene-coated spunbonded polyolefin, if high direct contact potential exists)

- Hard hat

- Safety glasses (if half-mask respirator is worn)

- Half-mask or full-face air-purifying respiratory protection with NIOSH/MSHA approved cartridges (organic vapor/HEPA)

The Level D equipment shall include:

- Boots or work shoes (with steel toe and shank)
- Hard hat
- Safety glasses

7.0 WORK ZONES AND SECURITY MEASURES

The area work zones will be clearly identified as appropriate with safety cones, flags, barrier tape or signs. The work zones shall include:

- Exclusion Zone (contaminated and active work areas)
- Contamination Reduction Zone
- Support Zone

The precise locations of the work zones, equipment storage areas, rest areas, restroom facilities, and routes of exit will be established in the field. In general, the Exclusion Zone shall be the marked area surrounding the excavation site. The Contamination Reduction Zone shall be an area at one edge of the Exclusion Zone where dry decontamination of boots/shoes can take place and where used disposable personal protective clothing can be deposited in a drum. The area of the Contamination Reduction Zone shall not be larger than is necessary to allow for the completion of these functions.

The Support Zone shall be outside of the Contamination Reduction Zone and shall be located upwind of the Exclusion Zone. A rest area shall be located in the Support Zone. A diagram showing the approximate zone locations appear as Figure 2 in Appendix B.

Spoils which will remain during off-shift hours on or near the site, shall be covered and security shall be provided to avoid exposure to the public and the environment.

8.0 DECONTAMINATION MEASURES

As part of the system to prevent or reduce the physical transfer of contaminants by people and/or equipment from the subject area, procedures will be instituted for decontaminating or disposing of all articles leaving the Exclusion Zone(s). The Site Safety Officer shall oversee all decontamination procedures and shall have the option to modify the such procedures.

8.1 All on-site personnel not having a high direct contact potential shall perform dry decontamination of footwear upon exiting the Contamination Reduction Zone. The FID or PID direct-reading instrument shall be used to verify the effectiveness of such procedures. Any article showing a FID/PID reading above background shall be decontaminated using wet methods (e.g. soap and water with a double rinse using a pressure washer).

8.2 All respirator bodies shall be decontaminated in the Support Zone with soap and warm water following use. Solvents shall not be used for that purpose. Respirators shall be allowed to air dry in a clean area.

8.0 DECONTAMINATION MEASURES (CONTINUED)

8.3 All on-site personnel having a high direct contact potential shall perform wet decontamination of footwear upon exiting the work area. Visible soil and contamination shall be removed from boots by washing with soap and water in a wading pool or other appropriate basin as each individual steps from the Contamination Reduction Zone to the Support Zone. The FID or PID direct-reading instrument shall be used to verify the effectiveness of such procedures.

8.4 All on-site personnel having a high direct contact potential shall remove outer gloves upon exiting the Exclusion Zone. These gloves may be disposed of as waste in a drum located in the Contamination Reduction Zone or they may be decontaminated using soap and water, if deemed appropriate. The FID or PID direct-reading instrument shall be used to verify the effectiveness of the decontamination procedures.

8.5 All on-site personnel having a high direct contact potential shall remove protective clothing upon exiting the Exclusion Zone. This clothing shall be containerized as waste in a drum located in the Contamination Reduction Zone.

8.6 Workers/visitors will be required to wash hands and face thoroughly with soap and water prior to leaving the site and will be instructed to remove work clothes and shower as soon as possible thereafter.

8.7 Equipment visibly contaminated during work activities in the Exclusion Zone shall be decontaminated using wet methods (e.g. portable steam generator with a spray nozzle, or equivalent). A record of such procedures showing equipment identification numbers shall be kept in a bound log. Following decontamination of equipment, wipe tests may be collected from equipment periodically, at the discretion of the Site Safety Officer, in order to verify acceptability of the decontamination procedures.

8.8 All decontamination tools, brushes, sponges and the like, and used/soiled disposable personal protective equipment shall, unless shown otherwise, be considered contaminated and so treated. Such wastes shall be stored on site in sealed DOT specification 17-H (open top) 55-gallon drums.

8.9 The spent decontamination solutions shall be collected on site in a suitable container and shall be handled as hazardous wastes pending analytical testing. The results of such analysis shall determine treatment or disposal options.

8.10 All soil sampling equipment will be thoroughly cleaned between sampling events using a dilute Alconox solution followed by double rinsing with clean water, followed by rinsing with distilled water. The sampler shall be hand dried.

9.0 GENERAL SAFE WORK PRACTICES

9.1 The subject work area will be restricted to authorized visitors and personnel. These individuals will be required to attend a tailgate safety meeting upon entering the subject area during which they will be informed of the various work zones and facilities, the health and safety hazards associated with their assigned work activities, control measures, the care and use of personal protective equipment, emergency action plans, and other pertinent information. Tailgate safety meetings will be conducted on a daily basis at the beginning of each shift. Attendance rosters will be recorded and maintained by the Project Manager or Site Safety Officer.

9.2 All persons entering the site will be required to identify themselves to the Project Manager or Site Safety Officer. Persons who have not attended a tailgate safety meeting on that day shall be required to do so with the Site Safety Officer or other authorized representative. Persons unfamiliar with the site will be informed of site hazards and instructed to avoid contact with contaminated surfaces, soils, sample materials, or related equipment, and, at the discretion of the Site Safety Officer, may be instructed to remain a minimum of 50 feet upwind of all active work areas.

9.3 All persons entering the Exclusion Zone shall do so at the Contamination Reduction Zone while wearing the appropriate personal protective equipment (as applicable).

9.4 Eating, drinking, chewing gum or tobacco, smoking or any other activity that increases the potential to ingest contaminated material is prohibited in all areas of the Exclusion and Contamination Reduction Zones.

9.5 Any skin contact with contaminated or potentially contaminated surfaces, samples or equipment shall be avoided.

9.6 Personnel shall use the "Buddy System" when performing site duties. If work activities are required to be performed in Exclusion and Contamination Reduction Zones, communication and visual contact between members shall be maintained at all times.

9.7 As appropriate, equipment will be bonded and grounded, and will be spark resistant.

9.8 A fire extinguisher shall be available for use in the subject area during all working hours. If the travel distance to the extinguisher from any point in the area is greater than 50 feet, then additional fire extinguishers shall be furnished and strategically located so that the travel distance does not exceed 50 feet.

9.9 A portable emergency eyewash station shall be strategically located in the work area. The eye wash station shall be capable of flushing both eyes simultaneously with copious amounts of water for a period of at least 15 minutes.

9.0 GENERAL SAFE WORK PRACTICES (CONTINUED)

9.10 Whenever feasible, all equipment and ground surfaces which will be in direct contact with contaminated soils shall be plasticized.

9.11 Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse contaminated materials into the air is prohibited.

9.12 All hazardous wastes, raw materials, intermediates, products, mixtures, samples, contaminated personal protective equipment, or other contaminated materials which are removed from the subject site shall be properly packaged, marked, labeled, accompanied by appropriate shipping papers and transported in accordance with all applicable Federal, State, and local regulations including, but not limited to, the California Code of Regulations, Title 22, and the Code of Federal Regulations, Title 49--Transportation.

9.13 All stockpiled soils which are believed potentially contaminated shall be covered with plastic.

9.14 At the end of each working day and/or the work being performed, site personnel shall restore the work area to the same degree of neatness as when work commenced.

9.15 Site personnel must effectively barricade excavations, street openings, etc., as required by all applicable regulations.

9.16 A first aid kit will be located on site.

9.17 A warning sign which complies with the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) shall be posted at the entrance of all work areas where one or more substances which are known to the State of California to cause cancer or reproductive harm are known or suspected to exist. That warning sign shall state:

> WARNING: This area contains a chemical known to the State of California to cause cancer or reproductive toxicity.

This requirement may be waived for all work areas in which entry is prohibited except for persons who have attended a site safety meeting during which the potential health hazard are discussed.

10.0 SANITATION

Potable (drinking quality) water, hand washing, and toilet facilities shall be provided, and shall be maintained in a safe and sanitary manner.

11.0 STANDARD OPERATING PROCEDURES

11.1 Personal Protective Equipment

All persons required to wear personal protective equipment shall be trained in the proper use, care and maintenance of this equipment, and shall have submitted to a physical examination by a licensed medical physician, and shall have been deemed physically fit to wear such equipment. Such equipment shall be inspected by the user prior to donning. Donned gloves and boots shall be taped to protective clothing to provide closure.

All persons who are required to wear respiratory protection shall perform the necessary inspections and pressure checks prior to entering the subject work zones. Workers should be aware of the potential for "breakthrough" for contaminants through respirator cartridges. Signs of breakthrough may include smelling, tasting, or experiencing respiratory irritation while wearing the respirator. Cartridges shall be changed at the end of every shift, when breakthrough occurs, or at the manufacturer's recommended schedule.

11.2 Tobacco Smoking Policy

Tobacco smoking shall be permitted only in a smoking area designated by the SSO.

11.3 Excavation Permit

A Cal-OSHA permit is required for excavations or trenches 5 feet or greater in depth, into which an employee is required to descend (T8, CCR, Article 2, Subchapter 2, § 341).

11.4 Observance of Unanticipated Hazardous Materials

In the event unanticipated hazardous material(s) are observed or symptoms of distress are experienced by workers, an investigation shall be conducted by the Site Safety Officer. This individual has the authority to collect samples to ascertain the identity of the material(s).

11.5 Symptoms of Distress

The Project Manager and Site Safety Officer shall periodically observe personnel for symptoms of distress. Indications of such adverse effect include:

- changes in complexion, skin discoloration
- signs of incoordination
- changes in demeanor, disposition, or speech patterns
- excessive salivation, pupillary response

Field personnel are required to contact the Site Safety Officer upon experiencing ill effects such as:

11.0 STANDARD OPERATING PROCEDURES (CONTINUED)

11.5 Symptoms of Distress (Continued)

- headache
- blurred vision
- irritation to the eyes, mucous membranes, respiratory tract or skin
- nausea or vomiting
- dizziness
- heat stress

11.6 Heat Stress

The Site Safety Officer shall be trained to recognize the symptoms of heat rash, heat cramps, heat exhaustion, and heat stroke. Utilizing the following procedures will help reduce the potential for workers to experience symptoms of heat stress:

- Provide plenty of liquids to replace loss of body fluids, including salt water solutions or commercial mixes such as Gatorade (registered product). Commercial mixes may be preferred by those individuals on low sodium diets.

- Experience has shown that the following rest regimen is appropriate for acclimatized field workers performing light/moderate work while wearing protective clothing outdoors. The regimen may require modification for persons not acclimatized to work in hot environments.

Adjusted Temperature (°F + (13 x % Sunshine))	**Normal Work Ensemble**	**Impermeable Ensembles**
90°F and above	After each 45 minutes of work	After each 15 minutes of work
87.5°F to 90°F	After each 60 minutes of work	After each 30 minutes of work
82.5°F to 87.5°F	After each 90 minutes of work	After each 60 minutes of work
77.5°F to 82.5°F	After each 120 minutes of work	After each 90 minutes of work
72.5°F to 77.5°F	After of each 150 minutes of work	After each 120 minutes of work

11.0 STANDARD OPERATING PROCEDURES (CONTINUED)

11.6 Heat Stress (Continued)

- In order to evaluate the adequacy of the rest regimen, heart rate (pulse) determinations shall be made involving each worker as he/she leaves the Exclusion Zone and again approximately one minute after the individual exits that zone. If the pulse exceeds 0.7 x (220 - age of the individual) or if the one-minute pulse exceeds 110 beats per minute, then that individual shall be prohibited from performing additional work on the site before seeking medical advice from an Occupational Health Physician, and the rest regimen times applicable for all other site individuals shall be reduced by 30 percent.

- Upon the recommendation of an Occupational Health Physician, core temperatures will be recorded using an ear thermometer which has the appropriate conversion capability. These data will be provided to the Physician for evaluation.

11.7 Daily Shutdown

All equipment and materials shall be parked and/or stored in a safe location designated by the Project Manager.

11.8 Stop Work Orders

The Project Managers, Site Safety Officer, or other authorized representative will stop all work at the site in the event that:

- work is performed contrary to the provisions of the specifications and/or approved work plans,

- work is performed contrary to the conditions of any applicable permit or certificate, or

- it is determined upon inspection that continuation of work is likely to endanger any person or public and/or private property.

Stop work orders may be issued by verbal command or written notice. If verbally issued to the contractor performing work on-site, the stop work order will be followed-up within 24-hours by written notice.

12.0 CONTINGENCY PLANS

In the event of an emergency, the team member that observes this condition shall give an emergency alarm (three blasts of a vehicle horn). All unnecessary communications will cease and the member giving the alarm shall notify the Project Manager and Site Safety Officer of all

12.0 CONTINGENCY PLANS (CONTINUED)

pertinent information. Actions shall be directed by the Project Manager and Site Safety Officer. Actions to be taken will be dictated by the emergency. All injured personnel shall be taken to the designated local medical facility and all uninjured personnel shall remain in a safe area. The emergency care medical facility nearest the subject site is the Good Samaritan Hospital located at 616 South Witmer Street in Los Angeles, California (refer to Thomas Brothers Guide map page number 634, coordinates D3, which appears in Appendix B as Figure 1). Directions from the site to the medical facility are as follows:

- Proceed north (right) on Vignes Street;
- Turn west (left) on East Macy Street;
- Turn south (left) on Grand Avenue;
- Turn west (right) on 5th Avenue;
- Travel six blocks west on 5th Avenue, hospital will be on the left.

All appropriate local emergency response agencies shall be notified immediately. Emergency contacts include:

• Good Samaritan Hospital	(213) 977-2121
• Fire Department	911
• Police	911
• Ambulance/Paramedics	911
• Poison Control Center (University of California)	(714) 634-5988
• National Response Center	(800) 424-8802
• Chemtrec (24 hours)	(800) 424-9300

All emergency actions as well as emergency and non-emergency accidents/injuries shall be documented by the Site Safety Officer, Project Manager, or other competent individual in accordance with all applicable regulations.

Special consideration shall be given to personnel showing signs of heat stress. The following guidelines and first and medical procedures shall be used:

- Heat Rash can be caused by continuous exposure to hot and/or humid air. The condition is characterized by a localized red skin rash and reduced sweating. The treatment includes keeping skin hygienically clean and allowing the skin to dry thoroughly after using protective clothing.

- Heat Cramps can be caused by profuse perspiration with inadequate fluid intake and salt replacement. This condition is characterized by muscle spasm and pain in the extremities and abdomen. The treatment involves removing the victim to a cool place and providing sips of salted water (one teaspoon of salt in one quart of water). Manual pressure may also be applied to the cramped muscles.

12.0 CONTINGENCY PLANS (CONTINUED)

- Heat Exhaustion, a mild form of shock, can be caused by substantial physical activity in heat and profuse perspiration without adequate fluid and salt replacement. The symptoms include weak pulse; shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and fatigue. The treatment involves removing the victim to a cool place and removing as much clothing as possible. Give sips of salted water and fan the victim continuously to remove heat by convection. Do not allow victim to become chilled. Treat for shock as necessary.

- Heat Stroke, the most severe form of heat stress, can be fatal. The symptoms include red, hot, dry skin; body temperature of 105°F or greater; no perspiration; nausea; dizziness and confusion; strong rapid pulse; coma; and death. Heat stroke is a true medical emergency. The treatment involves removing as much clothing as possible and wrapping the victim in a sheet soaked with water. Apply cold packs, if available, under arms, around neck, or on another body part where the packs can cool large surface blood vessels. If convulsions develop, prevent victim from biting tongue. Transport the victim to an emergency medical facility. If transportation to a facility is not possible, immerse the victim in an ice water bath. Do not over chill the victim once the body temperature is reduced to below 102°F.

13.0 TRAINING REQUIREMENTS

All on-site personnel (except those with temporary, short-term, and sporadic site visits, i.e. supply delivery personnel) shall have successfully completed all applicable training requirements found in the Final Rule for Hazardous Waste Operations and Emergency Response, Code of Federal Regulations, Title 29, Part 1910.120, dated March 6, 1989, as well as specific requirements found in the following regulations (as applicable).

State of California, Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA), California Code of Regulations (CCR), Title 8, General Industry Safety Orders:

- Section 5155--Airborne Contaminants
- Section 3215--Means of Egress
- Section 3203--Injury and Illness Prevention Program
- Section 3301--Use of Compressed Air or Gas
- Section 4650--Storage, Handling, and Use of Cylinders
- Section 5097--Allowable Exposure (Noise)
- Section 5141--Control of Harmful Exposure to Employees
- Section 5144--Respiratory Protective Equipment
- Section 3204--Employee Exposure and Medical Records
- Section 5192--Hazardous Waste Operations and Emergency Response
- Article 10--Personal Safety Devices and Safeguards

14.0 MEDICAL SURVEILLANCE PROGRAM

The objectives of a medical surveillance program are:

- to establish a baseline physical examination status of health to which future medical changes can be compared;
- to identify and analyze illnesses or conditions that may be aggravated by exposure to hazardous materials, physical agents, other stressors, job activities, or any combination of one or more; and
- to allow for recognition of any abnormalities at the earliest reasonable opportunity and so that corrective measures can be implemented.

All authorized personnel (except those with temporary, short-term, and sporadic site visits, i.e. supply delivery personnel) shall have successfully completed a preplacement or annual update medical examination which includes a complete medical and occupational history, physical examination, and biological monitoring including complete blood count (CBC), urine analysis, baseline serum cholinesterase, chemistry panel (SMAC), methemoglobin levels, pulmonary function testing (FEV_1 and FVC), chest x-ray, and electrocardiogram (EKG) for individuals over 35 years of age, audiometry and vision screening. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician. The examining physician shall be provided with the following information:

- a copy of the U.S. Department of Labor, OSHA, Hazardous Waste Operations and Emergency Response; Final Rule;
- a description of the employee's duties as they relate to the employee's potential exposures;
- the employee's exposure levels or anticipated exposure levels;
- a description of the personal protective equipment which shall be used by the employee; and
- information from previous medical examinations of the employee which are not readily available to the examining physician.

Each employee shall be provided with a copy of a written opinion from the examining physician containing the following:

- the physician's opinion as to whether the employee has any detected medical condition which would place the employee at an increased health risk, given anticipated exposures;
- the results of the medical examination and tests;

14.0 MEDICAL SURVEILLANCE PROGRAM (CONTINUED)

- the physician's recommended limitations, if any, concerning the employee's assigned work; and

- a statement that the employee has been informed by this physician of the results of the medical examination and any medical conditions which require further examination or treatment.

15.0 RECORDKEEPING

Records shall be kept consistent with all applicable OSHA regulations. The following records will be maintained at the offices of each subcontractor:

- Hazard Communication and Hazardous Waste Site Training
- Respiratory Protection Training (and proof of annual fit testing)
- Respirator Assignment
- Medical Surveillance
- Site Safety Inspection Reports
- Personal Monitoring Records
- Accident Logs and OSHA Logs

The following records will be maintained by the Project Manager and each subcontractor Site Manager at the site and/or the corporate offices as appropriate:

- Site Entry Log
- Visitors
- Accident Log
- SHSP (and changes)
- Sampling activities
- Chain-of-Custody forms
- Emergency Action forms
- Worker illness and/or injury reports
- Work Plan (progress and changes)
- Telephone conversations
- Site Safety Inspection Reports
- Daily Work Activities and Conditions
- Decontamination Log (as applicable)
- Tailgate Safety Meeting forms

All subcontractors shall be responsible to maintain their employee records in a manner consistent with the applicable regulations.

ENVIROHEALTH, INC.

Brian P. Daly, CIH
Technical Director

Date: 11/30/93

ATTACHMENT A

Primary Health Hazards Of Selected Potential Metal Contaminants

Analyte	Primary Health Hazard	PEL	TLV
Chromium - total (Cr)	Pulmonary sensitization, dermatitis	0.5 mg/m^3	0.5 mg/m^3
Lead - (Pb)	Weakness, insomnia, anemia, abdominal pain, tremors, abdominal pain, facial pallor, colic	0.05 mg/m^3	0.05 mg/m^3

Primary Health Hazards Of Selected Potential Volatile Organic Compounds

Analyte	Primary Health Hazard	PEL	TLV
Benzene	Eye irritant, central nervous system depressant, leukemia	1 ppm	1 ppm
Ethyl benzene	Irritant, central nervous system depressant, headaches	100 ppm	100 ppm
Methylene chloride	Eye and skin irritant, central nervous system depressant, nausea, headaches, fatigue, suspected carcinogen	50 ppm	50 ppm
Toluene	Eye and skin irritant, central nervous system depressant, lassitude, defats skin, headaches	100 ppm	100 ppm
Xylene	Eye and skin irritant, central nervous system depressant, lassitude, defats skin, headaches	100 ppm	100 ppm

Primary Health Hazards Of Selected Potential Polycyclic Aromatic Hydrocarbons

Analyte	Primary Health Hazard	PEL	TLV
Acenaphthalene	Eye, skin and mucous membrane irritant	N/L	N/L
Acenaphthene	Eye, skin and mucous membrane irritant, liver and kidney toxin	N/L	N/L
Anthracene	Eye, skin and mucous membrane irritant	N/L	N/L
Benzo (a) anthracene	Eye, skin and mucous membrane irritant, liver and kidney toxin, suspect carcinogen	N/L	N/L
Benzo (b) fluoranthene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L
Benzo (k) fluoranthene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L
Benzo (g,h,i) perlene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L
Benzo (a) pyrene	Eye, skin and mucous membrane irritant, liver and kidney toxin, suspected carcinogen	N/L	N/L
Chrysene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L
Dibenzo (a,h) anthracene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L
Dibenzofuran	Chloracne, metabolic disorders, suspect carcinogen	N/L	N/L
Fluoranthene	Eye, skin and mucous membrane irritant, cocarcinogen	N/L	N/L
Fluorene	Eye, skin and mucous membrane irritant	N/L	N/L
Indeno (1,2,3-cd) pyrene	Eye, skin and mucous membrane irritant, suspect carcinogen	N/L	N/L

Analyte	Primary Health Hazard	PEL	TLV
2-Methylphenaphthalene	Eye, skin and mucous membrane irritant	N/L	N/L
Naphthalene	Upper respiratory tract, eye and skin irritant, kidney and liver toxin	10 ppm	10 ppm
Phenanthrene	Eye, skin and mucous membrane irritant	N/L	N/L
Pyrene	Eye, skin and mucous membrane irritant, liver toxin, cocarcinogen	N/L	N/L

mg/m^3: milligrams per cubic meter of air

ppm: parts per million parts of air

PEL: Cal-OSHA 8-hour time-weighted permissible exposure limit

TLV: ACGIH 8-hour time-weighted average threshold limit value

N/L: Not Listed

Air Monitoring Action Levels

Contaminant	Monitoring Location	Monitoring Device	Action Level (Above Background)	Action
Flammable gas/vapor	In excavation/at grade	CGI	<1% LEL	Continue operations
Flammable gas/vapor	In excavation/at grade	CGI	>1% to ≤10% LEL	Continue operations using engineering controls
Flammable gas/vapor	In excavation/at grade	CGI	>10% to ≤20% LEL	Notify Cal-OSHA, continue operations using engineering controls, monitor continuously

LEL: lower explosive limit
CGI: combustible gas indicator

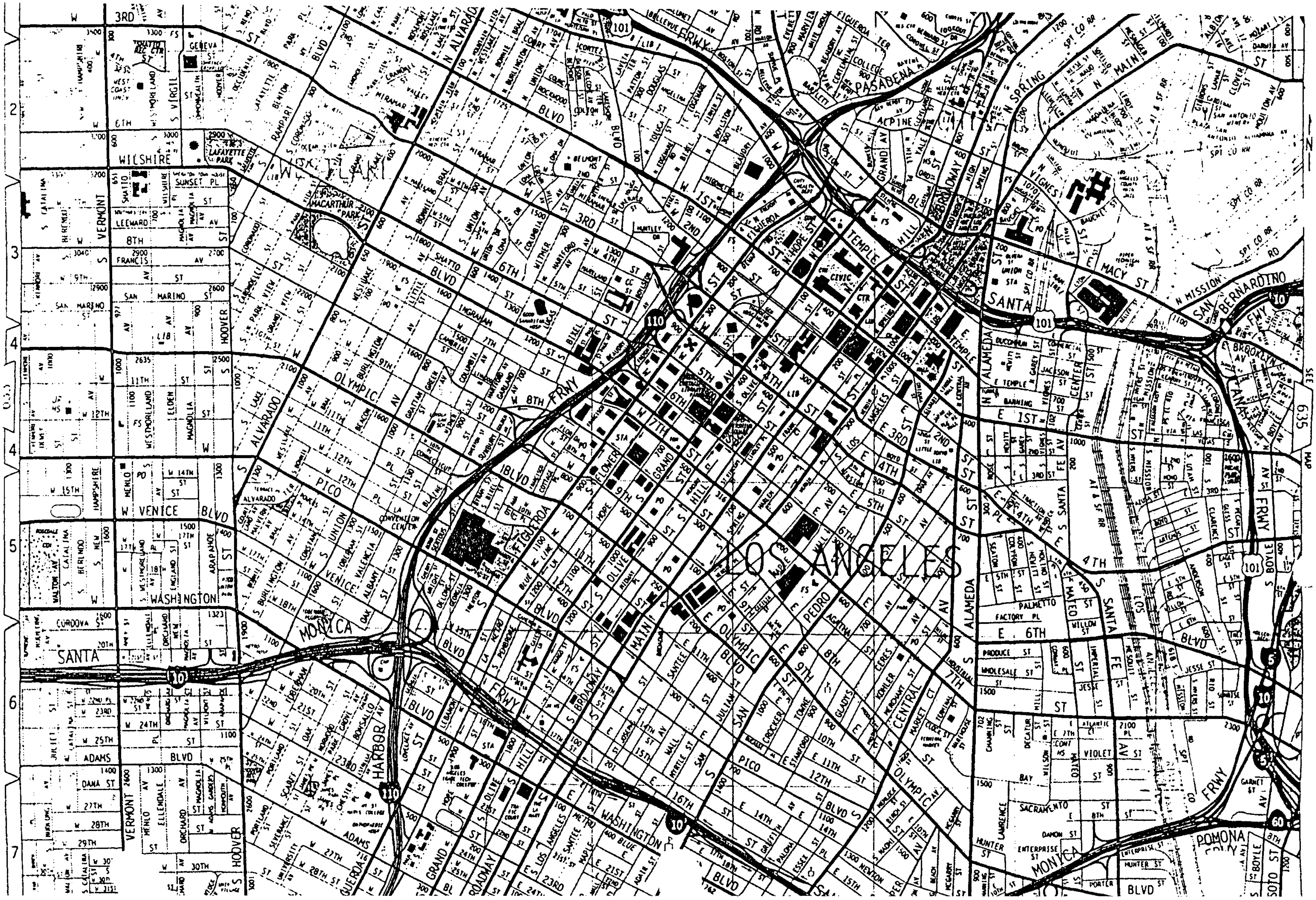
Air Monitoring Action Levels

Contaminant	Monitoring Location	Monitoring Device	Action Level (Above Background)	Action
Organic vapors	OBZ	FID/PID	<5 ppm	Continue work using Level D PPE
Organic vapors	OBZ	FID/PID	5 to 50 ppm	Upgrade to Level C PPE with half-mask APR
Organic vapors	OBZ	FID/PID	>50 to 250 ppm	Upgrade to Level C PPE with full-face APR
Organic vapors	OBZ	FID/PID	>250 ppm	Upgrade to Level B PPE
Organic vapors	Spoil pile/ excavation face	FID/PID	>50 ppm	Comply with SCAQMD Rule 1166
Organic vapors	Site perimeter	FID/PID	≤3 ppm	Continue work
Organic vapors	Site perimeter	FID/PID	>3 ppm	Cease work, use engineering controls to limit emissions

OBZ: operator breathing zone
FID: flame ionization detector
PID: photoionization detector
ppm: parts per million
PPE: personal protective equipment
APR: air-purifying respirator
SCAQMD: South Coast Air Quality Management District

ATTACHMENT B

FIGURE 1 - SITE TO HOSPITAL ROUTE MAP



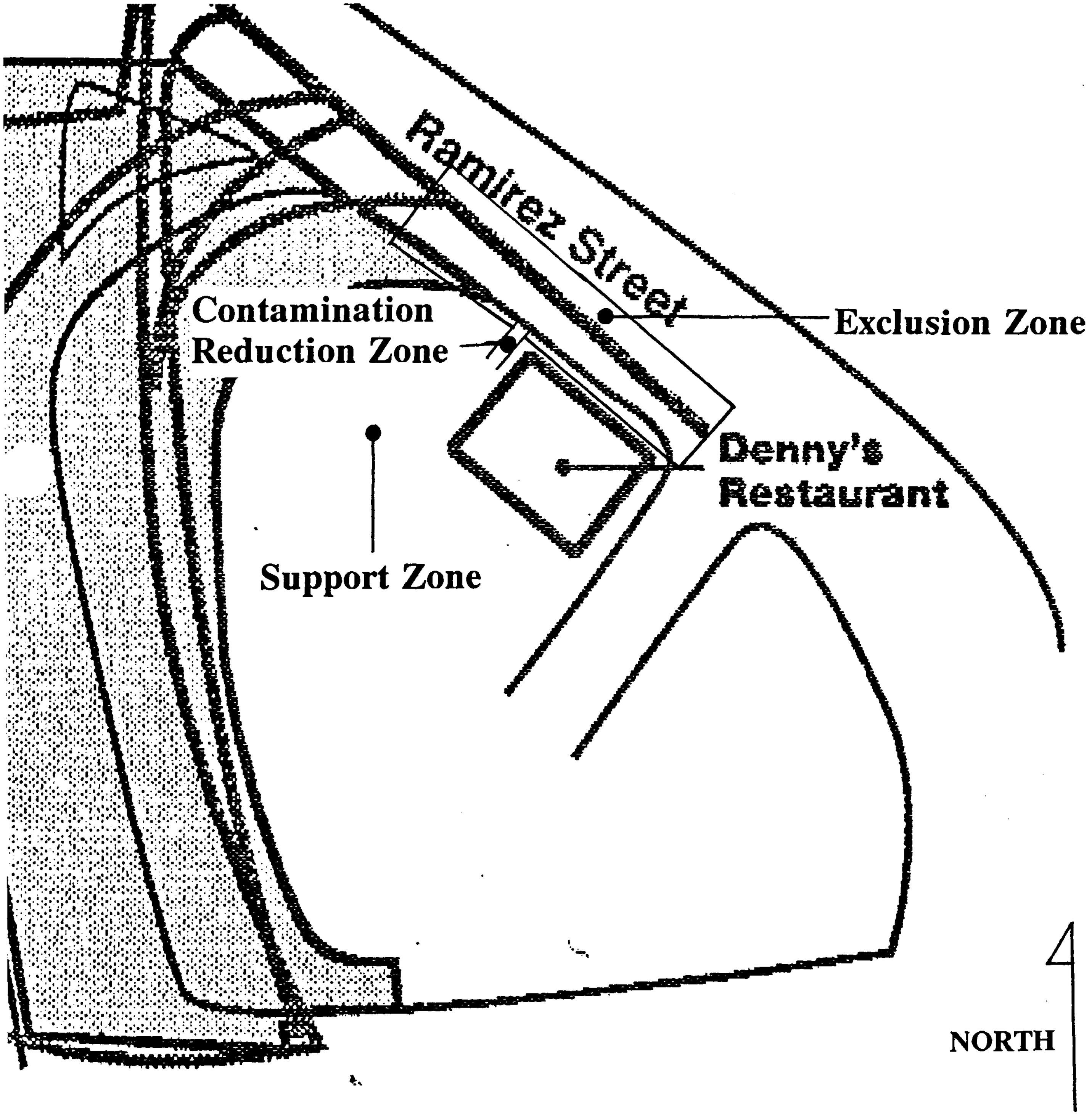


Figure 2: Ramirez Street Site Showing Exclusion, Contamination Reduction, and Support Zones

ATTACHMENT C

ATTACHMENT C1

SOIL SAMPLES

UNION STATION GATEWAY
VIGNES STREET RAMP IMPROVEMENT PROJECT AND UTILITY INSTALLATION SOIL PROFILING ACTIVITY REPORT AND ANALYTICAL RESULTS

On November 17, 1993, Dames & Moore conducted soil sampling at the Union Station Gateway (USG) Vignes Street Ramp Site in Los Angeles to evaluate whether the soils at the site would be regulated as hazardous waste under the federal [40 CFR 261] and California [22 CCR 66261] regulations. The soil, which was contained in storage bins, had been generated by nearby utility trenching activities. The soil was containerized one hour after excavation, and sampled approximately one hour later. The soil surface had been sprayed with a vapor suppressant and the lids of the bins were closed. A strong odor was noticed upon opening of the bins during sampling.

Soil was collected in 8 oz. glass jars from two soil bins from a depth of approximately one foot. Soil from each bin was subsequently mixed together and packed in glass jars to form two composite samples. These composite samples were analyzed for: Title 26 metals (TTLC extraction), semi-volatiles by EPA method 8270, PCBs by EPA method 8080, phenols by EPA method 9065, total cyanide by EPA method 9010, sulfide by EPA method 9030, total recoverable petroleum hydrocarbons (TRPH) by EPA method 418.1, pH by EPA method 9040, flash point by EPA method 1010, and fish bioassay.

One additional soil sample was collected from each bin and analyzed for volatile organics using EPA method 8240. These samples were not composited or mixed in order to reduce the loss of volatile organic compounds.

Sample labels with the following information were affixed to each jar: boring number, sample number, depth, collector name, owner, sample ID number, date and time of collection. Sealed and labeled samples were stored in the field in an ice chest and shipped under standard chain-of-custody to Lee & Ro, a California state certified laboratory. The analytical results and chain-of-custody forms are attached.

ANALYTICAL RESULTS

The soil sample from the first bin was found to have concentrations of 1,350 milligrams per kilogram (mg/kg) of TRPH, 2.36 mg/kg of phenols and a pH of 7.8. In addition, the soil sample was found to contain the semi-volatile compounds bis 2-ethylbenzylphthalate, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene at concentrations of 860, 75, 110, 72, 440, and 200 micrograms per kilogram (μg/kg), respectively. The soil sample from the second bin was found to have concentrations of 2,670 mg/kg of TRPH, 3.52 mg/kg of phenols and a pH of 7.3. This soil sample was found to contain the semi-volatile compounds pyrene (470 μg/kg), bis(2-ethylhexyl)phthalate (2,500 μg/kg), benzo(b)fluoranthene (230 μg/kg), benzo(a)amthracene (70

μg/kg), benzo(a)pyrene (350 μg/kg), acenaphthylene (80 μg/kg), fluoranthene (230 μg/kg), chrysene (240 μg/kg), benzo(k)fluoranthene (60 μg/kg), indeno(1,2,3-cd)pyrene (530 μg/kg), and benzo(g,h,i)perylene (520 μg/kg).

The soil samples from the bins did not contain measurable concentrations of PCBs, VOCs, and sulfide. Since higher than average organic vapor analyzer (OVA) readings were measured in the field and no VOCs, as analyzed per method 8240, were detected in the soil samples, gas chromatography analyses were performed on air samples collected at the bottom of the utility trenches. These analyses identified the presence of dihydrodicyclopentadiene and dicyclopentadiene. The quantification and confirmation of these compounds in soil will be performed at a later date.

Cyanide was not detected in the sample from the first bin, but was found at a concentration 3.67 mg/kg in the sample from the second bin. Both samples passed the toxicity test and the concentrations of metals detected in the samples were found to be below the respective Total Threshold Limit Concentration (TTLC). The sample from the first bin was found to have a flash point of 129 degrees Farenheight (F) , and the sample from the second bin was found to have a flash point greater than 200 degrees F.

When compared to the regulatory thresholds, the results of the analytical testing indicate that the soils would not be classified as hazardous waste.

LEE&RO
Environmental Laboratories
a division of LEE&RO Consulting Engineers, Inc.

Mailing Address:
P.O. Box 93070
City of Industry, CA 91715-3070

Tel: (818) 912-3391 • FAX: (818) 912-2015
1199 South Fullerton Road, City of Industry, CA 91748

LABORATORY ANALYSIS

3X-0786 Pg. 1 of 2

Client name : Dames & Moore
Matrix : Soil
Client ID : Job # 27721-001-131
L & R ID# : 3X-0786

Date sampled: 11/17/93
Date received: 11/18/93
Date analyzed: 11/22/93
Date reported: 11/23/93

Parmeter	Type	Results	Units	Method
Total Recoverable Petroleum Hydrocarbons	G	1,350	mg/Kg	EPA 418.1
pH	G	7.77		EPA 9040
Sulfide	G	<0.02	mg/Kg	EPA 9030
Cyanide	G	<2.0	mg/Kg	EPA 9010
Phenols	G	2.36	mg/Kg	EPA 9065
Toxicity	G	Passed		See ATL
Flash Point	G	See W.L.		EPA 1010

G=Grab sample, < =less than

POLYCHLORINATED BIPHENYLS BY EPA 8080

Parameter	Type	Results*	Units	M.D.L.
Arochlor 1016	G	<0.005	mg/Kg	0.005
Arochlor 1221	G	<0.005	mg/Kg	0.005
Arochlor 1232	G	<0.005	mg/Kg	0.005
Arochlor 1242	G	<0.005	mg/Kg	0.005
Arochlor 1248	G	<0.005	mg/Kg	0.005
Arochlor 1248	G	<0.005	mg/Kg	0.005
Arochlor 1260	G	<0.005	mg/Kg	0.005

C=Composite sample, G=Grab sample, < =less than. (*) Sample might contain Chlordane.

TITLE 26 METALS

Parameter	Type	Results	Units	TTLC	Method
Antimony	G	<1.0	mg/Kg	500	EPA 7040
Arsenic	G	<0.1	mg/Kg	500	EPA 7060
Barium	G	55.3	mg/Kg	10000	EPA 7080
Beryllium	G	0.21	mg/Kg	75	EPA 7090
Cadmium	G	<0.1	mg/Kg	500	EPA 7131
Chromium, total	G	4.22	mg/Kg	2500	EPA 7190
Cobalt	G	2.27	mg/Kg	8000	EPA 7200
Copper	G	4.88	mg/Kg	2500	EPA 7210
Lead	G	2.99	mg/Kg	1000	EPA 7420
Mercury	G	<0.2	mg/Kg	20	EPA 7471
Molybdenum	G	1.0	mg/Kg	3500	EPA 7480
Nickel	G	4.26	mg/Kg	2000	EPA 7520
Selenium	G	<0.2	mg/Kg	100	EPA 7740
Silver	G	0.76	mg/Kg	500	EPA 7760
Thallium	G	<5.0	mg/Kg	700	EPA 7840
Vanadium	G	21.7	mg/Kg	2400	EPA 7910
Zinc	G	16.7	mg/Kg	5000	EPA 7950

C=Composite sample, G=Grab sample, < =less than.

LEE & RO Environmental Laboratories

Ek Han Kwee, Ph.D.
Technical Director

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a division of LEE&RO Consulting Engineers, Inc.

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City of Industry, CA 91715-3070

Tel: (818) 912-3391 • FAX: (818) 912-2015
1199 South Fullerton Road, City of Industry, CA 91748

LABORATORY ANALYSIS

Client name : Dames & Moore
Matrix : Soil
Client ID : 1A
L & R ID# : 3X-0785

Date sampled: 11/17/93
Date received: 11/17/93
Date analyzed: 11/22/93
Date reported: 11/22/93

VOLATILE ORGANICS BY EPA 8240 (GC/MS)

Parameter	Type	Results	Units	M.D.L
Dichlordifluoromethane	G	<0.005	mg/Kg	0.005
Chloromethane	G	<0.005	mg/Kg	0.005
Vinyl chloride	G	<0.005	mg/Kg	0.005
Bromomethane	G	<0.005	mg/Kg	0.005
Chloroethane	G	<0.005	mg/Kg	0.005
Trichlorofluoromethane	G	<0.005	mg/Kg	0.005
Acetone	G	<0.05	mg/Kg	0.05
1,1-Dichloroethene	G	<0.002	mg/Kg	0.002
Methylene chloride	G	<0.002	mg/Kg	0.002
Carbon disulfide	G	<0.002	mg/Kg	0.002
Acrylonitrile	G	<0.05	mg/Kg	0.05
trans-1,2-Dichloroethene	G	<0.002	mg/Kg	0.002
1,1-Dichloroethane	G	<0.002	mg/Kg	0.002
Vinyl acetate	G	<0.05	mg/Kg	0.05
2-Butanone	G	<0.01	mg/Kg	0.01
Chloroform	G	<0.002	mg/Kg	0.002
1,1,1-Trichloroethane	G	<0.002	mg/Kg	0.002
Carbon tetrachloride	G	<0.002	mg/Kg	0.002
1,2-Dichloroethane	G	<0.002	mg/Kg	0.002
Benzene	G	<0.002	mg/Kg	0.002
Trichloroethene	G	<0.002	mg/Kg	0.002
1,2-Dichloropropane	G	<0.002	mg/Kg	0.002

VOLATILE ORGANICS BY EPA 8240 CONTINUED

Parameter	Type	Results	Units	M.D.L
Bromodichloromethane	G	<0.002	mg/Kg	0.002
4-Methyl-2-pentanone	G	<0.01	mg/Kg	0.01
trans-1,3-Dichloropropene	G	<0.002	mg/Kg	0.002
cis-1,3-Dichloropropene	G	<0.002	mg/Kg	0.002
Toluene	G	<0.002	mg/Kg	0.002
2-Hexanone	G	<0.01	mg/Kg	0.01
1,1,2-Trichloroethane	G	<0.002	mg/Kg	0.002
Tetrachloroethene	G	<0.002	mg/Kg	0.002
Dibromochloromethane	G	<0.002	mg/Kg	0.002
Chlorobenzene	G	<0.002	mg/Kg	0.002
Ethylbenzene	G	<0.002	mg/Kg	0.002
p+m-Xylene	G	<0.002	mg/Kg	0.002
o-Xylene	G	<0.002	mg/Kg	0.002
Styrene	G	<0.002	mg/Kg	0.002
Bromoform	G	<0.002	mg/Kg	0.002
1,1,2,2-Tetrachloroethane	G	<0.002	mg/Kg	0.002
1,3-Dichlorobenzene	G	<0.002	mg/Kg	0.002
1,4-Dichlorobenzene	G	<0.002	mg/Kg	0.002
1,2-Dichlorobenzene	G	<0.002	mg/Kg	0.002

G=Grab sample, < =less than, M.D.L = Method detection limit,

LEE & RO Environmental Laboratories

Ek Han Kwee, Ph.D.

Technical Director

Weck Laboratories, Inc.
Analytical & Environmental Services

Client: Lee & Ro Environmental Laboratories
1199 South Fullerton Road
Industry, CA 91748

Report Date: November 22, 1993

Received Date: November 18, 1993
Thursday 01:02P/TN

Attn.: Ek Han Kwee (818) 912-3391 FAX (818) 912-2015 /

Project Name:
Project #
Location:
Collected By:
Purchase Order #50457 48 Hour RUSH

Certificate of Analysis

Lab #9317645 Client Sample ID: 3X-0786 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Flash Point (Closed Cup)	> 200	Degrees F	EPA 1010		11/19/93
Note: No flash up to 200 F					
N-Nitroso-dimethylamine	< 100	ug/kg	EPA 8270	100	11/19/93
Phenol	< 400	ug/kg	EPA 8270	400	11/19/93
2-Chlorophenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
1,4-Dichlorobenzene	< 80	ug/kg	EPA 8270	80	11/19/93
1,2-Dichlorobenzene	< 40	ug/kg	EPA 8270	40	11/19/93
bis(2-Chloroisopropyl) Ether	< 140	ug/kg	EPA 8270	140	11/19/93
N-Nitroso-Di-n-Propylamine	< 80	ug/kg	EPA 8270	80	11/19/93
Nitrobenzene	< 500	ug/kg	EPA 8270	500	11/19/93
2-Nitrophenol	< 2000	ug/kg	EPA 8270	2000	11/19/93
bis(2-Chloroethoxy)Methane	< 300	ug/kg	EPA 8270	300	11/19/93
Benzoic Acid	< 2000	ug/kg	EPA 8270	2000	11/19/93
Naphthalene	< 40	ug/kg	EPA 8270	40	11/19/93
Hexachlorobutadiene	< 60	ug/kg	EPA 8270	60	11/19/93
2-Methylnapthalene	< 60	ug/kg	EPA 8270	60	11/19/93
2,4,6-Trichlorophenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
2-Chloronaphthalene	< 40	ug/kg	EPA 8270	40	11/19/93
Dimethyl Phthalate	< 40	ug/kg	EPA 8270	40	11/19/93
2,6-Dinitrotoluene	< 300	ug/kg	EPA 8270	300	11/19/93
Acenaphthene	< 60	ug/kg	EPA 8270	60	11/19/93
4-Nitrophenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
2,4-Dinitrotoluene	< 200	ug/kg	EPA 8270	200	11/19/93
Fluorene	< 40	ug/kg	EPA 8270	40	11/19/93
4-Nitroaniline	< 4000	ug/kg	EPA 8270	4000	11/19/93
N-Nitrosodiphenylamine	< 60	ug/kg	EPA 8270	60	11/19/93
4-Bromophenyl-phenylether	< 100	ug/kg	EPA 8270	100	11/19/93
Hexachlorobenzene	< 80	ug/kg	EPA 8270	80	11/19/93
Pentachlorophenol	< 2000	ug/kg	EPA 8270	2000	11/19/93
Phenanthrene	< 40	ug/kg	EPA 8270	40	11/19/93
Delta-BHC	< 40	ug/kg	EPA 8270	40	11/19/93

Client: Lee & Ro Environmental Laboratories

Project Name: Project #
Location: Collected By:
Purchase Order #50457 48 Hour RUSH
Report Date: November 22, 1993

Lab #9317645 Client Sample ID: 3X-0786 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Di-n-Buthylphthalate	< 40	ug/kg	EPA 8270	40	11/19/93
Heptachlor Epoxide	< 200	ug/kg	EPA 8270	200	11/19/93
Pyrene	70	ug/kg	EPA 8270	60	11/19/93
4,4'-DDE	< 100	ug/kg	EPA 8270	100	11/19/93
Endrin	< 120	ug/kg	EPA 8270	120	11/19/93
4,4-DDD	< 80	ug/kg	EPA 8270	80	11/19/93
Butylbenzylphthalate	< 60	ug/kg	EPA 8270	60	11/19/93
Endosulfan Sulfate	< 600	ug/kg	EPA 8270	600	11/19/93
3,3-Dichlorobenzidine	< 300	ug/kg	EPA 8270	300	11/19/93
bis(2-ethylhexyl) Phthalate	860	ug/kg	EPA 8270	200	11/19/93
Benzo(b)Fluoranthene	75	ug/kg	EPA 8270	40	11/19/93
Benzo(a)Pyrene	110	ug/kg	EPA 8270	100	11/19/93
Dibenzo(a,h)Anthracene	< 4000	ug/kg	EPA 8270	4000	11/19/93
Aniline	< 400	ug/kg	EPA 8270	400	11/19/93
bis(2-Chloroethyl) Ether	< 40	ug/kg	EPA 8270	40	11/19/93
1,3-Dichlorobenzene	< 40	ug/kg	EPA 8270	40	11/19/93
Benzyl Alcohol	< 20000	ug/kg	EPA 8270	20000	11/19/93
2-Methylphenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
4-Methylphenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
Hexachloroethane	< 60	ug/kg	EPA 8270	60	11/19/93
Isophorone	< 40	ug/kg	EPA 8270	40	11/19/93
2,4-Dimethylphenol	< 2000	ug/kg	EPA 8270	2000	11/19/93
2,4-Dichlorophenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
1,2,4-Trichlorobenzene	< 40	ug/kg	EPA 8270	40	11/19/93
4-Chloroaniline	< 200	ug/kg	EPA 8270	200	11/19/93
4-Chloro-3-Methylphenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
Hexachlorocyclopentadiene	< 2000	ug/kg	EPA 8270	2000	11/19/93
2,4,5-Trichlorophenol	< 1000	ug/kg	EPA 8270	1000	11/19/93
2-Nitroaniline	< 200	ug/kg	EPA 8270	200	11/19/93
Acenaphthylene	< 40	ug/kg	EPA 8270	40	11/19/93
3-Nitroaniline	< 600	ug/kg	EPA 8270	600	11/19/93
2,4-Dinitrophenol	< 20000	ug/kg	EPA 8270	20000	11/19/93
Dibenzofuran	< 80	ug/kg	EPA 8270	80	11/19/93
Diethylphthalate	< 40	ug/kg	EPA 8270	40	11/19/93
4-Chlorophenyl-phenylether	< 60	ug/kg	EPA 8270	60	11/19/93
4,6-Dinitro-2-Methylphenol	< 2000	ug/kg	EPA 8270	2000	11/19/93
Azobenzene	< 40	ug/kg	EPA 8270	40	11/19/93
Alpha-BHC	< 1000	ug/kg	EPA 8270	1000	11/19/93
Beta-BHC	< 120	ug/kg	EPA 8270	120	11/19/93
Gamma-BHC (Lindane)	< 120	ug/kg	EPA 8270	120	11/19/93
Anthracene	< 60	ug/kg	EPA 8270	60	11/19/93
Heptachlor	< 80	ug/kg	EPA 8270	80	11/19/93

Client: Lee & Ro Environmental Laboratories

Project Name:
Project #
Location:
Collected By:
Purchase Order #50457 48 Hour RUSH
Report Date: November 22, 1993

Lab #9317645 Client Sample ID: 3X-0786 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Aldrin	< 140	ug/kg	EPA 8270	140	11/19/93
Fluoranthene	< 60	ug/kg	EPA 8270	60	11/19/93
Endosulfan I	< 1000	ug/kg	EPA 8270	1000	11/19/93
Dieldrin	< 140	ug/kg	EPA 8270	140	11/19/93
Endosulfan II	< 1000	ug/kg	EPA 8270	1000	11/19/93
Endrin Aldehyde	< 200	ug/kg	EPA 8270	200	11/19/93
4,4'-DDT	< 100	ug/kg	EPA 8270	100	11/19/93
Benzo(a)Anthracene	< 80	ug/kg	EPA 8270	80	11/19/93
Chrysene	< 80	ug/kg	EPA 8270	80	11/19/93
Di-n-Octyl Phthalate	< 300	ug/kg	EPA 8270	300	11/19/93
Benzo(k)Fluoranthene	72	ug/kg	EPA 8270	40	11/19/93
Indeno(1,2,3-cd)Pyrene	440	ug/kg	EPA 8270	200	11/19/93
Benzo(g,h,i)Perylene	200	ug/kg	EPA 8270	200	11/19/93
3-Methylphenol	< 1000	ug/kg	EPA 8270	1000	11/19/93

Authorized Signature

LABORATORY REPORT

Aquatic
Testing
Laboratories

"dedicated to providing quality aquatic toxicity testing"

2810 Bunsen Ave., Unit A
Ventura, CA 93003
(805) 650-0546 FAX (805) 650-0756

CA DOHS ELAP Cert. No.: 1775

Date: November 24, 1993

Client: Lee & Ro Environmental
1199 S. Fullerton
City of Industry, CA 91748

Laboratory No.: A-93111901-001/002

Date Sampled: 11/17/93
Date Received: 11/19/93

Sample I.D.: 3X-0786, 3X-0787

Sample Control:

The samples were received by ATL with the chain of custody record attached.

Sample Analysis:

The following analyses were performed on your sample:
CCR Title 22- Fathead Minnow Hazardous Waste Screen Bioassay.

Attached are the test data generated from the analysis of your sample.

Result Summary:

ATL Lab No.	Sample ID.	Results
A-93111901-001	3X-0786	LC50 > 750 mg/l
A-93111901-002	3X-0787	LC50 > 750 mg/l

Quality Control: Reviewed and approved by:

Joseph A. LeMay

Joseph A. LeMay, Laboratory Director

Thank you for your business.

FATHEAD MINNOW HAZARDOUS WASTE SCREEN BIOASSAY

No.: A9311901-001

ient/ID: Lee & Ro 3X786

TEST SUMMARY

Species: Pimephales promelas.
Fish length (mm): av: 29; min: 28; max: 31.
Fish weight (gm): av: .37; min: .30; max: .47.
Test Protocol: Calif. F&G/DOHS 1988.
Test type: Static.
Test chamber volume 10 l.
Mixing method: Sonication/mechanical shaking.

Source: Thomas Fish.
Date fish received: 10-20-93.
Regulations: CCR Title 22.
Endpoints: LC50 at 96 hrs.
Temperature: 20 +/- 2°C.
Number of replicates: 2.
Number of fish per chamber: 10.

Acclimation/dilution water: Reconstituted soft water (hardness 40-48 mg/l $CaCO_3$).
Aeration: Single bubble through narrow-bore tube.
QA/QC Batch No.: RT931022.

TEST DATA

	INITIAL			24 Hr				48 Hr				72 Hr				96 Hr			
DATE/TIME	11-20-93 1040			11-21-93 1035				11-22-93 1050				11-23-93 1115				11-24-93 1030			
ANALYST:	Rm			Rm				Lm				Rm				Rm			
	°C	DO	pH	°C	DO	pH	#D	°C	DO	pH	#D	°C	DO	pH	#D	°C	DO	pH	#D
CONT A	19.2	7.2	7.9	19.1	7.2	8.0	0	19.8	7.8	8.1	0	19.9	7.4	7.9	0	19.1	7.2	7.9	0
CONT B	19.0	7.8	7.9	19.1	7.6	7.9	0	19.7	7.8	8.1	0	19.8	7.8	7.9	0	19.1	7.4	7.9	0
400 A	19.3	8.8	8.2	19.9	6.1	7.7	0	20.4	5.8	7.6	0	20.5	5.4	7.7	0	19.9	5.0	7.6	0
400 B	19.1	8.8	8.2	20.0	6.6	7.7	0	20.5	6.8	7.6	0	20.5	6.3	7.7	0	20.0	5.6	7.6	0
750 A	19.1	8.8	8.2	20.0	6.1	7.6	0	20.4	5.9	7.6	0	20.5	5.4	7.7	0	20.0	4.8	7.5	0
750 B	19.0	8.8	8.2	20.0	6.8	7.6	0	20.4	6.8	7.6	0	20.4	6.4	7.7	0	19.9	5.6	7.6	0

Comments:
"A" replicates were mixed by sonication.
"B" replicates were mixed by mechanical aggitation on a shaker table

ADDITIONAL WATER CHEMISTRIES

CONTROL		
	Alk.	Hard
0 hr	31	41
96hr	33	41

HIGH CONC.		
	Alk.	Hard
0 hr	31	41
96hr	33	40

RESULTS

Total Number Dead	
CONTROL	0 /20
400 mg/l	0 /20
750 mg/l	0 /20

X	LC50 >750 mg/l (<40% dead in 750 mg/l conc.)
	400 <LC50< 750 (≥40% dead in 750 & ≤60% in 400) *** Definitive Test Required ***
	LC50 <400 mg/l (>60% dead in 400 mg/l conc.)

LEE&RO
Environmental Laboratories
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City of Industry, CA 91715-3070

Tel: (818) 912-3391 • FAX: (818) 912-2015
1199 South Fullerton Road, City of Industry, CA 91748

LABORATORY ANALYSIS

Client name : Dames & Moore
Matrix : Soil
Client ID : Job # 27721-001-131
L & R ID# : 3X-0787

Date sampled: 11/17/93
Date received: 11/18/93
Date analyzed: 11/22/93
Date reported: 11/23/93

Parameter	Type	Results	Units	Method
Total Recoverable Petroleum Hydrocarabons	G	2,670	mg/Kg	2 EPA 418.1
pH	G	7.30		EPA 9040
Sulfide	G	<0.02	mg/Kg	EPA 9030
Cyanide	G	3.67	mg/Kg	EPA 9010
Phenols	G	3.52	mg/Kg	EPA 9065
Toxicity	G	Passed		See ATL
Flash Point	G	See W.L.		EPA 1010

G=Grab sample, < =less than

POLYCHLORINATED BIPHENYLS BY EPA 8080

Parameter	Type	Results*	Units	M.D.L.
Arochlor 1016	G	<0.005	mg/Kg	0.005
Arochlor 1221	G	<0.005	mg/Kg	0.005
Arochlor 1232	G	<0.005	mg/Kg	0.005
Arochlor 1242	G	<0.005	mg/Kg	0.005
Arochlor 1248	G	<0.005	mg/Kg	0.005
Arochlor 1248	G	<0.005	mg/Kg	0.005
Arochlor 1260	G	<0.005	mg/Kg	0.005

C=Composite sample, G=Grab sample, < =less than. (*) Sample might contain Chlordane.

TITLE 26 METALS

Parameter	Type	Results	Units	TTLC	Method
Antimony	G	<1.0	mg/Kg	500	EPA 7040
Arsenic	G	<0.1	mg/Kg	500	EPA 7060
Barium	G	133	mg/Kg	10000	EPA 7080
Beryllium	G	0.34	mg/Kg	75	EPA 7090
Cadmium	G	0.14	mg/Kg	500	EPA 7131
Chromium, total	G	7.70	mg/Kg	2500	EPA 7190
Cobalt	G	5.5	mg/Kg	8000	EPA 7200
Copper	G	10.4	mg/Kg	2500	EPA 7210
Lead	G	12.6	mg/Kg	1000	EPA 7420
Mercury	G	<0.2	mg/Kg	20	EPA 7471
Molybdenum	G	2.38	mg/Kg	3500	EPA 7480
Nickel	G	8.50	mg/Kg	2000	EPA 7520
Selenium	G	<0.2	mg/Kg	100	EPA 7740
Silver	G	0.63	mg/Kg	500	EPA 7760
Thallium	G	<5.0	mg/Kg	700	EPA 7840
Vanadium	G	32.6	mg/Kg	2400	EPA 7910
Zinc	G	29.8	mg/Kg	5000	EPA 7950

C=Composite sample, G=Grab sample, <=less than.

LEE & RO Environmental Laboratories

Ek Han Kwee, Ph.D.
Technical Director

LEE&RO
Environmental Laboratories
a division of LEE&RO Consulting Engineers, Inc.

Mailing Address:
P.O. Box 93070
City of Industry, CA 91715-3070

Tel: (818) 912-3391 • FAX: (818) 912-2015
1199 South Fullerton Road, City of Industry, CA 91748

LABORATORY ANALYSIS

Client name : Dames & Moore
Matrix : Soil
Client ID : 1B
L & R ID# : 3X-0788

Date sampled: 11/17/93
Date received: 11/17/93
Date analyzed: 11/22/93
Date reported: 11/22/93

VOLATILE ORGANICS BY EPA 8240 (GC/MS)

Parameter	Type	Results	Units	M.D.L
Dichlordifluoromethane	G	<0.005	mg/Kg	0.005
Chloromethane	G	<0.005	mg/Kg	0.005
Vinyl chloride	G	<0.005	mg/Kg	0.005
Bromomethane	G	<0.005	mg/Kg	0.005
Chloroethane	G	<0.005	mg/Kg	0.005
Trichlorofluoromethane	G	<0.005	mg/Kg	0.005
Acetone	G	<0.05	mg/Kg	0.05
1,1-Dichloroethene	G	<0.002	mg/Kg	0.002
Methylene chloride	G	<0.002	mg/Kg	0.002
Carbon disulfide	G	<0.002	mg/Kg	0.002
Acrylonitrile	G	<0.05	mg/Kg	0.05
trans-1,2-Dichloroethene	G	<0.002	mg/Kg	0.002
1,1-Dichloroethane	G	<0.002	mg/Kg	0.002
Vinyl acetate	G	<0.05	mg/Kg	0.05
2-Butanone	G	<0.01	mg/Kg	0.01
Chloroform	G	<0.002	mg/Kg	0.002
1,1,1-Trichloroethane	G	<0.002	mg/Kg	0.002
Carbon tetrachloride	G	<0.002	mg/Kg	0.002
1,2-Dichloroethane	G	<0.002	mg/Kg	0.002
Benzene	G	<0.002	mg/Kg	0.002
Trichloroethene	G	<0.002	mg/Kg	0.002
1,2-Dichloropropane	G	<0.002	mg/Kg	0.002

VOLATILE ORGANICS BY EPA 8240 CONTINUED

Parameter	Type	Results	Units	M.D.L
Bromodichloromethane	G	<0.002	mg/Kg	0.002
4-Methyl-2-pentanone	G	<0.01	mg/Kg	0.01
trans-1,3-Dichloropropene	G	<0.002	mg/Kg	0.002
cis-1,3-Dichloropropene	G	<0.002	mg/Kg	0.002
Toluene	G	<0.002	mg/Kg	0.002
2-Hexanone	G	<0.01	mg/Kg	0.01
1,1,2-Trichloroethane	G	<0.002	mg/Kg	0.002
Tetrachloroethene	G	<0.002	mg/Kg	0.002
Dibromochloromethane	G	<0.002	mg/Kg	0.002
Chlorobenzene	G	<0.002	mg/Kg	0.002
Ethylbenzene	G	<0.002	mg/Kg	0.002
p+m-Xylene	G	<0.002	mg/Kg	0.002
o-Xylene	G	<0.002	mg/Kg	0.002
Styrene	G	<0.002	mg/Kg	0.002
Bromoform	G	<0.002	mg/Kg	0.002
1,1,2,2-Tetrachloroethane	G	<0.002	mg/Kg	0.002
1,3-Dichlorobenzene	G	<0.002	mg/Kg	0.002
1,4-Dichlorobenzene	G	<0.002	mg/Kg	0.002
1,2-Dichlorobenzene	G	<0.002	mg/Kg	0.002

G=Grab sample, < =less than, M.D.L = Method detection limit,

LEE & RO Environmental Laboratories

Ek Han Kwee, Ph.D.

Technical Director

Weck Laboratories, Inc.
Analytical & Environmental Services

Client: Lee & Ro Environmental Laboratories
1199 South Fullerton Road
Industry, CA 91748

Report Date: November 22, 1993

Received Date: November 18, 1993
Thursday 01:02P/TN

Attn.: Ek Han Kwee (818) 912-3391 FAX (818) 912-2015 ⁄

Project Name: Project #
Location: Collected By:
Purchase Order #50457 48 Hour RUSH

Certificate of Analysis

Lab #9317646 Client Sample ID: 3X-0787 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Flash Point (Closed Cup)	129	Degrees F	EPA 1010		11/19/93
N-Nitroso-dimethylamine	< 150	ug/kg	EPA 8270	150	11/19/93
Phenol	< 600	ug/kg	EPA 8270	600	11/19/93
2-Chlorophenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
1,4-Dichlorobenzene	< 120	ug/kg	EPA 8270	120	11/19/93
1,2-Dichlorobenzene	< 60	ug/kg	EPA 8270	60	11/19/93
bis(2-Chloroisopropyl) Ether	< 210	ug/kg	EPA 8270	210	11/19/93
N-Nitroso-Di-n-Propylamine	< 120	ug/kg	EPA 8270	120	11/19/93
Nitrobenzene	< 750	ug/kg	EPA 8270	750	11/19/93
2-Nitrophenol	< 3000	ug/kg	EPA 8270	3000	11/19/93
bis(2-Chloroethoxy)Methane	< 450	ug/kg	EPA 8270	450	11/19/93
Benzoic Acid	< 3000	ug/kg	EPA 8270	3000	11/19/93
Naphthalene	< 60	ug/kg	EPA 8270	60	11/19/93
Hexachlorobutadiene	< 90	ug/kg	EPA 8270	90	11/19/93
2-Methylnapthalene	< 90	ug/kg	EPA 8270	90	11/19/93
2,4,6-Trichlorophenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
2-Chloronaphthalene	< 60	ug/kg	EPA 8270	60	11/19/93
Dimethyl Phthalate	< 60	ug/kg	EPA 8270	60	11/19/93
2,6-Dinitrotoluene	< 450	ug/kg	EPA 8270	450	11/19/93
Acenaphthene	< 90	ug/kg	EPA 8270	90	11/19/93
4-Nitrophenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
2,4-Dinitrotoluene	< 300	ug/kg	EPA 8270	300	11/19/93
Fluorene	< 60	ug/kg	EPA 8270	60	11/19/93
4-Nitroaniline	< 6000	ug/kg	EPA 8270	6000	11/19/93
N-Nitrosodiphenylamine	< 90	ug/kg	EPA 8270	90	11/19/93
4-Bromophenyl-phenylether	< 150	ug/kg	EPA 8270	150	11/19/93
Hexachlorobenzene	< 120	ug/kg	EPA 8270	120	11/19/93
Pentachlorophenol	< 3000	ug/kg	EPA 8270	3000	11/19/93
Phenanthrene	< 60	ug/kg	EPA 8270	60	11/19/93
Delta-BHC	< 60	ug/kg	EPA 8270	60	11/19/93
Di-n-Buthylphthalate	< 60	ug/kg	EPA 8270	60	11/19/93

Client: Lee & Ro Environmental Laboratories

Project Name: **Project #**
Location: **Collected By:**
Purchase Order #50457 48 Hour RUSH
Report Date: November 22, 1993

Lab #9317646 Client Sample ID: 3X-0787 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Heptachlor Epoxide	< 300	ug/kg	EPA 8270	300	11/19/93
Pyrene	470	ug/kg	EPA 8270	90	11/19/93
4,4'-DDE	< 150	ug/kg	EPA 8270	150	11/19/93
Endrin	< 180	ug/kg	EPA 8270	180	11/19/93
4,4-DDD	< 120	ug/kg	EPA 8270	120	11/19/93
Butylbenzylphthalate	< 90	ug/kg	EPA 8270	90	11/19/93
Endosulfan Sulfate	< 900	ug/kg	EPA 8270	900	11/19/93
3,3-Dichlorobenzidine	< 450	ug/kg	EPA 8270	450	11/19/93
bis(2-ethylhexyl) Phthalate	2500	ug/kg	EPA 8270	300	11/19/93
Benzo(b)Fluoranthene	230	ug/kg	EPA 8270	150	11/19/93
Benzo(a)Pyrene	350	ug/kg	EPA 8270	300	11/19/93
Dibenzo(a,h)Anthracene	< 6000	ug/kg	EPA 8270	6000	11/19/93
Aniline	< 600	ug/kg	EPA 8270	600	11/19/93
bis(2-Chloroethyl) Ether	< 60	ug/kg	EPA 8270	60	11/19/93
1,3-Dichlorobenzene	< 60	ug/kg	EPA 8270	60	11/19/93
Benzyl Alcohol	< 30000	ug/kg	EPA 8270	30000	11/19/93
2-Methylphenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
4-Methylphenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
Hexachloroethane	< 90	ug/kg	EPA 8270	90	11/19/93
Isophorone	< 60	ug/kg	EPA 8270	60	11/19/93
2,4-Dimethylphenol	< 3000	ug/kg	EPA 8270	3000	11/19/93
2,4-Dichlorophenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
1,2,4-Trichlorobenzene	< 60	ug/kg	EPA 8270	60	11/19/93
4-Chloroaniline	< 300	ug/kg	EPA 8270	300	11/19/93
4-Chloro-3-Methylphenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
Hexachlorocyclopentadiene	< 3000	ug/kg	EPA 8270	3000	11/19/93
2,4,5-Trichlorophenol	< 1500	ug/kg	EPA 8270	1500	11/19/93
2-Nitroaniline	< 300	ug/kg	EPA 8270	300	11/19/93
Acenaphthylene	80	ug/kg	EPA 8270	60	11/19/93
3-Nitroaniline	< 900	ug/kg	EPA 8270	900	11/19/93
2,4-Dinitrophenol	< 30000	ug/kg	EPA 8270	30000	11/19/93
Dibenzofuran	< 120	ug/kg	EPA 8270	120	11/19/93
Diethylphthalate	< 60	ug/kg	EPA 8270	60	11/19/93
4-Chlorophenyl-phenylether	< 90	ug/kg	EPA 8270	90	11/19/93
4,6-Dinitro-2-Methylphenol	< 3000	ug/kg	EPA 8270	3000	11/19/93
Azobenzene	< 60	ug/kg	EPA 8270	60	11/19/93
Alpha-BHC	< 1500	ug/kg	EPA 8270	1500	11/19/93
Beta-BHC	< 180	ug/kg	EPA 8270	180	11/19/93
Gamma-BHC (Lindane)	< 180	ug/kg	EPA 8270	180	11/19/93
Anthracene	< 90	ug/kg	EPA 8270	90	11/19/93
Heptachlor	< 120	ug/kg	EPA 8270	120	11/19/93
Aldrin	< 210	ug/kg	EPA 8270	210	11/19/93

Weck Laboratories, Inc.
Analytical & Environmental Services

Client: Lee & Ro Environmental Laboratories

Project Name:
Project #
Location:
Collected By:
Purchase Order #50457 48 Hour RUSH
Report Date: November 22, 1993

Lab #9317646 Client Sample ID: 3X-0787 Matrix: Soil Collection Date: 11/17/93

Parameter	Result	Units	Method	MDL	Analyzed
Fluoranthene	230	ug/kg	EPA 8270	90	11/19/93
Endosulfan I	< 1500	ug/kg	EPA 8270	1500	11/19/93
Dieldrin	< 210	ug/kg	EPA 8270	210	11/19/93
Endosulfan II	< 1500	ug/kg	EPA 8270	1500	11/19/93
Endrin Aldehyde	< 300	ug/kg	EPA 8270	300	11/19/93
4,4′-DDT	< 150	ug/kg	EPA 8270	150	11/19/93
Benzo(a)Anthracene	70	ug/kg	EPA 8270	60	11/19/93
Chrysene	240	ug/kg	EPA 8270	120	11/19/93
Di-n-Octyl Phthalate	< 450	ug/kg	EPA 8270	450	11/19/93
Benzo(k)Fluoranthene	60	ug/kg	EPA 8270	60	11/19/93
Indeno(1,2,3-cd)Pyrene	530	ug/kg	EPA 8270	300	11/19/93
Benzo(g,h,i)Perylene	520	ug/kg	EPA 8270	300	11/19/93
3-Methylphenol	< 1500	ug/kg	EPA 8270	1500	11/19/93

Authorized Signature

FATHEAD MINNOW HAZARDOUS WASTE
SCREEN BIOASSAY

No.: A93111901-002

ent/ID: Lee + Ro 3X787

TEST SUMMARY

Species: Pimephales promelas.
Fish length (mm): av: 29; min: 28; max: 31.
Fish weight (gm): av: .37; min: .30; max: .47.
Test Protocol: Calif. F&G/DOHS 1988.
Test type: Static.
Test chamber volume 10 l.
Mixing method: Sonication/mechanical shaking.

Source: Thomas Fish.
Date fish received: 10-20-93.
Regulations: CCR Title 22.
Endpoints: LC50 at 96 hrs.
Temperature: 20 +/- 2° C.
Number of replicates: 2.
Number of fish per chamber: 10.

Acclimation/dilution water: Reconstituted soft water (hardness 40-48 mg/l $CaCO_3$).
Aeration: Single bubble through narrow-bore tube.
QA/QC Batch No.: R7931022

TEST DATA

	INITIAL			24 Hr				48 Hr				72 Hr				96 Hr			
DATE/TIME	11-20-93 1045			11-21-93 1040				11-22-93 1055				11-23-93 1120				11-24-93 1035			
ANALYST:																			
	°C	DO	pH	°C	DO	pH	#D	°C	DO	pH	#D	°C	DO	pH	#D	°C	DO	pH	#D
CONT A	19.2	7.2	7.9	19.1	7.2	8.0	0	19.8	7.8	8.1	0	19.9	7.4	7.9	0	19.1	7.2	7.9	0
CONT B	19.0	7.8	7.9	19.1	7.6	7.9	0	19.7	7.8	8.1	0	19.8	7.8	7.9	0	19.1	7.4	7.9	0
400 A	19.3	8.8	8.2	20.1	6.4	7.7	0	20.4	6.2	7.6	0	20.5	5.8	7.6	0	20.1	5.4	7.6	0
400 B	19.1	8.8	8.2	20.2	6.3	7.7	0	20.4	5.8	7.6	0	20.5	5.0	7.6	0	20.0	4.6	7.5	0
750 A	19.1	8.8	8.2	20.2	6.8	7.7	0	20.4	6.6	7.6	0	20.5	6.0	7.6	0	20.0	5.4	7.5	0
750 B	19.0	8.8	8.3	20.1	6.7	7.7	0	20.4	6.2	7.6	0	20.4	5.7	7.6	0	20.0	5.2	7.5	0

Comments:
"A" replicates were mixed by sonication.
"B" replicates were mixed by mechanical aggitation on a shaker table

ADDITIONAL WATER CHEMISTRIES

	CONTROL	
	Alk.	Hard
0 hr	31	41
96hr	33	41

	HIGH CONC.	
	Alk.	Hard
0 hr	31	42
96hr	34	44

RESULTS

Total Number Dead	
CONTROL	0 /20
400 mg/l	0 /20
750 mg/l	0 /20

X	LC50 >750 mg/l (<40% dead in 750 mg/l conc.)
	400 <LC50< 750 (≥40% dead in 750 & ≤60% in 400) *** Definitive Test Required ***
	LC50 <400 mg/l (>60% dead in 400 mg/l conc.)

CHAIN-OF-CUSTODY RECORD

WHITE COPY - Original (Accompanies Samples) YELLOW COPY - Collector PINK COPY - Project Manager

Boring or Well Number	Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (M)	TITLE 22 METALS	WET Test	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TCLP	pH	ASBESTOS	cyanide	Phenols	Sulfides	Flash point	Hazardous waste characteristics*	FIELD NOTES:	Total Number Of Containers	Laboratory Note Number
1A	1A	—	2^{30}	soil	8 oz jar			X																		L&R: 3X-0785	1	
2A	2A	—	2^{40}	"	"				X	X		X			X				X		X	X	X	X	X	L&R: 3X-0786	3	
2B	2B	—	2^{50}	"	"				X	X		X			X				X		X	X	X	X	X	L&R: 3X-0787	3	
1B	1B	—	2^{50}	soil	8 oz jar			X																		L&R: 3X-0788	1	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Margaret Dahlen	11·17·93/16^{00}	

ANALYTICAL LABORATORY: Lee + Ro

LABORATORY CONTACT: Dean Palmer

D&M CONTACT: M. Dahlen PHONE:

DAMES & MOORE
911 WILSHIRE BOULEVARD, SUITE 700
LOS ANGELES, CALIFORNIA 90017
(213) 683-1560 FAX NO. (213) 628-0015

LABORATORY NOTES:

* Hazardous waste characteristics to include 96-hour aquatic bioassay

JOB NO.: 27721-001-131 SHEET 1 OF 1

PROJECT USG

LOCATION Los Angeles

COLLECTOR M. Dahlen DATE OF COLLECTION 11·17·93

LEE&RO Environmental Laboratories **CHAIN OF CUSTODY RECORD** Page ____ of ____

Client Name: Lee + Ro

Phone No.:

31133 West Via Colinas · Suite 101
Westlake Village, California 91362

Phone: (818) 889-4256
FAX: (818) 889-0108

Address:

PO No.:

City, State, Zip:

Report Attention: Ek Han Kwee

Phone No.:

Sampled by:

Signature:

Bill to: Lee + Ro

LEE & RO will keep the samples for another four weeks after submitting the analyses reports and will then return all the samples to client for disposal.

Laboratory ID Number	Date Sampled	Time Sampled	Type* See key below	Sample Location/ID	Number of Containers	Analyses Required: Hazardous waste	Screen Bio Assay									Remarks
																fax results
	11-1793		soil	3X-0786	1	X										Wednesday morning
	11		11	3X-0787	1	X										11-24-93
																Dean

Relinquished by	Date/Time	Received by
Dean	11-18-93 | 1:30pm	
	11/19/93 | 1105	Maria E. LeMay
		Received by Laboratory

* KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge DW—Drinking Water WW—Wastewater GW—Groundwater SO—Soil OT—Other PE—Petroleum C—Composite G—Grab

Sample Condition:

Container Attacked Yes/No
Sample Precooled Yes/No
Sample Preserved Yes/No

Sample(s) are accepted from the laboratory Yes/No

Comments:

ATTACHMENT C2

AIR SAMPLES

SSM/Laboratories, Inc.

ANALYTICAL REPORT

Client:	Envirohealth	Project:	126351
		Received:	01-DEC-93
Report to:	Tim Morrison Envirohealth 3950 Paramount Boulevard Suite 105 Lakewood CA 90712	Reported:	07-DEC-93
		PURCHASE ORDER:	1931101

Sampled: 29-NOV-93 06:00 By: T. Morrison

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1124-02 Air Volume: 76.8 L SSM Sample: 1100582					
Benzene	< 0.001	mg/sample	< 0.004	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.006	ppm	1501
Toluene	< 0.002	mg/sample	< 0.007	ppm	1501
Xylene	< 0.002	mg/sample	< 0.006	ppm	1501
1931101-1124-03 Air Volume: Blank SSM Sample: 1100583					
Benzene	< 0.001	mg/sample			1501
Ethylbenzene	< 0.002	mg/sample			1501
Toluene	< 0.002	mg/sample			1501
Xylene	< 0.002	mg/sample			1501

< indicates less than the limit of quantitation.

Final concentrations were calculated from air volumes supplied by client.

Respectfully submitted,

Steven N. Delp

Steven N. Delp, CIH,
Director, Industrial Hygiene Services

30 Noble Street ■ P.O. Box 6527 ■ Reading, PA 19611-0527 ■ 215/376-4595 ■ Fax: 215/376-8522

SSM/Laboratories, Inc.

ANALYTICAL REPORT

Client:	Envirohealth	Project:	126274
		Received:	24-NOV-93
Report to:	Tim Morrison Envirohealth 3950 Paramount Boulevard Suite 105 Lakewood CA 90712	Reported:	07-DEC-93
		PURCHASE ORDER:	1931101

Sampled: 22-NOV-93 17:00 By: T. Morrison

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1117-01 Air Volume: 78.6 L SSM Sample: 1100322					
Benzene	0.002	mg/sample	0.006	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.006	ppm	1501
Toluene	< 0.002	mg/sample	< 0.010	ppm	1501
Xylene	< 0.002	mg/sample	< 0.006	ppm	1501
1931101-1118-01 ✓ Air Volume: 54.6 L SSM Sample: 1100323					
Benzene	< 0.001	mg/sample	< 0.005	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.008	ppm	1501
Toluene	< 0.002	mg/sample	< 0.010	ppm	1501
Xylene	< 0.002	mg/sample	< 0.008	ppm	1501
1931101-1118-02 ✓ Air Volume: Blank SSM Sample: 1100324					
Benzene	< 0.001	mg/sample			1501
Ethylbenzene	< 0.002	mg/sample			1501
Toluene	< 0.002	mg/sample			1501

SSM/Laboratories, Inc.

Client: Envirohealth
Project: 126274

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1118-02 SSM Sample: 1100324 - continued					
Xylene	< 0.002	mg/sample			1501

< indicates less than the limit of quantitation.

Final concentrations were calculated from air volumes supplied by client.

Respectfully submitted,

Steven N. Delp

Steven N. Delp, CIH,
Director, Industrial Hygiene Services

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
ANALYTICAL CHEMISTS

November 30, 1993

ENVIROHEALTH, INC.
3950 Paramount Blvd.
Suite 105
Lakewood, CA 90712

Attn: Tim Morrison

JOB NO. 25282 H

LABORATORY REPORT

Samples Received: Six (6) Samples
Date Received: 11-24-93
Purchase Order No: 1931101

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Six (6) samples	Polynuclear Aromatic Hydrocarbons by NIOSH 5506	Data Sheets

Michael Shelton Technical Director	D. J. Northington, Ph.D. President

This report is to be reproduced in its entirety.

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: METHOD BLANK

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Acetonitrile
Sample amount: Filter:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	100	60-150

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1117-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Filter
Sample amount: Filter:5mL

Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	97	60-150

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1117-03

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Filter
Sample amount: Filter:5mL

Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	31	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	95	60-150

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1120-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Filter
Sample amount: Filter:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	40	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	97	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1117-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: XAD
Sample amount: TUBE:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	1100	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	90	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1117-03

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: XAD
Sample amount: TUBE:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	16	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Recovery	Limits
P-Terphenyl	90	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Sample: 1931101-1120-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: XAD
Sample amount: TUBE:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	850	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	95	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25282
November 30, 1993

LABORATORY REPORT

Polynuclear Aromatic Hydrocarbons

Matrix Spike/Matrix Spike Duplicate Recovery Summary

Sample ID: BLANK
Units: ppb

Analyte	Sample Result	Amount Spiked	MS Result	% Rec MS	MSD Result	% Rec MSD	RPD
Ben(a)anth	ND	50	49.2	98	50.1	100	2
Ben(b)fluo	ND	50	47.3	95	50	100	6
Ben(k)fluo	ND	50	49.6	99	50.9	102	3
Naphthalen	ND	500	524	105	523	105	0

QC Limits

Analyte	RPD Control	% Recovery Control	
Benzo(a)anthracene	20	50	150
Benzo(b)fluoranthene	20	50	150
Benzo(k)fluoranthene	20	50	150
Naphthalene	20	50	150

Abbreviations Summary

General Reporting Abbreviations:

B	Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.
D	Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.
DL	Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.
J	Indicates that the value is an estimate.
ND	Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.
ppm ppb	parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg$_3$ (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).
TR	Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control	Control Limits are determined from historical data for a QC parameter. The test value must be within this acceptable range for the test to be considered in control. Usually this range corresponds to the 99% confidence interval for the historical data.
% Error	Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

ENVIROHEALTH, INC.

Request For Analysis

Project Number/Purchase Order: 193101 **Date Submitted:** 11-23
Project Contact: Tim Morrison **Turnaround Required:** Normal
Lab Destination: WCAS **Lab Contact:**

SAMPLE ID	VOLUME	MEDIA	ANALYSIS REQUESTED
✓ 193101-1117-01	406.4 ℓ	PTFE + XAD-2	PNAs by HPLC
✓ 193101-1117-03	Blank	|	
✓ 193101-1120-01	278.3 ℓ	|	

Special Instructions:

1. **Sampled by:** J. Morrison 11-22-93 17:00 **Received by** 11-22-93 17:00
2. **Relinquished by** 11-23-93 16:00 **Received by:** 11-24-93/10:04 a.m
3. **Relinquished by:** **Received by:**

Please include signature, date and time

Lab Use Only:

Rec'd 2 Cassettes labeled

193101-1120-01

#25282

3950 PARAMOUNT BOULEVARD, SUITE 105, LAKEWOOD, CA 90712 • (310) 421-2025 • FAX (310) 421-6445

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
ANALYTICAL CHEMISTS

December 7, 1993

ENVIROHEALTH, INC.
3950 Paramount Blvd.
Suite 105
Lakewood, CA 90712

Attn: Tim Morrison

JOB NO. 25292

LABORATORY REPORT

Samples Received: Six (6) Samples
Date Received: 11-30-93
Purchase Order No: 1931101

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Six (6) samples	Polynuclear Aromatic Hydrocarbons by NIOSH 5506	Data Sheets

Michael Shelton
Technical Director

B. Michael Hovanec

B. Michael Hovanec
Senior Staff Chemist

This report is to be reproduced in its entirety.

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: METHOD BLANK

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Acetonitrile
Sample amount: Filter:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	100	60-150

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1124-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: XAD
Sample amount: Tube:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	42	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	93	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1124-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: Teflon
Sample amount: Filter:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	97	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1127-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: XAD
Sample amount: Tube:5 mL

Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	14	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	290	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	88	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1127-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: Teflon
Sample amount: Filter:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	102	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1127-02

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: XAD
Sample amount: Tube:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	1300	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	55	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	80	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	97	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Sample: 1931101-1127-02

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-30-93
Date Extracted: 11-30-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: Teflon
Sample amount: Filter:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	100	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25292
December 7, 1993

LABORATORY REPORT

Polynuclear Aromatic Hydrocarbons

Matrix Spike/Matrix Spike Duplicate Recovery Summary

Sample ID: Batch QC
Units: ppb

Analyte	Sample Result	Amount Spiked	MS Result	% Rec MS	MSD Result	% Rec MSD	RPD
Ben(a)anth	ND	50	49.2	98	50.1	100	2
Ben(b)fluo	ND	50	47.3	95	50	100	6
Ben(k)fluo	ND	50	49.6	99	50.9	102	3
Naphthalen	ND	500	488	98	490	98	0

QC Limits

Analyte	RPD Control	% Recovery Control	
Benzo(a)anthracene	20	50	150
Benzo(b)fluoranthene	20	50	150
Benzo(k)fluoranthene	20	50	150
Naphthalene	20	50	150

Abbreviations Summary

General Reporting Abbreviations:

B	Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.
D	Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.
DL	Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.
J	Indicates that the value is an estimate.
ND	Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.
ppm ppb	parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg$_3$ (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).
TR	Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control	Control Limits are determined from historical data for a QC parameter. The test value must be within this acceptable range for the test to be considered in control. Usually this range corresponds to the 99% confidence interval for the historical data.
% Error	Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

ENVIROHEALTH, INC.

Request For Analysis

Project Number/Purchase Order: 1931101 **Date Submitted:** 11-29-93
Project Contact: Tim Morrison **Turnaround Required:** Normal
Lab Destination: WCAS **Lab Contact:**

	SAMPLE ID	VOLUME	MEDIA	ANALYSIS REQUESTED
✓	1931101-1127-01	305.8 l	XAD-2 PTFE	PNAs by HPLC
✓	1931101-1124-01	208 l	↓	↓
✓	1931101-1127-02	Blank	↓	↓

Special Instructions:

1. **Sampled by:** J. Morrison 11-29-93 0600 **Received by:** Thorg 11-29-93 06:00
2. **Relinquished by:** Thorg 11-29-93 16:00 **Received by:** Mary Mulahey 11-30-93 11:43 AM
3. **Relinquished by:** **Received by:**

Please include signature, date and time

Lab Use Only:

#25292

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
ANALYTICAL CHEMISTS

December 7, 1993

ENVIROHEALTH, INC.
3950 Paramount Blvd.
Suite 105
Lakewood, CA 90712

Attn: Tim Morrison

JOB NO. 25312 H

LABORATORY REPORT

Samples Received: Four (4) Samples
Date Received: 12-2-93
Purchase Order No: 1931101

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Four (4) samples	Polynuclear Aromatic Hydrocarbons by NIOSH 5506	Data Sheets

Michael Shelton
Technical Director

B. Michael Hovanec

B. Michael Hovanec
Senior Staff Chemist

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Sample: METHOD BLANK

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 11-24-93
Date Extracted: 11-30-93
Date Analyzed: 11-30-93
Instrument ID: LC

Matrix: Acetonitrile
Sample amount: Filter:5mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	100	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Sample: 1931101-1130-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 12-2-93
Date Extracted: 12-2-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: Teflon
Sample amount: Filter:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	18	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	103	60-150

WEST COAST ANALYTICAL SERVICE, INC.

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Sample: 1931101-1130-01

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 12-2-93
Date Extracted: 12-2-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: XAD
Sample amount: Tube:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	71	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Sample: 1931101-1130-02

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 12-2-93
Date Extracted: 12-2-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: Teflon
Sample amount: Filter:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	14	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	104	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Sample: 1931101-1130-02

Polynuclear Aromatic Hydrocarbons by NIOSH 5506

Date Received: 12-2-93
Date Extracted: 12-2-93
Date Analyzed: 12-2-93
Instrument ID: LC

Matrix: XAD
Sample amount: Tube:5 mL
Units: Total ng

CAS no.	Compound	Concentration	Detection Limit
83-32-9	Acenaphthene	ND	100
208-96-8	Acenaphthylene	ND	400
120-12-7	Anthracene	ND	100
56-55-3	Benzo(a)anthracene	ND	5
50-32-8	Benzo(a)pyrene	ND	5
205-99-2	Benzo(b)fluoranthene	ND	5
207-08-9	Benzo(k)fluoranthene	ND	5
191-24-2	Benzo(g,h,i)perylene	ND	30
218-01-9	Chrysene	ND	100
53-70-3	Dibenzo(a,h)anthracene	ND	10
206-44-0	Fluoranthene	ND	10
86-73-7	Fluorene	ND	200
193-39-5	Indeno(1,2,3-c,d)pyrene	ND	50
91-20-3	Naphthalene	ND	200
85-01-8	Phenanthrene	ND	200
129-00-0	Pyrene	ND	40

Surrogate	Percent Recovery	Control Limits
P-Terphenyl	78	60-150

ENVIROHEALTH, INC.
Mr. Tim Morrison

Job # 25312
Decmeber 7, 1993

LABORATORY REPORT

Polynuclear Aromatic Hydrocarbons

Matrix Spike/Matrix Spike Duplicate Recovery Summary

Sample ID: Batch QC
Units: ppb

Analyte	Sample Result	Amount Spiked	MS Result	% Rec MS	MSD Result	% Rec MSD	RPD
Ben(a)anth	ND	50	49.2	98	50.1	100	2
Ben(b)fluo	ND	50	47.3	95	50	100	6
Ben(k)fluo	ND	50	49.6	99	50.9	102	3
Naphthalen	ND	500	488	98	490	98	0

QC Limits

Analyte	RPD Control	% Recovery Control	
Benzo(a)anthracene	20	50	150
Benzo(b)fluoranthene	20	50	150
Benzo(k)fluoranthene	20	50	150
Naphthalene	20	50	150

Abbreviations Summary

General Reporting Abbreviations:

B	Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.
D	Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.
DL	Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.
J	Indicates that the value is an estimate.
ND	Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.
ppm ppb	parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).
TR	Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control	Control Limits are determined from historical data for a QC parameter. The test value must be within this acceptable range for the test to be considered in control. Usually this range corresponds to the 99% confidence interval for the historical data.
% Error	Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

ENVIROHEALTH, INC.

Request For Analysis

roject Number/Purchase Order: 193101 **Date Submitted:** 11-30-93
roject Contact: Tim Morrison **Turnaround Required:** Normal
ab Destination: WCAS **Lab Contact:**

SAMPLE ID	VOLUME	MEDIA	ANALYSIS REQUESTED
31101-1130-01	509 l	XAD2 + PTFE	PNAs by HPLC
31101-1130-02	BLANK		

ecial Instructions:

Sampled by: T. Morrison 11-30-93 17:07 **Received by:** Anne Thorp 11-30-93 17:07
Relinquished by: Anne Thorp 12-1-93 16:00 **Received by:** Bob Olson 12-2-93 10.14
Relinquished by: **Received by:**

Please include signature, date and time

b Use Only:

#25312

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
ANALYTICAL CHEMISTS

December 3, 1993

ENVIROHEALTH, INC.
3950 Paramount Blvd.
Suite 105
Lakewood, CA 90712

Attn: Tim Morrison

JOB NO. 25299

H

LABORATORY REPORT

Samples Received: One (1) Tedlar Bag
Date Received: 12-1-93
Purchase Order No: 1931101

The sample was analyzed as follows:

Samples Analyzed	Analysis	Results
One (1) sample	Volatile Organics by GCMS	Data Sheets

Michael Shelton
Technical Director

D. J. Northington, Ph.D.
President

This report is to be reproduced in its entirety.

CLIENT: ENVIROHEALTH, INC.
WCAS JOB #: 25299

SAMPLE: 1931101-1201-01

GAS PHASE VOLATILE COMPOUNDS

DATE RECEIVED:	12/01/93	MATRIX:	GAS
DATE EXTRACTED:	NA	SAMPLE AMOUNT:	0.2ML
DATE ANALYZED:	12/02/93	RUN NUMBER:	25299G2
INSTRUMENT ID:	5101	UNITS:	PPM (V/V)

CAS NO.	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	1.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	1.
78-93-3	2-BUTANONE (MEK)	ND	1.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	1.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	1.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
5-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
75-71-8	DICHLORODIFLUOROMETHANE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	1.
75-09-2	METHYLENE CHLORIDE	ND	1.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	1.
67-63-0	2-PROPANOL	ND	1.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	1.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	1.
-01-4	VINYL CHLORIDE	ND	1.
1330-20-7	TOTAL XYLENES	ND	1.

CLIENT: ENVIROHEALTH, INC.
WCAS JOB #: 25299

SAMPLE: 1931101-1201-01

TENTATIVELY IDENTIFIED COMPOUNDS

DATE RECEIVED: 12/01/93
DATE EXTRACTED: NA
DATE ANALYZED: 12/02/93
INSTRUMENT ID: 5101

MATRIX: GAS
SAMPLE AMOUNT: 0.2ML
RUN NUMBER: 25299G2
UNITS: PPM (V/V)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	DIHYDRODICYCLOPENTADIENE	GAS	3.
2	DICYCLOPENTADIENE	GAS	90.

CLIENT: ENVIROHEALTH, INC.
WCAS JOB #: 25299

SAMPLE: GAS BLANK

GAS PHASE VOLATILE COMPOUNDS

DATE RECEIVED: 12/02/93
DATE EXTRACTED: NA
DATE ANALYZED: 12/02/93
INSTRUMENT ID: 5101

MATRIX: GAS
SAMPLE AMOUNT: 0.2ML
RUN NUMBER: GBLK319
UNITS: PPM (V/V)

CAS NO.	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	1.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	1.
78-93-3	2-BUTANONE (MEK)	ND	1.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	1.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	1.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
-34-3	1,1-DICHLOROETHANE	ND	1.
07-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
75-71-8	DICHLORODIFLUOROMETHANE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	1.
75-09-2	METHYLENE CHLORIDE	ND	1.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	1.
67-63-0	2-PROPANOL	ND	1.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	1.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	1.
-01-4	VINYL CHLORIDE	ND	1.
1330-20-7	TOTAL XYLENES	ND	1.

CLIENT: ENVIROHEALTH, INC.
WCAS JOB #: 25299

SAMPLE: GAS BLANK

TENTATIVELY IDENTIFIED COMPOUNDS

DATE RECEIVED: 12/02/93
DATE EXTRACTED: NA
DATE ANALYZED: 12/02/93
INSTRUMENT ID: 5101

MATRIX: GAS
SAMPLE AMOUNT: 0.2ML
RUN NUMBER: GBLK319
UNITS: PPM (V/V)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	GAS	

Abbreviations Summary

General Reporting Abbreviations:

B	Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.
D	Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.
DL	Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.
J	Indicates that the value is an estimate.
ND	Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.
ppm ppb	parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg$_3$ (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).
TR	Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

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Control	Control Limits are determined from historical data for a QC parameter. The test value must be within this acceptable range for the test to be considered in control. Usually this range corresponds to the 99% confidence interval for the historical data.
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SSM/Laboratories, Inc.

page 1 of 1 07DEC93_1247_13_N1031

ANALYTICAL REPORT

Client:	Envirohealth	Project:	126351
		Received:	01-DEC-93
Report to:	Tim Morrison Envirohealth 3950 Paramount Boulevard Suite 105 Lakewood CA 90712	Reported:	07-DEC-93
		PURCHASE ORDER:	1931101

Sampied: 29-NOV-93 06:00 By: T. Morrison

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1124-02 Air Volume: 76.8 L SSM Sample: 1100582					
Benzene	< 0.001	mg/sample	< 0.004	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.006	ppm	1501
Toluene	< 0.002	mg/sample	< 0.007	ppm	1501
Xylene	< 0.002	mg/sample	< 0.006	ppm	1501
1931101-1124-03 Air Volume: Blank SSM Sample: 1100583					
Benzene	< 0.001	mg/sample			1501
Ethylbenzene	< 0.002	mg/sample			1501
Toluene	< 0.002	mg/sample			1501
Xylene	< 0.002	mg/sample			1501

< indicates less than the limit of quantitation.

Final concentrations were calculated from air volumes supplied by client.

Respectfully submitted,

Steven N. Delp

Steven N. Delp, CIH,
Director, Industrial Hygiene Services

30 Noble Street ■ P.O. Box 6527 ■ Reading, PA 19611-0527 ■ 215/376-4595 ■ Fax: 215/376-8522

SSM/Laboratories, Inc.

ANALYTICAL REPORT

Client: Envirohealth

Report to: Tim Morrison
Envirohealth
3950 Paramount Boulevard
Suite 105
Lakewood CA 90712

Project: 126274
Received: 24-NOV-93
Reported: 07-DEC-93

PURCHASE ORDER: 1931101

Sampled: 22-NOV-93 17:00 By: T. Morrison

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1117-01					
Air Volume: 78.6 L					
SSM Sample: 1100322					
Benzene	0.002	mg/sample	0.006	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.006	ppm	1501
luene	< 0.002	mg/sample	< 0.010	ppm	1501
ylene	< 0.002	mg/sample	< 0.006	ppm	1501
1931101-1118-01					
Air Volume: 54.6 L					
SSM Sample: 1100323					
Benzene	< 0.001	mg/sample	< 0.005	ppm	1501
Ethylbenzene	< 0.002	mg/sample	< 0.008	ppm	1501
Toluene	< 0.002	mg/sample	< 0.010	ppm	1501
Xylene	< 0.002	mg/sample	< 0.008	ppm	1501
1931101-1118-02					
Air Volume: Blank					
SSM Sample: 1100324					
Benzene	< 0.001	mg/sample			1501
Ethylbenzene	< 0.002	mg/sample			1501
Toluene	< 0.002	mg/sample			1501

lient: Envirohealth
Project: 126274

	RESULT	UNITS	CONCENTRATION	UNITS	METHOD
1931101-1118-02 SSM Sample: 1100324 - continued					
Xylene	< 0.002	mg/sample			1501

< indicates less than the limit of quantitation.

Final concentrations were calculated from air volumes supplied by client.

Respectfully submitted,

Steven N. Delp

Steven N. Delp, CIH,
Director, Industrial Hygiene Services

APPENDIX B

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP), as part of the Soil Sampling and Analysis Plan (SSAP), provides the details of the methodologies which will be followed by Dames & Moore during the additional soil characterization investigation. The QAPP describes the sampling and drilling procedures, laboratory testing and the QA/QC procedures. The scope of work addressed in this QAPP is limited to the investigation of Parcel A and B and the underground Utilities Trench location.

2.0 SOIL BORING

2.1 Soil Boring Locations

Five soil borings will be drilled on each parcel (A and B) in areas where contaminated soils were previously detected at the former location of a coal gasification plant, and along the proposed street realignment. Soil samples will also be collected at the utility trench locations.

Prior to the start of the drilling, the boring locations will be marked on the ground by the staff of Dames & Moore. The mark will consist of a point at the center of 1.0-foot diameter circle, spray painted in white. Each borehole will be properly identified in successive numerical order, also in white paint.

After all the borings are located, Underground Service Alert (USA) will be notified of the proposed investigation and the location of the borings. For additional assurance that each boring location is free from any subsurface obstructions, a limited geophysical survey will be conducted prior to the actual drilling.

2.2 Drilling Method, Equipment and Procedure

The hollow-stem auger boring will be used in this particular project. This method is very effective for drilling unconsolidated materials up to a maximum depth of 200 feet.

The equipment used for hallow-stem auger drilling includes either a mechanically or hydraulically-powered drilling rig, which is usually truck-mounted to permit easy and rapid mobilization and demobilization.

Only dry drilling methods (i.e., no drilling mud or water will be introduced into the boreholes) will be employed. The rig simultaneously rotates and advances the hollow-stem auger columns. These columns serve not only as casings to prevent "cave-in" or collapse of bore walls but also as the medium to carry soil cuttings towards the surface through the auger flights.

2.3 Equipment Decontamination

Prior to every drilling and sampling operation, all drilling and sampling equipment and accessories are decontaminated by steam cleaning.

To prevent cross-contamination between soil samples obtained at different depths and at different borings, additional decontamination procedures for the sampling equipment are performed after every sampling run and for the drilling accessories upon completion of every hole. All steam cleaning condensate and wash water will be collected in 55-gallon drums pending proper transport and disposal to an approved disposal site.

2.4 Abandonment of Borehole

Upon completion of drilling and soil sampling, bentonite chips will be used to backfill the borehole. The bentonite chips will be poured into the borehole as the augers are removed at 5-foot intervals. The down-hole hammer may be used to ensure that no bridging has occurred. This process will continue until the borehole is filled and capped with approximately 4 inches of cold-patch asphalt or concrete, as appropriate.

2.5 Drill Cuttings Disposal

Drill cuttings will be stored in sealed 55-gallon drums. The cuttings will be disposed of accordingly, depending on the analytical tests results. If concentrations are below hazardous levels, the drill cuttings will be removed to a prearranged receptor. If concentrations are above hazardous levels, the cuttings will be removed to a certified landfill facility.

3.0 SOIL SAMPLING PROCEDURES

3.1 Methodology

In conjunction with the auger drilling, soil samples will be collected at depths of 2 feet and 6 feet using the Standard Penetration Test (SPT). In cases where the boring has to be extended due to deeper contamination, soil samples will be collected at 3-foot intervals to a depth of 20 feet. Beyond 20 feet, DTSC concurrence will be obtained.

Soil samples are obtained by driving a 2.5-inch diameter California split-spoon sampler within the designated sampling depth. The number of blows (NB) to effect every 6 inches penetration for the entire 18 inches of sampling, are recorded. After the sampler is pulled out, the drilling is resumed for the next drilling interval. The sequence of drilling is repeated until the target sampling depth for the borehole is reached. The sampler is lowered into the borehole, either on a wire line or at the end of the drill pipe, and driven 18 inches into the subsoils with the use of a standard 140-pound drop hammer.

3.2 Sample Collection

Upon retrieval of the split-spoon sampler from the borehole, the sampler is split longitudinally. The middle portion cylinder is saved for laboratory analyses. It is trimmed at both ends of any protruding materials. The ends are then covered by Teflon sheeting and sealed with tight fitting plastic end caps. The sample is properly labeled as to sample and boring number, depth and date collected. The sample is then placed in a Ziploc plastic bag and stored in a cooler containing blue ice.

The lower most end cylinder (near the drive shoe) is either archived for future reference or examined by the field geologist. The upper most end is normally discarded and/or examined by the field geologist in case the lower most end sample is kept as duplicate sample.

Prior to lithological logging, the drive samples are monitored for offgassing of volatile organic compounds using an hNu photoionization detector (PID) or any other equivalent monitoring devised.

3.3 Field Blank and/or Duplicate Samples

As part of the field QA/QC, field blank and/or duplicate soil samples will be collected for every ten soil samples obtained either from the borings or trench locations. Blank sample maybe collected from known uncontaminated areas within the vicinity of the project site. These control samples will be similarly identified as regular samples. The field staff, however, shall have a proper identification of these control samples in their field log books.

3.4 Lithological Logging

Both the drill cuttings and the drive samples are examined by the field geologist as they are collected. The soil materials are described in accordance with the ASTM Unified Soil Classification System (USCS), as to the soil type, grain size, color, presence of fines, relative densities and descriptions and characteristics which may infer presence of contamination's such ad discoloration and odor. All these features including the location of the borehole, the name of the contractor, filling method and equipment used, SPT measurements, PID readings, sample number and other information pertaining to these soil investigation are incorporated in the boring logs for each of the borehole.

3.5 Decontamination of Sampling Devices

Prior to the start of the sampling operations and after completion of every sampling round, the sampling devices such as the split-spoon sampler and the Shelby tubes (brass rings) are decontaminated by scrubbing them by hand using distilled water and then rinsed with tap water, rinsed three times with deionized water and air-dried prior to reassembly of the sampler.

4.0 UTILITY TRENCH SAMPLING

Excavation for the utility trenches will be monitored by the use of the hNu PID. Soil samples will be collected in areas where sustained measurements of 100 parts per million (ppm) are recorded and/or discoloration and odor are noted in the subsoils.

Soil samples will be collected from the bottom of the trenches. Each samples will be obtained by manually driving into the subsoils a drive hammer with a 2-inch diameter by 6-inch core sampler assembly. Soil samples is collected in a brass sleeve or tube placed inside the core sampler. Following retrieval, the sample will be handled in the same manner s that described for the samples from the borings.

5.0 SAMPLE HANDLING AND CUSTODY

Protocols for handling samples which include sample preparation, labeling, preservation and chain-of-custody documentation are strictly observed from the moment of its collection through analysis and reporting of analytical values.

5.1 Sample Documentation

Immediately after sample collection, the sample container is properly labeled indicating sample identification number, borehole number depth sample taken and date collected. Sample lithologic descriptions, measurement and other relevant information regarding the on-going soil investigation are indicated in the corresponding borehole log.

5.2 Sample Preservation

For sample preservation purposes while in the field, the sample containers are placed in a Ziploc plastic bag and stored in an ice chest with blue ice to keep the samples collected at approximately 4°C until delivered to a DTSC-certified analytical laboratories where samples are stored in cold storage units.

5.3 Chain-of-Custody Transfer

The collected samples are either shipped by express courier or hand delivered to the analytical laboratories for analyses within 48 hours of sampling.

All samples submitted to laboratory for chemical analyses are accompanied by chain-of-custody record. The record includes information such as sample identification number, sampling date and time, sample location, type of analysis required, special instructions for the laboratory. This record or form is checked for accuracy and completeness, and then signed and dated by the laboratory sample custodian accepting the sample.

6.0 ANALYTICAL QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

This section of the QAPP discusses the basis for ensuring that the analytical data are technically and statistically valid, meeting the site-specific QA objectives and are thoroughly documented. It describes the analytical QA/QC procedures, data handling and documentation control.

6.1 Sample processing and Control

All samples from this project will be received, logged-in, processed and analyzed by DTSC-authorized laboratory contracted for this specific project within 24 hours after collection.

For the specific analytes to be analyzed, Table 1 presents the required sample container, preservation and the turn-around requirements.

Table 1: Sampling and Turn Around Requirements for Soil Samples

Analytes	Container	Preservative	Maximum Turn Around
VOC	Brass sleeves	Cool, 4°C	7 days
SVOC	Brass sleeves	Cool, 4°C	14 days
Metal (Pb)	Brass sleeves	Cool, 4°C	14 days

Note: VOC - volatile organic compounds
SVOC - semi-volatile organic compounds
Pb - lead

After sample collection, an on-site representative of the analytical laboratory will take custody of all samples by signing the Chain-of-Custody (COC) forms. The Dames and Moore staff and the laboratory representative will relinquish and accept the soil samples, respectively. Both will affix their signatures and the date on the COC. A copy of the COC will be left to the Dames and Moore field staff.

When the samples arrive at the laboratory, a sample receiving staff will coordinate the acceptance and log in procedures. The receiving staff will first reconcile the COC with the samples and sample labels and will then have the courier sign to relinquish the samples and then sign himself to accept the samples. Once the transfer has been effected, the sample receiving staff will log the samples (either onto a sample log book or database) as to the client name, sample identification, date, etc. The condition of the individual sample as will as any discrepancies on the COC documentation will be noted both on COC and the log book/database.

To ensure the integrity of the target analytes, sub-sampling of the soil samples for various analyses will be as follows: first sub-sample will be for the analysis of VOC, second for SVOC and the remaining for lead analyses.

Following sample analyses, unused samples will be stored for future reference.

6.2 Laboratory Calibration Procedures

The laboratory performing the analytical procedures will monitor the quality of all reagents and standard solutions used, and will document this monitoring program. The monitoring program will include screening of reagents for impurities.

Calibration all analytical instruments used in the performance of the specified procedures will be performed in accordance with manufacture's guidelines and EPA requirements. Specifically, GC/MS will be turned on a daily basis according to the specifications of the EPA

CLP. The instrument will then be calibrated for all target compounds. Each ICP will be calibrated prior to running samples in accordance with EPA CLP protocols. Each AA unit will also be calibrated prior to running of samples. All samples will be spiked to determine whether matrix effects or other interference's are present. Other instruments used for specific procedures will be calibrated according to Manufacturer and EPA guidelines; and as necessitated by specific requirements of the analytical program.

6.3 Laboratory Analytical Procedures

All analyses will be conducted in accordance with relevant EPA requirements, including the current CPL protocols, 40 CFR 136, EPA-600/4-79-020 (1983), EPA-600/4-82-057 (1982), and SW-846. Requirements for limits of detection and other quantitation limits shall be in accordance with guidelines published by the California Regional Water Quality Control Board (CRWQCB) having jurisdiction over the project location, where applicable.

Table 2 presents the analytical tests to be performed on all the soil samples which will be collected:

Table 2: Analytical Test Schedule

Analytes	EPA Method	Detection Limit
VOC	EPA - 8240	5-10 ug/kg
SVOC	EPA - 8270	330-1650 ug/kg
Lead	EPA - 6010/7000 series	0.15 mg/kg
Dicyclopentadiene	8240 Modified *	5-10 ug/kg
Dihydrodicyclopentadiene	8240 Modified *	5-10 ug/kg

Where it is not possible to achieve these limits, due to matrix properties or required dilutions, these conditions will be noted and described.

* Since dicyclopentadiene and its hydrate, dihydrodicyclopentadiene, are not target compounds, a modified method must be used to ensure "hard quantification" (positive identification) by mass spectroscopy. The modification must include running Method 8240 with the standard for both compounds.

These compounds are associated with coal gasification and hydrocarbon cracking processes. Their boiling points place them in the range of volatile organics detectable by Method 8240.

6.4 Analytical Data Reduction and Validation

Analytical data will be reviewed inhouse by laboratory staff to ensure accuracy and completeness. Specific items to be verified include: that sample preparation and analysis information are correct and complete; that the appropriate procedures have been followed; that results are correct and complete; that QC samples are within established control limits; that blanks are within appropriate QC limits; that special preparation and analytical requirements have been met; and that documentation is complete. Documentation of QA/QC, at a minimum, recovery ranges for selected anayties, will form part of the laboratory report.

6.5 Laboratory Inhouse QC Checking

Laboratory performance QC checks will include control samples, and method blanks, along with daily calibration data generation.

Matrix-specific QC procedures will include the analysis of matrix spikes, and spike duplicates; monitoring recovery of surrogate compounds; monitoring results of standard dilutions if applicable; analysis of field blanks; and determination of method detection limits in specific matrices.

Ref:/A:/9312D&M/QAPP.sam

APPENDIX C

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

TABLE OF CONTENTS

Section Page

1.0 INTRODUCTION 1

2.0 CLASSIFICATION AND MANAGEMENT 1
  2.1 PRELIMINARILY CLASSIFIED AS NON-HAZARDOUS 2
  2.2 PRELIMINARILY CLASSIFIED AS HAZARDOUS 2
  2.3 GENERATION 3
  2.4 TRANSPORTATION 4
  2.5 RECONTAINERIZATION AND TEMPORARY STORAGE 4

3.0 SAMPLE PROCEDURES 5
  3.1 SAMPLE COLLECTION PROCEDURES 5
  3.2 SAMPLE DOCUMENTATION PROCEDURES 7
    3.2.1 Chain-of-Custody Records 7
    3.2.2 Sample Identification / Analysis Request 7

4.0 ANALYTICAL TESTING PROCEDURES 7
  4.1 TOXICITY 8
    4.1.1 Organic Compounds 9
    4.1.2 Inorganic Compounds 10
    4.1.3 Fish Bioassay 11
  4.2 IGNITABILITY 11
  4.3 CORROSIVITY 11
  4.4 REACTIVITY 12
  4.5 OTHER APPLICABLE TESTING 12

5.0 WASTE MANAGEMENT 12
  5.1 HAZARDOUS WASTE 13
  5.2 NON-HAZARDOUS WASTE 14

LIST OF TABLES

Table No.

1 WASTE SAMPLING AND ANALYSIS PROCEDURES
2 SAMPLE IDENTIFICATION/ANALYSIS REQUEST
3 CANDIDATE WASTE MANAGEMENT FACILITIES

LIST OF FIGURES

Figure No.

1 SITE LOCATION MAP
2 VIGNES STREET RAMPS SITE
3 VIGNES STREET RAMPS SITE AND APPROXIMATE LOCATION OF UTILITY TRENCHES
4 WASTE DRUM/CONTAINER LABEL
5 WASTE COLLECTION FORM
6 PROPOSITION 65 WARNING
7 WASTE TRANSFER FORM
8 HAZARDOUS WASTE STORAGE AREA INSPECTION FORM
9 WASTE DISPOSITION FORM
10 CHAIN OF CUSTODY FORM

WASTE MANAGEMENT PLAN
USG VIGNES STREET RAMPS SITE
LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

This Waste Management Plan (Plan) discusses procedures for managing wastes generated at the Vignes Street Ramps Site. Figure 1 shows a "Site Location Map". Figure 2 shows the "Vignes Street Ramps Site" and Figure 3 shows the "Vignes Street Ramps Site and Approximate Locations of Utility Trenches".

Removal Action activities may include intrusive investigations or excavations that will result in the generation of various solid and liquid wastes. The primary goal of the Waste Management Plan is to establish procedures to ensure that wastes generated are classified and managed in accordance with the applicable regulatory requirements. Proper management includes the identification and implementation of waste minimization activities, where practicable. This Plan provides guidance on the proper management of wastes including potentially contaminated excavated soil, drilling mud, soil cuttings, well purge/development water, used personal protective equipment (PPE), decontamination fluids, disposable sampling equipment (DE), and other solid or liquid wastes.

2.0 CLASSIFICATION AND MANAGEMENT

At the time waste is generated at the Vignes Street Ramps Site (Facility), a preliminary suspected contaminated or suspected uncontaminated designation will be made by the parties involved based on their best professional judgement and the data available. To make this differentiation, field personnel may rely on their knowledge of the site history, field organic vapor analyzer measurements, visual/olfactory observations, and/or other analytical screening results. This differentiation will aid in the initial segregation and grouping of wastes. Suspected uncontaminated materials will be designated as Category "A". Suspected contaminated materials will be designated as Category "B". This categorization may be used to segregate and group materials for management activities including sampling and recontainerization. The categories are recorded on the container label (Figure 4) and the criteria for these categories are described on the Waste Collection Form (Figure 5). The data will also be used to make a preliminary judgement as to whether a waste would meet the criteria of a hazardous waste or whether it would be classified as a non-hazardous waste. Depending on the preliminary classification, the wastes will be managed as described below.

2.1 PRELIMINARILY CLASSIFIED AS NON-HAZARDOUS

If a waste stream is known (based on previous analytical testing) or expected to be non-hazardous, it will be transported to the Staging Area where it will be stored in the original container or combined with similar materials (by category) in bulk containers. The Staging Area is located at 729 North Vignes Street in Los Angeles.

If previously tested and classified as non-hazardous, the waste will not be resampled and will be managed in an appropriate manner until it is sent offsite. If a waste stream has not been previously tested and classified, a sample will be collected and submitted to a laboratory for analysis within *four* weeks from the time it was generated. Records will be maintained to show adherence to the four week schedule.

If the analytical data indicates that the waste is non-hazardous the waste will be managed onsite in an appropriate manner until it is sent offsite. If the analytical data indicates that the waste is either a RCRA or a California hazardous waste, procedures will be implemented to transport the waste to an offsite Treatment, Storage, or Disposal Facility (TSDF) within 90 days from receipt of the data.

In cases where the same or essentially the same hazardous waste has been generated previously and has already been accepted (profiled) at an offsite facility, the waste will be transported offsite within 90 days. In cases where the waste has not been accepted, profiling will be expedited to obtain acceptance at an appropriate facility. While onsite, wastes classified as hazardous will be managed in accordance with the applicable portions of 22 CCR 6262.34 (generator requirements).

2.2 PRELIMINARILY CLASSIFIED AS HAZARDOUS

If a waste is known, based on previous analytical testing, or is expected to be either a RCRA or a California hazardous waste, it will managed accordingly. If it is essentially the same as a waste that has been generated previously and has been accepted (profiled) at a TSDF, then it may be either temporarily stored onsite or transported offsite. If it is a new waste stream, it will be managed onsite until samples are collected and analyzed and it is profiled. While managed onsite, the waste may be stored in the original container or combined with similar materials in a bulk container (waste treatment will not be conducted). Based on the definition of "onsite" (22 CCR 66261.10), the hazardous waste may be managed within the Vignes Street Ramps Site boundary for up to 90 days without a permit provided the requirements of 22 CCR 66262.34 are met.

Wastes managed onsite may be temporarily stored in one or more locations, but will typically be moved to the Staging Area. Waste management areas at the Facility will be selected to ensure that the wastes can be properly managed and that procedures protective of health and the environment can be implemented. Wastes managed onsite may include solids, liquids and sludges. Wastes found to be non-hazardous, based on analytical results, will remain onsite for temporary storage and will be managed as described above.

2.3 GENERATION

The waste generated will be managed at the point of generation and/or onsite as follows:

- Labeled roll-off bins with removable covers (tarps).
- Inert materials (concrete, asphalt, metal, etc.) may be placed on an asphalt pad.
- Labeled open-top (DOT 17H) 55-gallon drums will be used to collect soil cuttings.
- Labeled closed-top (DOT 17E) 55-gallon drums will be used to collect liquids or a vacuum truck may be used to collect and transport the liquids.
- Drilling muds will be allowed to accumulate in a mud tank (or lined pit) adjacent to the well during the drilling activity and will be removed from the tank/pit using a vacuum truck or may be transferred to drums.
- Used PPE and DE will be double-bagged in plastic bags or managed in a similar manner.
- Liquids removed from wells may be stored in appropriate containers and be managed by one of the methods listed above.

Labels will be available to label the waste containers. The information recorded on the labels may include the container (drum) number, generation location, contents, and appropriate information. Figure 4 provides an example drum/container label. The storage area will be provided with a means to deter unauthorized entry such as a fence or barricades. Appropriate warning signs, including Proposition 65 as necessary, will be provided. An example Proposition 65 sign is shown in Figure 6.

2.4 TRANSPORTATION

Prior to transport, the containers will be properly sealed, checked for appropriate labeling, and inspected for leaks. Container handling and transportation services will be provided by onsite by the excavation contractor and transport offsite will be conducted by Mesa Services Inc. (Mesa) or other California-registered waste hauler. As required, transportation procedures will comply with requirements set forth in 49 CFR Part 173, Subparts C, D, and E which address shipping papers, markings, and labeling, respectively. Management of the containerized waste will be documented on the Waste Collection (Figure 5) and Waste Transfer (Figure 7) forms.

2.5 RECONTAINERIZATION AND TEMPORARY STORAGE

As appropriate, wastes may be recontainerized from 55-gallon, or other size drums, into bulk storage containers at the Staging Area. Bulk container types may include labeled, 4-20 cubic yard covered bins for excavated soils and soil cuttings; portable, plastic closed-top tanks provided with top inlets for liquids; similar tanks with removable covers for drilling muds; or other appropriate containers. Separate containers will be used to segregate materials by classification and category. The recontainerization activities will be conducted by Mesa or other qualified personnel who will provide the necessary equipment. Empty containers may be reused, returned to the supplier or a reconditioner, or managed as scrap metal.

At the Staging Area, containers may be placed on an asphalt paved storage area. The area will not be bermed or otherwise enclosed, thereby facilitating movement of the containers. The storage area may be enclosed by chain-link fencing or other device to deter unauthorized entry to the area. Security personnel may periodically monitor the area during non-working hours. Spill control equipment, fire extinguishers, and personal protective equipment will be provided, as required. The Staging Area will be marked using signs, including "Danger Hazardous Waste Storage Area—Only Authorized Personnel Allowed" and "No Smoking", as appropriate. Equivalent wording may be used in some locations. Figures 1, 2, and 3 provide plot plans of the facility and the vicinity.

Containers used to manage hazardous waste will be labeled as shown in Figure 4. Proper waste codes, identified during the analytical data review, and a start-storage date will be recorded on the label. An inventory of the waste containers in the storage areas at the Facility will be maintained by the Waste Management Custodian. The areas will be periodically inspected. At a minimum, weekly inspections of the hazardous waste storage areas will be documented. Figure 8 provides a Hazardous Waste Storage Inspection Form, identifying the types of items that will be evaluated. When wastes are transported offsite, they will be accompanied by a Uniform Hazardous Waste Manifest (UHWM) or appropriate shipping papers. Waste disposition will be recorded on the Waste Disposition Form (Figure 9).

3.0 SAMPLE PROCEDURES

This section describes sample collection and documentation procedures.

3.1 SAMPLE COLLECTION PROCEDURES

The primary objective when sampling a waste stream is to obtain a sample that is representative of the entire volume of waste to be managed. The sample must be collected, preserved, and managed according to agency-approved methods. A summary of the sampling procedures is provided in Table 1 and general information is provided below.

- If the waste is homogeneous, then the entire sample may be collected from one location. If the properties of the waste vary with location in the waste container being sampled, then multiple samples from several locations (within a given bulk container, within a container of multi-phase material, or from multiple containers that have been grouped together for sampling) should be collected and sent to the laboratory where a composite sample will be prepared. In either case, multiple sample containers may be used to collect the total required volume of Sample. The individual sample container expected to contain the "average" concentration of volatiles and semivolatiles of all of the material in the Sample should be marked as the container from which the lab will extract an aliquot to conduct the volatile and/or semi-volatile tests. This aliquot shall be taken prior to any compositing of containers that may be required.

- The equipment used to collect the sample (coliwasa, auger, weighted bottle, scoop, etc.) must be clean. Common equipment used to collect samples of more than one waste stream should be cleaned between uses. The equipment used to collect samples should be similar to that used to collect field samples.

- For most samples, a clean glass bottle should be used. Bottles should be obtained from the laboratory. When possible, the bottle cap should be teflon lined and the sample container should be filled to the top to minimize headspace. Typical sample volumes required by the analytical laboratory are two liters for solids and three liters for liquids or sludges. More material may be required if special tests will be conducted; check with the lab if there are questions. Note - in addition to the volume of Sample required by the laboratory, two liters of sample (solid or liquid) will also need to be collected for use by the TSDF to run "fingerprint" tests. If the individual sample containers will be composited prior to analysis, then the material intended to be sent to the TSDF should be included in the laboratory compositing process and then sent to the TSDF by the lab in order to better assure that the material sent to the TSDF is the "same" as the material analyzed by the lab.

- After the sample container has been filled, the cap should be put on firmly. As appropriate, a security seal may be used. A label should be attached to the bottle and include the same information as used for field sample identification. As appropriate, the sample container should be placed in a zip-lock bag to contain the material if the sample leaks or the bottle is broken to prevent contamination of the other samples and the ice chest.

- The Samples should be identified using the procedures and nomenclature identified below:

  Sample Location - If all of the sample containers comprising the Sample are filled from the same waste container, regardless of whether they will be composited, each sample container will be labeled with the exact same Sample Location as is written on the container label (a two letter designator followed by a four digit number). If the sample containers comprising the Sample are filled from different waste containers each of which has a unique container label, then the Sample Location shall be designated as "DRMCOMP" on each of the individual sample container labels.

  Sample Number - Regardless of the number of locations within a waste container or the number of waste containers involved in a grouping, each of the sample containers comprising the Samples will be identified by the same seven digit Sample ID that is unique to that Sample (waste stream). This ID will include a two character alphabetic designator and a five digit sequential number. The alphabetic designator applicable to waste samples are:

  - WS = Waste Soil
  - WW = Waste Water

Note - if samples are collected from a multi-phase waste and the individual phases will be classified and managed separately, then each Sample shall be given a unique Sample Number (e.g., if the water phase and solid phase in a container were going to be separated and managed differently, then the water phase would have a different Sample Number than the solid phase). If the multiple phases will be homogenized and managed as a single waste stream, then only one Sample Number would be assigned and it would be written on all sample containers comprising the Sample.

- As soon as possible, the Sample should be placed in a cold ice chest or a refrigerator until it can be picked-up or delivered to the analytical lab.

3.2 SAMPLE DOCUMENTATION PROCEDURES

3.2.1 Chain-of-Custody Records

When a Sample of a waste is collected, a sample Chain-Of-Custody (COC) record form must be completed. The COC will be signed by each individual who takes possession of the sample containers. This form documents information about the sample including the time and date the sample was collected, who collected it, where it was collected, provides the sample identity, and specifies the analytical tests to be performed for each sample. For waste Samples, the generic COC shall be used (Figure 10) and the note "See Attached Sample Identification/Analysis Request" (or SIAR) should be entered in the *Comments* section.

3.2.2 Sample Identification / Analysis Request

In addition to the COC, a Sample Identification/Analysis Request (SIAR) should be completed for each Sample. Table 2 provides an example SIAR. The completed SIAR should accompany the Sample and COC to the laboratory. The laboratory should be requested to return a copy of the SIAR with the analytical test results and completed COC to the data management coordinator.

4.0 ANALYTICAL TESTING PROCEDURES

In order to properly manage wastes, it is necessary to establish, via analytical testing or generator knowledge, which of the waste streams contain contaminants at sufficient levels to require the waste to be classified and managed as a hazardous waste. The California regulatory definition of a hazardous waste is provided in 22 CCR 66261 which includes the RCRA criteria for hazardous waste classification. A waste is classified as hazardous if it exhibits one or more of the hazardous characteristics of toxicity, ignitability, corrosivity, or reactivity or if it is a RCRA listed waste. Wastes which do not exhibit any of the hazardous characteristics and are not RCRA listed are classified as non-hazardous wastes. None of the wastes at the Site are known to be RCRA listed. However, the wastes may exhibit a RCRA hazardous characteristic.

This section discusses the procedures that will be used to identify the potential hazardous characteristics of the waste to facilitate waste management (i.e., treatment, recycle, disposal) and to profile the waste prior to managing the waste, as applicable. Combined, these activities will be referred to as the waste classification phase. The guidelines for determining the appropriate analytical tests to be performed are based on the waste characterization requirements for hazardous waste generators (22 CCR 66261, Article 3) and waste management facility specific acceptance requirements. Although the guidelines summarized below will provide useful assistance, the final decision regarding which analytical tests will be needed will be made by a person knowledgeable of the site history and who has expertise in the area of hazardous waste classification.

Analytical data for the sample should be reviewed to assess the need for additional sampling and/or analytical testing in order to properly classify and/or manage the wastes. Analytical testing of soil and/or groundwater for VOCs, SVOCs, (including all analytes addressed by the TCLP method), CCR Title 22 metals, cyanide, and pesticides/PCBs may be conducted during the investigative and waste management activities, as necessary. Analytical testing for selected hazardous waste characteristics, such as ignitability, corrosivity, reactivity, and toxicity or waste-management-facility specific tests or notification/certification of applicable treatment standards for land disposal may be required to supplement existing data. Sections 4.1 through 4.4 describe each of these characteristics and analytical procedures for evaluating wastes. Section 4.5 describes the other potentially applicable analytical tests/requirements.

4.1 TOXICITY

One of the characteristics that causes a waste to be classified as hazardous is toxicity. Toxicity is defined in CCR 22-66261.24. The following subsections discuss the organic and inorganic analytes that will be evaluated to assess the toxicity of the waste.

4.1.1 Organic Compounds

Analytical laboratory tests for detecting the total concentration of individual organic compounds will be conducted initially for a representative sample of each waste stream (bulk container or group of smaller containers holding similar material) awaiting classification unless current analytical data already exists which is representative of the waste. As appropriate, the sample should be tested and the results evaluated by one or more of the methods identified in the following paragraphs.

If the total concentration of an individual organic analyte in a solid or liquid sample is greater than its corresponding hazardous (CCR 22-66261.24(a)(2)) or extremely hazardous (CCR 22-66261.113) Total Threshold Limit Concentration (TTLC) value, then the waste is hazardous or extremely hazardous, respectively, exhibits the characteristic of toxicity, and will be managed appropriately. If there is an applicable hazardous waste treatment standard requiring the extractable concentration of the analyte to be known for land disposal restriction compliance (22 CCR 66268), then the waste sample should be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP).

If the total concentration of an individual organic analyte in a solid sample is equal to or greater than 20 times its corresponding TCLP value, then the waste sample should be analyzed by the TCLP to assess whether it exhibits the hazardous characteristic of toxicity for that compound. For the organic compounds that have a Soluble Threshold Limiting Concentration (STLC) regulatory limit, if the total concentration of the compound in the sample is equal to or greater than 10 times its corresponding STLC value, then the waste sample should be analyzed by the Waste Extraction Test (WET) to evaluate whether the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual organic analyte in a liquid sample (less than one percent nonfilterable suspended solids) is greater than its corresponding STLC or TCLP value, then the concentration detected may be assumed to be equal to the concentration of an extract prepared by the applicable extraction methodology. This concentration should be compared directly to the STLC and TCLP regulatory limits and if the concentration exceeds the limit, then the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual organic analyte in a liquid sample (greater than one percent nonfilterable suspended solids) is equal to or greater than its corresponding STLC or TCLP regulatory limits, then the waste sample may be analyzed by the WET or TCLP, respectively, to assess whether it exhibits the hazardous characteristic of toxicity, or it may be assumed that the concentration detected in the waste sample is greater than the regulatory limit and that the waste exhibits the hazardous characteristic of toxicity.

4.1.2 Inorganic Compounds

Analytical laboratory tests for detecting the total concentration of individual inorganic compounds (e.g., metals) will be conducted initially for a representative sample of each waste stream awaiting classification unless current analytical data already exists which is representative of the waste. As appropriate, the sample should be tested and the results evaluated by one or more of the methods identified in the following paragraphs.

If the total concentration of an individual inorganic compound in a solid or liquid sample is greater than its corresponding hazardous or extremely hazardous TTLC value, then the waste is hazardous or extremely hazardous, respectively, exhibits the characteristic of toxicity, and will be managed appropriately. If there is an applicable hazardous waste treatment standard requiring the extractable concentration of the analyte to be known for land disposal restriction compliance, then the waste sample should be analyzed by the TCLP if it is a federal listed compound or by the WET if it is a California-only listed compound.

If the total concentration of an individual compound in a solid sample is equal to or greater than 20 times its corresponding TCLP value, then the waste sample should be analyzed by the TCLP to assess whether the waste exhibits the hazardous characteristic of toxicity. Similarly, if the total concentration of an individual compound in a solid sample is equal to or greater than 10 times its corresponding STLC value, then the waste sample should be analyzed by the WET to assess whether the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual compound in a liquid sample (less than one percent nonfilterable suspended solids) is greater than its corresponding STLC or TCLP value, then the concentration detected may be assumed to be equal to the concentration of an extract prepared by the applicable extraction methodology. This concentration should be compared directly to the STLC and TCLP regulatory limits and if the concentration exceeds the limit, then the waste exhibits the hazardous characteristic of toxicity.

If the total concentration of an individual compound in liquid sample (greater than one percent nonfilterable suspended solids) is equal to or greater than its corresponding STLC or TCLP regulatory limits, then the waste sample may be analyzed by the WET or TCLP, respectively, to assess whether the waste exhibits the hazardous characteristic of toxicity, or it may be assumed that the concentration detected in the waste sample is greater than the regulatory limit and that the waste exhibits the hazardous characteristic of toxicity.

If the total lead concentration in a sample is equal to or greater than 100 mg/kg or mg/l, then the waste sample should be analyzed for organic lead and the resultant concentration compared to the hazardous or extremely hazardous TTLC values for organic lead to assess whether the waste exhibits the hazardous characteristic of toxicity.

4.1.3 Fish Bioassay

Fish bioassay tests are conducted to assess California hazardous waste toxicity characteristics (CCR 22-66261.24(a)(6)). Results are dependent on the combined effect of the constituents in the waste. Fish bioassay testing should be conducted initially as part of the first few classification events for waste generated during the investigation. Results of the tests should be reviewed in conjunction with the constituents detected and trends, if any, should be noted to assess the need for future fish bioassay testing.

4.2 IGNITABILITY

In addition to toxicity, one of the characteristics that can cause a waste to be classified as hazardous is ignitability. Ignitability is defined in 22 CCR 66261.21. A representative sample should be collected and submitted for a flashpoint analysis (EPA Test Method 1010) for tanks of liquid waste (including stirrable sludges) generated during the investigations, and thereafter, as necessary for waste classification and profiling purposes.

4.3 CORROSIVITY

A third characteristic that can cause a waste to be classified as hazardous is corrosivity. Corrosivity is defined in 22 CCR 66261.22. A representative sample should be collected for each of the waste streams to be classified during the investigation and analyzed for pH (EPA Test Methods 9040 or 9045), and thereafter, as necessary for waste classification and profiling purposes.

4.4 REACTIVITY

The fourth characteristic that can cause a waste to be classified as hazardous is reactivity. Reactivity is defined in 22 CCR 66261.23. Total sulfides and total cyanides (EPA Test Methods 9030 and 9010) should be conducted initially for the waste samples collected for the first few classification events during the investigation, and thereafter, as necessary for waste classification and profiling purposes. If the total sulfide concentration is equal to or greater than 500 mg/kg or mg/l, then the waste sample should be analyzed for reactive sulfides as described in Chapter 7 of SW-846. Similarly, if the total cyanide concentration is equal to or greater than 250 mg/kg or mg/l, then the waste sample should be analyzed for reactive cyanides to assess whether the waste exhibits the hazardous characteristic of reactivity.

4.5 OTHER APPLICABLE TESTING

Requests for additional analytical testing may include specific analyses required by the Class I Treatment, Storage, and Disposal Facilities (TSDFs) or other waste management facilities as part of the waste profiling and facility acceptance procedures.

Proper waste management must include consideration of the hazardous waste treatment standards for compliance with land disposal restrictions. To identify the applicable treatment standard, the liquid wastes may need to be classified as wastewater or non-wastewater based on results from a Total Suspended Solids (TSS) test and Total Organic Carbon (TOC) test. As necessary, a representative sample of aqueous wastes will be collected and tested for TSS and TOC. In addition, solid wastes that may contain free liquids must be analyzed by the paint filter test to evaluate the presence of free liquids.

5.0 WASTE MANAGEMENT

After the waste has been classified as hazardous or non-hazardous at the Staging Area, activities will be initiated to transport the waste to an appropriate offsite waste management facility. Once classified, the available waste management options will be identified (e.g., Class III landfill, Class I landfill, treatment or recycling facility). The following subsections describe these activities for hazardous and non-hazardous wastes, respectively.

5.1 HAZARDOUS WASTE

After a waste has been classified as hazardous, the containerized waste may be moved to a separate area of the Staging Area and the generator requirements (22 CCR 66262.34) will be met.

The use and management of containers will comply with Title 22, Article 9 of Chapter 15 and for tanks Article 10 of Chapter 15. When identified as hazardous, the containers will be labeled with a hazardous waste label. Information recorded on the label may include the following:

- the name of the waste
- hazardous properties/appropriate waste codes
- the start date of storage
- proper DOT shipping name
- the words "Hazardous Waste"
- waste composition and physical state
- name/address of company generating the waste
- the wording "State and Federal Law prohibits improper disposal. If found, contact the nearest police or public safety authority, the U.S. EPA, or the Cal-EPA Department of Toxic Substances Control"

The offsite transport of waste will be documented on the Waste Transfer Form (Figure 7).

An assessment of whether the hazardous waste (non-liquid only) can be landfilled will be made prior to identifying a hazardous waste treatment, storage, or disposal facility (TSDF). This assessment will be consistent with the land disposal restriction requirements. If the waste has not yet been profiled with the TSDF or cannot be managed using an existing profile, then a completed waste profile application form will be submitted to the TSDF with a representative sample of the waste. Authorizations are typically valid for a period of one year. Each inherently different waste stream will be profiled separately. If the waste can be managed using an existing profile, then transportation of the waste to the TSDF will be scheduled in a timely manner. To facilitate receipt at the TSDF, the TSDF will be notified of the impending waste shipment at least 24 hours prior to transportation time, when practicable.

A California Uniform Hazardous Waste Manifest (UHWM) will be completed and will accompany the wastes sent to an in-state TSDF. Wastes sent out of state, if any, will be accompanied by a manifest from the state in which the receiving facility is located. Prior to any offsite shipment of hazardous waste to an out-of-state management facility, a written notification to the appropriate state environmental official in the receiving state and to DTSC's/EPA's Designated Project Coordinator will be provided, if required.

The wastes will typically be transported in bulk, either in covered storage bins (solids) or in vacuum trucks (liquids). However, a situation may occur where the waste will be transported in DOT-approved containers other than bins or vacuum trucks. For example, if the drummed waste was not recontainerized at the staging area for segregation purposes, then the waste will be transported in DOT-approved drums. The UHWMs will be completed by a USG representative or by a party approved to complete the documents. Transportation of wastes offsite will be documented on the Waste Disposition Form as described in the Data Management Plan. An example Waste Disposition Form is provided as Figure 9.

In addition to the UHWM, the transport of waste meeting specific criteria may need to be accompanied by a California Extremely Hazardous Waste (EHW) Permit. If a waste is classified as extremely hazardous per the criteria identified in 22 CCR 66261.110 or .113, then a completed application for an EHW permit will be submitted to the Cal-EPA, Department of Toxic Substances Control (DTSC). A copy of the permit issued by the DTSC will accompany the waste sent to the TSDF.

Mesa Services, Inc. (Mesa) or other California-registered hazardous waste transporter, will transport the hazardous waste to the designated TSDF. Table 3 provides a list of candidate Class I facilities that may be used. Other facilities may be used throughout the project. The waste load will be visually monitored by the transporter and compared to the information provided on the manifest. Upon arrival at the designated TSDF, a TSDF representative may collect a sample of the waste and conduct a screening analysis on the sample. If the screening analysis indicates that the waste is the same as that represented on the manifest, then the waste load will be accepted. If the screening analysis indicates that the waste is different than that represented on the manifest, then the waste load will be rejected and the waste may be transported back to its point of origin.

5.2 NON-HAZARDOUS WASTE

After a waste has been classified as non-hazardous, the following waste management procedures will be initiated. Communication with the appropriate waste management facilities (treatment, recycle, disposal) will be established to understand the proper waste approval procedures for each waste type to be managed. In most cases, the candidate receiving facility will require a letter requesting approval for the waste and a copy of the analytical data representative of the waste. If the waste is disposed of in a landfill, or otherwise applied to land, the Regional Water Quality Control Board (RWQCB) may need to be involved in approving the disposal or placement of the waste. Because the recommended management practice for PPE/DE does not include analytical testing, the letter should describe the procedures used to minimize potential contamination of the PPE/DE. Table 3 provides a list of the candidate facilities.

A non-hazardous waste shipping paper will be completed and will accompany the waste to the non-hazardous waste management facility. The waste may be transported in bulk, either in the covered storage bins (solids) or in vacuum trucks (liquids). Appropriate shipping papers will be completed by a USG party representative or by a party approved to complete the documents. Transportation of wastes offsite will be documented on the Waste Disposition Form as described in the Data Management Plan. An example Waste Disposition Form is provided as Figure 9.

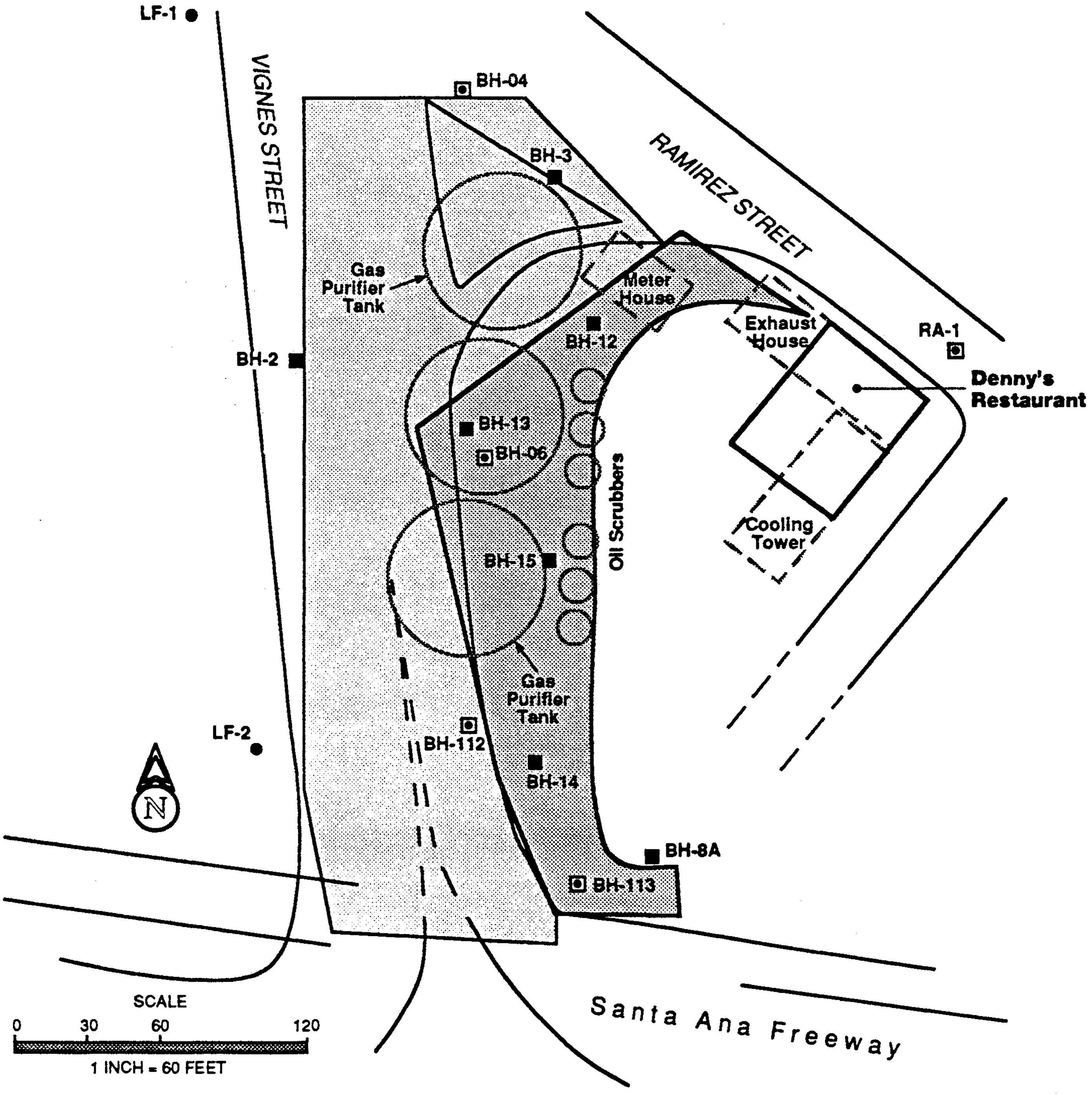
REFERENCE: USGS
Los Angeles, California

FIGURE 1

SITE LOCATION MAP

Denny's Site Parcel "A"
Los Angeles, CA

Dames & Moore



EXPLANATION

BH-3 ■ Approximate Levine•Fricke Soil Boring Location

LF-1 ● Approximate Monitoring Well Location

BH-04 ⊡ Approximate Earth Technology Corp. Soil Boring Location

▱ ○ Approximate Former Coal Gasification Plant Areas

— Approximate Site Boundary

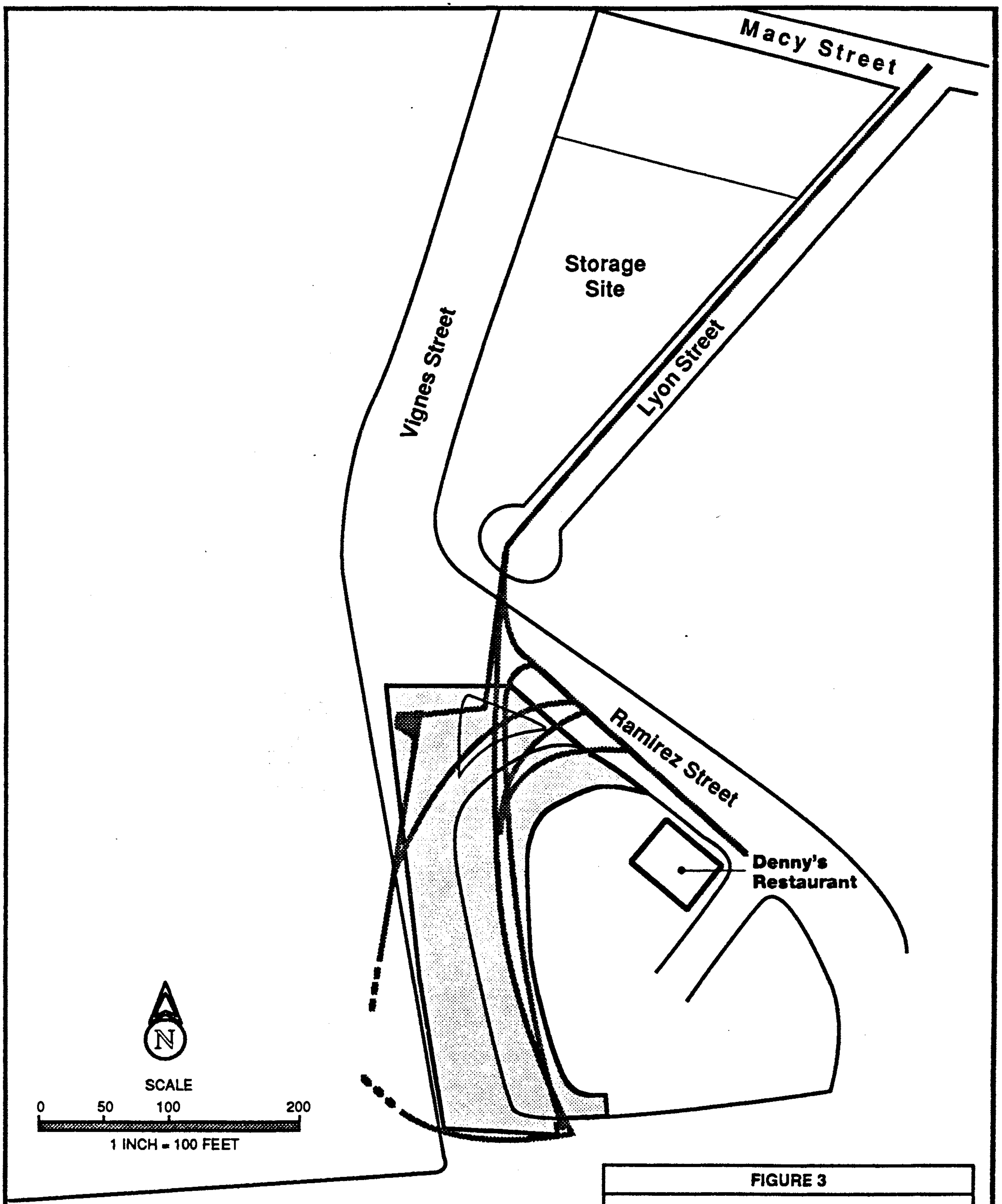
▨ Parcel A

☐ Parcel B

FIGURE 2

Vignes Street Ramps Site Former Coal Gasification Plant and Approximate Soil Boring Locations

Dames & Moore



EXPLANATION

▨ Site Boundary

━ Utility Trench

FIGURE 3

Vignes Street Ramps Site and Approximate Location of Utility Trenches In City of LA Public Right of Way

Dames & Moore

TABLE 1
WASTE SAMPLING AND ANALYSIS PROCEDURES

Issue	Bulk Solid	Drummed Solid	Bulk Liquid	Drummed Liquid
Number of Sample Containers (Note - Each Sample will consist of multiple sample containers full of material. Each sample container that is part of a given Sample shall be labeled with the same Sample ID Number even though each sample container may contain material from different waste containers.)	If the material to be sampled is homogeneous, a single representative Sample may be collected (i.e., all sample containers filled from the same location within the bulk container). If the material is non-homogeneous, fill sample containers from approximately 2-4 different locations within the bulk container. The sample containers comprising the Sample should be composited by the lab prior to analysis.	Premise - one or more waste containers are grouped together for analysis. If the material in all of the waste containers is similar and homogeneous, the Sample may be comprised of sample containers collected from a single waste container that is representative of the material in all of the waste containers. If the material in the waste containers is non-similar and/or non-homogenous, then sample containers should be collected from (A) at least 50% of the waste containers if there are less than 10 in the group, (B) at least 35% of the waste containers if there are between 10 and 20 in the group, and (C) at least 20% of the waste containers if there are more than 20 in the group. The sample containers comprising the Sample should be composited by the lab prior to analysis.	If the material to be sampled is homogeneous, a single representative Sample may be collected (i.e., all sample containers filled from the same location within the bulk tank). If the material is non-homogeneous (multi-phase) and will be homogenized prior to management as a waste, fill sample containers from approximately 2-4 different locations within the bulk tank. The sample containers comprising the Sample should be composited by the lab prior to analysis. If the material is non-homogeneous (multi-phase) and the phases will be managed separately, collect a Sample from each phase and identify the Samples for the different phases with different Sample Numbers.	Premise - one or more waste containers are grouped together for analysis. If the material in all of the waste containers is similar and homogeneous, the Sample may be comprised of sample containers collected from a single waste container that is representative of the material in all of the waste containers. If the material in the waste containers is non-similar and/or non-homogenous, then sample containers should be collected from (A) at least 50% of the waste containers if there are less than 10 in the group, (B) at least 35% of the waste containers if there are between 10 and 20 in the group, and (C) at least 20% of the waste containers if there are more than 20 in the group. Follow the procedures for "Bulk Liquid" regarding whether the phases will be homogenized or managed separately. The sample containers comprising the Sample should be composited by the lab prior to analysis.
Equipment	See 3.0	See 3.0	See 3.0	See 3.0
Quantity (total volume of Sample to be collected. May either be all from one location or the total volume of the containers to be composited. See SW-846.	Total of 4 liters per Sample. Typically 2 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 4 liters per Sample. Typically 2 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 5 liters per Sample. Typically 3 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".	Total of 5 liters per Sample. Typically 3 liters for the lab; however, check with lab based on tests to be run. Two liters for the TSDF to "fingerprint".

Labeling	See 3.0	See 3.0	See 3.0	See 3.0
Chain of Custody	Complete using same procedures as site samples.	Complete using same procedures as site samples.	Complete using same procedures as site samples.	Complete using same procedures as site samples.
Analytical Tests	See 4.0	See 4.0	See 4.0	See 4.0
Sample Identification/Analysis Request	See 4.0	See 4.0	See 4.0	See 4.0

TABLE 2
SAMPLE IDENTIFICATION / ANALYSIS REQUEST (SIAR)

Sampled By ________________________________ Sample Date ______________
Sample ID ____
Waste Container ID (if composite, list all waste container IDs represented by the composite)________
____
Free Liquids Present: Yes _____ No ________
Sample of: Liquid _____ Solid _____ Sludge ______ Drilling Mud ______
Is Waste Homogeneous? Yes _____ No ______ (If "No", will it be composited? Yes _____ No ______)

CHECK THOSE ANALYTICAL TESTS TO BE RUN:

Corrosivity (acids/bases)	____	pH (EPA 9045 or 9040 depending on matrix)
Ignitability	____	Flash Point (EPA 1010) (liquid/stirable solids only)
"CCR" metals	____	TTLC and STLC as required (22 CCR 66261.24(2))
Aquatic Toxicity	____	Fathead Minnow Bioassay (22 CCR 66261.24(b))
TCLP	____	TCLP Metals, as required (22 CCR 66261)
	____	TCLP Volatiles, as required (EPA 8240) (22 CCR 66261)
	____	TCLP Semivolatiles, as required (EPA 8270) (22 CCR 66261)
	____	TCLP Pesticides
	____	TCLP Herbicides
Reactivity	____	Total Sulfide (EPA 9030) and Total Cyanide (EPA 9010)
Reactivity	____	Rx. Sulfide (EPA ____) and Rx. Cyanide (EPA ____)
Oil and Grease	____	Oil and Grease (EPA 9071 or 413.1)
TPH	____	Total Pet. Hydrocarbon (TPH) (ASTM 418.1)
Other	____	B.T.X.E (EPA 8015M)
	____	Total Organic Halogens (TOX) (EPA 9020)
	____	BTU (heat content)
	____	PCBs (EPA 8080)
	____	Organic Lead if TTLC >100 ppm
	____	Specific Gravity
	____	Free liquids (paint filter test)
	____	TSS (total suspended solids)
	____	TOC (total organic carbon)
	____	BOD /COD (405.1 / 410.4)
	____	Fluorides (340)
	____	Other ______________________________

Note: Samples should be kept on ice for shipment.

TABLE 3

CANDIDATE WASTE MANAGEMENT FACILITIES

FACILITY[a]	LOCATION	WASTE TYPES ACCEPTED
Land Disposal and Incineration		
Treatment, Recycle, Fuel Blending		
Landmark[b]	Los Angeles, CA	Asphalt (non-haz)
TPS Technologies Inc.[b]	Victorville, CA	Thermal Desorption (non-haz)
Gibson Oil[b]	Los Angeles, CA	Asphalt Road Base (non-haz)

[a] Other waste management facilities will be evaluated on an as needed basis.

[b] Preferred waste management facilities.

FIGURE 4
WASTE DRUM/CONTAINER LABEL

USG VIGNES STREET RAMPS SITE

WASTE DRUM/CONTAINER LABEL

Container ID: ______________________________ Percent Full: _______________

Name: ______________________________ Date: _______________

Location ID: ______________________________ Interval: _______________

Waste Type: ______________________________ Source: _______________

Suspected Contaminant: ____

Comments: ______________________________________

____

____

Category

FIGURE 5
WASTE COLLECTION FORM

USG VIGNES STREET RAMPS SITE

WASTE COLLECTION FORM NO. _____

Name: ________________ | Date: ____________ | Site Description: ____________________ | Location ID: ____________

Container ID	Container Type	Percent Full	Waste Type	Waste Source	Depth	PID/OVA Max Resp. ppm	Odor Y/N/NA	Stain/ Sheen Y/N/NA	Category A or B	Suspected Contaminant(s) Comments

Definitions:
1. Odor: Yes, No, Not Available
2. Stain: Yes, No, Not Available
3. Category: A = PID/OVA < 20 ppm and/or the waste has no discernable odor or stain/sheen
   B = PID/OVA ≥ 20 ppm and/or the waste has a discernable odor or stain/sheen

PROPOSITION 65 WARNING

WARNING

DETECTABLE AMOUNTS OF CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS, OR OTHER REPRODUCTIVE HARM ARE FOUND IN AND AROUND THIS AREA. CHEMICALS INCLUDE:

- **Lead**
- **Toluene**
- **Benzo(a)anthracene**
- **Benzo(a)pyrene**
- **Bis(2-ethylhexyl)phtalate**
- **Chrysene**
- **Dibenzo(a,h)anthracene**
- **Indeno(1,2,3)pyrene**

AVISO

SE AVISA QUE HAY DETECCION DE QUIMICAS QUE EL ESTADO DE CALIFORNIA SABE SON RELACIONADOS A CAUSAR CANCER, DEFECTOS DE NACIMIENTO Y OTROS HORRORES REPRODUCTIVOS QUE SE ENCUENTRAN ACQUI Y EN EL AREA. ESTAS QUIMICAS INCLUYEN:

- **Plomo**
- **Toluene**
- **Benzo(a)anthracene**
- **Benzo(a)pyrene**
- **Bis(2-ethylhexyl)phtalate**
- **Chrysene**
- **Dibenzo(a,h)anthracene**
- **Indeno(1,2,3)pyrene**

FIGURE 7
WASTE TRANSFER FORM

USG VIGNES STREET RAMPS SITE

WASTE TRANSFER FORM NO. ______

Name: ____________________

Date: ____________________

Container Number	Transferred From	Transferred To	Transfer Type	Time	Container Still Used?

Comments: ____

____

FIGURE 8

HAZARDOUS WASTE STORAGE AREA INSPECTION FORM
(TO BE CONDUCTED ON A WEEKLY BASIS)

Inspector's Name/Title ______________________ Date of Inspection __

Time of Inspection ______________________ (AM/PM)

Item	Specifics (if applicable)	Status		Recommended Remedial Action	Date Remedial Action Completed
		Acceptable	Not Acceptable		
CONTAINER PLACEMENT	Drums on pallets; sufficient aisle space; limit of 2 drum pallets per stack				
CONTAINER CONDITION	No leaks or rust; sealed bungs and lids; no liquid/residue on containers				
LABELING OF CONTAINERS	Proper identification and accumulation date; internal log number;				
GROUNDING STRAPS	Flammables connected to ground				
SEGREGATION OF INCOMPATIBLE MATERIALS/WASTES	Acids/caustics separate; flammables/combustibles together				
PALLETS	Not damaged (eg. broken wood, warping, nails missing)				
FENCE, GATE, LOCK	Area locked if unattended; no visible corrosion or damage				
FIRE EXTINGUISHER	Unobstructed access; charged; signs indicating location				
SPILL CONTROL EQUIPMENT	Absorbent; shovel available				
SHOWER/EYE WASH	Functioning properly; unobstructed access				
LABELING STORAGE AREAS	Hazards; no smoking signs; hazardous waste storage area				
PERSONAL PROTECTIVE AND OTHER EQUIPMENT	Gloves; goggles; apron; bung wrench				

Version: 11/22/93