CORRECTIVE ACTION PLAN

FORMER MARKETING STATION #2651
235 MARKET STREET
SAN DIEGO, CALIFORNIA

VOLUME I

Prepared for:

Unocal Corporation
Asset Management Group
3915 Mission Avenue, #7416
Oceanside, California 92054

and

Golden West Hotel
720 Fourth Avenue
San Diego, California

Prepared by:

GeoSyntec Consultants
11440 West Bernardo Court, Suite 300
San Diego, California 92127
(619) 674-6559

19 February 1999

TABLE OF CONTENTS

VOLUME I

Page

1. INTRODUCTION 1

1.1 Summary 1
1.2 Purpose 1
1.3 Site Background 2
1.3.1 General Setting 2
1.3.2 Site Boundaries 3
1.3.3 Previous Site Investigations 3
1.3.4 Recent Site Investigations 3

2. ASSESSMENT OF IMPACTS 4

2.1 Soil Conditions 4
2.1.1 Regional Geology 4
2.1.2 Soil Composition 4
2.1.3 Hydrocarbons in Soil 4
2.2 Groundwater Conditions 5
2.2.1 Regional Hydrogeology 5
2.2.2 Site Hydrogeology 5
2.2.3 Floating LNAPL in Wells 6
2.2.4 LNAPL Composition 7
2.2.5 Dissolved-Phase Hydrocarbons 7

3. SOIL GAS SURVEY 9

3.1 Sampling Methods 9
3.2 Soil Gas Sample Results 10
3.2.1 Petroleum Hydrocarbons 10
3.2.2 Methane 10

4. EVALUATION OF FIRE AND EXPLOSION RISK 12

4.1 Sampling Methods 12

TABLE OF CONTENTS (continued)

4.2 Subgrade Utility Lines 12
4.3 Utility Cavity Gas Sample Results 12
4.4 Source of Gas 13
4.5 Fire and Explosion Risks 13
4.5.1 Current Conditions – Subsurface Utilities 13
4.5.2 Future Conditions 14

5. CURRENT SITE DEVELOPMENT PLANS 15

5.1 Basement Parking 15
5.2 Basement Parking Ventilation 15
5.3 Living Areas 15

6. SITE CLEANUP OBJECTIVES 16

6.1 Cleanup Requirements and Directives 16
6.1.1 Cleanup and Abatement Order No.91-45 16
6.1.2 September 6, 1995 RWQCB Directive 17
6.1.3 July 22, 1998 RWQCB LNAPL Interim Guidance 18
6.2 Leaching Potential of Soil Contaminants 20
6.3 LNAPL in Soil Matrix 21
6.3.1 LNAPL in Soil Computations 22
6.3.2 Proposed Cleanup Goals for Soil 23
6.3.2.1 Unsaturated Zone 23
6.3.2.2 Saturated Zone 23
6.3.3 Estimated Quantity of Soil Exceeding Cleanup Goal 24
6.3.4 Estimated Quantity of Mobile LNAPL 24
6.4 Vapor Risk Analysis 25
6.4.1 Exposure Scenario 25
6.4.2 Input Parameters and Approach 25
6.4.3 Results of Vapor Risk Assessment 26

7. REMEDIATION ALTERNATIVES FEASIBILITY STUDY 28

7.1 Natural Attenuation 28
7.2 Vapor Extraction/Dual Phase Extraction 29

TABLE OF CONTENTS (continued)

7.2.1 Vapor Extraction of Light-End Hydrocarbons 30
7.2.2 Enhanced Bioremediation of Heavy-End Hydrocarbons 30
7.2.3 Dual Phase Extraction 31
7.3 Air Sparging with Vapor Extraction 32
7.4 Soil Excavation and Disposal 33
7.5 Vapor Control System 34
7.6 Excavation and Vapor Control System 36
7.7 Summary 36

8. PROPOSED REMEDIATION DESIGN AND SCOPE OF WORK 37

8.1 Excavation and Vapor Control System 37

9. REFERENCES 40

TABLES

1 Estimated Quantity of Contaminated Soil and LNAPL
2 Evaluation of Remedial Alternatives

FIGURES

1 Areas of Contaminated Soil
2 Conceptual Design Vapor Control System
3 Excavation Cross Sections

APPENDICES

A Tables and Figures from Vapor Extraction Technology, Inc.
B Mobile Light Non Aqueous Phase Liquid in Soil, Residual Saturation Calculations
C Vapor Phase Risk Assessment
D Information to Comply with Appendix A of RWQCB Interim Guidance

TABLE OF CONTENTS (continued)

VOLUME II

E	Recent Boring Logs
F	Monitoring Well Table and Logs
G	Underground Utility Line Maps
H	Soil Physical Properties Lab Reports
I	Certified Analytical Report - Soil
J	Certified Analytical Report - Water
K	Certified Analytical Report - Vapor
L	Laboratory Reports – Vapor Field Analysis

1. INTRODUCTION

1.1 Summary

This corrective action plan (CAP) has been prepared for the property located at 235 Market Street in San Diego, California (the Site). Specifically, this CAP provides a summary of:

- Site-specific cleanup levels for hydrocarbons in soil;
- Potential risks of fire or explosion, and other health risks;
- Remedial measures and engineering controls for residual contaminants; and
- Remediation of contaminants by natural attenuation;

1.2 Purpose

This CAP has been prepared in accordance with Title 23, Division 3, Chapter 16, Article 11 Section 2722 of the California Code of Regulations (CCR). Per the CCR, this CAP includes: 1) an assessment of impacts of contamination; 2) a feasibility study to evaluate site remediation and mitigation alternatives; 3) a determination of appropriate cleanup goals; and 4) a proposed method(s) and schedule for monitoring and reporting the progress or corrective action.

This CAP is in conformance with the SDRWQCB Cleanup and Abatement Order Nos. 89-51 (and amendments) and 91-45 as amended (Amendments Nos. 1, 2 and 3).

1.3 Site Background

1.3.1 General Setting

The Site is located on the south side of Market Street between Second and Third Avenues in downtown San Diego, California (Appendix A, Figures 1 and 2). The Site is listed as San Diego County Assessors Parcel Number 535-073-11 and San Diego County Site Assessment and Mitigation (SAM) Division Case No. H29519-001. The Site is presently a paved parking lot that is operated by American Parking Company. The Site was formerly a truck fueling and service station facility with multiple underground fuel storage tanks, dispenser islands, and associated underground piping.

North and east of the Site are multi-family residences (Appendix A, Figure 3). West of the Site is an active parking lot and Greyhound Bus maintenance and fuel storage yard. South of the Site are commercial and multi-family residences. The majority of the surrounding area consists of buildings with commercial use on the ground level floor and multi-family residences in the upper floors.

The topography of the Site and surrounding area is flat. The elevation of the Site is approximately 17.0 feet above mean sea level (msl).

The Site is located at the northern margin of a large contaminated area known as the "Blob". The "Blob" is a popular label for a group of neighboring and possibly coalescing plumes of light nonaqueous phase liquid (LNAPL) suspended on top of the local groundwater table in the Marina District of downtown San Diego. The LNAPL throughout the area is comprised of refined petroleum product, generally agreed to be a mixture of gasoline and diesel fuel (Geomatrix, 1990). The hydrocarbons were discovered in 1986 during an environmental site assessment for other contaminants at a site being considered for acquisition by the Center City Redevelopment Agency.

1.3.2 Site Boundaries

The north, east and west boundaries of the Site coincide with the inside edge of the sidewalks (Appendix A, Figures 2 and 3). The southern property boundary of the Site is along the north side of the adjoining commercial buildings.

1.3.3 Previous Site Investigations

The Site has been under environmental investigation since 1987 when two wells (CC-7 and CC-11) were installed in the sidewalk at the direction of Center City Development Corporation (CCDC). The wells were installed as a part of a regional subsurface investigation of several city blocks of the downtown Marina Redevelopment Area. Because the wells encountered soil and groundwater contamination, the Site was investigated further during 1989 and 1990 at the direction of Unocal and Golden West Hotel (Leighton and Associates, 1989, 1990).

Currently, monitor wells at the Site and other nearby sites of the Marina Redevelopment Area are being routinely monitored by Geomatrix Consultants (Geomatrix, 1998). The collective well monitoring is being performed under the direction of a joint program developed by the Redevelopment Agency of the City of San Diego, Transportation Leasing Company, Shell Oil Company, GTF Properties, Unocal Corporation, and Golden West Hotel.

1.3.4 Recent Site Investigations

On August 11, 12, and 13, 1998 Vapor Extraction Technology (VET) installed eight soil borings, and performed a soil gas and utility cavity gas survey at the Site (Appendix A, Tables 1 through 4). The purpose of this work was to collect additional data to aid in refining the understanding of subsurface conditions at the Site.

2. ASSESSMENT OF IMPACTS

2.1 Soil Conditions

2.1.1 Regional Geology

The Site is located within the coastal plain of San Diego County. The coastal plain is directly underlain by the late Pleistocene Bay Point Formation, consisting of poorly consolidated marine terrace, nonmarine slopewash, and near shore and marine estuarine deposits. The Bay Point Formation is underlain by Quaternary, Tertiary, and Upper Cretaceous age sediments of the San Diego embayment, and at greater depth by Mesozoic crystalline rocks (Kennedy and Peterson, 1975).

2.1.2 Soil Composition

Wells and borings at the Site extend to a maximum depth of approximately 40 feet below ground surface (bgs). Soil from ground surface to approximately 10 feet bgs consist of fill material comprised of a mixture of silt, sand and clay (Appendix A, Figures 4 and 5). Soil from approximately 10 to 30 feet bgs consist of fine to medium-grained silty and clayey sand with minor interbedded gravelly sand. Below 30 feet bgs, the soil consists of sandy and silty clay with gravelly sand interbeds.

2.1.3 Hydrocarbons in Soil

Soil samples collected at the Site indicate that petroleum hydrocarbons are present from approximately 5 to 20 feet bgs. Total petroleum hydrocarbons as gasoline (TPHg) concentrations range from below the laboratory detection limit of 5 parts per million (ppm) to 24,000 ppm. The highest concentration of TPHg was detected in boring GWL-6 at 5 feet bgs. Soil analytical data are presented in 5 foot segments in Appendix A, Figures 6 through 15 and are summarized in Table 1 of Appendix A.

2.2 Groundwater Conditions

2.2.1 Regional Hydrogeology

The Site is located in the Lindbergh Hydrologic Subarea (8.21) of the San Diego Mesa Hydrologic Area, Pueblo San Diego Hydrologic Unit (California Regional Water Quality Control Board, San Diego Region, 1994). Groundwater within this Hydrologic Subarea has no designated beneficial use and has been excepted from the municipal drinking water use designation. The elevation of groundwater at the Site is approximately equal to mean sea level, which is approximately 15 to 20 feet bgs. No drinking water wells exist within 1,000 feet of the Site according to Mr. Ed Low, California Department of Water Resources. No surface freshwater body exists in the Lindbergh Hydrologic Subarea. Surface water runoff in the vicinity of the Site flows southwest into San Diego Bay.

Groundwater underlying the Site is considered by RWQCB to be in communication with surface water of San Diego Bay. The San Diego Bay has the following beneficial uses; industrial service supply; navigation; water contact recreation; non-contact water recreation; ocean commercial and sport fishing; saline water habitat; preservation of rare and endangered species; marine habitat; fish migration; and shellfish harvesting. Natural groundwater quality underlying the Site is relatively poor and is characterized as sodium-chloride type with a high measured total dissolved solids (TDS) concentration.

2.2.2 Site Hydrogeology

Eleven monitor wells have been installed at the Site (Appendix A, Figure 2). Monitor wells GW-1 through GW-3 were installed by Golden West Hotel. Monitor wells GWL-1 through GWL-8 were installed by Unocal Corporation (LEI, 1989 and 1990). In addition, monitor wells CC-7, CC-11, OMW-3, and OMW-11 were installed by the Center City Development Corporation.

Depth to groundwater at the Site as of August 26, 1998, was approximately 17.5 feet bgs, or approximately –0.5 feet msl (Appendix A, Table 2). Historically, since

monitoring at the Site began in 1989, the depth to groundwater has varied between 17.0 and 24.0 feet bgs (Appendix A, Figure 22). The groundwater table generally rose from 24 to 17 feet bgs during 1989 to 1994, then dropped an average of one foot from 1994 to 1996 (Appendix A, Figure 22). From 1996 to 1998, the groundwater table has risen an average of 0.5 foot to its present depth.

The current groundwater gradient at the Site shows a westerly flow direction with a gradient of approximately 0.005. Historically, the direction of groundwater flow has been to the west to southwest (Geomatrix, 1998).

2.2.3 Floating LNAPL in Wells

Historic groundwater monitoring data indicate that free-product has been measured in wells GWL-1, GWL-3, GWL-5, GWL-7, GW-1, GW-2, and GW-2, and GW-3 (Appendix A, Table 2). The hydrograph and free product thickness charts for wells GW-1, GW-2, GW-3, GWL-2 and GWL-3 have been prepared to evaluate the occurrence of free product (Appendix A, Figure 22 and 23). The hydrographs and free product charts for these wells indicate that a rise in the water table correlates with a reduction in free product thickness for each well. Conversely, it appears that a drop in the water table correlates with the appearance of free product in some wells. Between 1994 and 1996, there has been an overall water table drop of approximately one foot. This correlates with the appearance of free product in wells GW-2 and GWL-3.

The historical occurrence of measurable floating free product in the wells may be due to well construction and/or the hydrodynamic affects on LNAPL in the soil matrix. The LNAPL is apparently relatively immobile in the soil matrix (below hydrocarbon saturations of 0.2 to 0.3) both above and below the water table (Huntley et al., 1994). When the water table drops below most of the LNAPL in the soil matrix, the water pressure and other matrix forces change such that the LNAPL may become mobile and accumulate in monitor wells under the forces of gravity. As the water table rises above the LNAPL in the soil matrix, the LNAPL becomes "trapped" in the matrix due to water pressure. This reduces the mobility of the LNAPL such that the LNAPL cannot accumulate in a nearby well.

2.2.4 LNAPL Composition

Based on analytical data, the free product, or LNAPL is comprised of gasoline and some diesel (L&A, 1990). Previous analyses indicated that the gasoline-to-diesel percentages for four samples collected from the Site were as follows:

Well No.	Gasoline-To-Diesel Ratio
GW-2	95/5
GWL-1	75/25
GWL-2	90/10
GWL-3	75/25

A sample of the free product from monitor well GWL-3 was collected and analyzed for fuel fingerprint, TPHg, BTEX and lead (VET, 1996). The results of these analyses are as follows:

Method	Constituent	Concentration (ppm)
8015/3510	TPHg	950,000 (95 percent)
8020	Benzene	5,600
	Toluene	25,000
	Ethylbenzene	9,700
	Total Xylenes	77,000
	Organic Lead	442

According to the laboratory report and case narrative, the product is most probably a mixture of gasoline and diesel (VET, 1996).

2.2.5 Dissolved-Phase Hydrocarbons

Groundwater sampling was performed at the Site on August 6, 1998 (Appendix A, Table 2; Figures 20 and 21). The wells with no current or historical LNAPL include the wells located in the northern sidewalk area (CC-7, CC-11, and

OMW-11) and well GWL-8 located in the middle of the east side of the Site. Based on the most recent groundwater quality data, it appears that the dissolved-phase contaminant concentrations at the Site increase in a westerly direction across the Site (Appendix A, Figure 21). All groundwater samples collected during August 1998 were also analyzed for MTBE using EPA Method 8260. MTBE was not detected in any of the groundwater samples (Appendix A, Table 2).

Because the water table has fluctuated historically in response to seasonal variations and local dewatering, there is a potential for free product to be trapped below the water table. Historical water level/free product data indicate that when the water table was at a depth of approximately 19 to 22 feet bgs in 1989, substantial free product was observed in some of the monitor wells at the Site. The water level currently occurs at a depth of approximately 17 feet bgs. Free product was not observed in any monitor wells during the last sampling event in August 1998. It is uncertain if the free product has been attenuated, bioremediated, or merely trapped below the water table.

Groundwater quality data can serve as an indicator of potential LNAPL that may be trapped below the water table. If LNAPL representative of gasoline were trapped below the water table in the vicinity of a monitor well, the dissolved concentrations of fuel hydrocarbon constituents should approach the solubility of the constituents. If the dissolved concentration in a groundwater sample is approximately 10 percent of the solubility for that constituent, then it is likely that LNAPL is present in the vicinity of that monitor well. Further, it is likely that the LNAPL would become mobile if the water table dropped.

Based on the groundwater sampling performed in August 1998, groundwater wells that contain dissolved hydrocarbon constituents at concentrations of approximately 10 percent of their solubility include GWL-3 and GWL-4. Monitor wells that contained free product within the last two years include GW-2, GWL-3, and GWL-6.

3. SOIL GAS SURVEY

A soil gas survey was performed at the Site during August 11 through 13, 1998 (VET, 1998). The soil gas samples were collected in conjunction with boring installation and soil sampling.

3.1 Sampling Methods

Soil gas sampling at the Site was conducted under the direct supervision of Dr. Robert Sweeny of Unocal, and James Reed of VET. The method utilized was the soil gas probe with field gas chromatograph (GC) instrument analysis for sample quality control (QC).

Forty-four soil gas sample groups were collected and analyzed (Appendix A, Table 4). Each sample group was comprised of three field samples for field GC analysis and one 1-liter tedlar bag sample for certified laboratory analysis.

The three field GC samples included a "Blank" sample, and an "After" sample. The Blank sample data show that the probe was cleaned and flushed prior to probe insertion into the soil. The "Before" and "After" sample data are used to evaluate the integrity of the tedlar-bag "Lab" sample which was collected between the time that the "Before" and "After" field samples were collected. The soil gas data for the "Before", "After", and "Lab" samples should be consistent with each sample in the group. Inconsistent data indicate a "poor" lab sample, which are noted on Table 4 of Appendix A. There were six "poor" samples, which were not used in the soil gas mapping or evaluation of this Site. Poor samples are usually due to a poor seal above the probe sample screen/tip. The other 38 samples showed excellent integrity and were utilized for site evaluation.

3.2 Soil Gas Sample Results

3.2.1 Petroleum Hydrocarbons

Soil gas samples were collected in borings at depths of 1, 3, 5, 10 and 15 feet bgs. The results of the TPHg/BTEX and fixed gas analyses are summarized on Table 4 of Appendix A. TPHg, BTEX, methane, and carbon dioxide concentrations generally increase with depth at the Site. The methane and carbon dioxide appear to be byproducts of hydrocarbon biodegradation. Nitrogen and oxygen concentrations decrease with depth. The TPHg/BTEX data are consistent with soil sample analytical data, which shows the highest hydrocarbon contamination near the 15-foot depth at the Site. This is shown by a comparison of Figures 6 to 15 with Figures 16 to 19 of Appendix A.

Benzene concentrations in soil gas ranged from a detection limit of 1.6 parts per million-vapor (ppmv) to 1,300 ppmv. The maximum benzene concentration was detected in boring B-20 at a depth of 16 feet below grade. Because benzene is the most carcinogenic compound in gasoline, benzene concentrations in soil gas were used as a tool to evaluate the potential risk to human health based on future land use. The maximum concentration of benzene detected in soil gas at the Site was used as a conservative value in the vapor risk analysis (Section 6.4).

3.2.2 Methane

Methane concentrations in soil gas ranged from a detection limit of 1,000 ppmv to 180,000 ppmv (Appendix A, Table 4). The highest concentration was detected in the sample collected from boring B23 at a depth of 15 feet bgs. The highest concentration equates to a value of 18 percent methane. The lower explosive limit (LEL) and upper explosive limit (UEL) for methane are 5 and 15 percent, respectively. If methane occurs within this range of concentrations in the presence of oxygen, there is a potential for fire and/or explosions if an ignition source is available. Under existing conditions, methane does not appear to pose a potential hazard of fire and explosion because there is insufficient oxygen and no ignition sources in the subsurface.

In general, methane was detected at concentrations exceeding the LEL in samples collected from the central and western portion of the Site at and below 13 feet bgs. However, the samples collected from boring B23 detected methane at concentrations exceeding the LEL at depths of 5, 10, 13, 15, and 16.5 feet bgs. The methane at these concentrations and depth pose a potential fire and explosion hazard based on the future site use. These data indicate that engineering controls may be warranted to prevent fires and explosions in the future development.

4. EVALUATION OF FIRE AND EXPLOSION RISK

4.1 Sampling Methods

The risk of fire, explosion, or nuisance conditions from on-site volatile vapors was evaluated by direct vapor sampling from specific locations at the Site, and within a 100-foot radius of the perimeter of the property boundary. The structures where gases could possibly collect and concentrate in uncontrolled conditions were sampled. These structures included underground utility vaults, sewer and storm drain manholes, and other subsurface utility cavities (Appendix A, Figure 2).

The structures were first sampled by inserting a flexible plastic tube into the manhole or other cavity feature. Care was taken to not include surface air into the cavity and not flush the gases out of the cavity prior to and during sampling. The plastic tube was attached to an Organic Vapor Analyzer (OVA) and explosiometer in succession. After the OVA and lower explosive limit (LEL) readings were collected, the tube was attached to a portable sampling pump. A one-liter tedlar sample bag was filled using the pump. A 20-cc syringe sample was collected from the bag, and the remainder of the bag was sent to the laboratory for analyses. The syringe sample was immediately analyzed on-site using the field GC instruments

4.2 Subgrade Utility Lines

The locations of underground utility lines at and near the Site have been evaluated (Appendix J). Some of these lines correspond with the surface utility structures that were sampled during this survey. The various utility line companies were contacted for these maps. Precise information regarding the depth of the utilities was not available from the utility companies. The utilities are approximately 3 to 6 feet deep, with the exception of sewer lines which can extend to a depth of 10 feet bgs. This depth is above the highest known water table at the Site, which is currently approximately 17.0 feet bgs. Therefore, it is unlikely that free product or contaminated groundwater from the Site could enter utility line trenches and migrate away from the Site.

4.3 Utility Cavity Gas Sample Results

The field and laboratory results of the utility cavity samples are summarized on Table 5 of Appendix A. Gases from seventeen structures were collected and analyzed. Samples G1, G2, G3, G4, G5, G16, and G17 showed detectable TPHg up to 76 ppmv. Samples G1 and G2 showed detectable benzene up to 0.091 ppmv. Samples G10, G13, and G16 showed detectable methane up to 1,606 ppmv. Field OVA and LEL instrument readings for all sampled structures were below background concentrations.

Sample G16, which shows the highest measured TPHg and methane concentrations of 76 and 1,606 ppmv, respectively, was collected from the well box of monitoring well GW-3. Apparently, the gases emanated from a leaky well casing seal or well cap. The well casing extends into contaminated soil and groundwater. Sample G13, which shows the second highest measured methane concentration of 141 ppmv, was collected from a natural gas-line manhole. The source of methane detected has not been determined.

4.4 Source of Gas

Based upon the presence of TPHg and BTEX compounds in some of the utility cavity samples, it appears that these gases originated from the soil and/or groundwater contamination at and near the Site which include other areas of the "Blob". The source of methane may be from the degradation of naturally-occurring organic material, man-made organic material, or from the degradation of petroleum hydrocarbons. The gases may have migrated into the utility cavities through cracks, other subgrade openings, or diffusion through the concrete walls of the utility structures.

4.5 Fire and Explosion Risks

4.5.1 Current Conditions – Subsurface Utilities

The onsite sample G16 showed the highest volatile gas concentrations of all the samples collected. The sample showed 76 ppmv TPHg which is equivalent to

approximately 0.5 percent of the lower explosive limit (LEL) for gasoline. The sample also showed 1,606 ppmv methane which is equivalent to approximately 3 percent LEL for methane. Collectively, this sample shows that the atmosphere in the well box cavity is at approximately 3.5 percent of the LEL. The next highest sample result (G13) showed an equivalent of 1 percent LEL for methane only.

The physical requirements for gases to burn or explode in this site setting would be an accumulation of gases in a confined space that collectively exceeded 100 percent of the LEL in the presence of an ignition source. In general, and considering OSHA safety margins, there is no risk of fire or explosion in an atmosphere when the LEL is below approximately 10 percent of the LEL. Therefore, based upon the gas sampling from the structures at and near the site, there appears to be no risk of fire or explosion in the utility vaults at the time of the survey. These conditions may change and should be re-evaluated after the Site is developed.

4.5.2 Future Conditions

The projected future use of the Site includes a subsurface parking structure that may extend 10 feet bgs (Section 5.0). The installation and presence of the structure will alter the distribution of gases in the subsurface at the Site. As previously stated, methane has been detected at concentrations exceeding the LEL in numerous samples collected from the site. Based on these data, there is a potential for fires and/or explosions in the subsurface parking lot if engineering controls are not implemented in conjunction with hot spot removal. Engineering controls may include a vapor control system consisting of a gas extraction system and geomembrane installed below the concrete slab for the parking structure. Engineering controls should also consider and be designed to prevent the off-site migration of hydrocarbon vapors and methane due to the installation of the parking structure.

5. CURRENT SITE DEVELOPMENT PLANS

The Site is located in the San Diego Downtown Redevelopment District. The area is zoned for commercial or multi-family residential development. The current Site use is a single level parking lot. Currently, there is a preliminary plan to develop the entire Site into a multi-story condominium building in conformance with the Downtown Redevelopment plan. The basic parameters of the proposed development are described in this section.

5.1 Basement Parking

The lower two levels at the Site will be a parking garage. The entire Site will be excavated to 10 feet bgs. Vertical retaining walls will be placed along the property lines. The property lines are at the inside edges of the sidewalks, and at the south side of the property against existing commercial/residential buildings. The basement floor will be a pour-in-place concrete slab on graded soil. The elevation of the basement slab will be 7.5 feet bgs as measured from the existing sidewalk surfaces. The lower level will be used for parking only. The second parking level will be used for parking and will include one office. +Footings??

5.2 Basement Parking Ventilation

The ventilation plans for the lowest basement level parking are not yet known but will be controlled by the building code requirements to ventilate carbon monoxide. Ventilation may be with forced air, or open wall (open window) construction, or a combination of these features.

5.3 Living Areas

There will be five levels of residential condominium units that will directly overlie the two-level basement parking structure. The site cleanup levels of this CAP are based on this development scenario.

6. SITE CLEANUP OBJECTIVES

6.1 Cleanup Requirements and Directives

6.1.1 Cleanup and Abatement Order No.91-45

Cleanup and Abatement Order No.91-45 states that free product at the Site must be mitigated (CAO 91-45, p.7). The San Diego Regional Water Quality Control Board (RWQCB), in their directive letter dated 5/17/95, stated the following:

> *"In order to establish the removal of free petroleum product as the site-specific groundwater remediation objective, the discharger must continue groundwater monitoring of dissolved contaminants and demonstrate that soil/groundwater contamination at the Site meets the following conditions:*
>
> *a) Residual dissolved contaminants in groundwater at the Site do not pose a threat to the designated beneficial uses of San Diego Bay. It must be shown that residual groundwater contaminants will not impact San Diego Bay through:*
>
> *i) advective transport of dissolved contaminants by groundwater movement through soils, and/or*
>
> *ii) transport of contaminated groundwater through man-made (e.g., underground utilities, sewers, stormdrains, etc.) and/or natural preferential pathways (e.g. buried channels, etc.).*
>
> *b) Residual dissolved groundwater contaminants at the Site will not impact the current and future dewatering operations at the San Diego Convention Center.*
>
> *c) The volume and concentration of residual soil contaminants at the Site will not generate or yield recoverable free petroleum product as a result of natural or artificially induced (i.e., groundwater dewatering operations) fluctuations in the depth of the water table at the site.*

d) *The volume and concentration of residual soil contaminants at the Site will not create a future condition of groundwater pollution, which may pose a future threat to the designated and beneficial uses of San Diego Bay.*

e) *The volume and concentration of residual soil and groundwater contaminants at the Site will not pose a threat to human health or the environment.*

Although soil remediation levels between 100 and 1,000 mg/kg total petroleum hydrocarbons (TPH) are acceptable to the RWQCB, the dischargers may wish to reconsider a modified remedial action alternative which will be compatible with the minimum required conditions stated above. Residual soil contaminants under current site conditions must not yield recoverable free petroleum product to the groundwater and must not contribute dissolved contaminants, which could impact the designated beneficial uses of San Diego Bay. Proposed remedial alternatives and cleanup levels must be designed to provide adequate protection to human health and environment."

6.1.2 September 6, 1995 RWQCB Directive

Based on a remedial action plan (RAP) submitted by Unocal in January, 1995, the RWQCB stated in their directive letter dated September 6, 1995 that:

"*RWQCB staff required that soil cleanup levels be adequate to protect groundwater from impacts by free petroleum product at the site. It is not clear whether the state Underground Storage Tank (UST) Cleanup Fund will reimburse the dischargers for costs incurred while attempting to reach soil cleanup levels beyond those required by the RWQCB. You may wish to investigate this situation by contacting the state UST cleanup fund at (916) 227-4419.*

RWQCB staff concur with the implementation of the proposed RAP. The discharger will be required to provide the following information upon completion of the soil remediation at the site.

1. *Provide analytical data and supporting technical rationale to document that residual concentrations of total petroleum hydrocarbons in soils at the Site are not capable of yielding free petroleum product (NAPL) to groundwater. This information must be reviewed and signed by a state certified professional geologist or civil engineer.*

2. *Prepare and submit a verification soil sampling work plan to the RWQCB Executive Officer within 60 days of completing the proposed soil remediation at this site. Verification soil samples must be collected from the vadose zone (above the ambient water table) at the site."*

6.1.3 July 22, 1998 RWQCB Interim LNAPL Guidance

On July 22, 1998, the RWQCB issued Supplemental Instructions and Interim Guidance on Required Cleanup at Low-Risk Fuel Contamination Sites (Interim Guidance). The Interim Guidance provided guidance on data collection requirements for the evaluation of residual free product or LNAPL on groundwater. Appendix A of the Interim Guidance included a framework of minimum information that should be included in corrective action plans where LNAPL is present such as the subject Site. The minimum information that is required includes:

- identification of beneficial uses of groundwater and surface water,
- evaluation of the extent and impacts of LNAPL on-and off-site;
- evaluation of historical observations of free product;

- evaluation of hydrogeologic condition affecting advective contaminant transport, attenuation mechanisms, and plume stability;
- evaluation of technical feasibility of removing all LNAPL from groundwater;
- estimation of economic feasibility of removing all LNAPL from groundwater;
- tabulation of contaminant characteristics left in-situ, including type of LNAPL and previous remedial efforts;
- evaluation of environmental persistency of water quality impairment;
- evaluation of risk to human health from exposure to product and/or vapors from residual LNAPL;
- evaluation of risk from fire and explosion hazards associated with residual LNAPL and/or associated vapors; and
- evaluation of ecological risks from exposure to LNAPL and/or associated vapors.

Based on recent telephone conversation with RWQCB staff, it is our understanding that the RWQCB staff may consider closing sites within this redevelopment district if it can be demonstrated that the Site complies favorably with the conditions stated above. To this end, the information described above has been provided in outline format in Appendix D.

Certain elements of the Interim Guidelines may be inconsistent with CAO 91-45. However, based on the Interim Guidelines, and the information provided in response to the Interim Guidelines in Appendix D, the Site appears to be a favorable candidate for closure after the corrective action recommended herein has been implemented.

6.2 Leaching Potential of Soil Contaminants

The synthetic precipitate leaching procedure (SPLP) and toxicity characteristic leaching procedure (TCLP) results relative to each respected whole-soil sample hydrocarbon analytical results are summarized below and in Table 3 of Appendix A. A total of 13 soil samples were analyzed using both the SPLP and TCLP methods. The soil samples for SPLP and TCLP analyses were selected from soil at the Site that best represented the highest concentrations of hydrocarbon contaminants. The results are further summarized as follows:

1. For soil samples that contained contaminant concentrations equal to or less than the values listed below, the SPLP or TCLP leachate contained no detectable contaminants. The detection limits are listed below:

	Contaminant Concentration in Soil (mg/kg)	Leachate Detection Limit (mg/L)
TPHg	510	< 8.3
TPHd	320	< 2.0
Benzene	4.6	< 0.050
Toluene	9.2	< 0.050
Ethylbenzene	1.2	< 0.050
Xylenes	11	< 0.10

2. The soil samples that contained the highest concentrations generally contained the highest leachate concentrations. The samples with the highest concentrations that were also analyzed using SPLP and the resultant leachate concentrations are summarized below:

	Soil Concentration (mg/kg)	SPLP Leachate Concentrations (mg/L)
TPHg	10,000	22
TPHd	8,200	<11
Benzene	120	1.9
Toluene	180	3.7
Ethylbenzene	260	2.1
Xylenes	730	5.7

The SPLP concentration for benzene and ethylbenzene listed above exceed the water quality criteria issued by the RWQCB in the April 1, 1996 interim guidance for sites within 1,000 feet of San Diego Bay. Because the Site is located approximately 1,600 feet from San Diego Bay, the water quality criteria do not apply to the site. In summary, the SPLP leachate concentrations are approximately 100 to 1,000 times lower than the soil concentrations. These SPLP data indicate that certain "hot spots" exist at the Site that may serve as sources for groundwater contamination if left unabated.

6.3 LNAPL in Soil Matrix

To evaluate the risk to groundwater from impacted soil above and below the water table, the residual saturation of a typical gasoline was evaluated using site-specific soil parameter data (Appendix B). A typical gasoline was selected instead of site-specific product because the values derived from a typical gasoline will provide a more conservative approach for the following reasons:

- The product at the Site consists of a mixture of primarily gasoline and diesel fuel. Diesel fuel has a higher viscosity and will be less mobile in soil than gasoline.

- The product at the Site appears to consist of weathered gasoline from a variety of sources over time. The exact date and nature of each source has not been determined. A typical gasoline will provide a more conservative analysis than a weathered product.

Residual saturation is the saturation at which free product becomes discontinuous and is immobilized by capillary forces. At and below the residual saturation concentration, the free product is "trapped" and does not migrate under gravitational forces. At concentrations exceeding the residual saturation, the free product will be mobile and will have the ability to migrate through the vadose zone and form free product on the water table.

6.3.1 LNAPL in Soil Computations

A simplified equation based on the methods of Brooks-Corey was used for this evaluation (Environmental Systems & Technologies, Inc. [ESTI], 1990). This equation and approach is consistent with the Site Assessment and Mitigation (SAM) Manual guidelines for Evaluating Risk in the Corrective Action Process (ERICA) (SAM, 1999). The equations, input parameters, and results are presented in Appendix B.

The simplified equation is based on empirical data and assumes that the water saturation (S_w) equals the residual or irreducible water saturation (S_{rw}) (Appendix B). The simplified equation also assumes a "typical porous media" as determined by the Brooks-Corey equation (ESTI, 1990). An additional simplifying assumption is a critical flow rate at which free product migration is considered insignificant. As an industry standard, the critical flow rate is assumed to be 10^{-7} centimeters per second (cm/sec) or one order of magnitude less than a typical landfill clay liner.

The soil physical property data for the Site were divided based on whether the samples represented unsaturated or saturated conditions (i.e. if the samples were collected above or below the water table). The average value for each of the parameters was calculated for both unsaturated and saturated conditions, with the exception of vertical hydraulic conductivity to which the geometric mean was calculated (Appendix B). The range of residual saturation for both above and below the water table was calculated by using the average physical property data with the lowest, geometric mean, and highest values of vertical hydraulic conductivity. Using this method, the

lowest residual saturation values correspond to the highest hydraulic conductivities or coarsest-grained soils.

6.3.2 Proposed Cleanup Goals for Soil

The proposed cleanup goals for soil are described in the following section. The goals presented below are intended to serve as guidelines for the removal of soil that may serve as a potential source of mobile LNAPL to the extent technically feasible and economically practicable.

6.3.2.1 Unsaturated Zone

Using the referenced method of calculation, the residual saturation above the water table, or in the vadose zone, ranges from approximately 0.04 to 0.52 (dimensionless). This equates to a TPHg concentration of approximately 5,875 mg/kg to 77,650 mg/kg (Appendix B). If the lower residual saturation value is used, the potential for LNAPL to migrate downward in the vadose zone and accumulate on the water table will be minimized. For this reason, and to be conservative, **a cleanup goal of 5,800 mg/kg TPHg is recommended for soil above the water table** to minimize the potential for LNAPL at the Site.

6.3.2.2 Saturated Zone

Because the water table has fluctuated historically in response to seasonal variations and local dewatering, there is a potential for free product to be trapped below the water table. The residual saturation below the water table ranges from approximately 0.01 to 0.05 (dimensionless). This equates to a TPHg concentration (C_s) of approximately 2,580 mg/kg to 8,950 mg/kg (Appendix B). If the lower residual saturation value is used, the potential for LNAPL to migrate upward and accumulate on the water table or reappear if the water table declines will be minimized. For this reason, and to be conservative, **a cleanup goal of 2,500 mg/kg TPHg is recommended for soil below the water table** to minimize the potential for LNAPL at the Site. Based on

historical water levels, it is anticipated that soil remediation should not extend below 21 feet below land surface.

The estimated values of residual saturation are within the range of residual saturation values provided by the American Petroleum Institute and the "Level 1" values listed in the ERICA Guidance document (SAM, 1999).

6.3.3 Estimated Quantity of Soil Exceeding Cleanup Goal

The locations where soil contains hydrocarbons at concentrations exceeding the cleanup goal are summarized on Figure 1. The extent of soil exceeding the cleanup goal appears to be a conservative estimate because it is based on all historical soil quality data. Accordingly, it is anticipated that natural bioremediation has been successful in reducing the concentrations of hydrocarbons at some locations.

The estimated quantity of soil containing hydrocarbons at concentrations exceeding the cleanup goals is approximately 2,140 cubic yards or approximately 3,500 tons.

6.3.4 Estimated Quantity of Mobile LNAPL

The estimated quantity of LNAPL was calculated based on the average concentration of TPHg in soil (above and below the water table) exceeding cleanup goals and the estimated volume of soil requiring remediation. It should be noted that free product was not observed during the last round of groundwater monitoring. However, soil analytical data, groundwater quality data, and historical free product measurements indicate that free product may be trapped below the water table in the vicinity of monitor wells GWL-3, GWL-4, and GWL-6. The total estimated volume of LNAPL at the Site in soil above the water table and that may be trapped below the water table is approximately 4,950 gallons (Table 1). This total volume represents the total volume of LNAPL within the areas of contaminated soil that exceed residual saturation concentrations. This does not necessarily mean that all LNAPL within the contaminated areas is mobile LNAPL.

6.4 Vapor Risk Analysis

An analysis of potential risks from the inhalation of residual contamination at the Site was performed. The vapor risk assessment was performed in accordance with the Vapor Phase Migration Model specified in the SAM Manual (SAM, 1999). The vapor risk assessment was equivalent to a Level 2 Risk Calculation as specified in the guidance manual. The input parameters, approach, and results of the Vapor Phase Risk Assessment are summarized in Appendix C.

6.4.1 Exposure Scenario

Based on future site use, the exposure scenario for the vapor risk analysis consisted of a security guard working in the subsurface structure for 12 hours a day over a 25-year period. The overlying structure at the Site will consist of condominiums that could represent a potential residential exposure scenario. However, this exposure pathway is considered incomplete because the subsurface parking structure will consist of two levels of parking below the proposed condominiums. In addition, the parking structure will be ventilated to remove carbon monoxide vapors due to vehicular traffic.

6.4.2 Input Parameters and Approach

In accordance with Level 2 Risk Calculations, site-specific data are used to calculate the potential risk to human receptors from the inhalation of benzene vapors. Input parameters are summarized in Appendix C. Soil physical property data were collected and analyzed to facilitate this evaluation. Site specific soil physical property data consisted of total porosity, air filled porosity, moisture content, bulk density, organic carbon content, and vertical hydraulic conductivity. Site-specific chemical data consisted of soil, groundwater, and soil gas data. Site-specific geometrical parameters for the Site consisted of the depth to contamination, and the slab attenuation factors. Other input parameters such as the Henry's Law coefficient and diffusion coefficient were obtained from standard chemical references.

The vapor risk assessment consists of a three-step process. First, the soil gas concentration is either calculated based on soil and/or groundwater data, or the soil gas concentration is measured at the site. To be conservative, if soil gas is measured, the maximum concentration is assumed to be present at equal concentrations beneath the site. To eliminate the uncertainties associated with calculating soil gas concentration from soil and groundwater quality data, actual, recent soil gas data was used in this evaluation.

The second step consists of calculating the flux of benzene vapors that may migrate into the subject structure. In this case, the structure is the subsurface parking lot. The third and final step consists of calculating the risk to a potential receptor based on the nature and duration of exposure. The input parameters for the risk calculation are default values used by EPA and Cal-EPA (EPA, 1989, Cal-EPA, 1994).

6.4.3 Results of Vapor Risk Assessment

Based on the input parameters and site-specific data discussed herein, the potential incremental excess cancer risk to a security guard under the exposure scenario described above is 3.3×10^{-5}. According to the US EPA, this level of risk is within the acceptable range of 1×10^{-4} to 1×10^{-6} for excess incremental cancer risk. However, according to SAM, the risk should be equal or less than 1×10^{-6} (SAM, 1999). Based on these data, soil remediation or engineering controls appears to be warranted to decrease potential cancer risks to an acceptable level.

Soil remediation may consist of excavation and removal. Based on the potential for LNAPL to migrate to and accumulate on the water table, it appears that soil remediation could be performed to remove "hot spots" at the site. These "hot spots" probably contribute significantly to the maximum soil gas concentrations measured recently. It is anticipated that the maximum soil gas concentration will decrease substantially after soil remediation has been performed, but the exact amount is uncertain.

Engineering controls could consist of the installation of a sub-slab gas extraction system, the installation of a vapor barrier (geomembrane), or aggressive

ventilation of the subgrade parking level. To evaluate the level of protection required by engineering controls, numerous vapor risk simulations were performed using various slab attenuation factors and ventilation rates. If a gas extraction system and geomembrane are given an attenuation factor of 100, the level of risk is 3.3×10^{-7}. In addition, soil gas data indicate that methane concentrations in the subsurface exceed the lower explosive limit for methane. These data suggest that engineering controls may be warranted to minimize the potential for fires and explosion, regardless of the carcinogenic risk.

7. REMEDIATION ALTERNATIVES FEASIBILITY STUDY

Six remedial alternatives that have the potential to remediate the Site are described in this section. These alternatives were selected based on current industry, best demonstrated available technologies for the subsurface conditions, contaminant volume, site complexity, system cost-effectiveness, and the cleanup goals for the site. The alternatives include:

1) Natural Attenuation;
2) Vapor Extraction/Dual Phase Extraction;
3) Vapor Extraction with Air Sparging;
4) Excavation and Disposal;
5) Vapor Control System; and
6) Excavation and Vapor Control System.

The advantages and disadvantages of each alternative and the associated estimated costs are summarized in Table 2. Each alternative is described in detail in the following sections.

7.1 Natural Attenuation

In the absence of most types of site development, natural attenuation has been deemed potentially appropriate for the site. Natural attenuation, also known as passive bioremediation, intrinsic bioremediation, or intrinsic remediation, is a passive remedial approach that depends upon natural processes to degrade and dissipate petroleum constituents in soil and groundwater. Some of the processes involved in natural attenuation of petroleum products include aerobic and anaerobic biodegradation, dispersion, volatilization. and absorption. In general, for petroleum hydrocarbons, biodegradation is the most important natural attenuation mechanism. It is the only natural process that results in an actual reduction of petroleum constituent mass.

Under the appropriate site conditions, natural attenuation can reduce the potential impact of a petroleum product release either by preventing constituents from being transported to sensitive receptors or by reducing constituent concentrations to less

harmful levels. Natural attenuation may also be an acceptable option for sites that have been subject to active remediation and which now have substantially reduced concentrations of contaminants. However, natural attenuation is not an appropriate option at all sites. The rates of natural processes are typically slow; contaminant levels may not be reduced to acceptable regulatory levels for years. In addition, long-term monitoring is necessary to demonstrate that contaminant concentrations are continually decreasing at a rate sufficient to ensure that potential receptors are not reached nor adversely affected.

Natural attenuation implementation for the Site will require additional soil analyses, and analysis of additional constituents during routine groundwater monitoring in order to document the long-term natural attenuation process. There are no other major costs for this option other than initial modeling and additional monitoring costs over a much longer period of time as compared to other more active remediation alternatives.

The time to remediate the Site of all NAPL using natural attenuation alone is estimated to be on the order of at least 100 years. This estimate is based on studies of similar contaminant settings in the San Diego Bay area (Dames & Moore, 1997a and 1997b). Because of the current development plans of this site, this remediation alternative by itself does not appear to be appropriate for the site.

7.2 Vapor Extraction/Dual Phase Extraction

A vapor extraction test was performed at the Site in 1994 (VET, 1994). The test showed that significant quantities of hydrocarbon vapor were extractable from the wells in the area of the greatest soil and groundwater contamination. These data indicate that vapor extraction of light-end hydrocarbons is a viable in-situ remediation alternative at this site.

Soil contamination below most of the capillary fringe and the water table is generally not extractable using vapor extraction alone. This is because the diffusion and volatilization of contaminants in water-saturated soil is exceedingly slow under most conditions of fine-grained soils. Therefore this technology would need to be

supplemented with dual phase extraction (Section 7.2.3) to meet the cleanup goals for soil below the current water table.

7.2.1 Vapor Extraction of Light-End Hydrocarbons

When a vapor extraction system is designed and constructed properly, it can be one of the most cost-effective methods of remediation for soils and groundwater affected by gasoline or other relatively volatile organic compounds. Generally, the light-end hydrocarbons (C11 and lighter) can be extracted by a vapor extraction system (VES). In order to properly design a system, which includes optimum placement of extraction wells and adequate sizing of extraction equipment, the Site subsurface conditions relating to vapor extraction first must be determined.

By applying a vacuum and removing hydrocarbon vapors from extraction wells, advective vapor flow is induced through the vadose zone and the capillary fringe. The contaminants volatilize from soil and/or groundwater and are transported as vapor to the extraction wells via the induced air flow.

Four main factors affect the performance of a vapor extraction system, and thus the total duration of site remediation. These factors are: 1) the physical and chemical properties of the contaminants; 2) concentrations of the contaminants throughout the vadose zone and in the groundwater; 3) the extracted vapor flow rates; and 4) the induced vapor flow-path in relation to the zone of soil and groundwater contamination. These factors are quantified in a feasibility test and are then used to design the appropriate vapor extraction system for the Site.

The wells at the subject site appear to be adequate in design and placement for initial VES remediation. It is anticipated that approximately 2 years of continuous VES operation would be required to remediate the light-end hydrocarbons at the Site.

7.2.2 Enhanced Bioremediation of Heavy-End Hydrocarbons

Enhanced bioremediation can be utilized to treat the heavy-end (C_{11} and heavier) hydrocarbons by providing oxygen to indigenous subsurface bacteria. This

enhancement occurs when an active vapor extraction system is utilized at the site. The introduction of atmospheric oxygen to the existing bacteria in soil stimulates microbial consumption of hydrocarbons. In general, the VES design consists of some site wells used as passive air inlet wells operated in conjunction with extraction wells. Atmospheric air is used as the medium to supply oxygen to the subsurface to cause an initial shift in the existing environment from anaerobic to aerobic, and eventually initiate aerobic biodegradation of the heavy-end hydrocarbons. Air inlet wells can be utilized primarily in passive mode since operation of the VES will induce airflow into the wells.

Because this site showed good overall characteristics for vapor extraction during testing, it is anticipated that subsurface bioremediation of heavy-end hydrocarbons will also occur as a result of any active VES operation. Remediation of heavy-end hydrocarbons will probably require more than 5 years to reach cleanup goals.

7.2.3 Dual Phase Extraction

Dual phase extraction has proved to be an effective groundwater clean-up method at other similar sites. This method involves pumping groundwater from the same wells that are undergoing vapor extraction. Groundwater levels are then depressed and vapors are extracted from the capillary fringe and below the static water table. The principle advantages of this alternative include proven effectiveness and relatively inexpensive equipment technology.

The disadvantages to this method include the treatment and disposal of water extracted. In addition, the extraction system may induce groundwater flow from an adjacent property onto the Site bringing with it other contaminants. Also, because groundwater is lowered and occasionally raised (due to system down-time) there is the potential for creating a hydrocarbon smear zone in the clayey soils near the groundwater table. Based on historical water level and free product monitoring, it appears that a smear zone may already be present at the site.

Because the Site showed overall favorable results during the vapor extraction test, remediation of LNAPL trapped in the capillary fringe and below the water table

may be viable using dual phase extraction technology. It is anticipated that cleanup goals could be achieved using dual phase extraction within 4 years.

7.3 Air Sparging with Vapor Extraction

Air sparging with vapor extraction has not been field-tested at the site. Therefore, its appropriateness for site cleanup cannot be evaluated with certainty. Evaluation of soil parameters such as porosity, clay content, and permeability suggest that the soil below the water table at the Site may be appropriate for air sparging. Nevertheless, the technology requires numerous wells, is labor intensive, and requires one or more years to typically achieve cleanup goals. Current site development plans may preclude its use at the Site.

Air sparging has been applied successfully to remediation projects. This method involves the injection of air below the groundwater table. The injected air then strips the dissolved-phase hydrocarbons from the groundwater and the hydrocarbon vapors are removed via nearby vapor extraction wells.

The principal advantages of this system include no groundwater removal or disposal, and only relatively simple technology is required. Once the system is installed, operation and maintenance is normally relatively minimal.

The disadvantages of this system include the potential need for long term and expensive field testing. Also, the system may not properly control or contain the plume, and does not always work well in clayey aquifers. In clayey aquifers, the injected air rapidly channels within the formation in a close radius (as little as 3 feet) to the injection well bore. The net result is favorable vapor recovery for only a short initial period, followed by poor vapor recoveries after the injected air paths and channels have stabilized in the formation. The only known practical solution to this problem is to install numerous closely spaced wells.

Because an air sparge test has not been performed at the Site, the ability to remediate LNAPL trapped in the capillary fringe and below the water table is uncertain

by this technology. It is anticipated that, if implemented, cleanup goals may be achieved using air sparging/vapor extraction within 4 years.

7.4 Soil Excavation and Disposal

Excavation and disposal of soil is an effective cleanup alternative if site conditions and future site use are favorable. Soil would be excavated using conventional equipment and transported off-site for disposal and/or treatment. Hydrocarbon impacted soil can be disposed of or recycled at a number of local permitted treatment facilities

Soil excavation would focus on the "hot spots" of hydrocarbons above and below the water table that have the potential to yield mobile LNAPL. Shoring may be required if there is a potential to compromise site feature and neighboring structures during excavation operations. Groundwater could be pumped using a vacuum truck when excavating soil below the water table to aid in removing mobile LNAPL.

The advantages of excavation are that the "hot-spots" and areas of LNAPL can be completely excavated and removed from the Site thereby removing the onsite sources of the contamination. To achieve this, the depth of excavation would need to be approximately 21 feet. Excavation of contaminated soil above 10 feet bgs could be coordinated with site development activities. Excavation for a basement or parking garage would remove some of the contaminated soil at the site. In addition, current site use would not be disrupted solely for site remediation because new site development would close the current site use at the time of excavation.

The disadvantages of excavation are the excavation process can be extremely disruptive to any onsite activities or installations. There is a potential for disruption and nuisance from excavation equipment, transporting equipment, dust, and odors. Contaminated soil cannot be excavated beyond the Site boundaries and as a result residual contamination at concentrations exceeding cleanup goals may be inaccessible. In addition, shoring may be required to excavate soil close to the property boundaries. Dissolved-phase contaminants in groundwater just outside of the excavation boundaries would not be affected. This contamination, if present upgradient of the Site, may continue to flow onto the Site. Excavation will be ineffective in protecting human health

from vapors emanating from contamination that may migrate onto the Site from off-site sources.

Based on the Site conditions and future site use, excavation appears to be a viable remedial alternative to remove LNAPL in soil above and below the water. It is anticipated that cleanup goals could be achieved using excavation within six months.

7.5 Vapor Control System

A vapor control system could consist of a cap covering the entire Site, horizontal extraction piping, and horizontal inlet piping (Figure 2). The cap would consist of one or more of the following elements: soil cover, horizontal geomembrane, and asphalt or concrete cover. The gas extraction piping would allow the removal of vapors that may accumulate beneath the structures of the proposed development. Vapors would be extracted either passively or actively. If required, extracted vapors would be treated using either vapor-phase carbon, or catalytic or thermal oxidation. Discharge of treated vapors to the atmosphere may require an air discharge permit or an exemption for a stationary source. Routine air monitoring and reporting would be a condition of the air discharge.

Air inlet piping could be installed around the perimeter of the property so that the influence of the gas extraction system would be limited to the Site. This would ensure that gas extraction at the Site does not pull in vapors from off-site sources. A geomembrane would be installed above the gas extraction piping to mitigate potential theoretical risk from exposure to hydrocarbon vapors. The purpose of this layout is to vent and extract vapors that may accumulate beneath the geomembrane while the geomembrane is intended to inhibit the vertical migration of vapors into the subsurface parking structure.

Air monitoring sensors could be placed throughout the Site. If the concentrations of methane and/or volatile non-methane constituents (such as benzene) exceed predetermined set points, the gas extraction and treatment system would be activated.

Vapors extracted during the operation of the vapor control system would also initiate cleanup of the Site similar to what would be achieved using the vapor extraction remedial alternative. The gas extraction system would be effective in removing volatile hydrocarbons from the subsurface, therefore removing the on-site source. Second, the oxygen provided by the air inlet piping would also serve to promote and enhance natural biodegradation.

The advantages of the vapor control and monitoring system is that it would reduce the risk associated with the accumulation of benzene and methane beneath the site. This extraction process may enhance natural bioremediation and decrease the level of soil and groundwater contamination beneath the Site. The gas control system will be designed to short circuit vapors that may migrate onto the Site from upgradient sources as well as vapors that may migrate off-site. Finally, irrespective of increases or decreases in the chemical quality of groundwater, the vapor control system would operate at a level to protect human health thus eliminating the need for groundwater monitoring.

The disadvantages of the vapor control system are that an air permit may be required to vent, treat and discharge into the atmosphere vapors that may accumulate beneath the development. Accordingly, monitoring of the effluent of subsurface sensors may be required on a routine basis. It was assumed that manual air monitoring would be performed at the site for 10 years. The vapor control system is not an active remediation system and depends on diffusion as the method by which the site would be remediated. In as much, the vapor control system is intended to protect human health and not remediate the site. Lastly, the vapor control system by itself will be ineffective in remediating mobile LNAPL at the site.

Based on the future site use, a vapor control system appears to be a viable remedial alternative to protect human health. The vapor control system could be installed during site development operations. Operation and maintenance of the vapor control system would be performed for at least 10 years.

7.6 Excavation and Vapor Control System

A combination of both excavation and a vapor control system appears to be a viable remedial alternative to remove "hot spots" and protect human health, respectively. These alternatives could be implemented in conjunction with site development operations. This combined alternative could achieve cleanup goals more quickly than any other alternative.

Excavation of "hot spots" would serve to remove soil above and below the water table that has the potential to yield mobile LNAPL. The vapor control system would passively vent vapors that may accumulate beneath the proposed development. The vapor control system and associated geomembrane would protect human health from potential exposure to hydrocarbon vapors and decrease the potential for fires and explosions from methane.

7.7 Summary

Based on this evaluation of the effectiveness, implementability, and cost of various remedial alternatives, the excavation and vapor control system alternative appears to be the best-suited remedial alternative for the Site. This combination of remedial alternatives will be effective and can be implemented during site development operations.

8. PROPOSED REMEDIATION DESIGN AND SCOPE OF WORK

8.1 Excavation and Vapor Control System

The scope of work and associated cost for excavation and the vapor control system are described in this section. The scope of work and remediation design described herein are based on the proposed residential development planned for the Site. If the proposed development is not implemented, the cleanup goals and associated site remediation should be re-evaluated. The proposed remediation plan consists of excavating hydrocarbon impacted soil exceeding cleanup goals and installing a sub-grade vapor control system.

Five areas were identified where residual concentrations of hydrocarbons exceed cleanup goals and soil remediation appears to be warranted (Figure 1). Three of the excavations will extend from ground surface to a maximum depth of approximately 21 feet bgs. Because Areas D and E are small, these areas will be remediated using large diameter borings. These areas represent localized zones where free product has been detected historically. One 4-foot diameter boring will be drilled in each area to a total depth of 21 feet below land surface. Temporary casing will be installed in each boring to facilitate total fluids extraction. The extent and depth of the soil excavation in each area is summarized on Figures 1 and 3. The estimated volume of contaminated soil in each area is summarized in Table 1.

Shell Oil Company, located at 148 Market Street, implemented excavation as the preferred remedial alternative (Kleinfelder, 1996). The quantity of soil removed and the total lateral and vertical extent of the excavation were similar to that planned for the Site.

After the impacted soil within the specified areas has been removed and the excavation has been compacted, the vapor control system will be installed. The vapor control system will consist of a passive vapor extraction system and a horizontal geomembrane system (Figure 2). This design is intended to minimize vapors that may potentially migrate into the subsurface parking lot. The vapor control system is also designed to minimize the potential for off-site migration of vapors as well as the on-site migration of vapors from off-site sources. The vapor control system will also decrease

the potential for fire and explosion hazards due to the accumulation of methane that has been detected at the Site.

The costs presented below are estimates only. Actual costs will depend on the selection of contractors, and the extent to which site restoration operations can be coordinated with development activities.

	ITEM	ESTIMATED COST
A.	**Site Preparation**	
1.	Abandon 11 monitor wells. ($2,000/well)	$22,000
2.	Shoring from 0 to 10 feet bgs in areas where excavation is near streets and buildings (140 linear feet, 1,400 square feet at $40/sq.ft.).	$56,000
3.	Shoring below 10 feet (150 linear ft, 1,500 sq. ft. at $25/sq. ft.).	$37,500
	Subtotal	**$115,500.00**
B.	**Excavation and Disposal**	
1.	Excavate, load, transport and disposal of contaminated soil above 10 feet bgs **below cleanup goals** (2,300 tons at $50/ton).	$115,000
2.	Excavate, load, transport and disposal of contaminated soil above 10 feet bgs **exceeding cleanup goals** (700 tons at $50/ton).	$35,000
3.	Excavate, load, transport, disposal of contaminated soil below 10 feet bgs **below cleanup goals** associated with footings for structure (550 tons at $50/ton).	$27,500
4.	Excavate, load, transport, disposal of contaminated soil **exceeding cleanup goals** below 10 feet. Import clean fill, backfill and compact (2,800 tons at $65/ton).	$182,000
5.	Dewatering and transportation using vacuum truck (5 days at $3,100/day).	$15,500
6.	Disposal of contaminated groundwater including washout (25,000 gallons at $.50/gallon).	$12,500
7.	Consulting and Laboratory Fees (35 days at $3,500/day).	$122,500
	Subtotal	**$510,000.00**

C.	**Vapor Control System**	
1.	Barrier system (20,000 sq. ft. of 60 mil HDPE geomembrane).	$80,500
2.	Passive gas extraction system (gravel layer, piping, valves, 8 oz. geotextile, and turbines).	$10,500
3.	Manual gas monitoring system (installation of 4 monitoring points and access vaults).	$5,100
4.	Manual gas migration monitoring system (2 perimeter probes).	$3,500
5.	Design, construction quality assurance/management, and project management.	$69,500
	Subtotal	**$169,100.00**

D.	**Monitoring, Operation and Maintenance**	
1.	Manual monitoring of vapor barrier system ($5,500/year for 10 years, assumes no O&M or treatment of effluent required).	$55,000
	Subtotal	**$55,000**

SUMMARY OF COSTS

A.	**Site Preparation**	**$115,500**
B.	**Excavation**	**$510,000**
C.	**Vapor Control System**	**$169,100**
D.	**Monitoring, Operation and Maintenance**	**$55,000**
	Grand Total	**$849,600.00**

9. REFERENCES

Applied Consultants, April 6, 1989. Site Assessment Investigation. 235 Market Street, San Diego, California

Applied Hydrogeologic Consultants, May 1987. Final Report Subsurface Hydrocarbon Plume Investigation Near Martin Luther King Way and First Avenue, San Diego, California.

Dames & Moore, February 21, 1997. Corrective Action Plan: Case Closure (Revised), Unauthorized Release Case No. H00397-001, Hydrocarbon Recovery System, Mission Brewery Plaza, 1751 Hancock Street, San Diego, California.

Dames & Moore, May 19, 1997. Corrective Action Plan – Response to CRWQCB Questions, Unauthorized Release Case No. H00397-001, Hydrocarbon Recovery System, Mission Brewery Plaza, 1751 Hancock Street, San Diego, California.

Environmental Science & Technologies, Inc., 1990. ARMOS, Areal Multiphase Organic Simulator for Free Phase Hydrocarbon Migration and Recovery, Users Guide, Version 2.2. Blacksburg, Virginia.

Geomatrix Consultants, September 14, 1998. Semi-Annual Report for Floating Product, January – July 1998, Remediation and Groundwater Monitoring, Marina Redevelopment Area, San Diego, California.

Geomatrix Consultants, September 6, 1995. 1995 Semi-Annual Report for Floating Product Remediation and Groundwater Monitoring, Marina Redevelopment Area, San Diego, California.

Geomatrix, January 25, 1994. Draft 1994 Annual Report for Floating Product Remediation and Groundwater Monitoring Marina Redevelopment Area San Diego, California.

Kleinfelder, August 30, 1996. Corrective Action Plan, GTF Properties and Shell Oil Product Company, 148 Market Street, San Diego, California.

Leighton and Associates, Inc., April 24, 1990. Excavation/Installation of Five Monitoring Wells. 235 Market Street, San Diego, California.

Leighton and Associates, Inc. April 26, 1990. Final Phase II Site Assessment of Subsurface Soil and Groundwater Conditions. 235 Market Street, San Diego, California.

Leighton and Associates, Inc. October 30, 1989. Site Assessment of Subsurface Soil and Groundwater Conditions. 235 Market Street, San Diego, California.

San Diego County Department of Environmental Health, Site Assessment and Mitigation Division (SAM), 1999. SAM Manual updates downloaded from DEH web site. January 1999.

San Diego Regional Water Quality Control Board, July 22, 1998. Regional Board Supplemental Instructions & Interim Guidance on Required Cleanup at Low Risk Fuel Contaminated Sites: Appendix A – Guidance on Data Collection Requirements for the Evaluation of Residual Free Product or Light Non-Aqueous Liquid (LNAPL) on Groundwater.

San Diego Regional Water Quality Control Board, July 10, 1998. Letter re: Workplan for Fire, Explosion, and Vapor Risk Assessment, Former Unocal/Golden West Hotels Station #2651 at 235 Market Street, San Diego dated April 29, 1998.

San Diego Regional Water Quality Control Board, November 7, 1996. Letter re: Vapor Extraction Technology, Inc.'s Corrective Action Plan for 235 Market Street, San Diego dated September 30, 1996.

San Diego Regional Water Quality Control Board, April 1, 1996. Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites (Replaces February 29, 1996 version).

San Diego Regional Water Quality Control Board, September 6, 1995. Response letter to VET's letter dated June 8, 1995 and Unocal's letter dated July 31, 1995.

San Diego Regional Water Quality Control Board, May 17, 1995. Letter Re: Vapor Extraction Technology, Inc.'s Remedial Action Plan dated 1/31/95, Former Unocal Station #2651, 235 Market Street, San Diego, CA.

Vapor Extraction Technology, Inc., August 4, 1998. Addendum to Workplan for Fire, Explosion, and Vapor Risk Assessment, Former Unocal Station #2651, 235 Market Street, San Diego, CA.

Vapor Extraction Technology, Inc., April 29, 1998. Workplan for Fire, Explosion, and Vapor Risk Assessment, Former Unocal Station #2651, 235 Market Street, San Diego, CA.

Vapor Extraction Technology, Inc., September 30, 1996. Corrective Action Plan for 235 Market Street, San Diego.

Vapor Extraction Technology, Inc., March 12, 1996. Workplan to Determine Site-Specific Soil Cleanup Levels, 235 Market Street, San Diego, California.

Vapor Extraction Technology, Inc., January 31, 1995. Remedial Action Plan for Hydrocarbon-Affected Site, 235 Market Street, San Diego, California.

Vapor Extraction Technology, Inc., August 26, 1994. Vapor Extraction Feasibility Test Report. 235 Market Street, San Diego, California.

Unocal Corporation. April 28, 1998. Plans for Revisions to Corrective Action Plan, Former Unocal Station #2651, 235 Market Street, San Diego, CA.

TABLE 1

ESTIMATED QUANTITY OF CONTAMINATED SOIL AND LNAPL

FORMER UNOCAL STATION #2651

235 MARKET STREET, SAN DIEGO, CA

AREA LOCATION	DEPTH (feet bgs)	LENGTH (feet)	WIDTH (feet)	THICKNESS (feet)	CUBIC FEET SOIL	CUBIC YARDS SOIL	TONS SOIL, EXCEEDING CLEANUP LIMITS	POUNDS SOIL, EXCEEDING SOIL CLEANUP LIMITS	Average Concentration of TPHg above Csat, (mg/kg)	Total Pounds of TPH in Soil	Gallons of LNAPL in Soil
A	2.5-17.5	50	20	15	15,000	556	889	1,777,778	6,305	11,209	1,779
B	7.5-12.5	45	45	5	10,125	375	600	1,200,000	6,500	7,800	1,238
C	7.5-21	45	45	13.5	27,338	1,013	1,620	3,240,000	3,500	11,340	1,800
D	17.5-21	20	15	3.5	1,050	39	62	124,444	3,000	373	59
E	17.5-21	15	20	3.5	1,050	39	62	124,444	3,000	373	59
					Site Total:	**2,021**	**3,233**	**6,466,667**		**31,096**	**4,936**

NOTES:

1. Represents LNAPL above and below water table.
2. Total volume of LNAPL is based on total mass of TPHg is not necessarily all mobile LNAPL.
3. Quantities given are those that exceed the proposed cleanup limits for hydrocarbons in soil at the site (Appendix B).
4. Refer to Figure 1 showing the "contaminated areas" of the site.
5. Conversion factors used: ton/cubic yard soil = 1.6; pound/gallon gasoline (LNAPL) = 6.3.

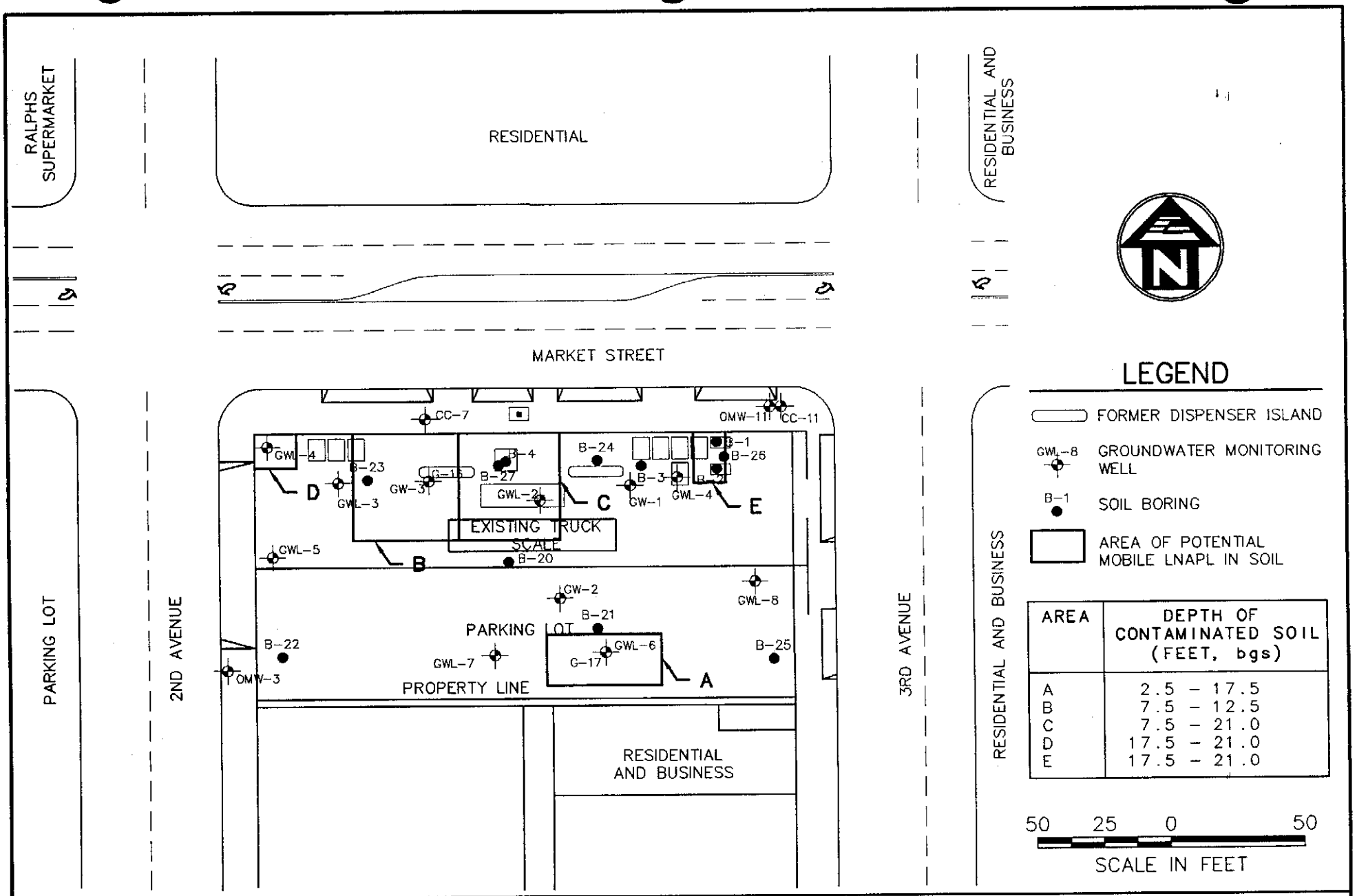
TABLE 2
EVALUATION OF REMEDIAL ALTERNATIVES
FORMER SERVICE STATION #2651

ALTERNATIVE	DESCRIPTION	ADVANTAGES	DISADVANTAGES	DURA-TION*	EFFECTIVE-NESS	CAPITAL COST	O&M COST PER YEAR	TOTAL O&M COST	TOTAL COST
				Years		(Includes field tests)	(Includes utilities)	Includes GW monitoring	
1. Natural Attenuation	Hydrocarbons are eliminated by natural biological processes in the soil and groundwater. **System Requirements:** None	1. Nonintrusive technology. 2. Low cost. 3. Effects entire plume, even below buildings.	1. Not effective under very high contaminant concentrations. 2. Longer cleanup times required. 3. Some site conditions may not be conducive to the process. 4. Does not protect human health.	20	POOR	$20,000	$8,000	$160,000	$180,000
2. Vapor Extraction/Dual Phase Extraction	Vapors, LNAPL, and groundwater extracted from wells screened in both vadose zone, capillary fringe, and water table. Hydrocarbon vapors in range of C1 to C11 abated with thermal oxidation. Hydrocarbons in range of C11 and higher destroyed in-situ by natu **System Requirements:** VES; thermal oxidizer, fluid separator; tanks; air stripper; carbon filters; pumps; field tests; APCD and NPDES permits.	1. VES is easily installed at the site. 2. Effective in cleanup of soil, LNAPL, and groundwater. 3. Technology is proven and readily available. 4. Would be protective of human health while in operation.	1. VE does not work well on low-permeable soils, such as clay and silt. 2. High O&M costs due to two separate treatment systems. 3. Discharge permits for air and groundwater required. 4. May pull in contaminated vapor and groundwater from off-site sources.	2	FAIR TO POOR	$186,000	$70,000	$140,000	$326,000
3. Vapor Extraction with Air Sparging	Air is injected at a point below water table through several injection wells at the site. This volatilizes contaminants in groundwater which are then extracted at vapor extraction wells. **System Requirements:** VES; Thermal oxidizer; specific injection wells; hard piping; injection blower.	1. If VES is already at the site, the additional sparge equipment is minimal. 2. Proven effective at some sites. 3. Site disruption is minimal. 4. Groundwater pumping/disposal not required.	1. Does not work well in low permeable aquifers. 2. May require extensive field tests to properly evaluate effectiveness. 3. Will inhibit site development operations.	6	FAIR	$350,000	$92,000	$552,000	$902,000
4. Soil Excavation and Disposal (Includes 10 years of groundwater monitoring)	Soil is completely excavated over a period of 4 to 8 weeks. Excavation is performed at time of site development. Excavated soil transported off-site for treatment and disposal. LNAPL and groundwater will be pumped from excavations below the water table **System Requirements:** Conventional excavation equipment	1. Can immediately remove hot spots of contaminated soil and LNAPL. 2. Costs are substantially reduced if performed concurrently with site development.	1. Can be disruptive during excavation and loading. 2. May require shoring near street and buildings. 3. May not be able to remove contaminated soil under street and buildings, and where limited by shoring. 4. Will not remediate dissolved phase hydrocarbons.	10	FAIR TO GOOD With Shoring	$586,400 $679,900	$8,800 $8,800	$88,000 $88,000	$674,400 $767,900

TABLE 2
EVALUATION OF REMEDIAL ALTERNATIVES
FORMER SERVICE STATION #2651

ALTERNATIVE	DESCRIPTION	ADVANTAGES	DISADVANTAGES	DURA-TION*	EFFECTIVE-NESS	CAPITAL COST	O&M COST PER YEAR	TOTAL O&M COST	TOTAL COST
				Years		(Includes field tests)	(Includes utilities)	Includes GW monitoring	
5. Vapor Control System (Includes 10 years of operation and maintenance)	Consists of vapor barrier (geomembrane) and passive vapor extraction system. Geomembrane will be placed on the base and up the sides of the excavation for the subsurface parking lot. Vapor extraction piping will be placed below geomembrane. **System Requirements:** Geomembrane and passive vapor extraction system.	1. Risk management alternative. 2. Will reduce risk to human health from benzene and fire and explosion hazard. 3. Will enhance natural attenuation.	1. Air permit and monitoring may be required. 2. Manual monitoring of system effectiveness. 3. Will not remove LNAPL. 4 Requires integrating design into development.		FAIR TO GOOD	$114,100	$5,500	$55,000	$169,100
6. Excavation and Vapor Control System (Includes 10 years of operation and maintenance)	Combination of Alternatives 4 and 5. **System Requirements:** Conventional excavation equipment, geomembrane, and passive vapor extraction system.	1. Can remove the majority of the contaminated soil and LNAPL. 2. Can provide highest level of protection to human health. 3. Can be performed concurrently with site development. 4. Soil/LNAPL remediation performed in the shortest time period.	1. Can be disruptive to site development operations. 2. May require shoring near street and buildings. 3. Will not be able to remove residual LNAPL under street and buildings.	10	GOOD	$700,500	$5,500	$55,000	$755,500
					With Shoring	$794,000	$5,500	$55,000	$849,000

NOTE: * Assumes continuous, 100% operation time.
Capital costs include design, installation, and construction quality assurance
Costs assume today's dollars not adjusted for inflation.



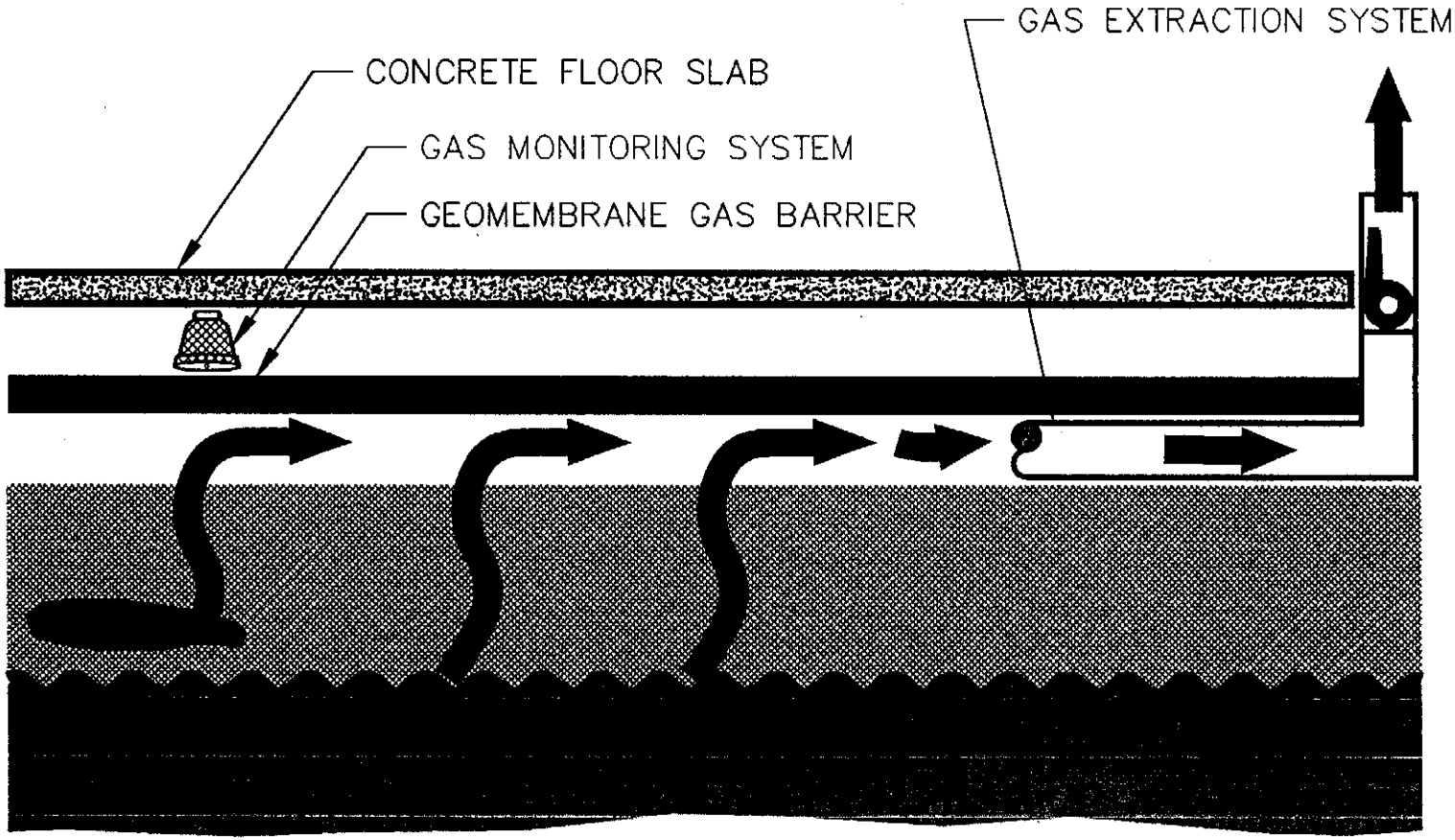
AREA	DEPTH OF CONTAMINATED SOIL (FEET, bgs)
A	2.5 – 17.5
B	7.5 – 12.5
C	7.5 – 21.0
D	17.5 – 21.0
E	17.5 – 21.0

GEOSYNTEC CONSULTANTS

AREAS OF CONTAMINATED SOIL
FORMER UNOCAL STATION #2651
SAN DIEGO, CALIFORNIA

FIGURE NO.	1
PROJECT NO.	HS0257-01
DATE:	20 NOV 1998

DWG: 0257F003.DWG 199812010815 LP



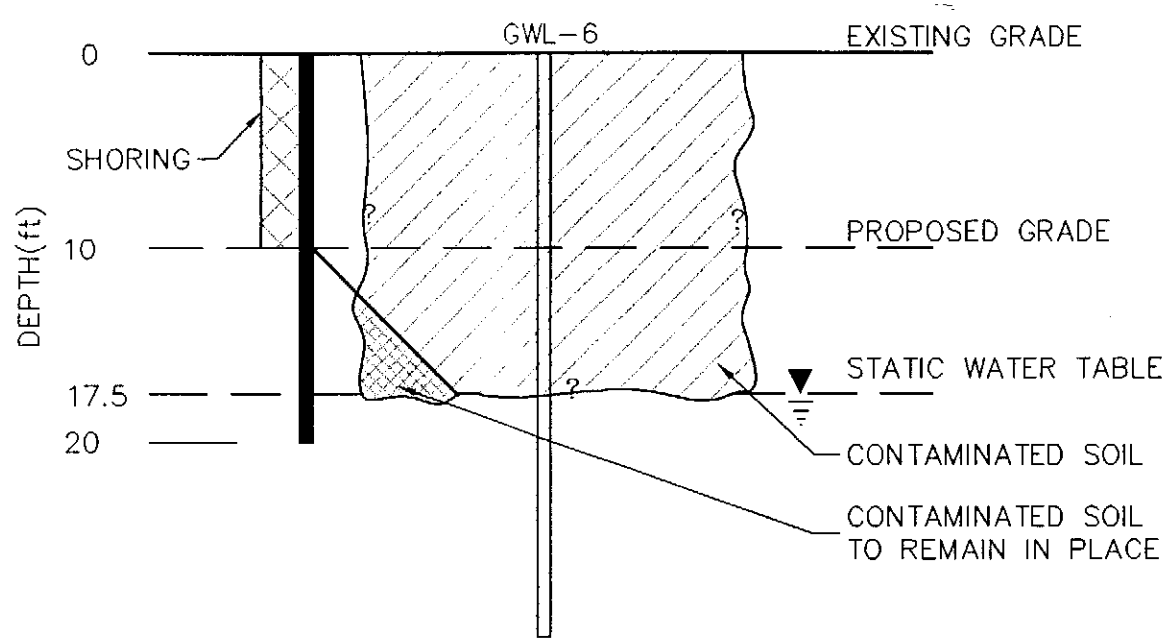
GEOSYNTEC CONSULTANTS

CONCEPTUAL DESIGN VAPOR CONTROL SYSTEM
FORMER UNOCAL STATION #2651 235 MARKET ST.
SAN DIEGO, CALIFORNIA

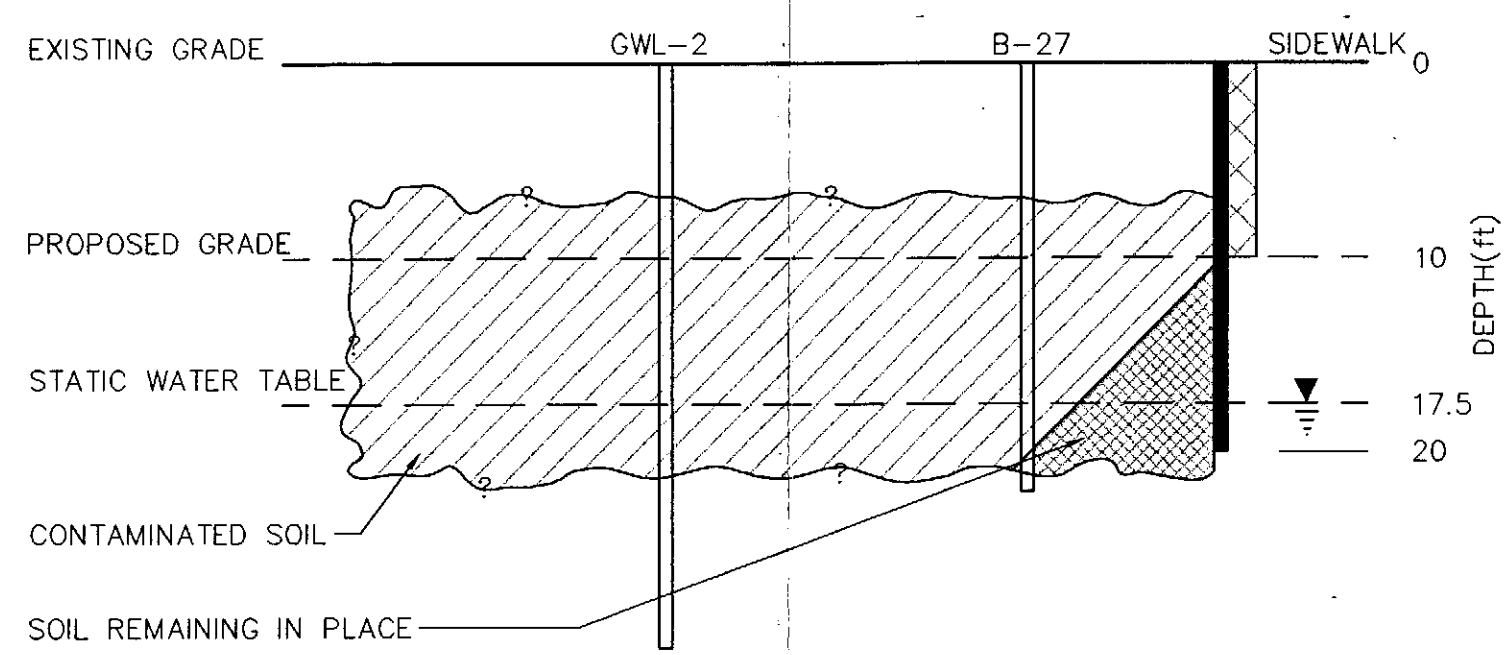
FIGURE NO.	2
PROJECT NO.	HS0257-02
DATE:	13-NOV-98

DWG: 0257F001.DWG 199811101327 LP

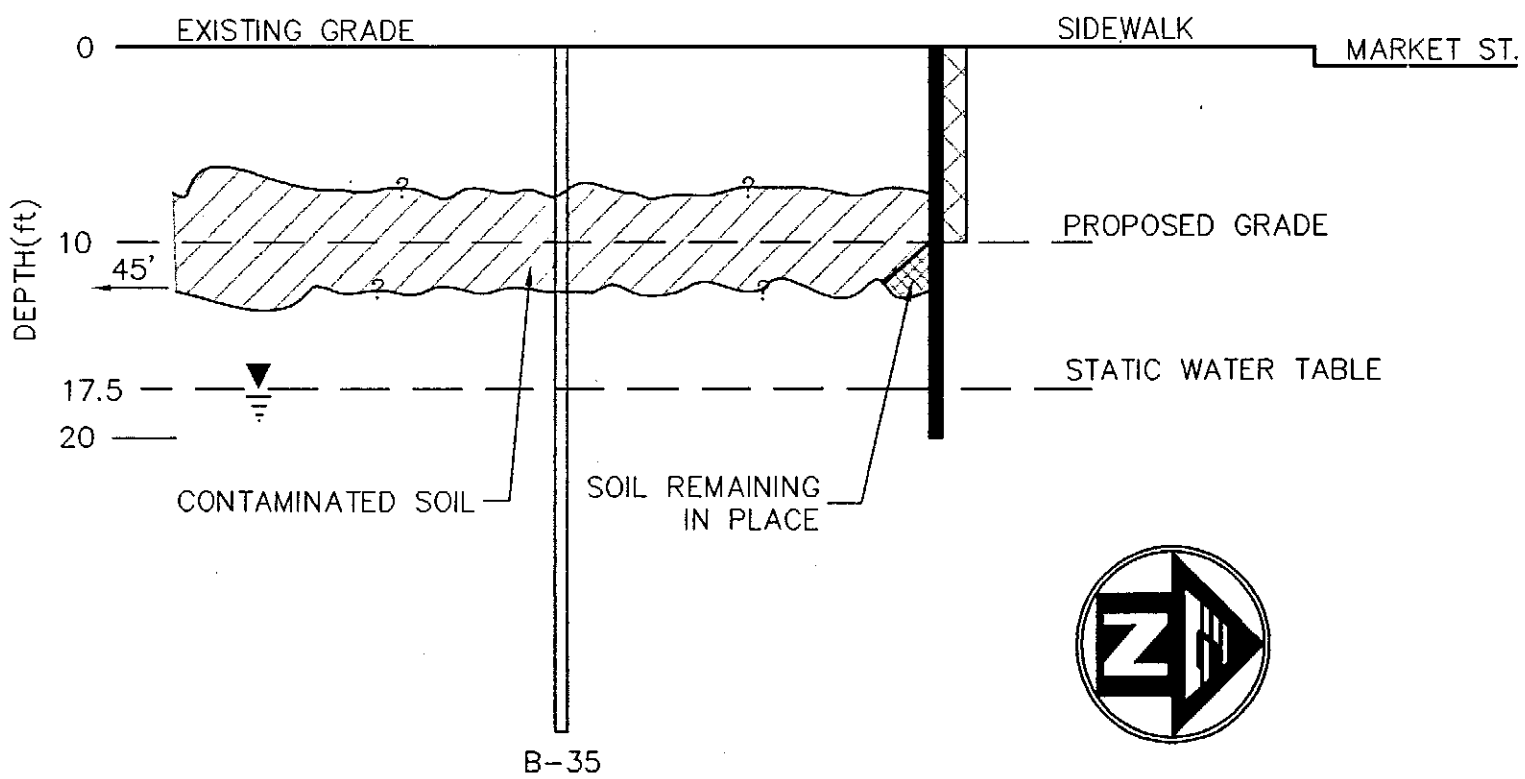
AREA A

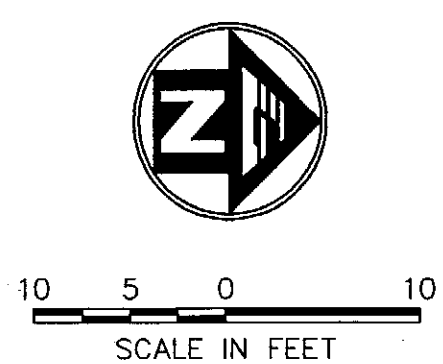


AREA C



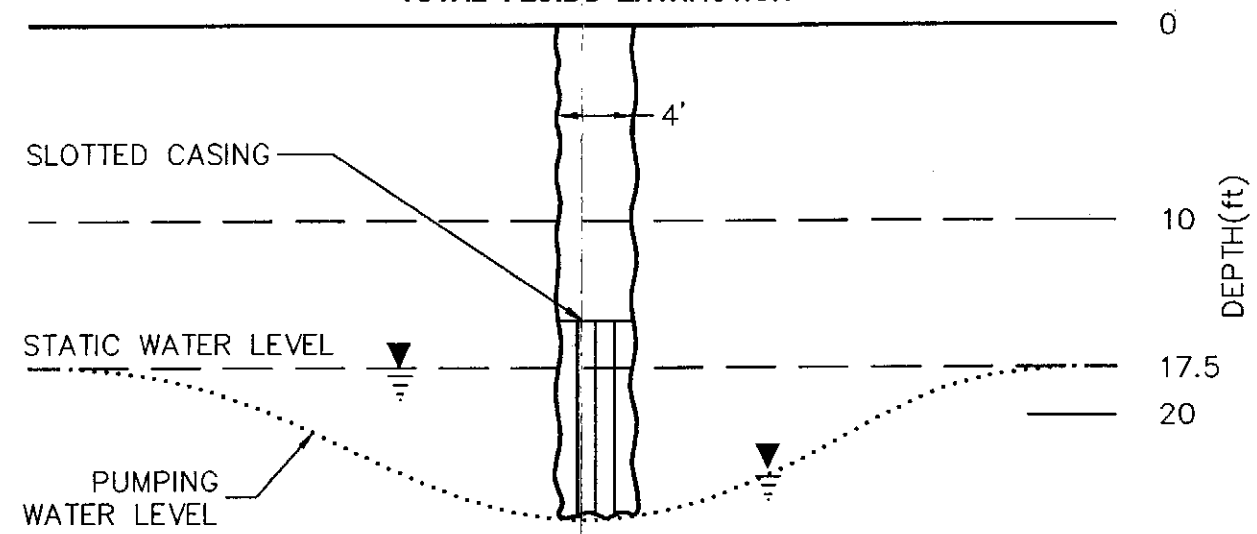
AREA B





AREAS D&E

DRILLED EXCAVATION WITH TOTAL FLUIDS EXTRACTION



GEOSYNTEC CONSULTANTS

EXCAVATION CROSS SECTIONS
FORMER UNOCAL STATION #2651
235 MARKET ST.
SAN DIEGO, CALIFORNIA

FIGURE NO.	3
PROJECT NO.	HS0257-01
DATE:	NOVEMBER 11 1998

DWG: M:\HS0257\FIGURES\0257F002.DWG 11111998 IC

APPENDIX A

TABLES AND FIGURES FROM VAPOR EXTRACTION TECHNOLOGY, INC.

TABLE 1
SOIL ANALYTICAL RESULTS SUMMARY
UNOCAL STATION #2651

SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
BORING AND WELL INSTALLATION SAMPLES:														
12/4/86	CC-7	17	na	6800.0	na	C6 - C20	100	4.2	97	250	na	na	na	AHC, 5/87
2/9/87	CC-11	18	na	ND<5	na	na	ND<1	ND<1	ND<1	ND<1	na	na	na	AHC, 5/87
											na	na		
3/13/89	GW-1 (B1-S1)	2	na	270.0	740	na	240	40000	12000	20000	na	na	na	AC, 4/89
3/13/89	GW-1 (B1-S3)	10	na	1.6	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-1 (B1-S4)	13	na	ND<1	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-1 (B1-S5)	18.5	na	8.5	660	na	na	na	na	na	na	na	na	AC, 4/89
3/13/89	GW-2 (B2-S2)	5	na	ND<1	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-2 (B2-S3)	10	na	ND<1	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-2 (B2-S4)	15	na	650.0	540	na	970	9900	ND<30	17000	na	na	na	AC, 4/89
3/13/89	GW-2 (B2-S6)	18	na	61.0	76	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-3 (B3-S1)	2	na	ND<1	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-3 (B3-S2)	5	na	1.1	ND<10	na	ND<30	ND<30	ND<30	ND<30	na	na	na	AC, 4/89
3/13/89	GW-3 (B3-S3)	10	na	ND<1	ND<10	na	76	1700	ND<30	2200	na	na	na	AC, 4/89
3/13/89	GW-3 (B3-S4)	15	na	920.0	640	na	690	6100	ND<30	14000	na	na	na	AC, 4/89
1989	B-1, #1	5	na	na	87	C9-C18 (D)	0.033	0.16	0.19	0.25	na	na	na	L&A, 10/89
1989	B-1, #2	10	na	na	5000	C6-C18 (D)	0.15	0.6	ND<0.025	7.1	na	na	na	L&A, 10/89
1989	B-1, #3	15	na	na	3200	C6-C17 (D)	0.11	2.3	ND<0.025	8	na	na	na	L&A, 10/89
1989	B-1, #4	19	na	8800.0	na	C6-C15 (G)	ND<0.025	8.3	11	12	na	na	0.8	L&A, 10/89
1989	B-2, #1	5	na	na	5200	C8-C17 (D)	0.11	ND<0.025	4.3	2.43	na	na	na	L&A, 10/89
1989	B-2, #2	10	na	ND<5	na	na	ND<0.025	ND<0.025	ND<0.025	ND<0.025	na	na	na	L&A, 10/89
1989	B-2, #3	15	na	na	4400	C7-C18 (D)	0.03	ND	0.4	1.3	na	na	na	L&A, 10/89
1989	B-2, #4	19	na	8600.0	na	C6-C17(G)	1.5	ND<0.025	5.5	9.8	na	na	0.4	L&A, 10/89
1989	B-3, #1	5	140	na	na	na	ND<0.025	0.12	0.14	0.76	na	na	na	L&A, 10/89
1989	B-3, #2	10	9	na	na	na	ND<0.025	ND<0.025	ND<0.025	ND<0.025	na	na	na	L&A, 10/89
1989	B-3, #3	15	9	na	na	na	ND<0.025	ND<0.025	ND<0.025	ND<0.025	na	na	na	L&A, 10/89
1989	B-3, #4	19	1200	na	na	na	ND<0.025	2.2	3.4	6.6	na	na	ND<0.3	L&A, 10/89
1989	B-4, #1	5	na	260.0	na	C6-C14 (G)	0.64	0.26	4.8	7.5	na	na	na	L&A, 10/89
1989	B-4, #2	10	na	9200.0	na	C6-C14 (G)	2	260	ND<0.025	820	na	na	na	L&A, 10/89

TABLE 1
SOIL ANALYTICAL RESULTS SUMMARY
UNOCAL STATION #2651

SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
1989	B-4, #3	15	na	860.0	na	C6-C14 (G)	0.6	23	15	79	na	na	na	L&A, 10/89
1989	B-4, #4	19	na	1300.0	na	C6-C14 (G)	1.1	52	35	185	na	na	na	L&A, 10/89
1989	GWL-1 (MW-100)	10	na	2800.0	na	C6-C14 (G)	1.2	ND<0.025	14	80	na	na	na	L&A, 10/89
1989	GWL-1 (MW-100)	15	na	na	210	C6-C18 (D)	ND<0.025	ND<0.025	0.088	0.76	na	na	na	L&A, 10/89
1989	GWL-1 (MW-100)	19	na	na	6800	C6-C21 (D)	0.86	ND<0.025	6.9	37	na	na	ND<0.3	L&A, 10/89
1989	GWL-2 (MW-101)	10	na	6500.0	na	C6-C14 (G)	13	13	72	310	na	na	1.1	L&A, 10/89
1989	GWL-2 (MW-101)	15	na	1100.0	na	C6-C14 (G)	ND<0.025	25	20	108	na	na	na	L&A, 10/89
1989	GWL-2 (MW-101)	19	na	2800.0	na	C6-C14 (G)	2.3	57	37	197	na	na	na	L&A, 10/89
1989	GWL-3 (MW-102)	10	na	1000.0	na	C6-C14 (G)	0.58	13	14	83	na	na	na	L&A, 10/89
1989	GWL-3 (MW-102)	15	na	1800.0	na	C6-C14 (G)	4.3	81	46	230	na	na	ND<0.3	L&A, 10/89
1989	GWL-3 (MW-102)	19	na	1400.0	na	C6-C14 (G)	ND	34	26	138	na	na	na	L&A, 10/89
3/8/90	GWL-4	5	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/8/90	GWL-4	10	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/8/90	GWL-4	15	na	1500.0	na	na	2	46	18	85	na	na	ND<0.5	L&A, 4/90
3/9/90	GWL-5	5	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/9/90	GWL-5	10	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/9/90	GWL-5	15	na	ND<5.0	na	na	ND<0.025	ND<0.025	ND<0.025	ND<0.025	na	na	ND<0.3	L&A, 4/90
3/9/90	GWL-5	20	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/12/90	GWL-6	5	na	24000.0	na	na	ND<1.250	4.9	10	70	na	na	ND<0.3	L&A, 4/90
3/12/90	GWL-6	10	na	4200.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/12/90	GWL-6	15	na	9600.0	na	na	3.5	0.62	4.5	14	na	na	ND<0.3	L&A, 4/90
3/12/90	GWL-7	5	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/12/90	GWL-7	10	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/12/90	GWL-7	15	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/12/90	GWL-7	20	na	22.0	na	na	0.57	1.4	5.2	24	na	na	1.4	L&A, 4/90
3/13/90	GWL-8	5	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/13/90	GWL-8	10	na	ND<5.0	na	na	na	na	na	na	na	na	na	L&A, 4/90
3/13/90	GWL-8	15	na	ND<5.0	na	na	ND<0.025	ND<0.025	ND<0.025	ND<0.025	na	na	ND<0.3	L&A, 4/90

TABLE 1
SOIL ANALYTICAL RESULTS SUMMARY
UNOCAL STATION #2651

SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
8/11/98	B20	4	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B20	5	na	1.1	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B20	6.5	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B20	11	na	3.0	na	na	0.010	0.010	ND<0.010	ND<0.030	ND<0.070	na	na	This Report
8/11/98	B20	13.5	na	1.3	ND<5.0	na	0.078	0.0063	0.031	0.10	ND<0.035	na	na	This Report
8/11/98	B20	16.5	na	650	130	C8-C35 (D)	ND<2.0	12	16	90	ND<14	ND<0.25	na	This Report
8/11/98	B20	21	na	ND<1.0	ND<5.0	na	0.0074	0.0052	0.0089	0.017	ND<0.035	ND<0.005	na	This Report
8/11/98	B20	26	na	ND<1.0	na	na	ND<0.0050	0.011	0.0061	0.037	ND<0.035	na	na	This Report
8/11/98	B20	31	na	ND<1.0	na	na	0.010	0.070	0.039	0.22	ND<0.035	na	na	This Report
8/11/98	B21	5.5	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B21	10.5	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B21	15	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B21	21	na	2200	9.0	C8-C35 (D)	5.5	5.0	9.5	7.9	16	ND<0.05	na	This Report
8/11/98	B21	26	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/11/98	B21	31	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B22	5.5	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B22	10.5	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B22	15.5	na	750	na	na	1.7	28	19	100	ND<7.0	na	na	This Report
8/12/98	B22	21	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	ND<0.005	na	This Report
8/12/98	B22	26	na	84	6.8	C8-C37 (D)	ND<0.40	1.1	1.2	6.6	ND<2.8	ND<0.005	na	This Report
8/12/98	B22	31	na	ND<1.0	na	na	ND<0.0050	0.0073	ND<0.0050	0.023	ND<0.035	na	na	This Report
8/12/98	B23	5.5	na	520	na	na	3.6	ND<1.0	5.7	7.5	ND<7.0	na	na	This Report
8/12/98	B23	10.5	na	10000	8,200	C8-C40 (D)	120	ND<20	260	730	ND<140	na	na	This Report
8/12/98	B23	15.5	na	440	320	C8-C30 (D)	1.3	6.7	ND<1.0	14	ND<7.0	na	na	This Report
8/12/98	B23	21	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	ND<0.005	na	This Report
8/12/98	B23	26	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B23	31	na	2.8	na	na	0.020	ND<0.0050	0.047	0.079	ND<0.035	na	na	This Report
8/12/98	B23	35	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B24	5.5	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B24	10.5	na	ND<1.0	ND<5.0	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B24	15.5	na	210	200	C8-C28 (D)	ND<1.0	ND<1.0	1.1	ND<3.0	ND<7.0	na	na	This Report

TABLE 1
SOIL ANALYTICAL RESULTS SUMMARY
UNOCAL STATION #2651

SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
8/12/98	B24	21	na	1.2	31	C8-C27 (D)	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	ND<0.005	na	This Report
8/12/98	B24	26	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/12/98	B24	31	na	ND<1.0	na	na	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	na	na	This Report
8/13/98	B25	5.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B25	10.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B25	15.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B25	21	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B25	26	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	5.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	10.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	13.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	14	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	14.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	15	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	15.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	16	na	ND<20	na	na	ND<0.10	ND<0.10	ND<0.10	ND<0.30	ND<0.035	na	na	This Report
8/13/98	B26	16.5	na	34	24	C8-C38 (D)	ND<0.050	ND<0.050	ND<0.050	0.34	4.3	ND<0.025	na	This Report
8/13/98	B26	17	na	150	150	C8-C35 (D)	0.088	0.095	0.62	1.6	ND<0.035	na	na	This Report
8/13/98	B26	17.5	na	290	na	na	0.24	0.56	ND<0.20	6.2	6.6	ND<0.05	na	This Report
8/13/98	B26	18	na	440	580	C8-C30 (D)	0.53	1.2	ND<0.20	11	2.2	ND<0.25	na	This Report
8/13/98	B26	18.5	na	1300	1,100	C8-C24 (D)	1.7	1.2	3.5	1.4	ND<7.0	na	na	This Report
8/13/98	B26	19	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	19.5	na	ND<10	na	na	0.073	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	20	na	150	na	na	0.23	0.29	0.57	2.0	ND<0.70	na	na	This Report
8/13/98	B26	26	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	30.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	31	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	35.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B26	36	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B27	5.5	na	1900	96	C8-C38 (D)	3.0	13	46	220	ND<14	na	na	This Report
8/13/98	B27	10.5	na	3400	3,300	C8-C15 (D)	5.3	110	97	470	ND<14	na	na	This Report
8/13/98	B27	13	na	3800	na	na	5.0	66	120	490	11	na	na	This Report
8/13/98	B27	13.5	na	3400	1,200	C8-C38 (D)	ND<5.0	80	110	480	ND<14	na	na	This Report

TABLE 1
SOIL ANALYTICAL RESULTS SUMMARY
UNOCAL STATION #2651

SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
8/13/98	B27	14	na	880	na	na	7.6	21	45	130	0.42	na	na	This Report
8/13/98	B27	14.5	na	940	na	na	8.0	24	35	110	ND<7.0	na	na	This Report
8/13/98	B27	15	na	2000	110	C8-C35 (D)	16	110	72	350	15	ND<0.25	na	This Report
8/13/98	B27	15.5	na	1700	na	na	ND<4.0	62	45	250	ND<28	na	na	This Report
8/13/98	B27	16	na	3200	1,200	C8-C36 (D)	11	130	93	470	19	ND<0.25	na	This Report
8/13/98	B27	16.5	na	690	na	na	ND<1.0	29	19	99	ND<7.0	na	na	This Report
8/13/98	B27	17	na	850	na	na	ND<2.0	34	24	130	ND<14	na	na	This Report
8/13/98	B27	17.5	na	1500	na	na	3.1	88	40	220	ND<14	na	na	This Report
8/13/98	B27	18	na	3800	na	na	7.2	260	97	500	33	ND<5	na	This Report
8/13/98	B27	18.5	na	3400	780	C8-C18 (D)	30	180	88	470	32	ND<0.25	na	This Report
8/13/98	B27	19	na	3600	na	na	32	30	100	390	25	na	na	This Report
8/13/98	B27	19.5	na	2300	na	na	21	ND<4.0	72	220	25	na	na	This Report
8/13/98	B27	20	na	30	na	na	0.30	0.40	0.99	3.4	ND<0.70	na	na	This Report
8/13/98	B27	20.5	na	11	na	na	0.12	0.36	0.30	1.4	ND<0.14	na	na	This Report
8/13/98	B27	21	na	510	5.2	C8-C35 (D)	4.6	9.2	13	58	ND<7.0	na	na	This Report
8/13/98	B27	21.5	na	ND<10	na	na	ND<0.050	ND<0.050	ND<0.050	ND<0.15	ND<0.035	na	na	This Report
8/13/98	B27	22	na	160	na	na	1.1	4.1	4.2	19	ND<0.70	na	na	This Report
8/13/98	B27	22.5	na	16	na	na	0.16	1.0	0.54	2.6	ND<0.035	na	na	This Report
8/13/98	B27	23	na	ND<10	na	na	0.071	0.25	0.16	0.60	0.037	na	na	This Report

NOTES: ND = Not detected at or above laboratory detection limits; TPH = Total petroleum hydrocarbons, by EPA Method 8015; BTEX analyzed using EPA Method 8020
na = not analyzed; ppm = parts per million; bgs = below ground surface, stockpile samples are below surface of stockpile
REFERENCE = source document for the analytical data
(D) = Indicates hydrocarbons were quantified using diesel
(G) = Indicates hydrocarbons were quantified using gasoline

BD/JLR
QA/QC

Vapor Extraction Technology, Inc.

1\SOILDATA XLS

10/9/98

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
MW-1 (GW-1)	13-Mar-89	16.82	21.00	na	0	na	na	na	na	na	na	na	na	na	na	AC 4/89
MW-1 (GW-1)	16-Jun-89	na	21.19	na	0.23	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GW-1	1-Nov-89	17.32	21.06	-3.74	0.21	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	15-Nov-89	17.32	20.90	-3.58	0.22	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	29-Nov-89	17.32	20.78	-3.46	0.22	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	13-Dec-89	17.32	20.69	-3.37	0.22	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	22-Feb-90	17.32	20.07	-2.75	0.20	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	7-Apr-90	17.32	19.37	-2.05	0.43	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-1	7/25-27/94	17.32	17.33	-0.01	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	8/23-25/94	17.32	17.39	-0.07	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	9/26-28/94	17.32	17.46	-0.14	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	10/24-26/94	17.32	17.57	-0.25	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	11/15-17/94	17.32	17.64	-0.32	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	12/12-14/94	17.32	17.73	-0.41	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-1	1-Jan-95	17.32	17.66	-0.34	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-1	1-Feb-95	17.32	17.58	-0.26	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-1	1-Mar-95	17.32	17.42	-0.10	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-1	1-Apr-95	17.32	17.41	-0.09	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-1	1-Jun-95	17.32	17.58	-0.26	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-1	1-Jul-95	17.32	17.88	-0.56	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Aug-95	17.32	17.83	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Sep-95	17.32	17.85	-0.53	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Oct-95	17.32	17.79	-0.47	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Nov-95	17.32	17.75	-0.43	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Dec-95	17.32	17.90	-0.58	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-1	1-Jan-96	17.32	17.97	-0.65	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	1-Feb-96	17.32	17.98	-0.66	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	1-Mar-96	17.32	17.98	-0.66	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	1-Apr-96	17.32	18.05	-0.73	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	1-May-96	17.32	18.07	-0.75	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	1-Jun-96	17.32	18.07	-0.75	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-1	26-Aug-98	17.32	17.58	-0.26	0.00	na	1200	1100	C8-C36	140	4.2	6.1	11	ND<50	na	This Report
MW-2 (GW-2)	13-Mar-89	16.74	21.593	na	0.4	na	na	na	na	na	na	na	na	na	na	AC 4/89
MW-2 (GW-2)	16-Jun-89	na	23.71	na	3.12	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GW-2	1-Nov-89	17.17	22.66	-5.49	2.12	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	15-Nov-89	17.17	22.42	-5.25	2.07	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	29-Nov-89	17.17	21.13	-3.96	1.87	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	13-Dec-89	17.17	21.89	-4.72	1.72	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	22-Feb-90	17.17	20.79	-3.62	1.14	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	7-Apr-90	17.17	20.11	-2.94	1.06	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-2	6/91-6/92	na	na	na	na	0.60	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	7/25-27/94	17.17	17.45	-0.28	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GW-2	8/23-25/94	17.17	17.52	-0.35	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	9/26-28/94	17.17	17.57	-0.40	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	10/24-26/94	17.17	17.67	-0.50	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	11/15-17/94	17.17	17.73	-0.56	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	12/12-14/94	17.17	17.83	-0.66	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-2	1-Jan-95	17.17	17.73	-0.56	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-Feb-95	17.17	17.66	-0.49	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-Mar-95	17.17	17.50	-0.33	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-Apr-95	17.17	17.49	-0.32	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-May-95	17.17	17.57	-0.40	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-Jun-95	17.17	17.68	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-2	1-Jul-95	17.17	17.93	-0.76	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Aug-95	17.17	17.91	-0.74	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Sep-95	17.17	17.94	-0.77	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Oct-95	17.17	17.91	-0.74	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Nov-95	17.17	17.87	-0.70	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Dec-95	17.17	17.99	-0.82	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-2	1-Jan-96	17.17	18.04	-0.87	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	1-Feb-96	17.17	18.05	-0.88	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	1-Mar-96	17.17	18.10	-0.93	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	1-Apr-96	17.17	18.15	-0.98	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	1-May-96	17.17	18.20	-1.03	0.06	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	1-Jun-96	17.17	18.22	-1.05	0.07	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-2	26-Aug-98	17.17	17.67	-0.50	0.00	na	11000	12000	C8-C31	3300	100	780	320	ND<670	na	This Report
MW-3 (GW-3)	13-Mar-89	16.765	21.17	na	0	na	na	na	na	na	na	na	na	na	na	AC 4/89
MW-3 (GW-3)	16-Jun-89	na	21.3	na	0.21	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GW-3	1-Nov-89	17.04	21.11	-4.07	0.37	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	15-Nov-89	17.04	20.92	-3.88	0.39	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	29-Nov-89	17.04	20.87	-3.83	0.47	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	13-Dec-89	17.04	20.87	-3.83	0.58	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	22-Feb-90	17.04	20.08	-3.04	0.23	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	7-Apr-90	17.04	19.71	-2.67	0.51	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GW-3	7/25-27/94	17.04	17.47	-0.43	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	8/23-25/94	17.04	17.51	-0.47	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	9/26-28/94	17.04	17.57	-0.53	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	10/24-26/94	17.04	17.68	-0.64	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	11/15-17/94	17.04	17.73	-0.69	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	12/12-14/94	17.04	17.83	-0.79	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GW-3	1-Jan-95	17.04	17.75	-0.71	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-3	1-Feb-95	17.04	17.69	-0.65	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-3	1-Mar-95	17.04	17.53	-0.49	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-3	1-Apr-95	17.04	17.50	-0.46	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95

Vapor Extraction Technology, Inc.

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GW-3	1-May-95	17.04	17.55	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-3	1-Jun-95	17.04	17.68	-0.64	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GW-3	1-Jul-95	17.04	17.98	-0.94	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Aug-95	17.04	17.94	-0.90	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Sep-95	17.04	17.95	-0.91	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Oct-95	17.04	17.92	-0.88	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Nov-95	17.04	17.85	-0.81	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Dec-95	17.04	17.98	-0.94	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GW-3	1-Jan-96	17.04	18.04	-1.00	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	1-Feb-96	17.04	18.07	-1.03	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	1-Mar-96	17.04	18.15	-1.11	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	1-Apr-96	17.04	18.14	-1.10	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	1-May-96	17.04	18.15	-1.11	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	1-Jun-96	17.04	18.17	-1.13	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GW-3	26-Aug-98	17.04	17.63	-0.59	0.00	na	19000	4300	C8-C28	5500	1200	730	2500	ND<1000	na	This Report
W-100 (GWL-1	28-Aug-89	na	30	na	ND	na	na	na	na	na	na	na	na	na	na	L&A 10/89
W-100 (GWL-1	5-Sep-89	na	na	na	na	na	25,000	na	C6 to C12	140,000	220,000	72,000	135,000	na	8	L&A 10/89
W-100 (GWL-1	13-Sep-89	na	21.29	na	0.66	na	na	na	na	na	na	na	na	na	na	L&A 10/89
W-100 (GWL-1	2-Oct-89	na	21.77	na	1.42	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-1	16-Jun-89	17.31	21.19	-3.88	0.23	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	13-Sep-89	17.31	21.29	-3.98	0.66	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	2-Oct-89	17.31	21.77	-4.46	1.42	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	1-Nov-89	17.31	22.43	-5.12	2.01	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	15-Nov-89	17.31	22.11	-4.80	3.77	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	29-Nov-89	17.31	21.14	-3.83	2.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	13-Dec-89	17.31	22.03	-4.72	2.01	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	6/91-6/92	na	na	na	na	0.50	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	22-Feb-90	17.31	21.12	-3.81	1.54	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	7-Apr-90	17.31	20.12	-2.81	1.35	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-1	7/25-27/94	17.31	17.15	0.16	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	8/23-25/94	17.31	17.23	0.08	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	9/26-28/94	17.31	17.28	0.03	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	10/24-26/94	17.31	17.38	-0.07	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	11/15-17/94	17.31	17.45	-0.14	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	12/12-14/94	17.31	17.55	-0.24	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-1	1-Jan-95	17.31	17.47	-0.16	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-1	1-Feb-95	17.31	17.40	-0.09	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-1	1-Mar-95	17.31	17.25	0.06	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-1	1-Apr-95	17.31	17.22	0.09	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-1	1-May-95	17.31	17.29	0.02	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-1	1-Jun-95	17.31	17.39	-0.08	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Jul-95	17.31	17.64	-0.33	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-1	1-Aug-95	17.31	17.64	-0.33	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Sep-95	17.31	17.67	-0.36	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Oct-95	17.31	17.63	-0.32	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Nov-95	17.31	17.58	-0.27	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Dec-95	17.31	17.71	-0.40	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-1	1-Jan-96	17.31	17.80	-0.49	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	1-Feb-96	17.31	17.81	-0.50	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	1-Mar-96	17.31	17.88	-0.57	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	1-Apr-96	17.31	17.81	-0.50	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	1-May-96	17.31	17.88	-0.57	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	1-Jun-96	17.31	17.90	-0.59	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-1	26-Aug-98	17.31	17.42	-0.11	0.00	na	7300	13000	C8-C39	400	22	82	320	ND<200	na	This Report
GWL-2	16-Jun-89	17.23	23.71	-6.48	3.12	na	na	na	na	na	na	na	na	na	na	L&A 4/90
W-101 (GWL-2	28-Aug-89	na	30	na	ND	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-2	5-Sep-89	na	na	na	na	na	24	na	na	4,000	9,500	830	8,000	na	16	L&A 4/90
W-101 (GWL-2	13-Sep-89	na	21.07	na	ND	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-2	13-Sep-89	17.23	21.07	-3.84	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
W-101 (GWL-2	2-Oct-89	na	21.54	na	0.61	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-2	2-Oct-89	17.23	21.54	-4.31	0.61	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	1-Nov-89	17.23	22.00	-4.77	1.33	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	15-Nov-89	17.23	21.69	-4.46	1.17	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	29-Nov-89	17.23	21.37	-4.14	0.94	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	13-Dec-89	17.23	21.15	-3.92	0.83	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	22-Feb-90	17.23	20.29	-3.06	0.62	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	7-Apr-90	17.23	19.53	-2.30	0.16	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-2	7/25-27/94	17.23	17.53	-0.30	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	8/23-25/94	17.23	17.62	-0.39	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	9/26-28/94	17.23	17.67	-0.44	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	10/24-26/94	17.23	17.77	-0.54	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	11/15-17/94	17.23	17.83	-0.60	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	12/12-14/94	17.23	17.93	-0.70	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-2	1-Jan-95	17.23	17.84	-0.61	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Feb-95	17.23	17.78	-0.55	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Mar-95	17.23	17.65	-0.42	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Apr-95	17.23	17.59	-0.36	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-May-95	17.23	17.66	-0.43	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Jun-95	17.23	17.77	-0.54	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Jul-95	17.23	18.05	-0.82	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-2	1-Aug-95	17.23	18.03	-0.80	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-2	1-Sep-95	17.23	18.04	-0.81	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-2	1-Oct-95	17.23	18.02	-0.79	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-2	1-Nov-95	17.23	17.97	-0.74	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96

Vapor Extraction Technology, Inc.

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-2	1-Dec-95	17.23	18.08	-0.85	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-2	1-Jan-96	17.23	18.17	-0.94	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-2	1-Feb-96	17.23	18.20	-0.97	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-2	1-Mar-96	17.23	18.22	-0.99	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-2	1-Apr-96	17.23	18.25	-1.02	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-2	1-May-96	17.23	18.25	-1.02	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-2	1-Jun-96	17.23	18.27	-1.04	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	16-Jun-89	16.70	21.30	-4.60	0.21	na	na	na	na	na	na	na	na	na	na	L&A 4/90
W-102 (GWL-3	29-Aug-89	na	25	na	ND	na	na	na	na	na	na	na	na	na	na	L&A 10/89
W-102 (GWL-3	13-Sep-89	na	22.87	na	2.91	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-3	13-Sep-89	16.70	22.87	-6.17	2.91	na	na	na	na	na	na	na	na	na	na	L&A 4/90
W-102 (GWL-3	2-Oct-89	na	23.51	na	3.82	na	na	na	na	na	na	na	na	na	na	L&A 10/89
GWL-3	2-Oct-89	16.70	23.51	-6.81	3.82	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	1-Nov-89	16.70	22.47	-5.77	2.50	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	15-Nov-89	16.70	21.93	-5.23	2.03	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	29-Nov-89	16.70	21.55	-4.85	1.70	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	13-Dec-89	16.70	21.21	-4.51	1.44	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	22-Feb-90	16.70	20.13	-3.43	0.84	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	7-Apr-90	16.70	19.40	-2.70	0.73	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-3	6/91-6/92	na	na	na	0.00	4.70	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	7/25-27/94	16.70	16.95	-0.25	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	8/23-25/94	16.70	17.03	-0.33	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	9/26-28/94	16.70	17.08	-0.38	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	10/24-26/94	16.70	17.19	-0.49	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	11/15-17/94	16.70	17.24	-0.54	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	12/12-14/94	16.70	17.34	-0.64	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-3	1-Jan-95	16.70	17.24	-0.54	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-Feb-95	16.70	17.18	-0.48	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-Mar-95	16.70	17.04	-0.34	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-Apr-95	16.70	17.00	-0.30	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-May-95	16.70	17.08	-0.38	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-Jun-95	16.70	17.17	-0.47	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-3	1-Jul-95	16.70	17.51	-0.81	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Aug-95	16.70	17.39	-0.69	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Sep-95	16.70	17.74	-1.04	0.36	0.11	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Oct-95	16.70	17.64	-0.94	0.26	0.13	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Nov-95	16.70	17.50	-0.80	0.16	0.08	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Dec-95	16.70	17.64	-0.94	0.21	0.08	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-3	1-Jan-96	16.70	17.73	-1.03	0.23	0.11	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	1-Feb-96	16.70	17.75	-1.05	0.20	0.11	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	1-Mar-96	16.70	17.83	-1.13	0.20	0.04	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	1-Apr-96	16.70	17.79	-1.09	0.19	0.08	na	na	na	na	na	na	na	na	na	GMTRX 9/96

Vapor Extraction Technology, Inc.

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-3	1-May-96	16.70	17.86	-1.16	0.27	0.08	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	1-Jun-96	16.70	17.88	-1.18	0.26	0.08	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-3	26-Aug-98	16.70	17.14	-0.44	0.00	0.00	21000	5100	C8-C26	9800	220	1300	1800	ND<2500	na	This Report
GWL-4	15-Mar-89	na	na	na	na	na	47	na	na	2,600	10,000	1,900	11,000	na	ND<0.01	L&A 4/90
GWL-4	7-Apr-90	16.19	19.21	-3.02	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-4	7/25-27/94	na	16.94	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	8/23-25/94	na	na	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	9/26-28/94	na	17.04	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	10/24-26/94	na	17.17	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	11/15-17/94	na	17.23	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	12/12-14/94	na	17.35	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-4	1-Jan-95	na	17.24	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-Feb-95	na	17.16	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-Mar-95	na	17.03	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-Apr-95	na	17.02	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-May-95	na	17.07	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-Jun-95	na	17.16	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-4	1-Jul-95	na	17.51	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Aug-95	na	17.44	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Sep-95	na	17.44	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Oct-95	na	17.41	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Nov-95	na	17.36	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Dec-95	na	17.46	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-4	1-Jan-96	na	17.55	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	1-Feb-96	na	17.55	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	1-Mar-96	na	17.57	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	1-Apr-96	na	17.62	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	1-May-96	na	17.63	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	1-Jun-96	na	17.65	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-4	26-Aug-98	na	17.16	na	0.00	na	21000	1600	C8-C36	13000	ND<100	300	550	ND<3300	na	This Report
GWL-5	7-Apr-90	15.91	19.74	-3.83	1.47	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-5	6/91-6/92	na	na	na	na	2.00	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	7/25-27/94	na	16.73	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	8/23-25/94	na	16.82	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	9/26-28/94	na	16.85	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	10/24-26/94	na	16.96	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	11/15-17/94	na	17.00	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	12/12-14/94	na	17.12	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-5	1-Jan-95	na	17.00	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-5	1-Feb-95	na	16.93	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-5	1-Mar-95	na	16.81	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95

Vapor Extraction Technology, Inc.

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-5	1-Apr-95	na	16.81	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-5	1-Jun-95	na	16.96	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-5	1-Jul-95	na	17.26	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Aug-95	na	17.20	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Sep-95	na	17.21	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Oct-95	na	17.21	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Nov-95	na	17.14	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Dec-95	na	17.25	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-5	1-Jan-96	na	17.32	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	1-Feb-96	na	17.37	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	1-Mar-96	na	17.42	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	1-Apr-96	na	17.41	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	1-May-96	na	17.41	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	1-Jun-96	na	17.43	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-5	26-Aug-98	na	16.91	na	0.00	na	28000	6200	C8-C28	6600	4500	1400	4000	ND<1300	na	This Report
GWL-6	13-Mar-90	na	na	na	na	na	3.7	na	na	160	44	170	400	na	ND<0.01	L&A 4/90
GWL-6	7-Apr-90	16.82	19.44	-2.62	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-6	1-Jan-95	na	17.84	na	0.03	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-6	1-Feb-95	na	17.73	na	0.01	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-6	1-Mar-95	na	17.62	na	0.02	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-6	1-Apr-95	na	17.58	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-6	1-Jun-95	na	17.80	na	0.02	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-6	1-Jul-95	na	18.03	na	0.03	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Aug-95	na	17.99	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Sep-95	na	18.08	na	0.05	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Oct-95	na	18.04	na	0.04	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Nov-95	na	17.98	na	0.02	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Dec-95	na	18.07	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-6	1-Feb-96	na	18.20	na	0.02	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-6	1-Mar-96	na	18.25	na	0.07	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-6	1-Apr-96	na	18.24	na	0.01	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-6	1-May-96	na	18.25	na	0.01	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-6	1-Jun-96	na	18.26	na	0.01	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-6	26-Aug-98	na	17.80	na	0.02	na	3100	na	na	580	20	84	58	ND<200	na	This Report
GWL-7	13-Mar-90	na	na	na	na	na	2.8	na	na	390	440	170	690	na	ND<0.01	L&A 4/90
GWL-7	7-Apr-90	16.82	19.53	-2.71	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-7	6/91-6/92	na	na	na	na	0.70	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	8/23-25/94	na	17.71	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	9/26-28/94	na	17.76	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	7/25-27/94	na	17.63	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	10/24-26/94	na	17.87	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-7	11/15-17/94	na	17.92	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	12/12-14/94	na	18.02	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-7	1-Jan-95	na	17.91	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-7	1-Feb-95	na	17.82	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-7	1-Mar-95	na	17.69	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-7	1-Apr-95	na	17.67	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-7	1-Jun-95	na	17.87	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-7	1-Jul-95	na	18.10	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Aug-95	na	18.08	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Sep-95	na	18.11	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Oct-95	na	18.10	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Nov-95	na	18.05	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Dec-95	na	18.16	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-7	1-Jan-96	na	18.25	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	1-Feb-96	na	18.28	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	1-Mar-96	na	18.30	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	1-Apr-96	na	18.32	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	1-May-96	na	18.32	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	1-Jun-96	na	18.39	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-7	26-Aug-98	na	17.84	na	0.00	na	8600	2000	C8-C36	2400	ND<40	480	810	ND<1300	na	This Report
GWL-8	13-Mar-90	na	na	na	na	na	ND<500	na	na	ND<0.5	ND<0.50	ND<0.5	1.2	na	ND<0.01	L&A 4/90
GWL-8	7-Apr-90	16.78	19.21	-2.43	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
GWL-8	7/25-27/94	na	17.22	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	8/23-25/94	na	17.30	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	9/26-28/94	na	17.35	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	10/24-26/94	na	17.48	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	11/15-17/94	na	17.57	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	12/12-14/94	na	17.12	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
GWL-8	1-Jan-95	na	17.54	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-Feb-95	na	17.46	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-Mar-95	na	17.31	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-Apr-95	na	17.30	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-May-95	na	17.44	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-Jun-95	na	17.47	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
GWL-8	1-Jul-95	na	17.67	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Aug-95	na	17.69	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Sep-95	na	17.73	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Oct-95	na	17.67	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Nov-95	na	17.67	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Dec-95	na	17.78	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
GWL-8	1-Jan-96	na	17.86	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-8	1-Feb-96	na	17.87	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
GWL-8	1-Mar-96	na	17.90	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-8	1-Apr-96	na	17.93	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-8	1-May-96	na	17.95	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-8	1-Jun-96	na	17.96	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
GWL-8	26-Aug-98	na	17.54	na	0.00	na	1500	590	C8-C36	22	7.1	4.8	15	ND<20	na	This Report
OMW-3	1-Jan-95	15.56	16.40	-0.84	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-Feb-95	15.56	16.31	-0.75	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-Mar-95	15.56	16.20	-0.64	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-Apr-95	15.56	16.17	-0.61	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-May-95	15.56	16.25	-0.69	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-Jun-95	15.56	16.35	-0.79	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-3	1-Jul-95	15.56	16.66	-1.10	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Aug-95	15.56	16.60	-1.04	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Sep-95	15.56	16.60	-1.04	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Oct-95	15.56	16.60	-1.04	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Nov-95	15.56	16.56	-1.00	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Dec-95	15.56	16.66	-1.10	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-3	1-Jan-96	15.56	16.72	-1.16	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	1-Feb-96	15.56	16.74	-1.18	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	1-Mar-96	15.56	17.80	-2.24	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	1-Apr-96	15.56	16.81	-1.25	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	1-May-96	15.56	16.82	-1.26	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	1-Jun-96	15.56	16.81	-1.25	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-3	26-Aug-98	15.56	16.29	-0.73	0.00	na	13000	1100	C8-C36	7800	ND<60	ND<60	400	ND<2000	na	This Report
OMW-11	2-Mar-89	17.85	21.42	-3.57	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	8-Mar-89	17.85	21.44	-3.59	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	15-Mar-89	17.85	21.45	-3.60	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	22-Mar-89	17.85	21.45	-3.60	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	29-Mar-89	17.85	21.46	-3.61	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	6-Apr-89	17.85	21.45	-3.60	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	20-Apr-89	17.85	21.53	-3.68	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	27-Apr-89	17.85	21.50	-3.65	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	2-May-89	17.85	21.50	-3.65	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	9-May-89	17.85	21.50	-3.65	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	17-May-89	17.85	21.50	-3.65	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	6-Jun-89	17.85	21.56	-3.71	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	21-Jun-89	17.85	21.51	-3.66	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	8-Jul-89	17.85	21.52	-3.67	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	2-Aug-89	17.53	21.48	-3.95	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	2-Oct-89	17.53	21.20	-3.67	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	1-Nov-89	17.53	20.90	-3.37	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
OMW-11	15-Nov-89	17.53	20.72	-3.19	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	29-Nov-89	17.53	21.15	-3.62	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	13-Dec-89	17.53	20.56	-3.03	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	22-Feb-90	17.53	19.98	-2.45	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
OMW-11	7/25-27/94	17.53	17.60	-0.07	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	8/23-25/94	17.53	17.72	-0.19	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	9/26-28/94	17.53	17.15	0.38	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	10/24-26/94	17.53	17.86	-0.33	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	11/15-17/94	17.53	17.95	-0.42	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	12/12-14/94	17.53	18.04	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
OMW-11	1-Jan-95	17.53	17.95	-0.42	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-Feb-95	17.53	17.89	-0.36	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-Mar-95	17.53	17.75	-0.22	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-Apr-95	17.53	17.69	-0.16	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-May-95	17.53	17.78	-0.25	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-Jun-95	17.53	17.88	-0.35	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
OMW-11	1-Jul-95	17.53	18.11	-0.58	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Aug-95	17.53	18.12	-0.59	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Sep-95	17.53	18.13	-0.60	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Oct-95	17.53	18.08	-0.55	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Nov-95	17.53	18.02	-0.49	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Dec-95	17.53	18.19	-0.66	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 3/96
OMW-11	1-Jan-96	17.53	18.26	-0.73	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	1-Feb-96	17.53	18.30	-0.77	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	1-Mar-96	17.53	18.31	-0.78	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	1-Apr-96	17.53	18.35	-0.82	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	1-May-96	17.53	18.36	-0.83	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	1-Jun-96	17.53	18.38	-0.85	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/96
OMW-11	26-Aug-98	17.53	17.91	-0.38	0.00	na	7100	3600	C8-C36	71	15	15	25	ND<200	na	This Report
CC-7	5-Apr-89	16.87	21.15	-4.28	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	6-Apr-89	16.87	21.50	-4.63	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	20-Apr-89	16.87	21.09	-4.22	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	27-Apr-89	16.87	21.20	-4.33	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	2-May-89	16.87	21.13	-4.26	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	9-May-89	16.87	21.10	-4.23	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	17-May-89	16.87	21.10	-4.23	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	26-May-89	16.87	21.06	-4.19	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	2-Jun-89	16.87	21.08	-4.21	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	6-Jun-89	16.87	21.10	-4.23	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	15-Jun-89	16.87	21.10	-4.23	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	21-Jun-89	16.87	21.09	-4.22	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	27-Jun-89	16.87	21.43	-4.56	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90

TABLE 2
SUMMARY OF GROUNDWATER MONITORING DATA
FORMER UNOCAL SS #2651

WELL ID	SAMPLE DATE	DATUM ELEVATION (feet MSL)	DEPTH TO GW (feet)	GW ELEVATION (feet MSL)	FP THICK-NESS (feet)	FP RECOV-ERY (gallons)	TPH GASOLINE (ppb)	TPH DIESEL (ppb)	TPHD CARBON RANGE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	TOTAL XYLENES (ppb)	MTBE (ppb)	TOTAL LEAD (ppb)	REFERENCE
CC-7	8-Jul-89	16.87	21.09	-4.22	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	2-Aug-89	16.87	21.04	-4.17	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	18-Aug-89	16.87	21.00	-4.13	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	2-Oct-89	16.87	20.80	-3.93	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	1-Nov-89	16.87	20.51	-3.64	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	15-Nov-89	16.87	20.32	-3.45	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	29-Nov-89	16.87	21.03	-4.16	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	13-Dec-89	16.87	20.10	-3.23	0.00	na	na	na	na	na	na	na	na	na	na	L&A 4/90
CC-7	7/25-27/94	16.87	17.24	-0.37	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-7	8/23-25/94	16.87	17.35	-0.48	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-7	9/26-28/94	16.87	17.38	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-7	10/24-26/94	16.87	17.49	-0.62	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-7	12/12-14/94	16.87	17.65	-0.78	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-7	1-Jan-95	16.87	17.57	-0.70	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	1-Feb-95	16.87	17.50	-0.63	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	1-Mar-95	16.87	17.38	-0.51	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	1-Apr-95	16.87	17.32	-0.45	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	1-May-95	16.87	17.40	-0.53	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	1-Jun-95	16.87	17.50	-0.63	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-7	26-Aug-98	16.87	17.47	-0.60	0.00	na	3900	720	C8-C36	1300	14	350	76	ND<330	na	This Report
CC-11	7/25-27/94	na	17.65	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	8/23-25/94	na	17.75	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	9/26-28/94	na	17.81	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	10/24-26/94	na	17.91	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	11/15-17/94	na	17.98	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	12/12-14/94	na	18.08	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 1/94
CC-11	1-Jan-95	na	18.00	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	1-Feb-95	na	17.94	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	1-Mar-95	na	17.79	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	1-Apr-95	na	17.74	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	1-May-95	na	17.81	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	1-Jun-95	na	17.93	na	0.00	na	na	na	na	na	na	na	na	na	na	GMTRX 9/95
CC-11	26-Aug-98	na	17.89	na	0.00	na	1000	900	C8-C36	14	2.3	2.1	4.2	ND<10	na	This Report

NOTES: Datum elevation is top of well casing measured in feet above mean sea level (MSL).
REFERENCE = Source document for data
GW = groundwater; FP = free product; TPH = total petroleum hydrocarbons; ppm, ppb = parts per million and billion, respectively
na = not applicable; ND = not detectable at or above lab detection limits
Groundwater elevations on this table not corrected for free product
TPH as gasoline analyzed using EPA Method 8015; BTEX and MTBE analyzed using EPA Method 8020

BD/JLR
QA/QC

TABLE 3

SOIL, TCLP, AND SPLP ANALYTICAL RESULTS SUMMARY

UNOCAL STATION #2651

ANALYSIS TYPE	SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
BORING INSTALLATION SAMPLES:															
SOIL	8/11/98	B20	16.5	na	650	130	C8-C35 (D)	ND<2.0	12	16	90	ND<14	na	na	This Report
SPLP	8/11/98	B20	16.5	na	14	ND<2.0	na	ND<0.050	0.11	0.32	2.3	ND<0.10	na	na	This Report
TCLP	8/11/98	B20	16.5	na	10	3.9	C8-C28 (D)	ND<0.050	0.14	0.27	1.9	ND<0.10	na	na	This Report
SOIL	8/11/98	B21	21	na	2200	9.0	C8-C35 (D)	5.5	5.0	9.5	7.9	16	ND<0.05	na	This Report
SPLP	8/11/98	B21	21	na	ND<8.3	ND<2.0	na	0.058	ND<0.050	0.19	ND<0.10	ND<0.10	na	na	This Report
TCLP	8/11/98	B21	21	na	ND<8.3	2.3	C8-C28 (D)	ND<0.050	ND<0.050	0.14	0.19	ND<0.10	na	na	This Report
SOIL	8/12/98	B22	26	na	84	6.8	C8-C37 (D)	ND<0.40	1.1	1.2	6.6	ND<2.8	ND<0.005	na	This Report
SPLP	8/12/98	B22	26	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
TCLP	8/12/98	B22	26	na	ND<8.3	ND<2.6	na	ND<0.050	ND<0.050	ND<0.050	0.19	ND<0.10	na	na	This Report
SOIL	8/12/98	B23	10.5	na	10000	8,200	C8-C40 (D)	120	ND<20	260	730	ND<140	na	na	This Report
SPLP	8/12/98	B23	10.5	na	22	ND<11	na	1.9	0.14	2.1	5.7	0.15	na	na	This Report
TCLP	8/12/98	B23	10.5	na	21	ND<4.0	na	1.6	0.11	1.8	5.0	0.22	na	na	This Report
SOIL	8/12/98	B23	15.5	na	440	320	C8-C30 (D)	1.3	6.7	ND<1.0	14	ND<7.0	na	na	This Report
SPLP	8/12/98	B23	15.5	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	0.10	0.72	ND<0.10	na	na	This Report
TCLP	8/12/98	B23	15.5	na	ND<8.3	3.1	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
SOIL	8/12/98	B24	21	na	1.2	31	C8-C27 (D)	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.015	ND<0.035	ND<0.005	na	This Report
SPLP	8/12/98	B24	21	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
TCLP	8/12/98	B24	21	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
SOIL	8/13/98	B26	16.5	na	34	24	C8-C38 (D)	ND<0.050	ND<0.050	ND<0.050	0.34	4.3	ND<0.025	na	This Report
SPLP	8/13/98	B26	16.5	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
TCLP	8/13/98	B26	16.5	na	ND<8.3	ND<2.6	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
SOIL	8/13/98	B26	18	na	440	580	C8-C30 (D)	0.53	1.2	ND<0.20	11	2.2	ND<0.25	na	This Report
SPLP	8/13/98	B26	18	na	ND<8.3	11	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
TCLP	8/13/98	B26	18	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	ND<0.10	ND<0.10	na	na	This Report
SOIL	8/13/98	B27	13.5	na	3400	1,200	C8-C38 (D)	ND<5.0	80	110	480	ND<14	na	na	This Report
SPLP	8/13/98	B27	13.5	na	49	ND<2.0	na	0.27	3.7	3.4	18	ND<0.10	na	na	This Report
TCLP	8/13/98	B27	13.5	na	26	ND<11	na	0.064	0.69	1.1	6.4	ND<0.10	na	na	This Report

Vapor Extraction Technology, Inc.

10/9/98

5\TCLPDATA XLS

TABLE 3

SOIL, TCLP, AND SPLP ANALYTICAL RESULTS SUMMARY

UNOCAL STATION #2651

ANALYSIS TYPE	SAMPLE DATE	SAMPLE LOCATION / ID	DEPTH (Feet bgs)	TRPH (418.1) (ppm)	TPH Gasoline (ppm)	TPH Diesel (ppm)	TPH Carbon Range	BENZENE (ppm)	TOLUENE (ppm)	ETHYL-BENZENE (ppm)	XYLENES (ppm)	MTBE (8020) (ppm)	MTBE (8260) (ppm)	ORGANIC LEAD (ppm)	REFERENCE
SOIL	8/13/98	B27	15	na	2000	110	C8-C35 (D)	16	110	72	350	15	ND<0.25	na	This Report
SPLP	8/13/98	B27	15	na	13	ND<2.0	na	ND<0.050	0.39	0.49	3.1	ND<0.10	na	na	This Report
TCLP	8/13/98	B27	15	na	14	ND<12	na	0.067	0.66	0.46	2.7	ND<0.10	na	na	This Report
SOIL	8/13/98	B27	16	na	3200	1,200	C8-C36 (D)	11	130	93	470	19	ND<0.25	na	This Report
SPLP	8/13/98	B27	16	na	22	ND<2.0	na	ND<0.050	0.66	1.0	5.0	ND<0.10	na	na	This Report
TCLP	8/13/98	B27	16	na	18	ND<2.0	na	ND<0.050	0.78	0.91	5.0	ND<0.10	na	na	This Report
SOIL	8/13/98	B27	18.5	na	3400	780	C8-C18 (D)	30	180	88	470	32	ND<0.25	na	This Report
SPLP	8/13/98	B27	18.5	na	31	ND<2.0	na	0.13	3.7	1.7	9.4	0.32	na	na	This Report
TCLP	8/13/98	B27	18.5	na	27	ND<10	na	0.05	2.0	1.2	7.0	0.15	na	na	This Report
SOIL	8/13/98	B27	21	na	510	5.2	C8-C35 (D)	4.6	9.2	13	58	ND<7.0	na	na	This Report
SPLP	8/13/98	B27	21	na	ND<8.3	2.3	na	ND<0.050	ND<0.050	0.082	0.44	ND<0.10	na	na	This Report
TCLP	8/13/98	B27	21	na	ND<8.3	ND<2.0	na	ND<0.050	ND<0.050	ND<0.050	0.16	ND<0.10	na	na	This Report

NOTES: ND = Not detected at or above laboratory detection limits; TPH = Total petroleum hydrocarbons, by EPA Method 8015; BTEX analyzed using EPA Method 8020
na = not analyzed; ppm = parts per million; bgs = below ground surface; (D) = hydrocarbons quantitated against diesel fuel standard
REFERENCE = source document for the analytical data
TCLP = Toxic Characteristics Leaching Procedure, analyzed using EPA Method 1311. Buffer solution is acetic acid (NaOH) with a pH = 4.93.
SPLP = Synthetic Precipitation Leaching Procedure, analyzed using EPA Method 1312. Buffer solution is 60/40 weight percent mixture of sulfuric acid (H_2SO_4) and nitric acid (HNO_3) with a pH = 5.0.

BD/JLR
QA/QC

Vapor Extraction Technology, Inc.

5\TCLPDATA.XLS

10/9/98

TABLE 4
FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES
UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/11/98	B20	1	BLANK	na	na	na	na	na	na	na	ND	0.027	78.72	21.25	
8/11/98	B20	1	BEFORE	na	0.010	0.162	ND	ND	na	na	7,503	6.240	88.64	4.34	
8/11/98	B20	1	LAB	23	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	4,000	3.7	82	14	
8/11/98	B20	1	AFTER	na	na	na	na	na	na	na	3,486	3.616	81.73	14.31	
8/11/98	B20	3.3	BLANK	na	na	na	na	na	na	na	24	0.125	78.94	20.93	
8/11/98	B20	3.3	BEFORE	na	2.069	0.063	ND	ND	na	na	5,895	1.490	84.91	13.00	
8/11/98	B20	3.3	LAB	140	1.9	ND<1.3	ND<1.2	ND<1.2	8.3	ND<1.4	5,100	1.7	82	15	
8/11/98	B20	3.3	AFTER	na	2.529	0.188	ND	ND	na	na	3,831	1.382	82.06	16.16	
8/11/98	B20	5.5	BLANK	na	na	na	na	na	na	na	ND	0.032	78.79	21.17	
8/11/98	B20	5.5	BEFORE	na	1.409	0.156	ND	ND	na	na	2,162	0.297	80.50	18.98	
8/11/98	B20	5.5	LAB	980	18	ND<2.7	ND<2.3	ND<2.3	78	na	33,000	6.7	80	9.9	
8/11/98	B20	5.5	AFTER	na	na	na	na	na	na	na	41,026	8.568	81.91	5.42	
8/11/98	B20	11.5	BEFORE	na	na	ND	ND	ND	na	na	2,606	0.416	80.09	19.12	
8/11/98	B20	11.5	LAB	46	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	0.17	78	22	Poor Sample
8/11/98	B20	14.5	BLANK	na	na	na	na	na	na	na	174	0.089	79.48	20.42	
8/11/98	B20	14.5	BEFORE	na	na	1.112	ND	ND	na	na	160,310	12.666	70.83	0.47	
8/11/98	B20	14.5	LAB	34,000	910	40	ND<23	ND<23	1,200	ND<6.9	150,000	12	69	4.1	
8/11/98	B20	14.5	AFTER	na	na	na	na	na	na	na	157,436	12.358	71.14	0.75	
8/11/98	B20	16	BLANK	na	na	na	na	na	na	na	388	0.189	79.42	20.35	
8/11/98	B20	16	BEFORE	na	na	na	ND	ND	na	na	160,048	12.420	71.29	0.27	
8/11/98	B20	16	LAB	54,000	1,300	320	ND<46	ND<46	1,100	na	170,000	13	68	1.6	
8/11/98	B20	16	AFTER	na	na	na	na	na	na	na	150,647	11.904	72.39	0.62	
8/11/98	B21	1.5	BLANK	na	na	na	na	na	na	na	416	0.184	79.37	20.41	
8/11/98	B21	1.5	BEFORE	na	0.041	0.359	0.589	na	na	na	ND	12.269	82.07	5.65	
8/11/98	B21	1.5	LAB	51	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	ND<0.10	86	14	
8/11/98	B21	1.5	AFTER	na	na	na	na	na	na	na	ND	13.089	81.16	5.75	
8/11/98	B21	3	BLANK	na	na	na	na	na	na	na	ND	12.226	82.04	5.73	
8/11/98	B21	3	BEFORE	na	ND	0.299	0.752	ND	na	na	ND	2.696	79.95	17.32	
8/11/98	B21	3	LAB	88	2.3	ND<1.3	ND<1.2	ND<1.2	ND<1.4	ND<1.4	ND<1,000	11	79	9.9	
8/11/98	B21	3	AFTER	na	na	na	na	na	na	na	ND	12.930	81.35	5.72	
8/11/98	B21	10	BLANK	na	na	na	na	na	na	na	ND	0.095	79.40	20.50	
8/11/98	B21	10	BEFORE	na	ND	0.243	0.272	ND	na	na	11,358	10.851	77.95	9.36	
8/11/98	B21	10	LAB	730	12	ND<1.3	ND<1.2	ND<1.2	15	na	7,900	8.3	78	13	

10/14/98

5\SOILVAP.XLS

Vapor Extraction Technology, Inc.

TABLE 4
FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES
UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/11/98	B21	10	AFTER	na	na	na	na	na	na	na	6,497	7.293	78.67	12.90	
8/11/98	B21	14.5	BLANK	na	na	na	na	na	na	na	31	0.091	79.22	20.69	
8/11/98	B21	14.5	BEFORE	na	ND	0.611	ND	0.131	na	na	9,771	1.058	79.37	18.48	
8/11/98	B21	14.5	LAB	98	1.8	ND<1.3	ND<1.2	ND<1.2	ND<1.4	ND<6.9	13,000	1.4	78	20	Poor Sample
8/11/98	B21	14.5	AFTER	na	na	na	na	na	na	na	23,332	3.122	80.13	14.24	
8/11/98	B21	16	BLANK	na	na	na	na	na	na	na	288	0.117	79.32	20.54	
8/11/98	B21	16	BEFORE	na	na	4.483	ND	ND	na	na	124,327	13.974	73.18	0.40	
8/11/98	B21	16	LAB	18,000	280	ND<27	ND<23	ND<23	390	ND<1.4	130,000	14	71	1.5	
8/11/98	B21	16	AFTER	na	na	na	na	na	na	na	123,585	13.987	73.18	0.47	
8/12/98	B22	0	LAB	21	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	ND<0.10	78	22	
8/12/98	B22	1	BLANK	na	na	na	na	na	na	na	ND	0.038	78.52	21.44	
8/12/98	B22	1	BEFORE	na	ND	0.180	ND	ND	na	na	ND	6.095	79.20	14.69	
8/12/98	B22	1	LAB	16	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	6.4	79	15	
8/12/98	B22	1	AFTER	na	na	na	na	na	na	na	ND	6.151	79.08	14.76	
8/12/98	B22	3	BLANK	na	na	na	na	na	na	na	ND	0.074	78.23	21.69	
8/12/98	B22	3	BEFORE	na	ND	0.156	ND	ND	na	na	15	5.026	78.91	16.03	
8/12/98	B22	3	LAB	17	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	2.8	78	20	
8/12/98	B22	3	AFTER	na	na	na	na	na	na	na	5	2.393	78.76	18.83	
8/12/98	B22	13	BLANK	na	na	na	na	na	na	na	28	0.045	79.08	20.87	
8/12/98	B22	13	BEFORE	na	na	4.364	ND	ND	na	na	92,941	13.454	76.72	0.52	
8/12/98	B22	13	LAB	13,000	340	ND<11	ND<9.2	ND<9.2	580	na	88,000	12	75	4.5	
8/12/98	B22	13	AFTER	na	na	na	na	na	na	na	91,489	13.455	76.80	0.60	
8/12/98	B22	15	BLANK	na	na	na	na	na	na	na	67	0.085	78.94	20.96	
8/12/98	B22	15	BEFORE	na	na	na	ND	ND	na	na	100,860	13.068	76.37	0.46	
8/12/98	B22	15	LAB	24,000	810	80	ND<23	ND<23	970	ND<36	100,000	13	74	3.7	
8/12/98	B22	15	AFTER	na	na	na	na	na	na	na	98,894	13.005	76.54	0.55	
8/12/98	B22	16.5	BLANK	na	na	na	na	na	na	na	45	0.065	79.11	20.83	
8/12/98	B22	16.5	BEFORE	na	na	na	1.154	4.212	na	na	101,818	13.055	76.29	0.46	
8/12/98	B22	16.5	LAB	34,000	1,100	270	ND<23	ND<23	1,100	ND<36	110,000	14	73	1.7	
8/12/98	B22	16.5	AFTER	na	na	na	na	na	na	na	100,871	13.084	76.38	0.45	
8/12/98	B23	1	BLANK	na	na	na	na	na	na	na	ND	0.030	79.50	20.46	
8/12/98	B23	1	BEFORE	na	na	1.222	ND	ND	na	na	23,643	1.720	78.29	17.60	
8/12/98	B23	1	LAB	1,700	44	2.3	ND<1.2	ND<1.2	94	na	16,000	1.2	77	20	

Vapor Extraction Technology, Inc.

TABLE 4
FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES
UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/12/98	B23	1	AFTER	na	na	na	na	na	na	na	12,909	0.946	78.94	18.82	
8/12/98	B23	3	BLANK	na	na	na	na	na	na	na	41	0.036	79.58	20.38	
8/12/98	B23	3	BEFORE	na	2.469	1.998	ND	ND	na	na	543	0.124	79.69	20.13	
8/12/98	B23	3	LAB	270	8.5	ND<1.3	ND<1.2	ND<1.2	7.5	na	ND<1,000	0.17	78	22	Poor Sample
8/12/98	B23	3	AFTER	na	na	na	na	na	na	na	3,040	0.368	80.15	19.17	
8/12/98	B23	5	BLANK	na	na	na	na	na	na	na	23	0.038	79.21	20.75	
8/12/98	B23	5	BEFORE	na	na	9.346	ND	ND	na	na	103,865	7.595	76.68	5.31	
8/12/98	B23	5	LAB	24,000	560	ND<27	ND<23	ND<23	390	na	99,000	7.1	74	8.9	
8/12/98	B23	5	AFTER	na	na	na	na	na	na	na	94,568	7.081	76.60	6.83	
8/12/98	B23	10	BLANK	na	na	na	na	na	na	na	69	0.059	79.39	20.55	
8/12/98	B23	10	BEFORE	na	na	8.844	ND	ND	na	na	167,555	11.579	70.60	1.05	
8/12/98	B23	10	LAB	39,000	940	ND<53	ND<46	ND<46	720	na	150,000	9.9	71	4.2	
8/12/98	B23	10	AFTER	na	na	na	na	na	na	na	120,093	8.857	75.39	3.65	
8/12/98	B23	13	BLANK	na	na	na	na	na	na	na	228	0.068	79.45	20.46	
8/12/98	B23	13	BEFORE	na	na	na	ND	0.451	na	na	167,360	12.039	70.02	1.20	
8/12/98	B23	13	LAB	49,000	1,200	56	ND<46	ND<46	860	ND<14	180,000	13	67	2.4	
8/12/98	B23	13	AFTER	na	na	na	na	na	na	na	168,258	12.335	69.78	1.06	
8/12/98	B23	15	BLANK	na	na	na	na	na	na	na	133	0.077	79.51	20.40	
8/12/98	B23	15	BEFORE	na	na	na	ND	0.365	na	na	171,044	11.872	69.74	1.27	
8/12/98	B23	15	LAB	51,000	1,200	150	ND<46	ND<46	860	ND<14	180,000	12	67	2.9	
8/12/98	B23	15	AFTER	na	na	na	na	na	na	na	167,178	11.791	70.00	1.49	
8/12/98	B23	16.5	BLANK	na	na	na	na	na	na	na	161	0.078	79.46	20.45	
8/12/98	B23	16.5	BEFORE	na	na	na	ND	1.054	na	na	77,229	4.720	76.12	11.40	
8/12/98	B23	16.5	LAB	22,000	500	140	ND<46	ND<46	390	na	61,000	3.8	75	15	
8/12/98	B23	16.5	AFTER	na	na	na	na	na	na	na	46,315	3.282	77.64	14.42	
8/12/98	B24	1	BEFORE	na	0.091	0.321	ND	ND	na	na	15	4.314	80.63	15.03	
8/12/98	B24	1	LAB	22	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	4.9	78	17	
8/12/98	B24	1	AFTER	na	na	na	na	na	na	na	8	5.537	79.50	14.96	
8/12/98	B24	3	BLANK	na	na	na	na	na	na	na	ND	0.042	79.57	20.39	
8/12/98	B24	3	BEFORE	na	0.059	0.255	ND	ND	na	na	ND	0.077	79.46	20.45	
8/12/98	B24	3	LAB	18	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	ND<0.10	78	22	Poor Sample
8/12/98	B24	3	AFTER	na	na	na	na	na	na	na	ND	0.038	79.50	20.46	
8/12/98	B24	5	BLANK	na	na	na	na	na	na	na	ND	0.037	79.35	20.61	

TABLE 4
FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES
UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/12/98	B24	5	BEFORE	na	0.352	1.304	ND	ND	na	na	11,857	10.340	82.02	6.17	
8/12/98	B24	5	LAB	120	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	4,000	6.6	80	14	
8/12/98	B24	5	AFTER	na	na	na	na	na	na	na	1,912	5.527	80.20	13.95	
8/12/98	B24	10	BLANK	na	na	na	na	na	na	na	ND	0.038	79.35	20.61	
8/12/98	B24	10	BEFORE	na	na	5.903	ND	ND	na	na	6,152	1.971	81.06	16.20	
8/12/98	B24	10	LAB	2,400	38	4.0	3.0	3.0	9.4	na	2,800	1.3	78	20	
8/12/98	B24	10	AFTER	na	na	na	na	na	na	na	2,806	1.289	80.16	18.17	
8/12/98	B24	13	BLANK	na	na	na	na	na	na	na	21	0.040	79.23	20.73	
8/12/98	B24	13	BEFORE	na	na	27.320	0.796	ND	na	na	53,454	4.028	77.10	13.50	
8/12/98	B24	13	LAB	23,000	560	58	ND<23	ND<23	500	na	110,000	8.3	74	7.6	
8/12/98	B24	13	AFTER	na	na	na	na	na	na	na	104,023	8.397	75.08	6.07	
8/12/98	B24	15	BLANK	na	na	na	na	na	na	na	108	0.072	79.42	20.49	
8/12/98	B24	15	BEFORE	na	na	na	5.883	ND	na	na	123,426	9.149	74.65	3.81	
8/12/98	B24	15	LAB	29,000	690	72	ND<23	ND<23	690	ND<14	130,000	10	73	3.8	
8/12/98	B24	15	AFTER	na	na	na	na	na	na	na	130,365	10.383	74.11	2.45	
8/12/98	B24	16.5	BLANK	na	na	na	na	na	na	na	92	0.059	79.45	20.48	
8/12/98	B24	16.5	BEFORE	na	na	na	6.991	ND	na	na	132,339	9.887	75.72	1.13	
8/12/98	B24	16.5	LAB	29,000	690	74	ND<23	ND<23	640	ND<14	120,000	9.3	76	2.5	
8/12/98	B24	16.5	AFTER	na	na	na	na	na	na	na	120,906	9.422	76.96	1.48	
8/13/98	B25	1	BLANK	na	na	na	na	na	na	na	ND	0.029	78.58	21.39	
8/13/98	B25	1	BEFORE	na	ND	0.140	ND	ND	na	na	8	1.054	80.93	18.01	
8/13/98	B25	1	LAB	19	ND<1.6	ND<1.3	2.1	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B25	1	AFTER	na	na	na	na	na	na	na	ND	1.119	80.17	18.71	
8/13/98	B25	3	BLANK	na	na	na	na	na	na	na	ND	0.044	78.58	21.38	
8/13/98	B25	3	BEFORE	na	ND	0.110	ND	ND	na	na	ND	1.435	79.82	18.73	
8/13/98	B25	3	LAB	11	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B25	3	AFTER	na	na	na	na	na	na	na	ND	0.959	79.26	19.76	
8/13/98	B25	5	BLANK	na	na	na	na	na	na	na	ND	0.040	78.62	21.33	
8/13/98	B25	5	BEFORE	na	ND	0.146	ND	ND	na	na	17	3.286	78.52	18.14	
8/13/98	B25	5	LAB	13	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B25	5	AFTER	na	na	na	na	na	na	na	26	2.493	78.74	18.72	
8/13/98	B25	10	BLANK	na	na	na	na	na	na	na	ND	0.049	78.84	21.11	
8/13/98	B25	10	BEFORE	na	0.006	0.122	ND	ND	na	na	39	6.840	78.12	14.91	
8/13/98	B25	10	LAB	14	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	

TABLE 4
FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES
UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/13/98	B25	10	AFTER	na	na	na	na	na	na	na	38	6.374	78.04	15.44	
8/13/98	B25	13	BLANK	na	na	na	na	na	na	na	ND	0.065	78.84	21.09	
8/13/98	B25	13	BEFORE	na	0.014	0.110	ND	ND	na	na	ND	0.482	79.40	20.05	
8/13/98	B25	13	LAB	8.3	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	Poor Sample
8/13/98	B25	13	AFTER	na	na	na	na	na	na	na	ND	0.463	79.23	20.25	
8/13/98	B25	15	BLANK	na	na	na	na	na	na	na	ND	0.041	79.07	20.88	
8/13/98	B25	15	BEFORE	na	0.352	0.112	ND	ND	na	na	4,070	12.335	86.82	0.43	
8/13/98	B25	15	LAB	210	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B25	15	AFTER	na	na	na	na	na	na	na	4,069	12.507	86.73	0.35	
8/13/98	B25	16.5	BLANK	na	na	na	na	na	na	na	7	0.225	79.36	20.41	
8/13/98	B25	16.5	BEFORE	na	0.552	0.402	ND	ND	na	na	4,095	12.105	87.05	0.43	
8/13/98	B25	16.5	LAB	180	2.4	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B25	16.5	AFTER	na	na	na	na	na	na	na	4,211	12.770	86.46	0.34	
8/13/98	B26	1	BLANK	na	na	na	na	na	na	na	ND	0.030	79.40	20.56	
8/13/98	B26	1	BEFORE	na	0.003	0.108	ND	ND	na	na	ND	0.069	79.42	20.50	
8/13/98	B26	1	LAB	19	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	Poor Sample
8/13/98	B26	1	AFTER	na	na	na	na	na	na	na	ND	0.049	79.45	20.50	
8/13/98	B26	3	BLANK	na	na	na	na	na	na	na	ND	0.031	79.42	20.54	
8/13/98	B26	3	BEFORE	na	0.003	0.108	0.401	0.095	na	na	ND	0.865	79.13	19.99	
8/13/98	B26	3	LAB	17	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B26	3	AFTER	na	na	na	na	na	na	na	ND	1.340	79.04	19.59	
8/13/98	B26	5	BLANK	na	na	na	na	na	na	na	ND	0.043	79.39	20.56	
8/13/98	B26	5	BEFORE	na	0.007	0.132	0.646	ND	na	na	ND	1.403	79.02	19.55	
8/13/98	B26	5	LAB	16	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B26	5	AFTER	na	na	na	na	na	na	na	ND	0.985	79.01	19.99	
8/13/98	B26	10	BLANK	na	na	na	na	na	na	na	ND	0.043	79.55	20.40	
8/13/98	B26	10	BEFORE	na	1.391	0.700	0.201	ND	na	na	2,838	5.030	80.81	13.47	
8/13/98	B26	10	LAB	240	4.4	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	B26	10	AFTER	na	na	na	na	na	na	na	2,136	4.711	80.66	14.04	
8/13/98	B26	13	BLANK	na	na	na	na	na	na	na	18	0.189	79.37	20.44	
8/13/98	B26	13	BEFORE	na	na	9.372	ND	ND	na	na	20,974	4.829	81.79	11.25	
8/13/98	B26	13	LAB	2,100	44	4.5	ND<2.3	ND<2.3	ND<2.8	na	na	na	na	na	
8/13/98	B26	13	AFTER	na	na	na	na	na	na	na	20,644	4.854	81.61	11.46	

TABLE 4

FIELD AND LABORATORY RESULTS OF SOIL GAS SAMPLES

UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID BORING	DEPTH (feet bgs)	MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/13/98	B26	15	BLANK	na	na	na	na	na	na	na	68	0.117	79.10	20.78	
8/13/98	B26	15	BEFORE	na	na	37.808	1.044	ND	na	na	47,580	10.323	84.34	0.56	
8/13/98	B26	15	LAB	13,000	160	37	ND<9.2	ND<9.2	140	ND<2.8	na	na	na	na	
8/13/98	B26	15	AFTER	na	na	na	na	na	na	na	48,255	10.588	84.14	0.43	
8/13/98	B26	16.5	BLANK	na	na	na	na	na	na	na	242	0.247	79.36	20.37	
8/13/98	B26	16.5	BEFORE	na	na	na	7.591	ND	na	na	43,699	9.347	83.50	2.77	
8/13/98	B26	16.5	LAB	10,000	120	29	ND<9.2	ND<9.2	110	ND<2.8	na	na	na	na	
8/13/98	B26	16.5	AFTER	na	na	na	na	na	na	na	35,347	7.662	82.59	6.20	

GLR

NOTES:
ND = not detected at or above detection limit; na = not available or applicable; bgs = below ground surface; ppmv = parts per million by volume
"BLANK" = Syringe gas sample collected from cleaned sample probe prior to insertion into soil.
"BEFORE" = Syringe gas sample collected from sample probe after insertion into soil and before tedlar bag sample extracted from probe.
"AFTER" = Syringe gas sample collected from sample probe after insertion into soil and after tedlar bag sample extracted from probe.
Laboratory results obtained as follows: TPH by EPA method 8015; BTEX and MTBE by EPA Method 8020; fixed gases by GC/TCD (ASTM D1946-90).
"BLANK", "BEFORE", and "AFTER" sample results obtained using field GC.
Field result for methane may contain argon.

QA/QC

Vapor Extraction Technology, Inc.

5\SOILVAP.XLS

10/14/98

TABLE 5

FIELD AND LABORATORY RESULTS OF UTILITY CAVITY GAS SAMPLES

UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID: SAMPLE	SAMPLE ID: DEPTH (feet bgs)	SAMPLE ID: MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/12/98	G1	3	FIELD	na	0.091	0.023	ND	ND	na	na	ND	0.029	79.59	20.38	
8/12/98	G1	3	LAB	18	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	ND<0.10	78	22	
8/12/98	G2	3	FIELD	na	0.064	0.208	ND	ND	na	na	ND	0.029	79.33	20.63	
8/12/98	G2	3	LAB	16	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	ND<1,000	0.22	77	22	
8/13/98	G3	1	FIELD	na	ND	0.092	ND	ND	na	na	ND	0.040	79.44	20.51	
8/13/98	G3	1	LAB	2.9	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G4	1.5	FIELD	na	ND	0.152	ND	ND	na	na	ND	0.030	79.32	20.65	
8/13/98	G4	1.5	LAB	16	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G5	na	FIELD	na	ND	0.066	ND	ND	na	na	ND	0.086	79.27	20.64	
8/13/98	G5	na	LAB	4.2	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G6	1	FIELD	na	ND	0.078	ND	ND	na	na	ND	0.037	79.23	20.72	
8/13/98	G6	1	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G7	na	FIELD	na	ND	0.084	ND	ND	na	na	ND	0.028	79.30	20.67	
8/13/98	G7	na	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G8	1	FIELD	na	ND	0.066	ND	ND	na	na	ND	0.690	79.87	19.43	
8/13/98	G8	1	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G9	1	FIELD	na	na	na	na	na	na	na	ND	0.126	79.30	20.56	
8/13/98	G9	1	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G10	na	FIELD	na	na	na	na	na	na	na	29	0.033	79.37	20.60	
8/13/98	G10	na	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G11	1.5	FIELD	na	na	na	na	na	na	na	ND	0.068	79.29	20.64	
8/13/98	G11	1.5	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G12	na	FIELD	na	na	na	na	na	na	na	ND	0.036	79.23	20.72	
8/13/98	G12	na	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G13	2	FIELD	na	ND	0.074	ND	ND	na	na	141	0.034	78.99	20.96	
8/13/98	G13	2	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G14	1	FIELD	na	ND	0.084	ND	ND	na	na	ND	0.030	79.22	20.75	
8/13/98	G14	1	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	

Vapor Extraction Technology, Inc.

TABLE 5

FIELD AND LABORATORY RESULTS OF UTILITY CAVITY GAS SAMPLES

UNOCAL STATION #2651

Vapor Extraction Technology, Inc.

DATE SAMPLED	SAMPLE ID: SAMPLE	SAMPLE ID: DEPTH (feet bgs)	SAMPLE ID: MODIFIER	(ppmv) TPH as Gasoline	(ppmv) BENZENE	(ppmv) TOLUENE	(ppmv) ETHYL-BENZENE	(ppmv) TOTAL XYLENES	(ppmv) MTBE	(ppmv) MTBE (8260)	(ppmv) METHANE	% CARBON DIOXIDE	% NITROGEN	% OXYGEN	COMMENTS
8/13/98	G15	na	FIELD	na	ND	0.052	ND	ND	na	na	ND	0.042	79.21	20.75	
8/13/98	G15	na	LAB	ND<2.4	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G16	1	FIELD	na	ND	ND	ND	ND	na	na	1,606	3.673	79.55	16.61	
8/13/98	G16	1	LAB	76	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	
8/13/98	G17	1	FIELD	na	ND	0.357	ND	ND	na	na	ND	0.041	79.29	20.66	
8/13/98	G17	1	LAB	4.9	ND<1.6	ND<1.3	ND<1.2	ND<1.2	ND<1.4	na	na	na	na	na	

NOTES:
ND = not detected at or above detection limit; na = not available or applicable; bgs = below ground surface; ppmv = parts per million by volume
"FIELD" = Syringe gas sample collected from utility cavity or manhole before tedlar bag sample was collected from same area.
Laboratory results obtained as follows: TPH by EPA method 8015; BTEX and MTBE by EPA Method 8020; fixed gases by GC/TCD (ASTM D1946-90).
"FIELD" sample results obtained using field GC.
Field result for methane may contain argon.

JLR

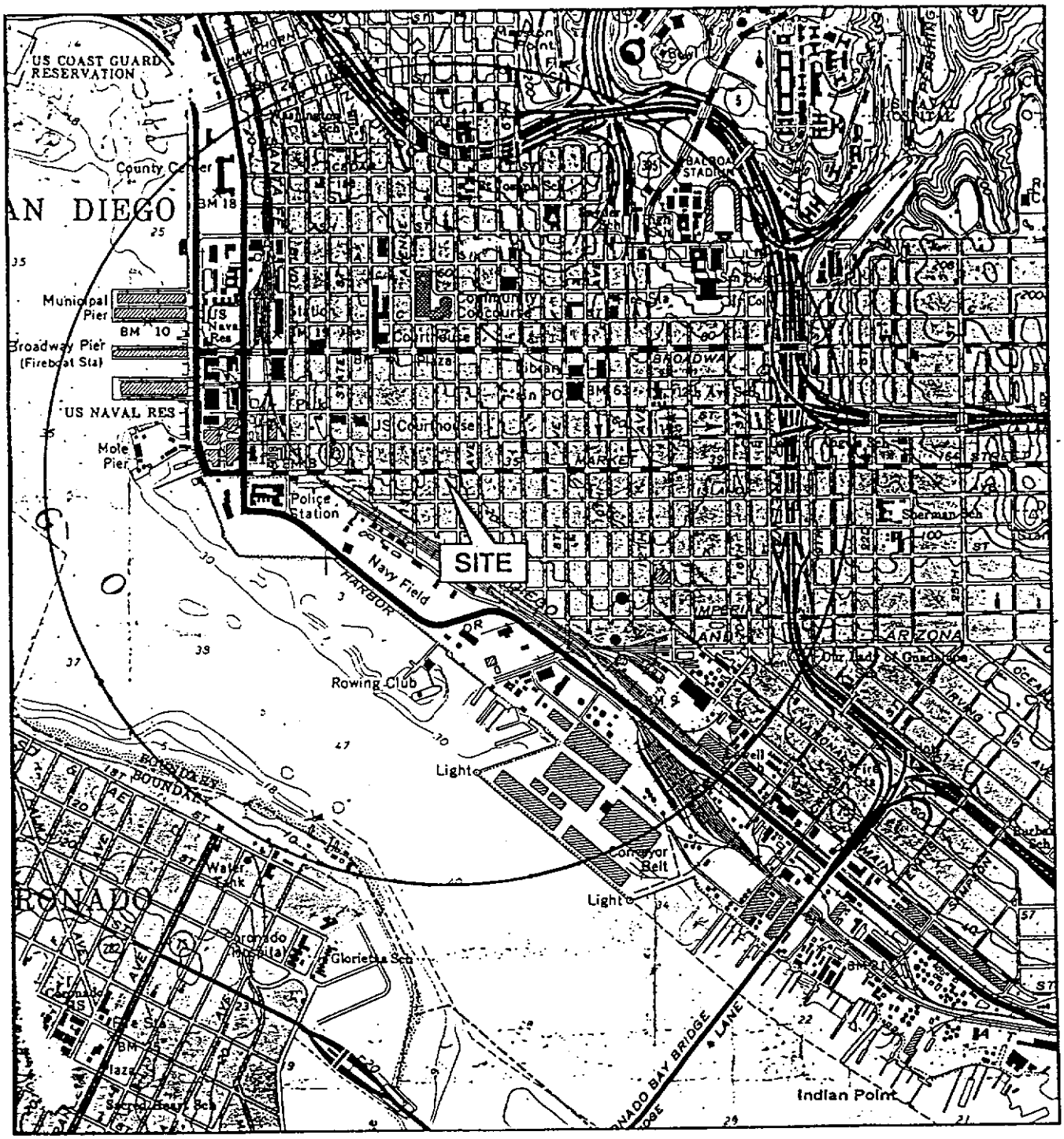
QA/QC

Vapor Extraction Technology, Inc.

5\CAVITVAP.XLS

10/14/98

FIGURES



1 MILE 3/4 1/2 1/4 0 1 MILE

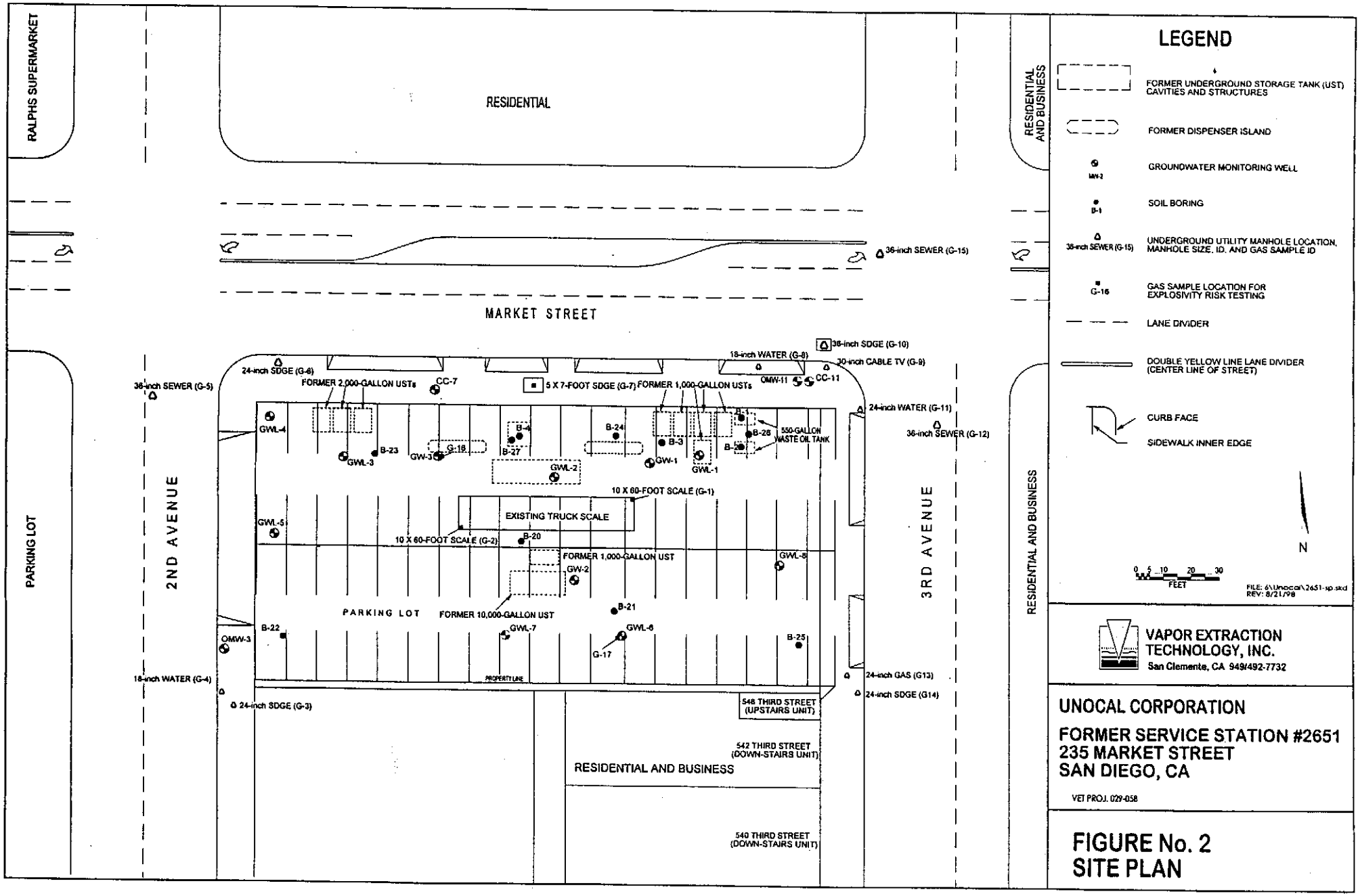
SCALE 1: 24 000

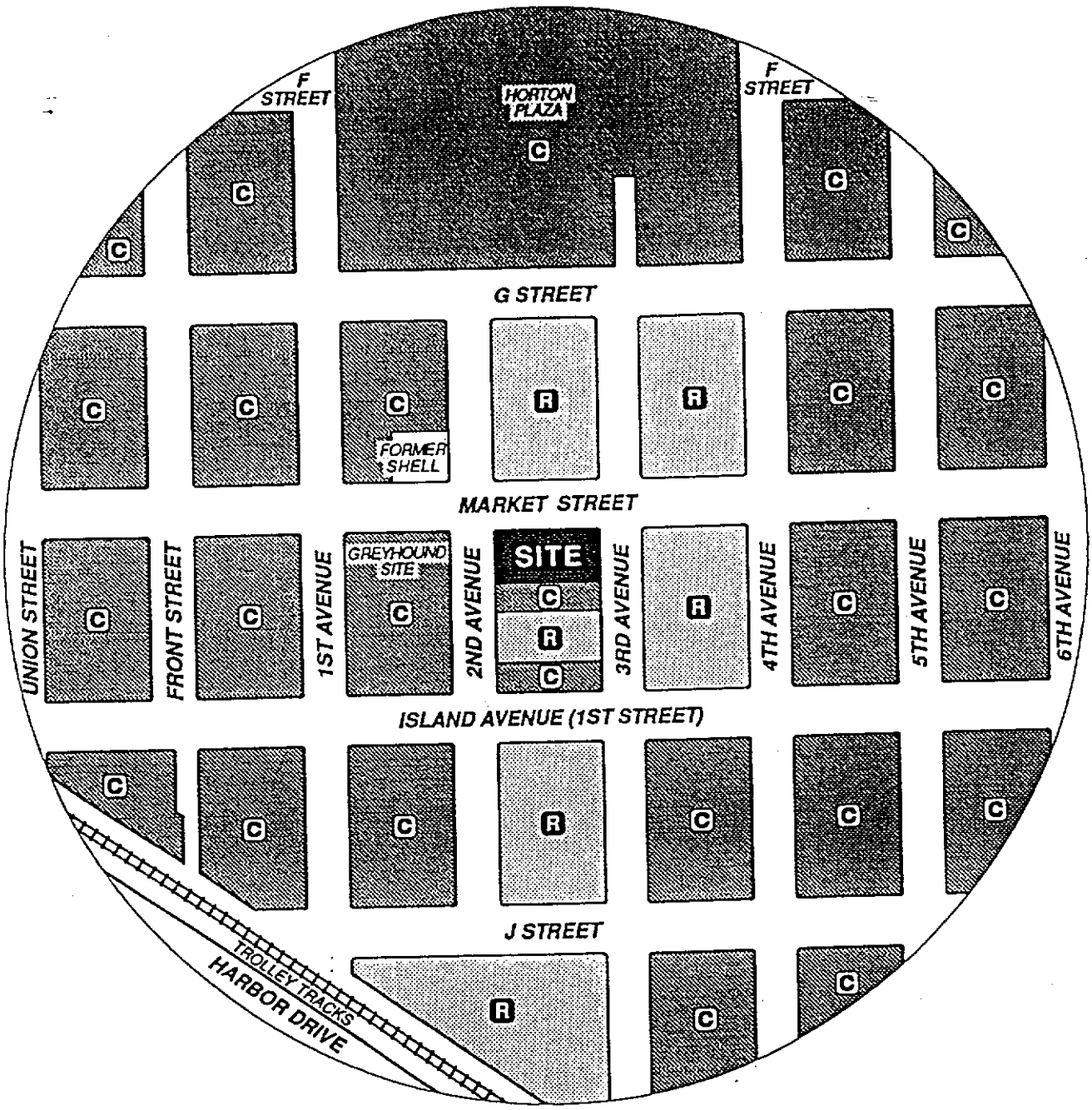
FROM POINT LOMA
USGS 7.5 MINUTE QUADRANGLE MAP
PHOTO REVISED 1975

FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 1.029.58.2

FIGURE No. 1
SITE LOCATION

Vapor Extraction Technology, Inc.


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
36-inch SEWER (G-15)
MARKET STREET
PARKING LOT
2ND AVENUE
3RD AVENUE
36-inch SDGE (G-10)
18-inch WATER (G-8)
30-inch CABLE TV (G-9)
24-inch SDGE (G-6)
36-inch SEWER (G-5)
FORMER 2,000-GALLON USTs
CC-7
5 X 7-FOOT SDGE (G-7)
FORMER 1,000-GALLON USTs
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
550-GALLON WASTE OIL TANK
GWL-4
B-23
GWL-3
GW-3
G-18
B-4
B-27
B-24
B-3
GW-1
GWL-1
GWL-2
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
GWL-5
10 X 60-FOOT SCALE (G-2)
B-20
FORMER 1,000-GALLON UST
GW-2
GWL-8
PARKING LOT
FORMER 10,000-GALLON UST
B-21
B-22
GWL-7
GWL-6
OMW-3
G-17
B-25
PROPERTY LINE
18-inch WATER (G-4)
24-inch SDGE (G-3)
24-inch GAS (G13)
24-inch SDGE (G14)
548 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
GROUNDWATER MONITORING WELL
SOIL BORING
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
N
FEET
FILE: 6:\Unocal\2651-sp.skd
REV: 8/21/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 2
SITE PLAN



LEGEND

R Residential Zone

C Commercial Zone

NOTES:

Figure prepared from San Diego County Assessor's parcel maps. All map element dimensions and locations are estimated.

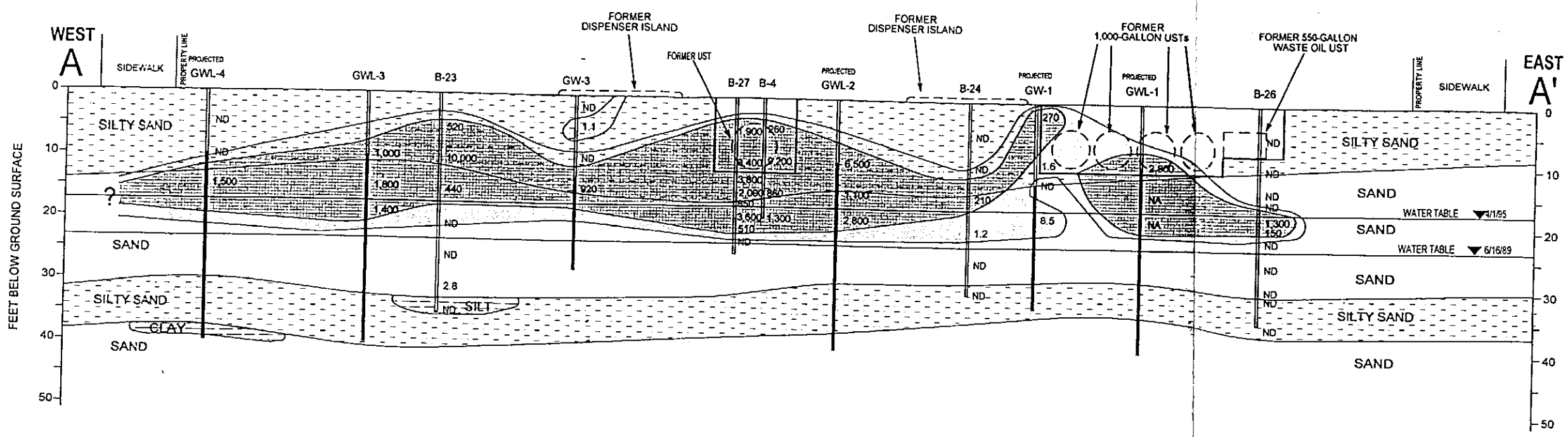
Scale(Feet)

0 150 300

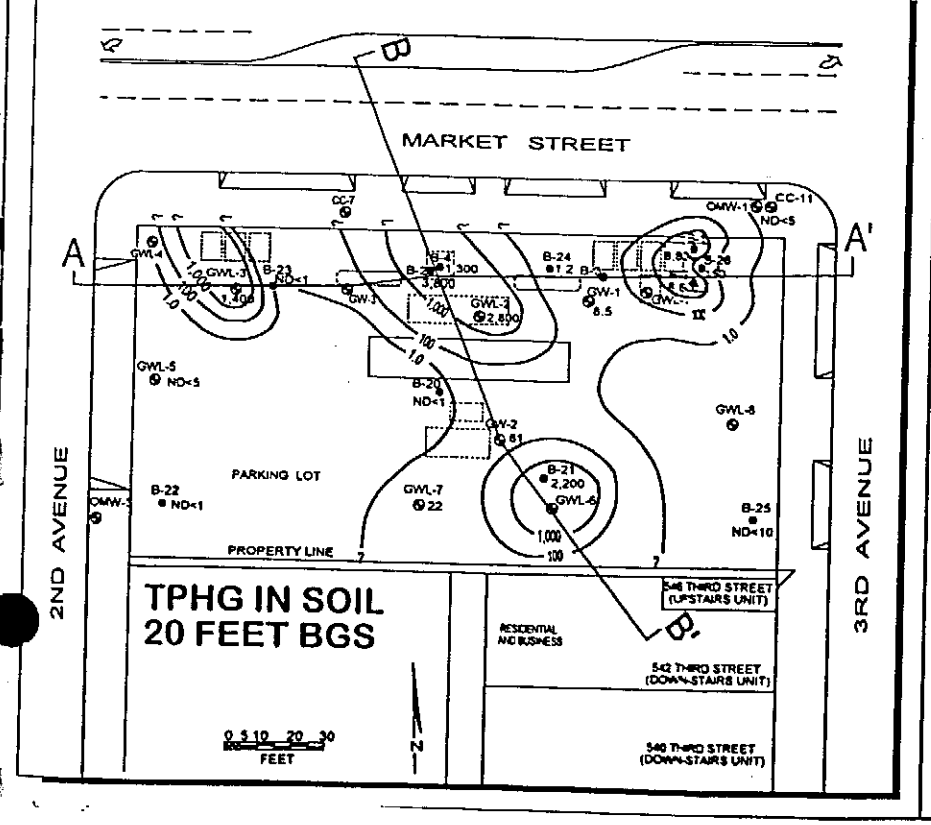
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 1.029.58.2

FIGURE No. 3
LAND USE WITHIN 1000 FEET

Vapor Extraction Technology, Inc.



INDEX MAP



LEGEND

VEW-2 BORING OR WELL

BLANK CASING OR BACKFILLED BORING

SCREENED CASING AND SAND-PACK INTERVAL

0.50 TPHG IN SOIL IN PPM

ND ND = NONDETECTABLE TPHG

APPROXIMATE EXTENT OF TPHG IN SOIL < 100 PPM

APPROXIMATE EXTENT OF TPHG IN SOIL > 100 PPM

SAND (HIGH PERMEABILITY)

SILTY SAND (MODERATE PERMEABILITY)

SILT AND CLAY (LOW PERMEABILITY)

6/16/89 WATER TABLE (WITH DATE OF MEASUREMENT)

NO VERTICAL EXAGGERATION

0 5 10 15 20

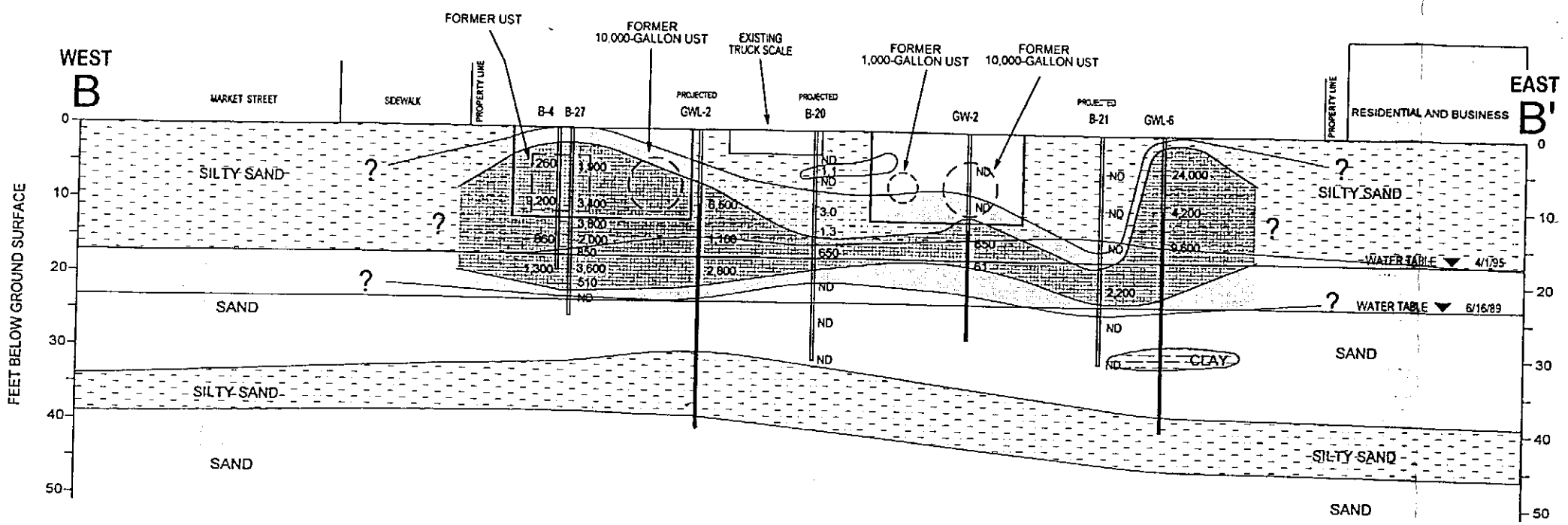
FEET

FILE: 6\Unocal\2651xsca.skd
REV: 10/15/98

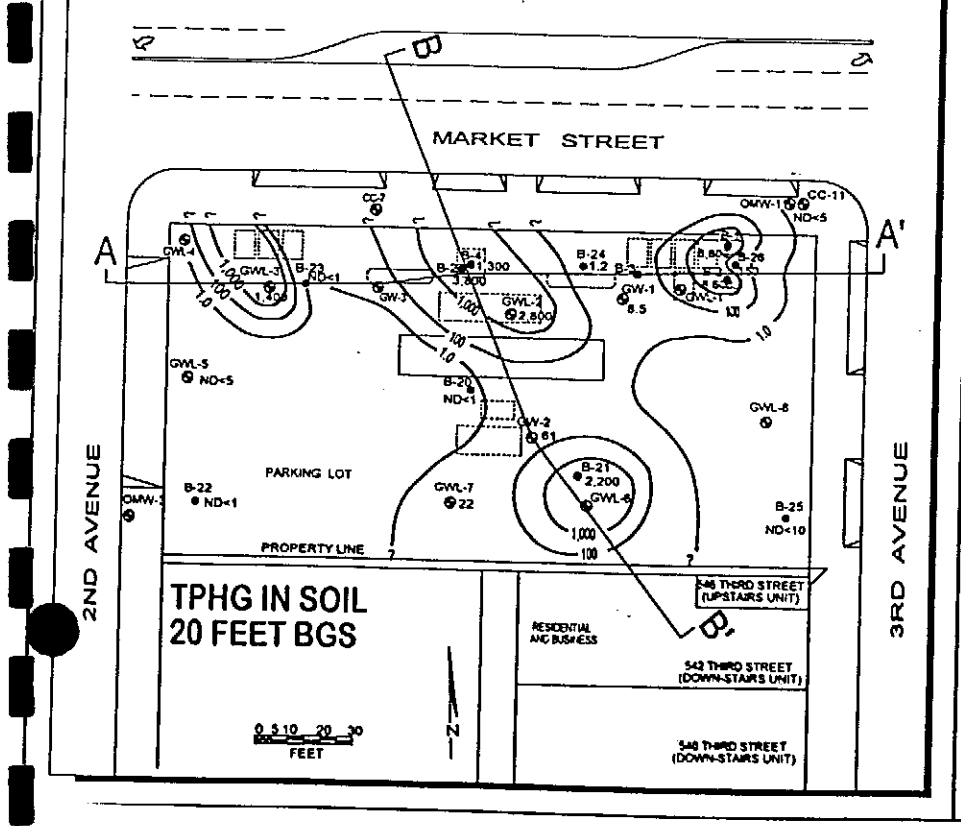
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

SITE:
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058

FIGURE No. 4
CROSS SECTION A-A'



INDEX MAP



LEGEND

VEW-2 — BORING OR WELL

BLANK CASING OR BACKFILLED BORING

SCREENED CASING AND SAND-PACK INTERVAL

0.50 — TPHG IN SOIL IN PPM

ND — ND = NONDETECTABLE TPHG

APPROXIMATE EXTENT OF TPHG IN SOIL < 100 PPM

APPROXIMATE EXTENT OF TPHG IN SOIL > 100 PPM

SAND (HIGH PERMEABILITY)

SILTY SAND (MODERATE PERMEABILITY)

SILT AND CLAY (LOW PERMEABILITY)

6/16/89 — WATER TABLE (WITH DATE OF MEASUREMENT)

NO VERTICAL EXAGGERATION

0 5 10 15 20

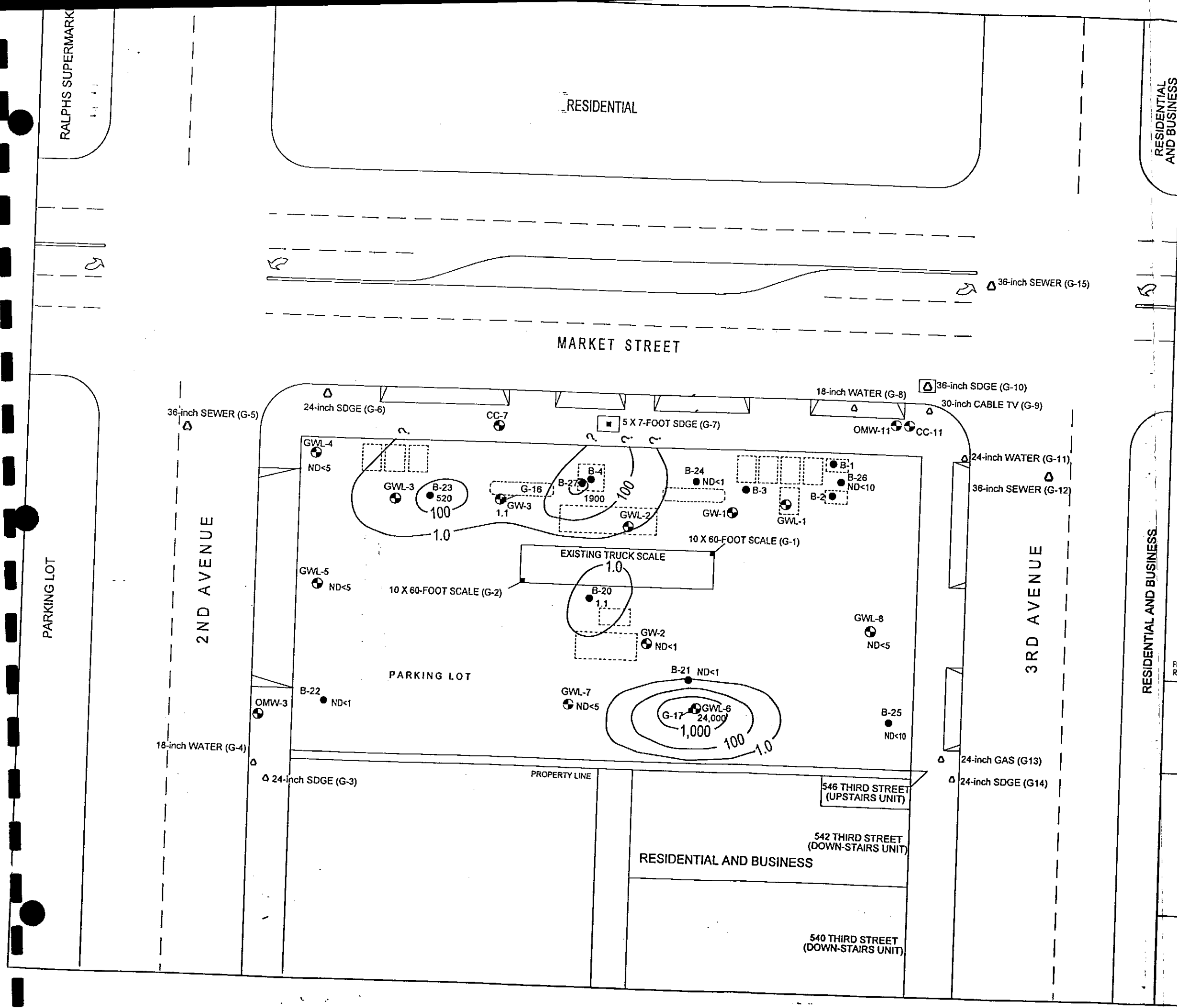
FEET

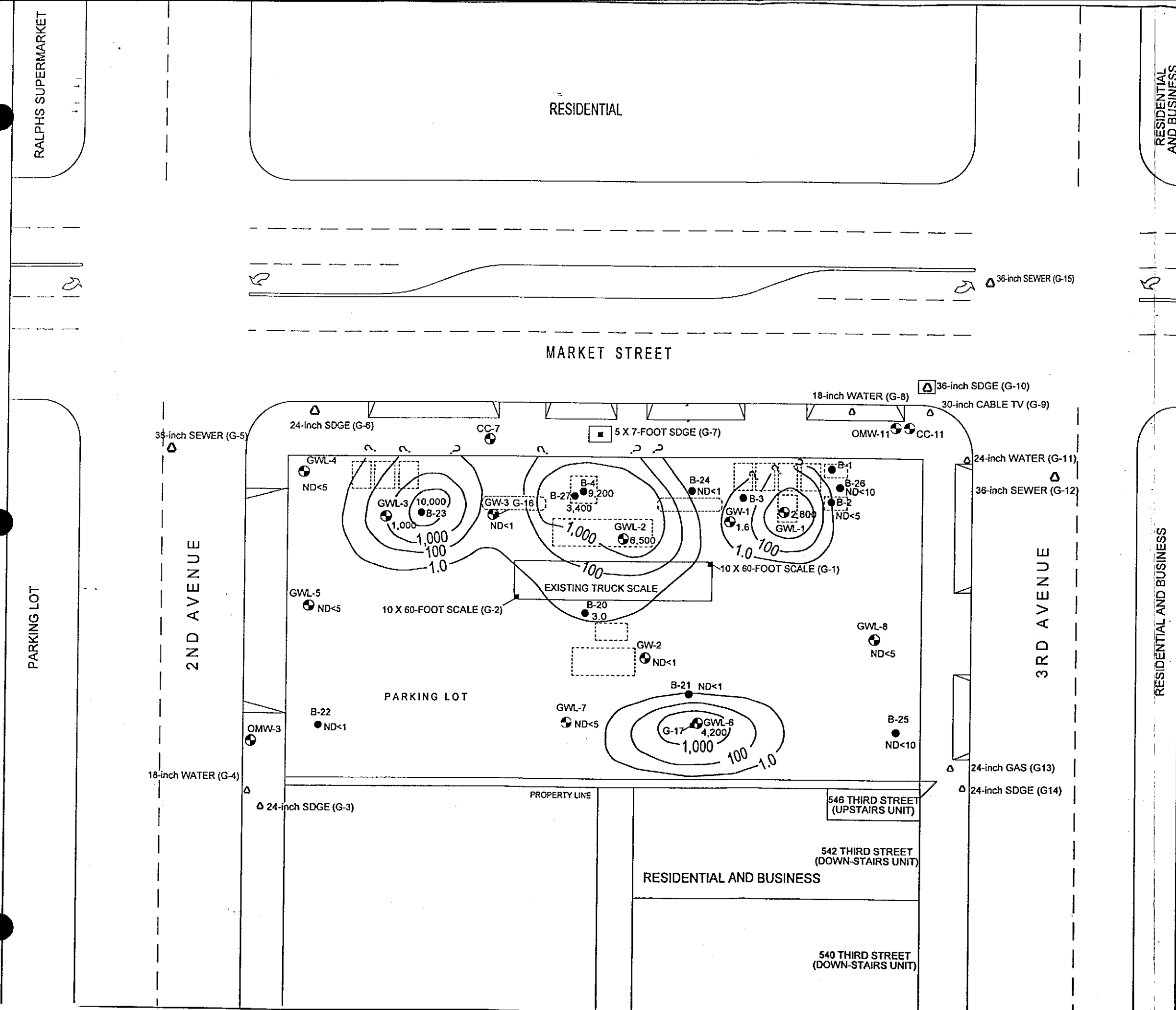
FILE: 6\Unocal\2651xscb.skd
REV: 10/15/98

VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

SITE:
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058

FIGURE No. 5
CROSS SECTION B-B'


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
36-inch SEWER (G-15)
MARKET STREET
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
5 X 7-FOOT SDGE (G-7)
18-inch WATER (G-8)
36-inch SDGE (G-10)
30-inch CABLE TV (G-9)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
ND<5
GWL-3
B-23
520
100
1.0
G-16
GW-3
1.1
B-27
B-4
1900
100
B-24
ND<1
GWL-2
GW-1
B-3
GWL-1
B-1
B-26
ND<10
B-2
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
1.0
10 X 60-FOOT SCALE (G-2)
GWL-5
ND<5
B-20
1.1
GW-2
ND<1
GWL-8
ND<5
2ND AVENUE
3RD AVENUE
PARKING LOT
B-21
ND<1
B-22
ND<1
OMW-3
GWL-7
ND<5
G-17
GWL-6
24,000
1,000
100
1.0
B-25
ND<10
18-inch WATER (G-4)
24-inch SDGE (G-3)
PROPERTY LINE
24-inch GAS (G13)
24-inch SDGE (G14)
546 THIRD STREET
(UPSTAIRS UNIT)
542 THIRD STREET
(DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET
(DOWN-STAIRS UNIT)
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
1,900
TPHG OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE TPHG.
100
ISOCONCENTRATION CONTOUR OF TPHG IN SOIL IN PPM.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sl-fph5.skd
REV: 10/12/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 6
TPHG IN SOIL,
5 FEET BGS



LEGEND

- FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
- FORMER DISPENSER ISLAND
- MW-2 — GROUNDWATER MONITORING WELL
- B-1 — SOIL BORING
- 36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
- G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
- LANE DIVIDER
- DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET).
- CURB FACE
- SIDEWALK INNER EDGE
- 6,500 — TPHG OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE TPHG.
- 100 — ISOCONCENTRATION CONTOUR OF TPHG IN SOIL IN PPM.

0 5 10 20 30 FEET

N

FILE: 6\Unocal\sl-tph10.skd
REV: 10/12/98

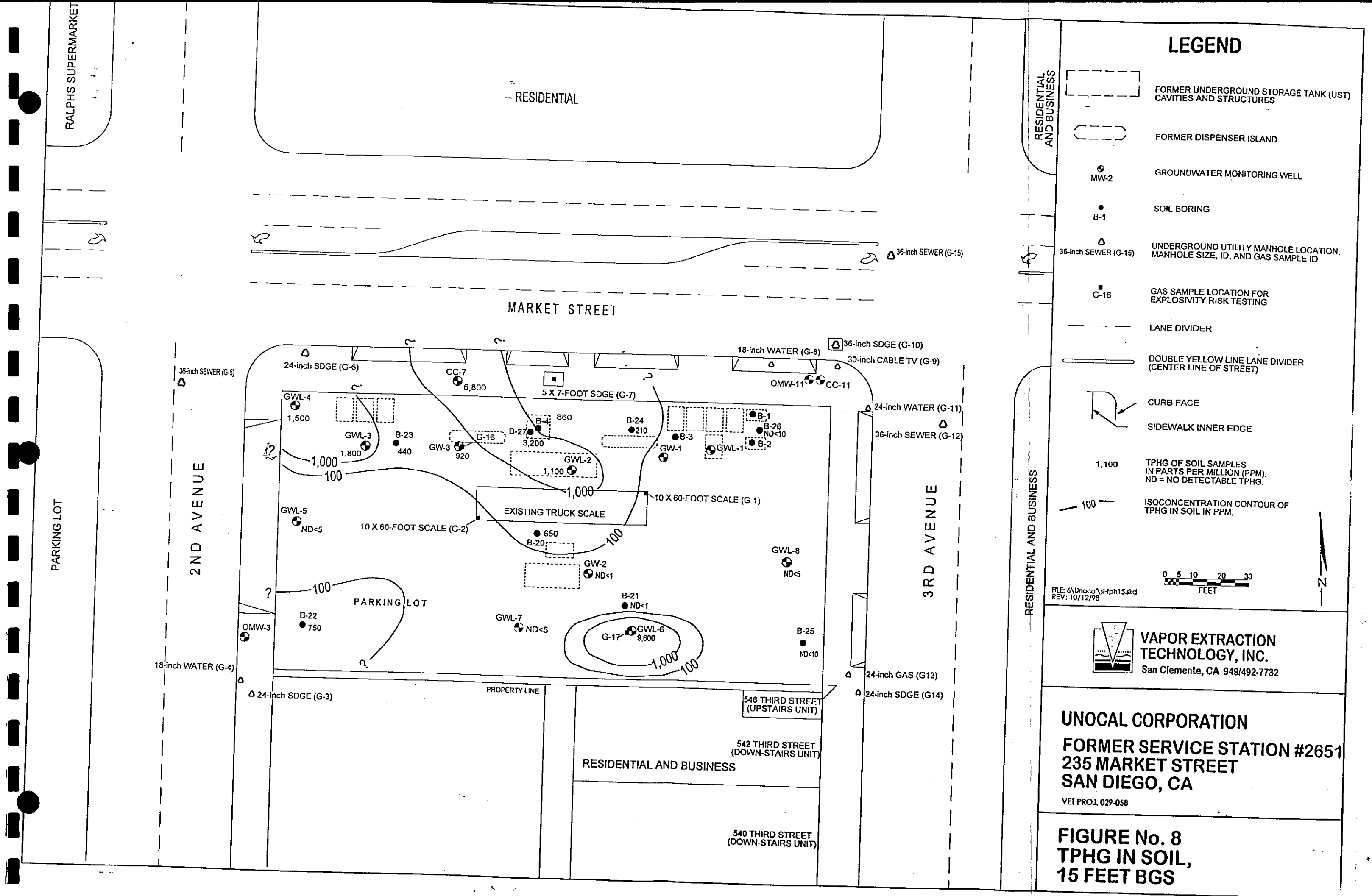
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

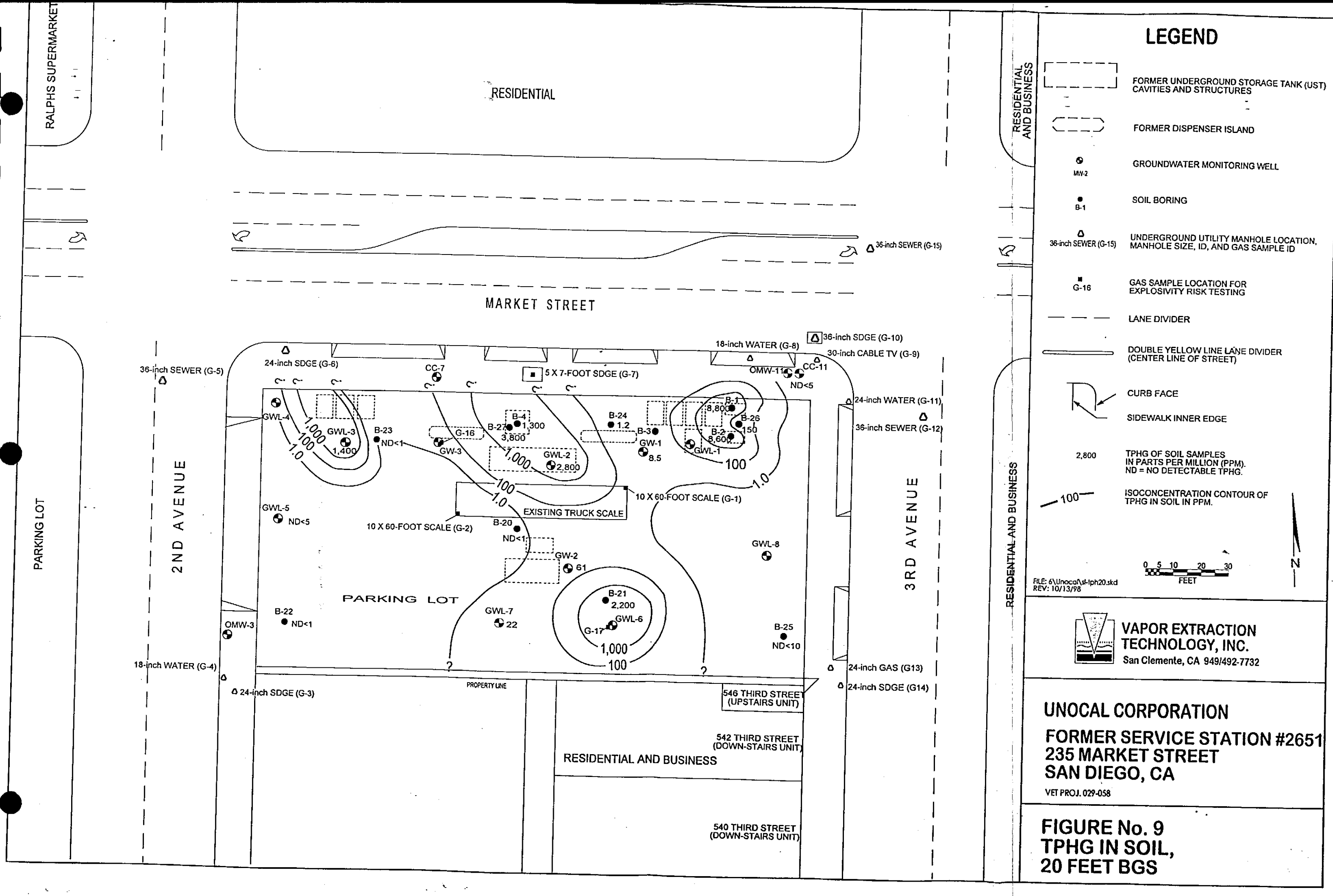
UNOCAL CORPORATION

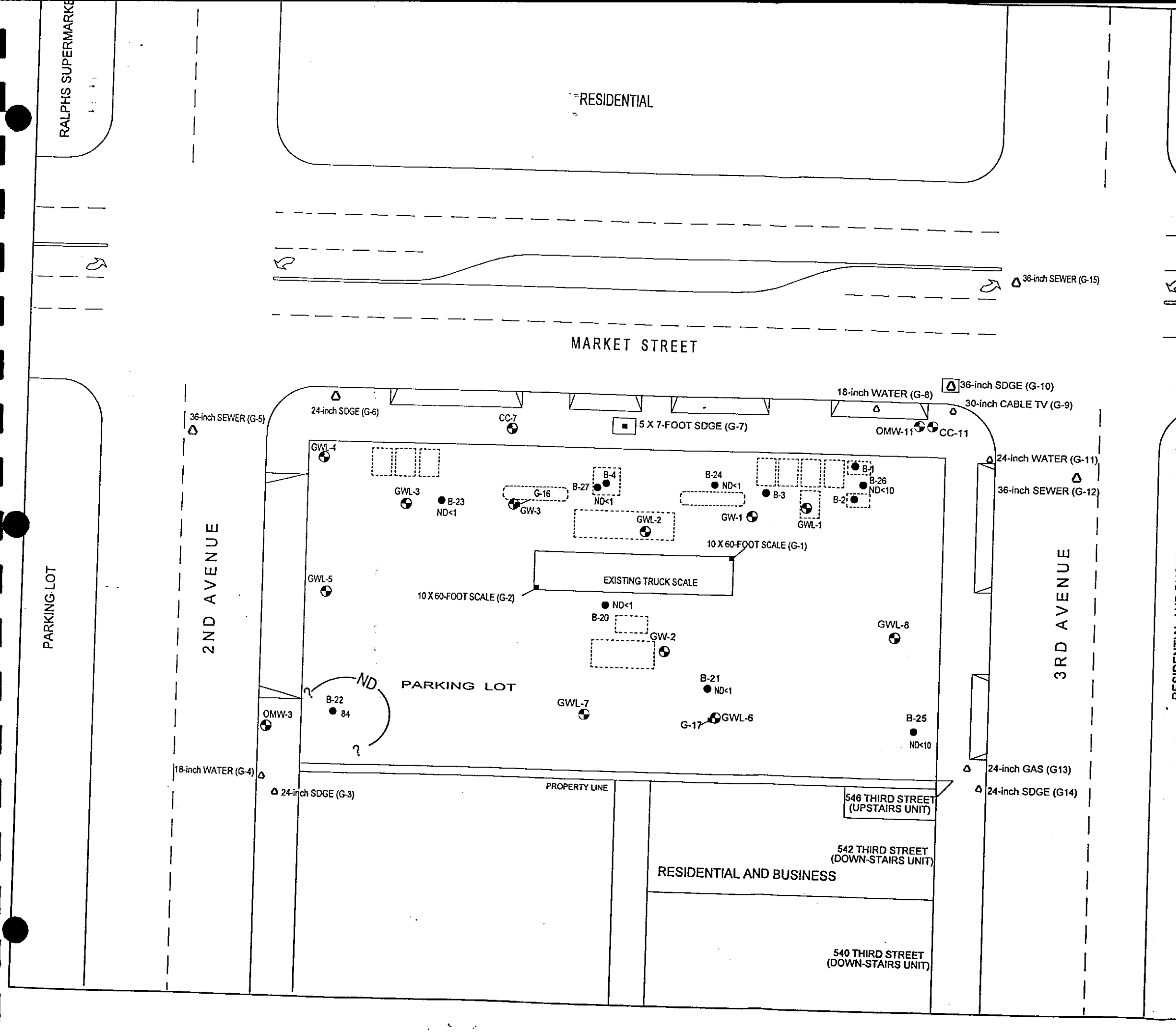
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No.7
TPHG IN SOIL,
10 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
MARKET STREET
36-inch SEWER (G-15)
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
6,800
5 X 7-FOOT SDGE (G-7)
18-inch WATER (G-8)
36-inch SDGE (G-10)
30-inch CABLE TV (G-9)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
1,500
GWL-3
1,800
B-23
440
GW-3
920
G-16
B-27
B-4
860
3,200
B-24
210
B-3
GW-1
GWL-1
B-1
B-26
ND<10
B-2
GWL-2
1,100
1,000
100
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
10 X 60-FOOT SCALE (G-2)
GWL-5
ND<5
650
B-20
GW-2
ND<1
GWL-8
ND<5
PARKING LOT
B-21
ND<1
B-22
750
OMW-3
GWL-7
ND<5
G-17
GWL-6
9,600
B-25
ND<10
18-inch WATER (G-4)
24-inch SDGE (G-3)
PROPERTY LINE
24-inch GAS (G13)
24-inch SDGE (G14)
546 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
PARKING LOT
2ND AVENUE
3RD AVENUE
RESIDENTIAL AND BUSINESS
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
1,100
TPHG OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE TPHG.
100
ISOCONCENTRATION CONTOUR OF TPHG IN SOIL IN PPM.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sl-tph15.skd
REV: 10/12/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 8
TPHG IN SOIL,
15 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
36-inch SEWER (G-15)
MARKET STREET
36-inch SDGE (G-10)
18-inch WATER (G-8)
30-inch CABLE TV (G-9)
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
5 X 7-FOOT SDGE (G-7)
OMW-11
CC-11
ND<5
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
1,000
100
1.0
GWL-3
1,400
B-23
ND<1
G-16
GW-3
B-27
B-4
1,300
3,800
B-24
1.2
B-3
GW-1
8.5
GWL-2
2,800
B-1
8,800
B-26
150
B-2
8,600
GWL-1
100
1.0
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
GWL-5
ND<5
10 X 60-FOOT SCALE (G-2)
B-20
ND<1
GW-2
61
GWL-8
PARKING LOT
B-21
2,200
GWL-6
G-17
1,000
100
B-22
ND<1
OMW-3
GWL-7
22
B-25
ND<10
18-inch WATER (G-4)
24-inch SDGE (G-3)
PROPERTY LINE
24-inch GAS (G13)
24-inch SDGE (G14)
546 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
PARKING LOT
2ND AVENUE
3RD AVENUE
RESIDENTIAL AND BUSINESS
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
2,800
TPHG OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE TPHG.
100
ISOCONCENTRATION CONTOUR OF TPHG IN SOIL IN PPM.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sl-tph20.skd
REV: 10/13/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 9
TPHG IN SOIL,
20 FEET BGS



LEGEND

- FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
- FORMER DISPENSER ISLAND
- MW-2 — GROUNDWATER MONITORING WELL
- B-1 — SOIL BORING
- 36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
- G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
- LANE DIVIDER
- DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
- CURB FACE
- SIDEWALK INNER EDGE
- 84 — TPHG OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE TPHG.
- ND — ISOCONCENTRATION CONTOUR OF TPHG IN SOIL IN PPM.

0 5 10 20 30 FEET

N

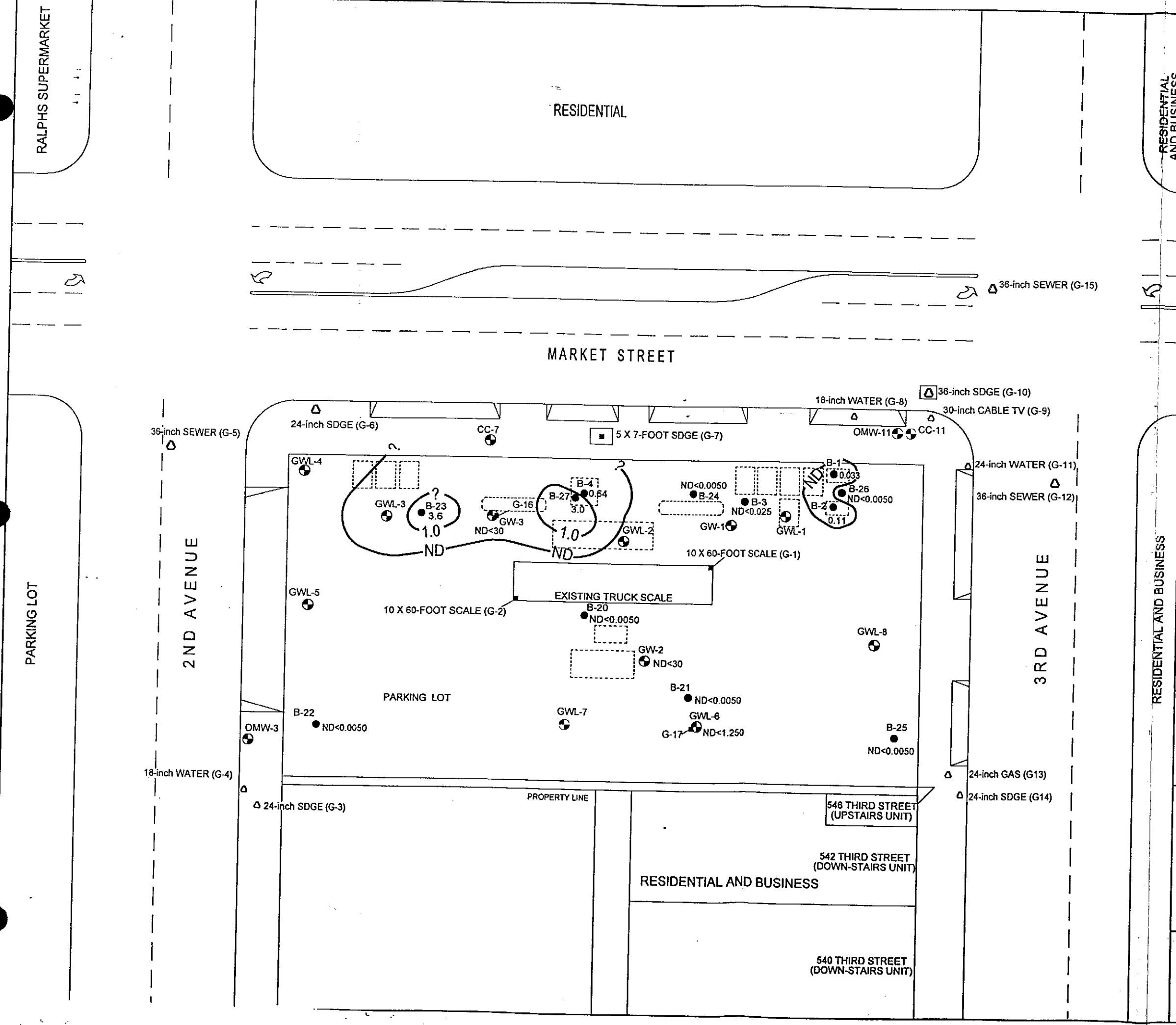
FILE: 6\Unocal\sl-tph25.skd
REV: 10/13/98

VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 10
TPHG IN SOIL, 25 FEET BGS



LEGEND

FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES

FORMER DISPENSER ISLAND

MW-2 — GROUNDWATER MONITORING WELL

B-1 — SOIL BORING

36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID

G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING

LANE DIVIDER

DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)

CURB FACE

SIDEWALK INNER EDGE

0.64 — BENZENE OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE BENZENE.

1.0 — ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL IN PPM.

0 5 10 20 30 FEET

N

FILE: 6\Unocal\sl-ben5.skd
REV: 10/13/98

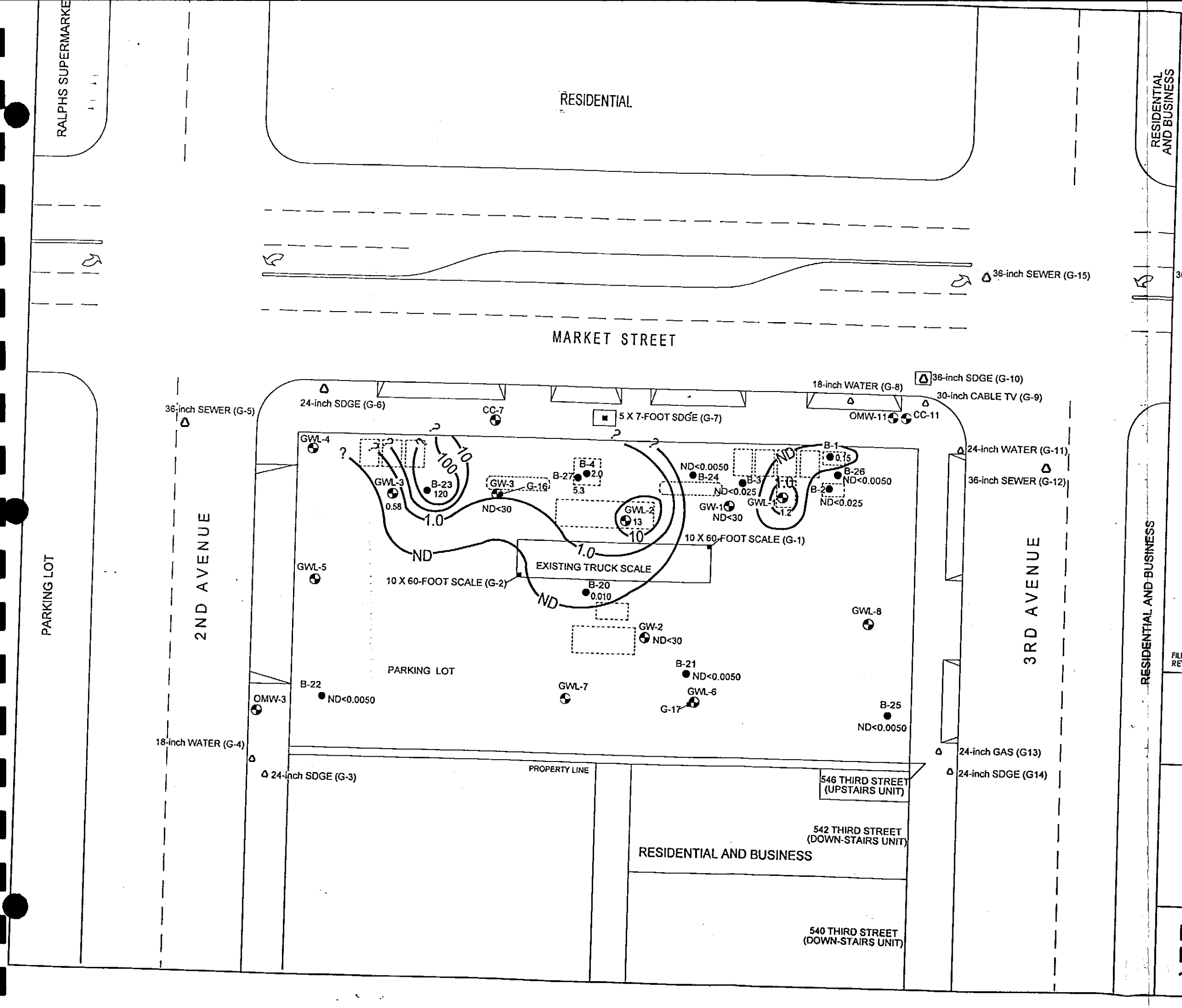
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION

FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 11
BENZENE IN SOIL, 5 FEET BGS



LEGEND

FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES

FORMER DISPENSER ISLAND

MW-2 — GROUNDWATER MONITORING WELL

B-1 — SOIL BORING

36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID

G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING

LANE DIVIDER

DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)

CURB FACE

SIDEWALK INNER EDGE

13 — BENZENE OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE BENZENE.

1.0 — ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL IN PPM.

0 5 10 20 30 FEET

N

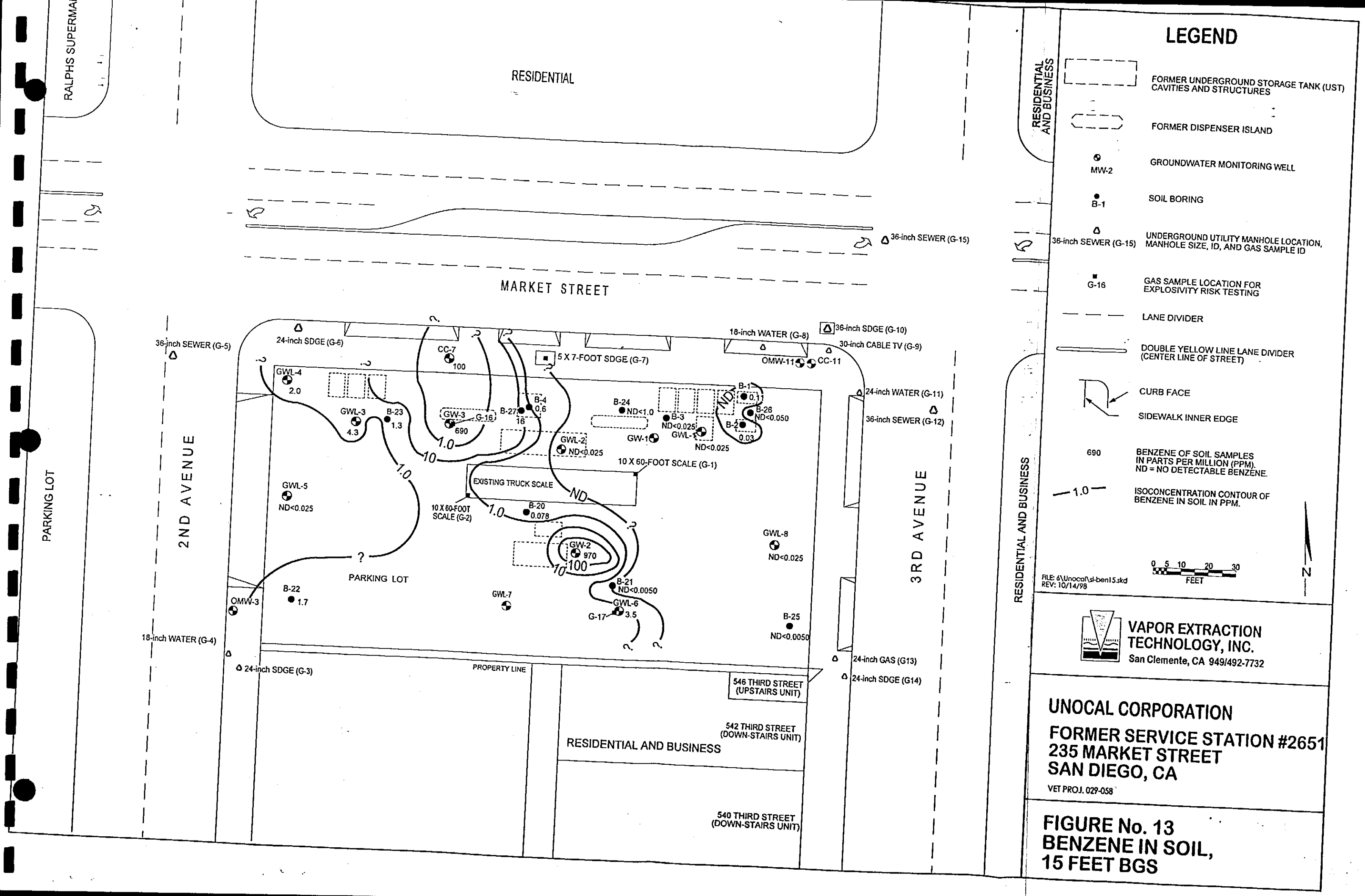
FILE: 6\Unocal\sl-ben10.skd
REV: 10/13/98

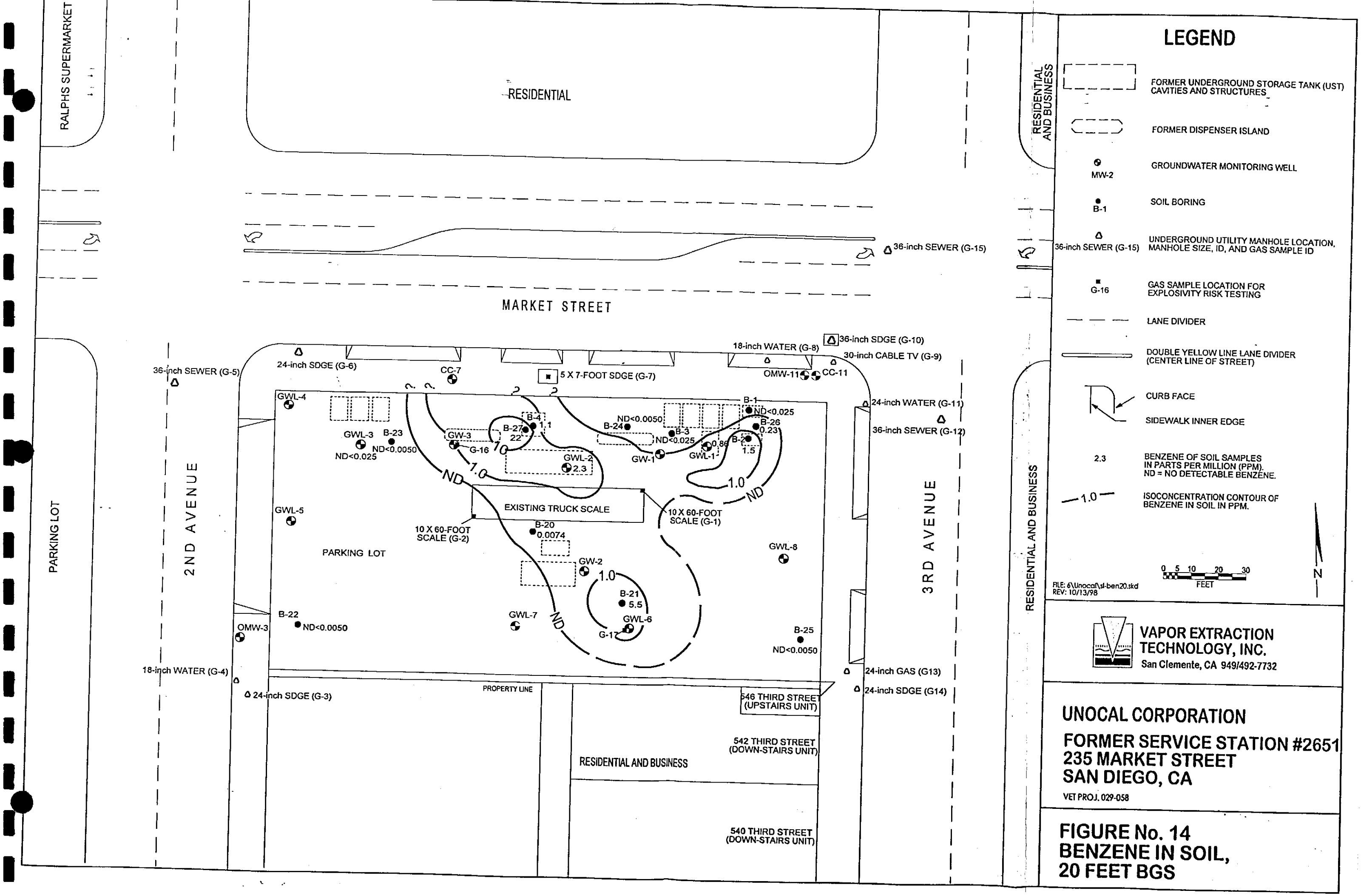
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

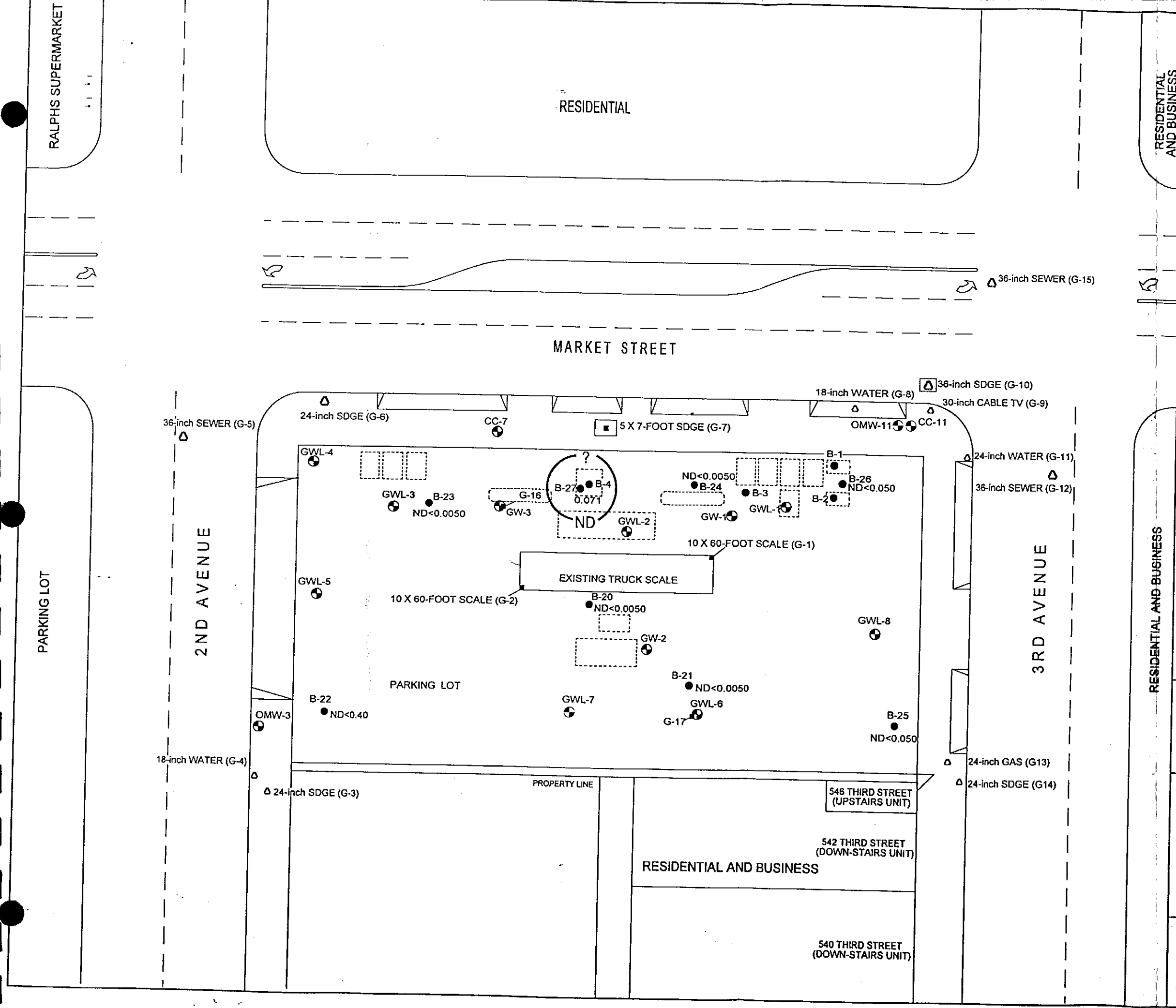
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 12
BENZENE IN SOIL, 10 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
MARKET STREET
36-inch SEWER (G-15)
PARKING LOT
2ND AVENUE
3RD AVENUE
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
100
5 X 7-FOOT SDGE (G-7)
18-inch WATER (G-8)
36-inch SDGE (G-10)
30-inch CABLE TV (G-9)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
2.0
GWL-3
4.3
B-23
1.3
GW-3
690
G-16
B-27
16
B-4
0.6
B-24
ND<1.0
B-3
ND<0.025
GW-1
GWL-1
ND<0.025
B-1
0.1
B-26
ND<0.050
B-2
0.03
GWL-2
ND<0.025
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
10 X 60-FOOT SCALE (G-2)
B-20
0.078
GWL-5
ND<0.025
GW-2
970
100
GWL-8
ND<0.025
B-21
ND<0.0050
GWL-6
3.5
G-17
GWL-7
B-25
ND<0.0050
B-22
1.7
OMW-3
18-inch WATER (G-4)
24-inch SDGE (G-3)
PROPERTY LINE
24-inch GAS (G13)
24-inch SDGE (G14)
546 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
690
BENZENE OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE BENZENE.
1.0
ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL IN PPM.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sl-ben15.skd
REV: 10/14/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 13
BENZENE IN SOIL,
15 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
36-inch SEWER (G-15)
MARKET STREET
36-inch SDGE (G-10)
18-inch WATER (G-8)
30-inch CABLE TV (G-9)
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
5 X 7-FOOT SDGE (G-7)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
B-1
ND<0.025
B-26
0.23
B-4
1.1
B-27
22
ND<0.0050
B-24
B-3
ND<0.025
GW-3
G-16
GWL-3
B-23
ND<0.0050
ND<0.025
GWL-2
2.3
GW-1
GWL-1
0.86
B-2
1.5
1.0
ND
EXISTING TRUCK SCALE
10 X 60-FOOT SCALE (G-1)
10 X 60-FOOT SCALE (G-2)
B-20
0.0074
GWL-5
PARKING LOT
GWL-8
GW-2
B-21
5.5
GWL-6
G-17
GWL-7
B-22
ND<0.0050
OMW-3
B-25
ND<0.0050
18-inch WATER (G-4)
24-inch SDGE (G-3)
24-inch GAS (G13)
24-inch SDGE (G14)
PROPERTY LINE
546 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
PARKING LOT
2ND AVENUE
3RD AVENUE
RESIDENTIAL AND BUSINESS
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
2.3
BENZENE OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE BENZENE.
1.0
ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL IN PPM.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sl-ben20.skd
REV: 10/13/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 14
BENZENE IN SOIL,
20 FEET BGS



LEGEND

- FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
- FORMER DISPENSER ISLAND
- MW-2 — GROUNDWATER MONITORING WELL
- B-1 — SOIL BORING
- 36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
- G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
- LANE DIVIDER
- DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
- CURB FACE
- SIDEWALK INNER EDGE
- 0.071 — BENZENE OF SOIL SAMPLES IN PARTS PER MILLION (PPM). ND = NO DETECTABLE BENZENE.
- —ND— ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL IN PPM.

0 5 10 20 30 FEET

N

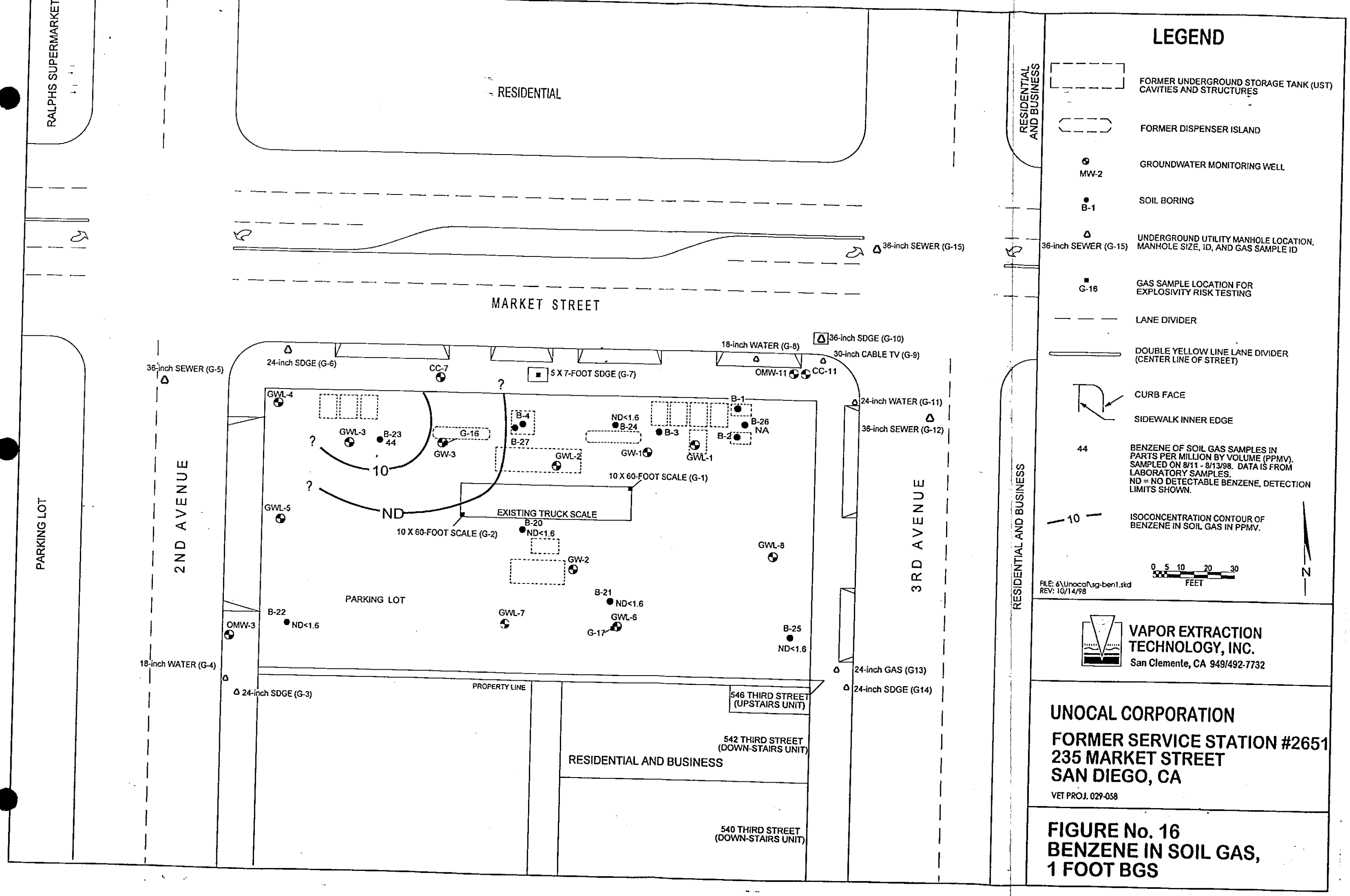
FILE: 6\Unocal\sl-ben25.skd
REV: 10/14/98

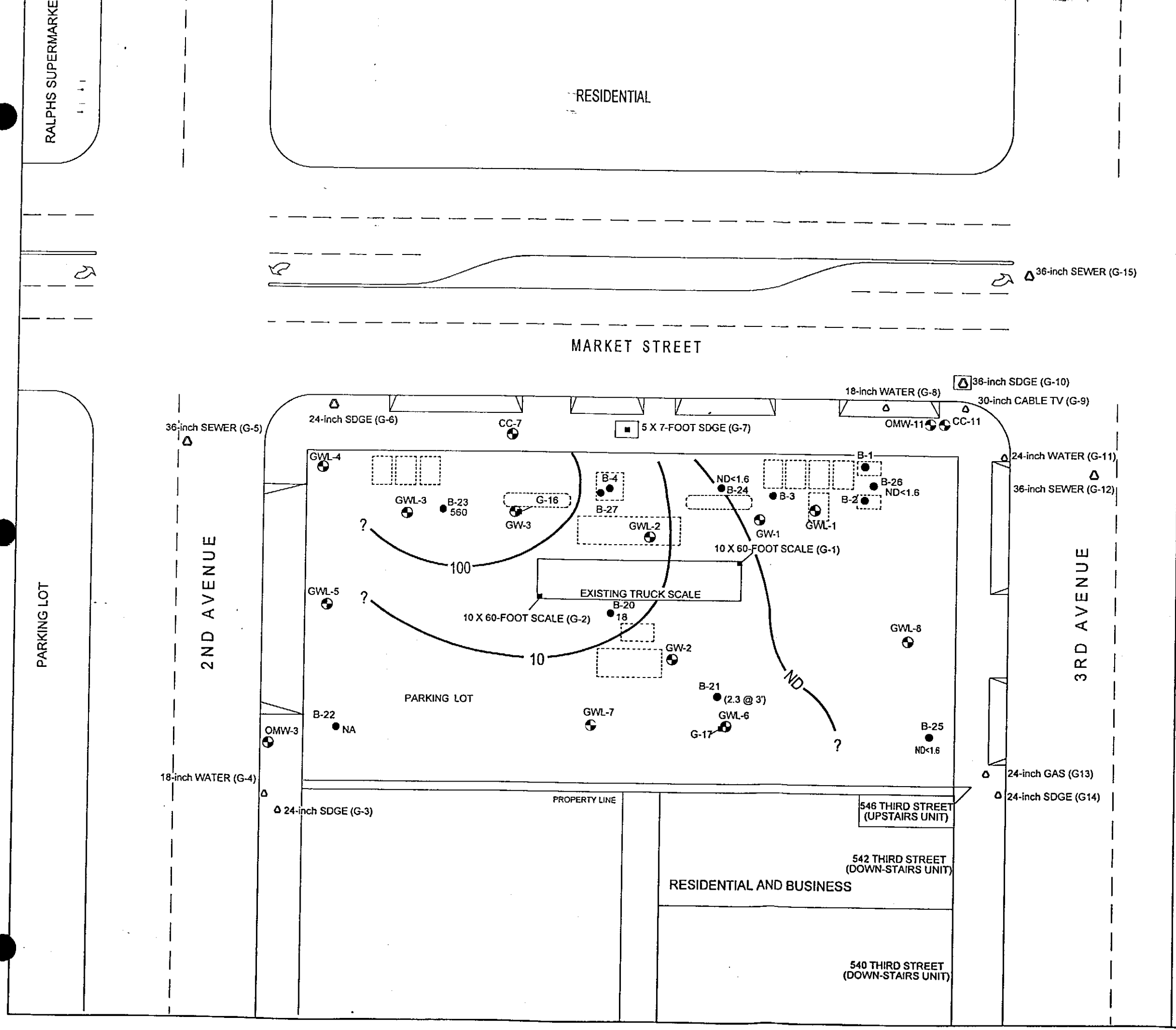
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 15
BENZENE IN SOIL,
25 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
36-inch SEWER (G-15)
MARKET STREET
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
5 X 7-FOOT SDGE (G-7)
18-inch WATER (G-8)
36-inch SDGE (G-10)
30-inch CABLE TV (G-9)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
GWL-3
B-23
44
G-16
GW-3
B-4
B-27
ND<1.6
B-24
B-3
B-1
B-26
NA
B-2
GW-1
GWL-1
GWL-2
10
ND
10 X 60-FOOT SCALE (G-1)
EXISTING TRUCK SCALE
10 X 60-FOOT SCALE (G-2)
B-20
ND<1.6
GWL-5
GW-2
GWL-8
PARKING LOT
B-21
ND<1.6
GWL-7
GWL-6
G-17
B-22
ND<1.6
OMW-3
B-25
ND<1.6
18-inch WATER (G-4)
24-inch SDGE (G-3)
24-inch GAS (G13)
24-inch SDGE (G14)
PROPERTY LINE
546 THIRD STREET (UPSTAIRS UNIT)
542 THIRD STREET (DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET (DOWN-STAIRS UNIT)
PARKING LOT
2ND AVENUE
3RD AVENUE
RESIDENTIAL AND BUSINESS
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
44
BENZENE OF SOIL GAS SAMPLES IN PARTS PER MILLION BY VOLUME (PPMV). SAMPLED ON 8/11 - 8/13/98. DATA IS FROM LABORATORY SAMPLES.
ND = NO DETECTABLE BENZENE, DETECTION LIMITS SHOWN.
10
ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL GAS IN PPMV.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sg-ben1.skd
REV: 10/14/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 16
BENZENE IN SOIL GAS,
1 FOOT BGS



LEGEND

FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES

FORMER DISPENSER ISLAND

MW-2 — GROUNDWATER MONITORING WELL

B-1 — SOIL BORING

36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID

G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING

LANE DIVIDER

DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)

CURB FACE

SIDEWALK INNER EDGE

18 — BENZENE OF SOIL GAS SAMPLES IN PARTS PER MILLION BY VOLUME (PPMV). SAMPLED ON 8/11 - 8/13/98. DATA IS FROM LABORATORY SAMPLES. ND = NO DETECTABLE BENZENE, DETECTION LIMITS SHOWN.

10 — ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL GAS IN PPMV.

0 5 10 20 30 FEET

N

FILE: 6\Unocal\sg-ben5.skd
REV: 10/14/98

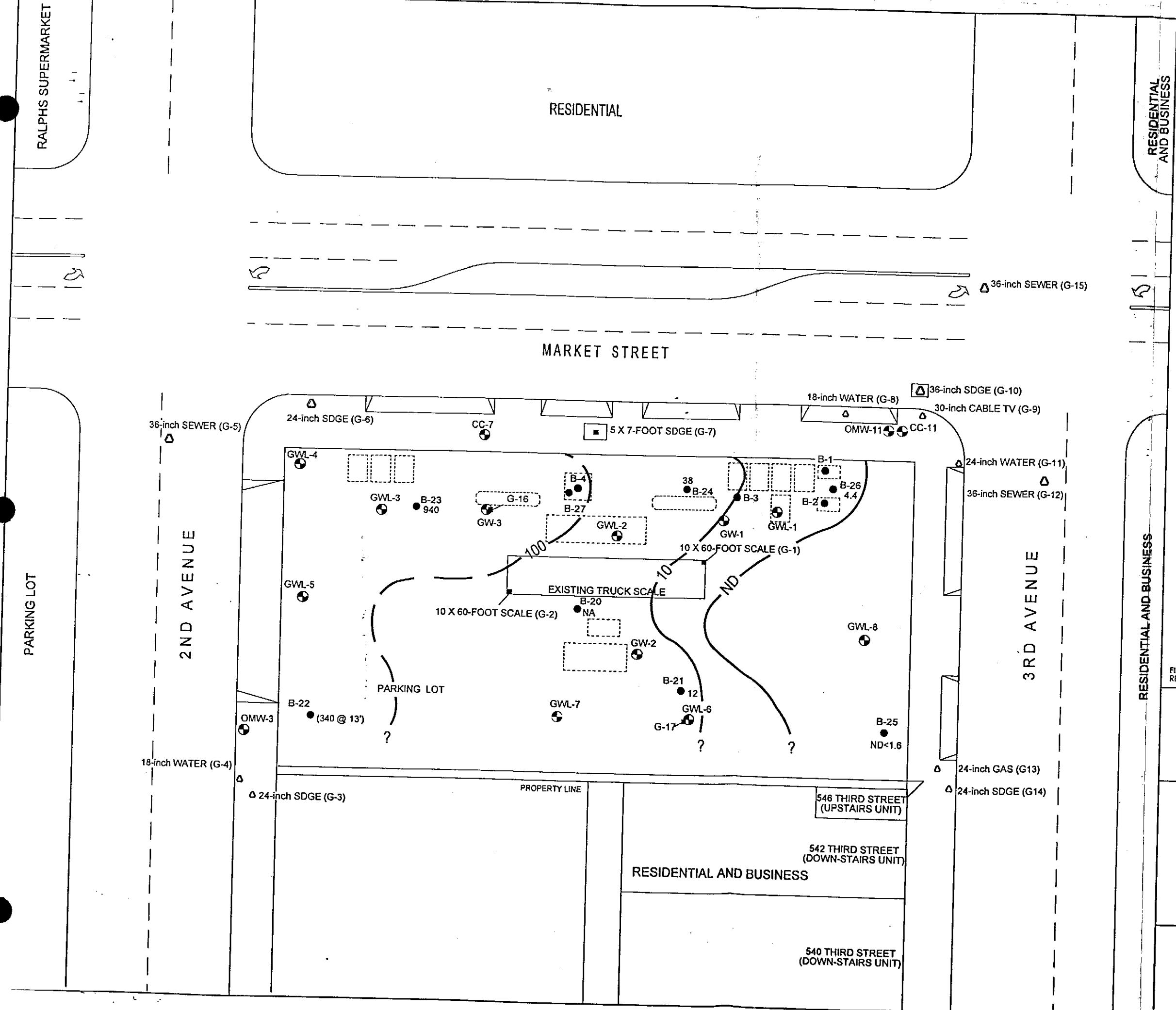
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION

FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 17
BENZENE IN SOIL GAS, 5 FEET BGS



LEGEND

- FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
- FORMER DISPENSER ISLAND
- MW-2 — GROUNDWATER MONITORING WELL
- B-1 — SOIL BORING
- 36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
- G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
- LANE DIVIDER
- DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
- CURB FACE
- SIDEWALK INNER EDGE
- 38 — BENZENE OF SOIL GAS SAMPLES IN PARTS PER MILLION BY VOLUME (PPMV). SAMPLED ON 8/11 - 8/13/98. DATA IS FROM LABORATORY SAMPLES. ND = NO DETECTABLE BENZENE, DETECTION LIMITS SHOWN.
- 10 — ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL GAS IN PPMV.

0 5 10 20 30 FEET

N

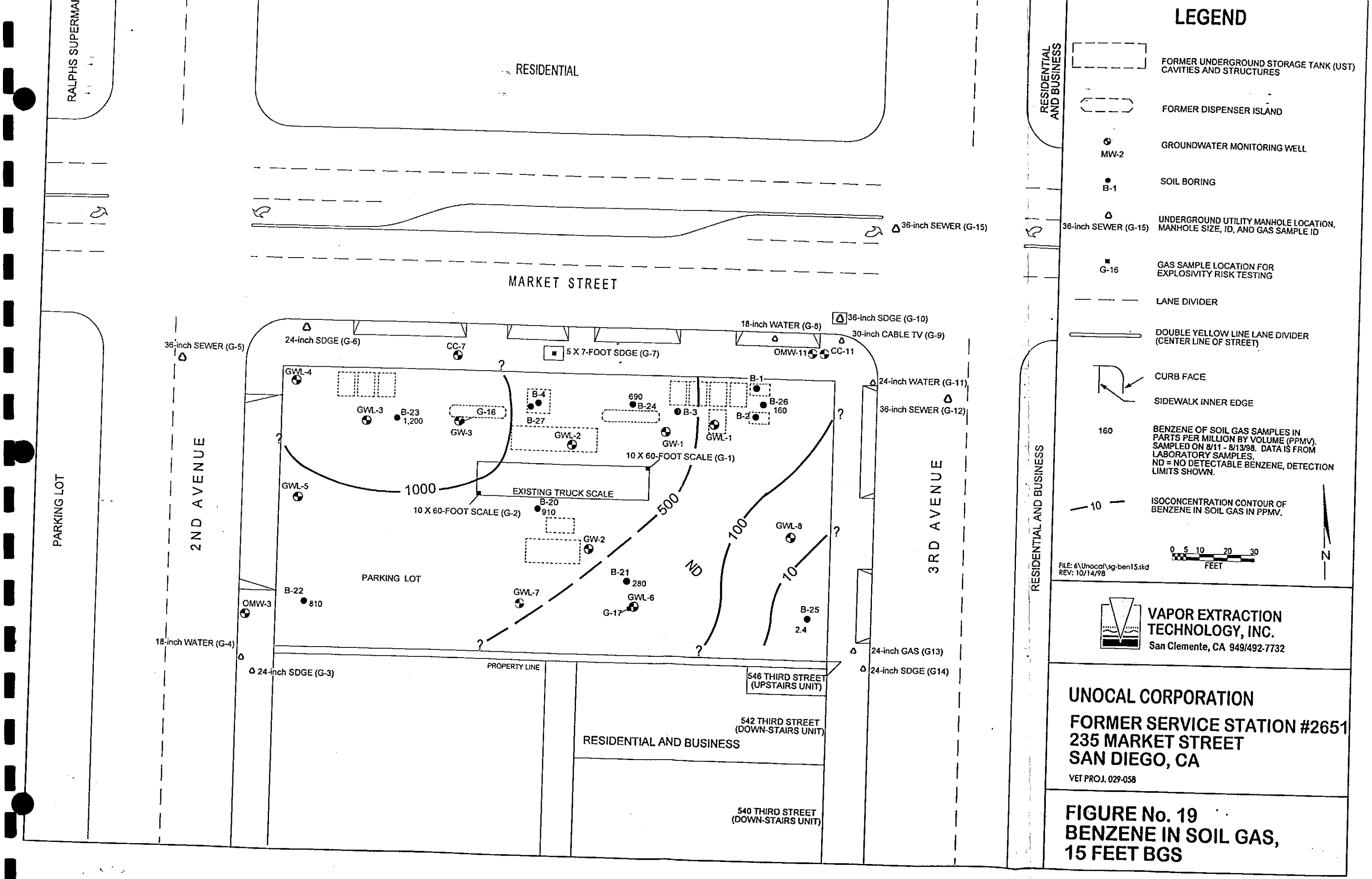
FILE: 6\Unocal\sg-ben10.skd
REV: 10/14/98

VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 18
BENZENE IN SOIL GAS, 10 FEET BGS


RALPHS SUPERMARKET
RESIDENTIAL
RESIDENTIAL AND BUSINESS
MARKET STREET
36-inch SEWER (G-15)
PARKING LOT
2ND AVENUE
3RD AVENUE
36-inch SEWER (G-5)
24-inch SDGE (G-6)
CC-7
5 X 7-FOOT SDGE (G-7)
18-inch WATER (G-8)
36-inch SDGE (G-10)
30-inch CABLE TV (G-9)
OMW-11
CC-11
24-inch WATER (G-11)
36-inch SEWER (G-12)
GWL-4
GWL-3
B-23
1,200
G-16
GW-3
B-4
B-27
690
B-24
B-3
B-1
B-26
160
B-2
GWL-2
GW-1
GWL-1
10 X 60-FOOT SCALE (G-1)
GWL-5
1000
EXISTING TRUCK SCALE
10 X 60-FOOT SCALE (G-2)
B-20
910
500
100
10
ND
GWL-8
GW-2
PARKING LOT
B-21
280
GWL-7
GWL-6
G-17
B-22
810
OMW-3
B-25
2.4
18-inch WATER (G-4)
24-inch SDGE (G-3)
24-inch GAS (G13)
24-inch SDGE (G14)
PROPERTY LINE
546 THIRD STREET
(UPSTAIRS UNIT)
542 THIRD STREET
(DOWN-STAIRS UNIT)
RESIDENTIAL AND BUSINESS
540 THIRD STREET
(DOWN-STAIRS UNIT)
LEGEND
FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES
FORMER DISPENSER ISLAND
MW-2
GROUNDWATER MONITORING WELL
B-1
SOIL BORING
36-inch SEWER (G-15)
UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID
G-16
GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING
LANE DIVIDER
DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)
CURB FACE
SIDEWALK INNER EDGE
160
BENZENE OF SOIL GAS SAMPLES IN PARTS PER MILLION BY VOLUME (PPMV). SAMPLED ON 8/11 - 8/13/98. DATA IS FROM LABORATORY SAMPLES.
ND = NO DETECTABLE BENZENE, DETECTION LIMITS SHOWN.
10
ISOCONCENTRATION CONTOUR OF BENZENE IN SOIL GAS IN PPMV.
0 5 10 20 30
FEET
N
FILE: 6\Unocal\sg-ben15.skd
REV: 10/14/98
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732
UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA
VET PROJ. 029-058
FIGURE No. 19
BENZENE IN SOIL GAS,
15 FEET BGS

RALPHS SUPERMARKET

RESIDENTIAL

RESIDENTIAL AND BUSINESS

36-inch SEWER (G-15)

MARKET STREET

36-inch SEWER (G-5)

24-inch SDGE (G-6)

CC-7 -0.60

5 X 7-FOOT SDGE (G-7)

18-inch WATER (G-8)

36-inch SDGE (G-10)

30-inch CABLE TV (G-9)

OMW-11 CC-11 -0.38

24-inch WATER (G-11)

36-inch SEWER (G-12)

GWL-4

-0.75

GWL-3 -0.44

B-23

G-16

GW-3 -0.59

B-4

B-27

B-24

GWL-2 -1.04*

GW-1 -0.26

B-3

GWL-1 -0.11

B-2

B-1

B-26

10 X 60-FOOT SCALE (G-1)

EXISTING TRUCK SCALE

-0.50

-0.25

10 X 60-FOOT SCALE (G-2)

GWL-5

B-20

GW-2 -0.50

FLOW

GWL-8

PARKING LOT

B-21

GWL-7

GWL-6

G-17

B-22

OMW-3 -0.73

B-25

18-inch WATER (G-4)

24-inch SDGE (G-3)

PROPERTY LINE

24-inch GAS (G13)

24-inch SDGE (G14)

546 THIRD STREET (UPSTAIRS UNIT)

542 THIRD STREET (DOWN-STAIRS UNIT)

RESIDENTIAL AND BUSINESS

540 THIRD STREET (DOWN-STAIRS UNIT)

PARKING LOT

2ND AVENUE

3RD AVENUE

RESIDENTIAL AND BUSINESS

LEGEND

FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES

FORMER DISPENSER ISLAND

MW-2 — GROUNDWATER MONITORING WELL

B-1 — SOIL BORING

36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID

G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING

LANE DIVIDER

DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)

CURB FACE

SIDEWALK INNER EDGE

-0.59 — GROUNDWATER ELEVATION IN FEET BELOW MEAN SEA LEVEL. WELLS MEASURED ON 8/26/98
* = DATA NOT USED

-0.50 — GROUNDWATER ELEVATION CONTOUR IN FEET BELOW MEAN SEA LEVEL

0 5 10 20 30
FEET

N

FILE: 6\Unocal\gw-grad.skd
REV: 10/12/98

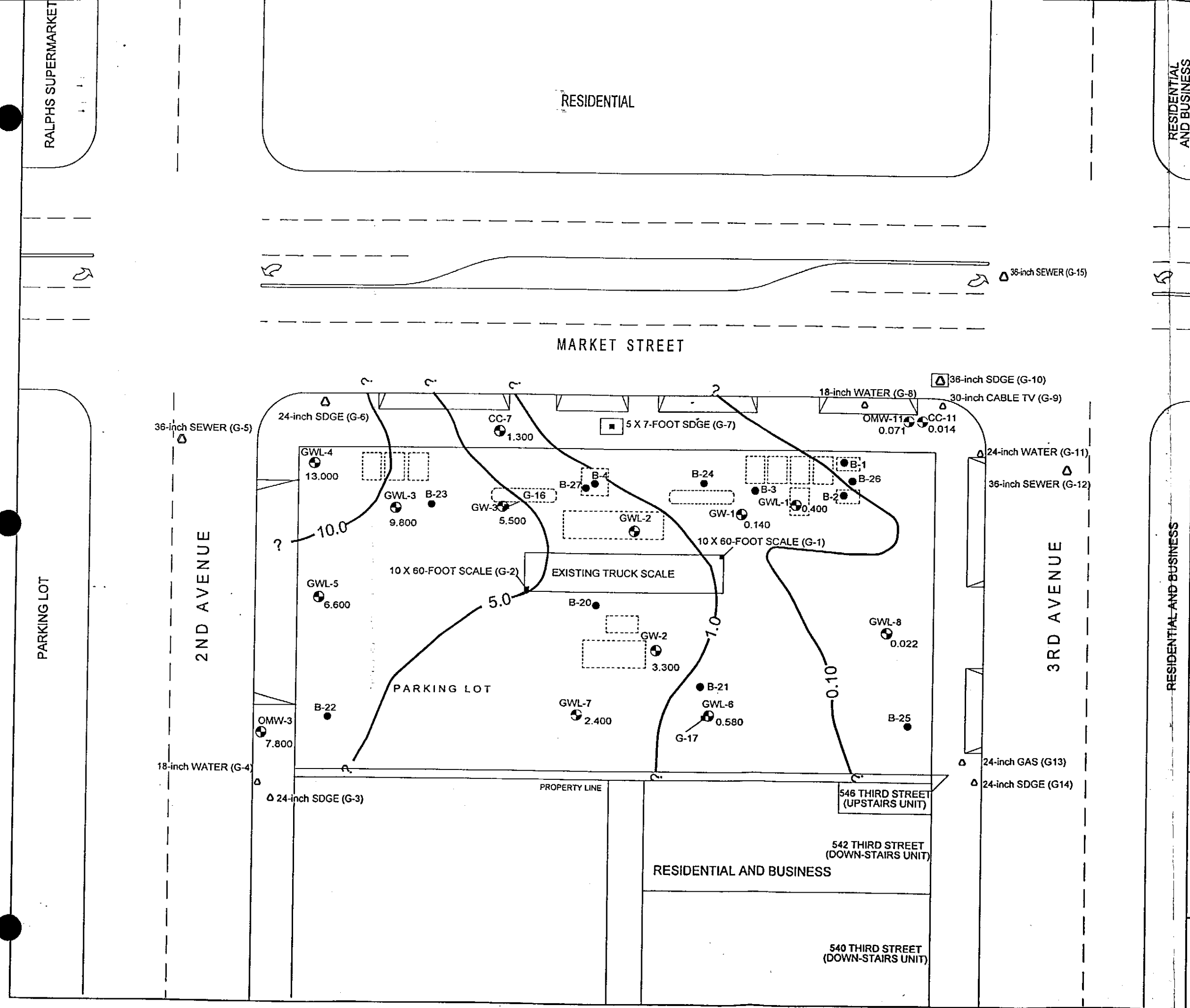
VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION

FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 20
GROUNDWATER GRADIENT, 8/26/98



LEGEND

FORMER UNDERGROUND STORAGE TANK (UST) CAVITIES AND STRUCTURES

FORMER DISPENSER ISLAND

MW-2 — GROUNDWATER MONITORING WELL

B-1 — SOIL BORING

36-inch SEWER (G-15) — UNDERGROUND UTILITY MANHOLE LOCATION, MANHOLE SIZE, ID, AND GAS SAMPLE ID

G-16 — GAS SAMPLE LOCATION FOR EXPLOSIVITY RISK TESTING

LANE DIVIDER

DOUBLE YELLOW LINE LANE DIVIDER (CENTER LINE OF STREET)

CURB FACE

SIDEWALK INNER EDGE

5.500 — DISSOLVED-PHASE BENZENE IN GROUNDWATER IN PARTS PER MILLION (PPM). WELLS SAMPLED ON 8/26/98.

5.0 — ISOCONCENTRATION CONTOUR OF DISSOLVED-PHASE BENZENE IN GROUNDWATER IN PPM.

0 5 10 20 30 FEET

N

FILE: 6\Unocal\gw-benz.skd
REV: 10/12/98

VAPOR EXTRACTION TECHNOLOGY, INC.
San Clemente, CA 949/492-7732

UNOCAL CORPORATION
FORMER SERVICE STATION #2651
235 MARKET STREET
SAN DIEGO, CA

VET PROJ. 029-058

FIGURE No. 21
BENZENE IN GROUNDWATER, 8/26/98

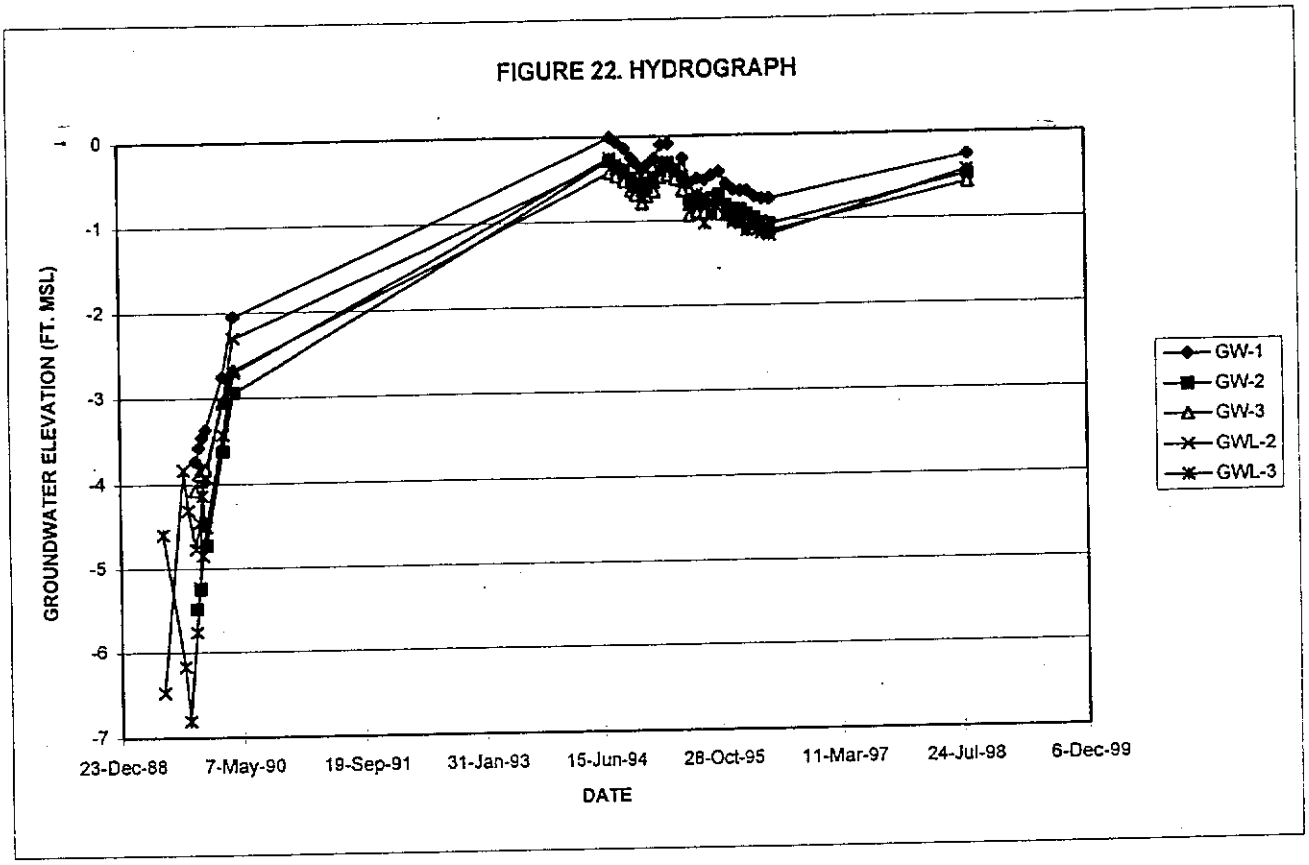


FIGURE 22. HYDROGRAPH
GROUNDWATER ELEVATION (FT. MSL)
0
-1
-2
-3
-4
-5
-6
-7
23-Dec-88
7-May-90
19-Sep-91
31-Jan-93
15-Jun-94
28-Oct-95
11-Mar-97
24-Jul-98
6-Dec-99
DATE
GW-1
GW-2
GW-3
GWL-2
GWL-3

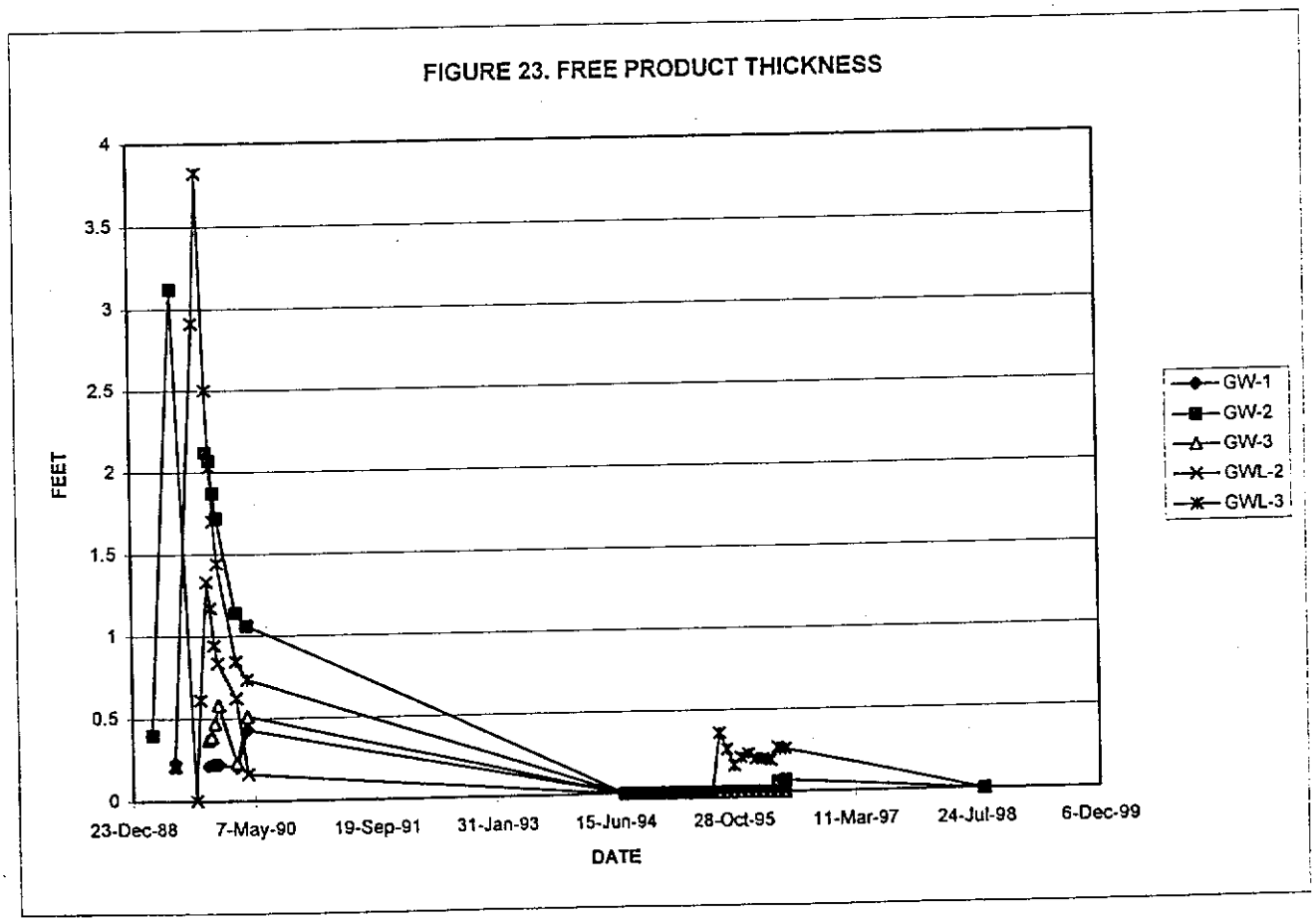


FIGURE 23. FREE PRODUCT THICKNESS
FEET
4
3.5
3
2.5
2
1.5
1
0.5
0
23-Dec-88
7-May-90
19-Sep-91
31-Jan-93
15-Jun-94
28-Oct-95
11-Mar-97
24-Jul-98
6-Dec-99
DATE
GW-1
GW-2
GW-3
GWL-2
GWL-3

APPENDIX B

MOBILE LIGHT NON AQUEOUS PHASE LIQUID IN SOIL RESIDUAL SATURATION CALCULATIONS

APPENDIX B
ALGORITHMS USED FOR RESIDUAL SATURATION CALCULATION

1.0 FIELD BULK DENSITY

In the calculation of residual saturation, the field bulk density is used rather than dry bulk density. This is due to the presence of moisture in a sample at the time it is analyzed for total petroleum hydrocarbons (TPH), i.e. the sample is analyzed as received from the field. Since moisture is present in the TPH analysis, the calculation of the petroleum hydrocarbon residual saturation should also account for the presence of moisture in the sample. The laboratory reports dry bulk density, which is the ratio of the mass of dried soil to its total volume. The following equation estimates the field bulk density:

$$\rho_{fb} = (\rho_w \theta_w) + \rho_b$$

where

$\rho_{fb} =$ *field bulk density* $[g/cm^3]$

$\rho_w =$ *density of water* $[g/cm^3]$

$\rho_b =$ *dry bulk density* $[g/cm^3]$

$\theta_w =$ *volumetric water content* $[-]$

2.0 PETROLEUM HYDROCARBON RESIDUAL SATURATION

A simplified equation based on the methods of Books-Corey was used to calculate the phase-separated hydrocarbon (PSH) residual saturation (Environmental Systems & Technologies, Inc. [ESTI], 1990). The following equation is also in draft guidelines currently being prepared by the SAM technical work group for Evaluating Risk in the Correction Action Process (ERICA) (SAM, 1997c).

This simplified equation is based on empirical data and assumes that the water saturation (S_W) equals the residual or irreducible water saturation (S_{rw}) (ESTI, 1990).

The simplified equation also assumes a "typical porous media" as determined by Brooks and Corey (ESTI, 1990 and Corey, 1990). An additional simplifying assumption is a critical flow rate at which PSH migration is considered insignificant.

$$S_{ro} = (1 - S_{rw}) \left[\frac{q_c \mu_{ro}}{\rho_{ro} K_{rwa}} \right]^{0.25}$$

$$S_{rw} = \frac{\theta_r}{\theta}$$

Simplifying assumption:

$$\theta_w = \theta_r$$

where S_{ro} = *unsaturated zone PSH residual saturation* [–]

S_{rw} = *residual water saturation or irreducible water saturation* [–]

$\mathbf{q}_c$ = *critical flow rate below which movement is insignificant* [–]

μ_{ro} = *relative viscosity of the PSH* [–]

ρ_{ro} = *PSH specific gravity (ratio of PSH to water density)* [–]

K_{sat} = *soil vertical saturated hydraulic conductivity* [cm/s]

θ = *porosity* [–]

θ_r = *volumetric residual water content* [–]

θ_w = *volumetric water content* [–]

3.0 TPH CONCENTRATION FROM RESIDUAL SATURATION

The following equation estimates the TPH concentration from the estimated LNAPL residual saturation:

$$TPH = \frac{S_{ro}\theta\rho_o 10^6}{\rho_{fb}}$$

where:

TPH = *TPH concentration* [mg/kg]

S_{ro} = *unsaturated zone PSH residual saturation* [–]

ρ_o = *PSH density* [g/cm^3]

θ = *porosity* [–]

ρ_{fb} = *field bulk density* [g/cm^3]

TABLE B-1
CALCULATION OF RESIDUAL LNAPL SATURATION

Unsaturated	LNAPL Residual Saturation (dimensionless)						TPH Concetration From Residual Saturation (mg/kg)					
	Srw	qc	μro	ρro	Kv	Sro	ρo	ρw	ρb	θt	θw	Cs
Low	0.60	1.00E-07	0.6	0.75	8.73E-04	**0.04**	0.75	1	1.66	0.37	0.21	**5867**
Average	0.60	1.00E-07	0.6	0.75	9.94E-06	**0.12**	0.75	1	1.66	0.37	0.21	**17961**
High	0.60	1.00E-07	0.6	0.75	2.86E-08	**0.52**	0.75	1	1.66	0.37	0.21	**77649**
Saturated												
Low	0.76	1.00E-07	0.6	0.75	9.06E-03	**0.01**	0.75	1	1.44	0.46	0.35	**2578**
Average	0.76	1.00E-07	0.6	0.75	1.26E-03	**0.02**	0.75	1	1.44	0.46	0.35	**4222**
High	0.76	1.00E-07	0.6	0.75	6.23E-05	**0.05**	0.75	1	1.44	0.46	0.35	**8952**

Statistical Analysis of Soil Physical Properties

	Unsaturated (above 17.5 ft bgs)			Saturated (below 17.5 ft bgs)		
	Low	Average	High	Low	Average	High
SMC	4.7	12.7	26.4	19.2	24.3	28.2
Srw	0.20	0.60	1.56	0.63	0.76	0.84
qc	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07
μro	0.40	0.60	0.80	0.40	0.60	0.80
ρro	0.70	0.75	0.80	0.70	0.75	0.80
Kv	2.86E-08	9.94E-06	8.73E-04	6.23E-05	1.26E-03	9.06E-03
ρo	0.70	0.75	0.80	0.70	0.75	0.80
ρw	1.00	1.00	1.00	1.00	1.00	1.00
ρb	1.50	1.66	1.83	1.42	1.44	1.49
θt	0.26	0.37	0.44	0.44	0.46	0.48
θw	0.09	0.21	0.48	0.28	0.35	0.40

Summary of Site-Specific Soil Physical Properties

ID	Depth	MC	ρb	θt	Kv	θw	Srw
B22	10.5	12.7	1.76	34.2	2.86E-08	0.22	0.65
B23	10.5	4.7	1.82	25.6	3.49E-04	0.09	0.33
B24	10.5	9.6	1.72	35.9	1.52E-07	0.17	0.46
B27	13	17.4	1.83	31	6.91E-08	0.32	1.03
B27	14	26.4	1.83	30.9	2.88E-07	0.48	1.56
B23	15.5	23.5	1.59	41	6.15E-06	0.37	0.91
B24	15.5	7.9	1.56	41.8	8.73E-04	0.12	0.29
B25	15.5	7.3	1.5	43.6	2.33E-04	0.11	0.25
B26	15.5	5.8	1.5	43.6	3.84E-04	0.09	0.20
B27	15.5	12.1	1.66	37.8	4.41E-07	0.20	0.53
B20	16.5	19.6	1.61	40.8	2.18E-04	0.32	0.77
B27	16.5	5.8	1.51	43.5	6.65E-04	0.09	0.20
B26	19	23.2	1.44	46.6	1.88E-03	0.33	0.72
B27	19	19.2	1.47	44.8	9.06E-03	0.28	0.63
B21	21	20.9	1.49	43.9	6.23E-05	0.31	0.71
B23	21	25.7	1.44	46.7	3.32E-03	0.37	0.79
B24	21	26.6	1.43	46.8	1.53E-03	0.38	0.81
B27	21.5	28.2	1.42	47.6	6.19E-04	0.40	0.84
B22	26	26	1.42	47.1	1.50E-03	0.37	0.78

TAB[illegible]-1
CALCULATION OF RESIDUAL LNAPL SATURATION

DEFINITION OF TERMS		
Term	**Description**	**Reference**
SMC	Soil Moisture Content	Site-specific
Srw	Residual Water Saturation	Calculated (ESTI, 1990)
qc	Critical Flow Rate (cm/s)	SAM, 1998
μro	Relative Oil Viscosity to Water	EPA, 1996
ρro	Relative Oil Specific Gravity to Water	EPA, 1996
Kv	Vertical Hydraulic Conductivity (cm/s)	Site-specific
Sro	Residual Oil Saturation	Calculated (ESTI, 1990)
ρo	Density of Phase-Separated Product (g/mL)	EPA, 1996
ρw	Density of Water (g/mL)	Assumed
ρb	Soil Bulk Density (g/mL)	Site-specific
θt	Total Porosity	Site-specific
θw	Water-Filled Porosity	Site-specific
Cs	Contaminant Concentration in Soil (mg/kg) (LNAPL Residual Saturation Concentration)	Calculated (ESTI, 1990)

APPENDIX C

VAPOR PHASE RISK ASSESSMENT

APPENDIX C

VAPOR PHASE RISK ASSESSMENT

1.0 INTRODUCTION

The technical approach, equations used and results of the vapor phase risk assessment are summarized in this section. This risk assessment was performed in accordance with the guidelines for a vapor phase migration model presented in the San Diego County Department of Environmental Health, Site Assessment and Mitigation Division Manual. This risk assessment is intended to evaluate the potential theoretical risk from the inhalation of hydrocarbon vapors beneath the site under a conservative exposure scenario. Because benzene is the most toxic hazardous substance in gasoline, this risk assessment only addresses the potential risk from the inhalation of benzene vapors.

2.0 TECHNICAL APPROACH

The vapor risk assessment consists of a three step process. First, the soil gas concentration is either calculated, based on soil and/or groundwater data, or the soil gas concentration is measured at the site. To be conservative, the maximum soil gas concentration is assumed to be present at a uniform concentration, everywhere beneath the site.

The second step consists of calculating the flux of benzene vapors that may migrate into the subject structure. In this case the structure is the subsurface parking lot. The third and final step consists of calculating the risk to a potential receptor based on the nature and duration of exposure. The input parameters for the risk calculation are default values used by EPA and Cal-EPA (EPA, 1989, Cal-EPA, 1994).

2.1 DIRECT MEASUREMENT OF SOIL GAS

Because a soil gas survey was recently performed at the site, site-specific soil gas data were used as a model input parameter (Appendix, Table 4). To be conservative, the highest concentration of benzene in soil gas at the site was used as the value to evaluate potential risk. This conservative approach eliminates the uncertainty of potential increases in soil gas concentration due to seasonal fluctuations which have not been characterized.

2.2 CALCULATION OF FLUX

The flux of a contaminant is calculated from Fick's First Law as:

$$FLUX = \frac{D_e * C_{sg}}{X}$$

where:

Flux = flux of contaminant (ug/hr-m^2)
D_e = effective diffusion coefficient (m^2/hr)
C_{sg} = contaminant concentration in the soil vapor (ug/m^3)
X = depth or distance to contamination in the vadose zone (m)

The diffusion process is considered to be molecular diffusion. The value for the diffusion coefficient is taken as the molecular diffusivity for the contaminant corrected for the effects of the soil column as:

$$D_e = \frac{D_a * P_a^{3.33}}{P_t^2}$$

where:

D_a= contaminant diffusion coefficient in air (m^2/hr)
P_a = air filled porosity (unitless)
P_t = total porosity (unitless)

2.3 CALCULATION OF INDOOR AIR CONCENTRATION

The indoor air concentration is dependent upon the area through which the flux passes and the indoor air exchange rate with outdoor air. The flux is considered to be attenuated by the presence of a concrete slab. For residential buildings, an indoor air exchange rate of one every 2 hours (or 0.5 exchanges per hour) is typically used. Commercial buildings typically have higher exchange rates which can be obtained from the building architect or engineer. If site specific air exchange rates are not available then the 0.83 exchanges per hour rate should be used. The indoor air concentration is calculated as follows:

$$C_i = \frac{Slab * Flux * A}{V * E} = \frac{Slab * Flux}{height * E}$$

where:

C_i = indoor air concentration (ug/m^3)
Slab = slab attenuation factor (unitless)
A = room floor area (m^2)
V = room volume (m^3)
height = room height (m)
E = indoor air exchange rate per hour (hr^{-1})

2.4 CALCULATION OF EXPOSURE AND ASSOCIATED RISK

The following equations are used to calculate the risk to a receptor or individual from a specific exposure (intake). The intake, which accounts for the nature of the receptor, is first calculated. Note that when the intake of known carcinogens is being evaluated, the averaging time (AT) is the number of days over a 70-year lifetime (25,500 days). To calculate the risk, the intake is applied to the cancer slope factor for the compound of concern. Accordingly, the risk is calculated as:

Risk = Intake * Slope Factor

Where:

Intake = vapor phase intake (mg/kg-day) (EPA, 1989)
Slope Factor = contaminant carcinogenic slope factor ([mg/kg-day]$^{-1}$)

and:

$$Intake = \frac{C_i * IR * ET * EF * ED}{BW * AT}$$

where:

C_i = concentration in the room (mg/m^3)
IR = inhalation rate (m^3/day)
ET = exposure time (hr/24hr)
EF = exposure frequency (days/yr)
ED = exposure duration (yr)
BW = body weight (kg)
AT = averaging time (days)

3.0 RESULTS OF VAPOR RISK ASSESSMENT

The results and input parameters used for this risk analysis are summarized in the following section (Tables C-1 and C-2). The site-specific input and exposure parameters

have also been summarized (Tables C-1 through C-3). Using the technical approach described herein, the potential risk to a security guard working in the subsurface parking lot for 12 hours a day for 25 years was evaluated. Based on the site-specific benzene concentrations, the risk to this receptor is 3.3×10^{-5} if no remediation is performed (Table C-1). This level of risk is with in the acceptable range of 10^{-4} to 10^{-6} excess incremental cancer risk according to EPA. However, this value exceeds the risk goals specified by the DEH of 10^{-6} excess incremental cancer risk. These data indicate that soil remediation and/or engineering controls are required to protect human health at the site.

A vapor control system/geomembrane is one type of engineering control that could be implemented at the site. The effect that the vapor control system would have is to prevent the migration of vapors from the subsurface into the overlying parking lot. It would not be unreasonable to assume that that a geomembrane and gas extraction system could account for a 100 fold attenuation of hydrocarbon vapors. This option was modeled by increasing the slab attenuation factor by 100 times. Using this approach, the theoretical risk to the subject receptor is 3.3×10^{-7} which is an acceptable level of risk (Table C-2).

TABLE C-1
VAPOR RISK ASSESSMENT
Former UNOCAL Station 2651
235 Market Street

5 approaches to determine benzene concentration at top of contamination						Value	Parameters	Comments
1	Groundwater with Free Product (Liquid Phase Hydrocarbons)					0.1	VP	contaminant vapor pressure at ASTP (atm)
C_{sg-1}	NA	(mg/m^3)	maximum soil gas value			78000	MW	molecular weight of benzene (mg/mole)
2	Soil with TPH concentrations > 100 mg/kg					0.01	MF	mole fraction of benzene in the free product
C_{sg-2}	NA	(mg/m^3)	maximum soil gas value			0.0244	RT	universal gas constant = 0.024 atm-m^3/mole at 25° C
3	Soil with TPH concentrations < 100 mg/kg					0.224	H	Henry's Law Constant
C_{sg-3}	NA	(mg/l)	NA	(mg/m^3)		NA	C_{soil}	contaminant (benzene) soil concentration (mg/kg)
4	Groundwater with no Free Product					NA	C_w	contaminant (benzene) groundwater conc. (ug/l)
C_{sg-4}	NA	(ug/l)	NA	(mg/m^3)		1.66	BD	soil bulk density (g/cm^3)
5	Direct measurement of soil gas					69.3072	K_d	sorption coefficient (cm^3/g)
C_{sg-5}	4225	(mg/m^3)				0.21	P_w	water filled porosity
						0.16	P_a	air filled porosity
C_{sg}	4225	(mg/m^3)	value to use in flux calculation			0.37	P_t	total porosity
						1300	M-C_{sg}	maximum benzene conc. in soil gas (ppm-v)(@16 ft)
Flux of contaminant from soil to outside or indoor air						126	K_{oc}	sorption coefficient normalized to organic carbon
FLUX-1	3.809	mg/hr-m^2	without slab factor or bioattenuation			0.15	K_{oi}	sorption coefficient normalized to organic phase
FLUX-2	0.03809	mg/hr-m^2	with slab factor (no bioattenuation)			0.55	f_{oc}	weight fraction organic carbon in soil
FLUX-3	0.00346	mg/hr-m^2	with bioattenuation (no slab factor)			0.048	f_{oi}	weight fraction of clay content = %clay/100
						0.000592	De	effective diffusion coefficient for benzene (m^2/hr)
FLUX	0.03809	mg/hr-m^2	value for indoor air calculation			0.0362	Da	benzene diffusion coefficient in air (m^2/hr)
						0.66	X_m	depth to the contamination (m) - can input ft below
Concentration in indoor air						2	X_{ft}	depth to the contamination (feet), e.g. M-C_{sg}
C_i	9.40	(ug/m^3)	value used in risk calculation			0.01	b	slab factor: 0.1 old, 0.01 new, .0001 geomembrane
Risk = intake times slope factor						10	alpha	damkohler number determined from field data
RISK	3.29E-05	or	1	in	30,368	1101	gamma	bioattenuation factor determined from alpha

Default values for parameters from 1998 SAM Manual, Section 6, Appendix B, page B-50
See Table C-3

TABLE C-2

VAPOR RISK ASSESSMENT USING VAPOR CONTROL SYSTEM

Former UNOCAL Station 2651
235 Market Street

5 approaches to determine benzene concentration at top of contamination						Value	Parameters	Comments
1	Groundwater with Free Product (Liquid Phase Hydrocarbons)					0.1	VP	contaminant vapor pressure at ASTP (atm)
C_{sg-1}	NA	(mg/m^3)	maximum soil gas value			78000	MW	molecular weight of benzene (mg/mole)
2	Soil with TPH concentrations > 100 mg/kg					0.01	MF	mole fraction of benzene in the free product
C_{sg-2}	NA	(mg/m^3)	maximum soil gas value			0.0244	RT	universal gas constant = 0.024 atm-m^3/mole at 25° C
3	Soil with TPH concentrations < 100 mg/kg					0.224	H	Henry's Law Constant
C_{sg-3}	NA	(mg/l)	NA	(mg/m^3)		NA	C_{soil}	contaminant (benzene) soil concentration (mg/kg)
4	Groundwater with no Free Product					NA	C_w	contaminant (benzene) groundwater conc. (ug/l)
C_{sg-4}	NA	(ug/l)	NA	(mg/m^3)		1.66	BD	soil bulk density (g/cm^3)
5	Direct measurement of soil gas					69.3072	K_d	sorption coefficient (cm^3/g)
C_{sg-5}	4225	(mg/m^3)				0.21	P_w	water filled porosity
						0.16	P_a	air filled porosity
C_{sg}	4225	(mg/m^3)	value to use in flux calculation			0.37	P_t	total porosity
						1300	M-C_{sg}	maximum benzene conc. in soil gas (ppm-v)(@16 ft)
Flux of contaminant from soil to outside or indoor air						126	K_{oc}	sorption coefficient normalized to organic carbon
FLUX-1	3.809	mg/hr-m^2	without slab factor or bioattenuation			0.15	K_{oi}	sorption coefficient normalized to organic phase
FLUX-2	0.00038	mg/hr-m^2	with slab factor (no bioattenuation)			0.55	f_{oc}	weight fraction organic carbon in soil
FLUX-3	0.00346	mg/hr-m^2	with bioattenuation (no slab factor)			0.048	f_{oi}	weight fraction of clay content = %clay/100
						0.000592	De	effective diffusion coefficient for benzene (m^2/hr)
FLUX	0.00038	mg/hr-m^2	value for indoor air calculation			0.0362	Da	benzene diffusion coefficient in air (m^2/hr)
						0.66	X_m	depth to the contamination (m) - can input ft below
Concentration in indoor air						2	X_{ft}	depth to the contamination (feet), e.g. M-C_{sg}
C_i	0.09	(ug/m^3)	value used in risk calculation			0.0001	b	slab factor: 0.1 old, 0.01 new, .0001 geomembrane
Risk = intake times slope factor						10	alpha	damkohler number determined from field data
RISK	3.29E-07	or	1	in	3,036,825	1101	gamma	bioattenuation factor determined from alpha

Default values for parameters from 1998 SAM Manual, Section 6, Appendix B, page B-50
See Table C-3

TABLE C-3
SUMMARY OF DEFAULT RISK PARAMETERS
Former UNOCAL Station 2651
235 Market Street

Parameter	Value	Description	Comments
height	4.88	room height (meters)	conversion 12 feet to 3.6576 meters
E	0.83	indoor air exchange rate per hour (hr^{-1})	recommended to use 0.5 for residential and 0.83 for commercial (ASTM, 1995)
IR	20	inhalation rate (m^3/day)	recommended to use 20 (EPA, 1989)
ET	12	exposure time (hr/24hr)	recommended to use 12 for commercial and 24 for residential (EPA, 1989)
EF	250	exposure frequency (days/yr)	recommended to use 250 for commercial and 365 for residential (EPA, 1989)
ED	25	exposure duration (yr)	recommended to use 25 for commercial and 70 for residential (EPA, 1989)
BW	70	body weight (kg)	recommended to use 70 (EPA, 1989)
AT	25500	average time (days)	recommended to use 25,500 (EPA, 1989)
SF	0.1	slope factor (mg/kg-day)	recommended to use 0.1 for benzene carcinogenic slope factor (CalEPA, 1994)

Default values for parameters from 1998 SAM Manual section 6; page B-50; Manual, Section 6, Appendix B, page B-50

APPENDIX D

INFORMATION TO COMPLY WITH APPENDIX A OF RWQCB INTERIM GUIDANCE

APPENDIX D

SUMMARY OF INFORMATION FOR APPENDIX A RWQCB INTERIM LNAPL GUIDANCE

This appendix summarizes in outline format the information required by the San Diego Regional Water Quality Control Board (RWQCB) for the evaluation of residual free product or light non-aqueous phase liquid at low risk fuel contaminated sites (RWQCB, 1998). It is the intent of this guidance to "proceed aggressively to close low risk soil only cases and not require active remediation of low risk groundwater cases". It is our understanding, that the RWQCB may consider closing low risk groundwater cases if it can be demonstrated that residual hydrocarbons pose no significant impact to, groundwater quality, human health, and the environment.

The reference to the text where each topic is described and a summary of the evaluation is provided in the following section for each of the 11 minimum information requirements of Appendix A of the Interim Guidance.

1. *Identify the beneficial uses of groundwater and surface water for the hydrologic basin where the site is located (RWQCB. 1994).*

   Reference: RWQCB Data Entry Form.

   Summary: Groundwater at the site has no designated beneficial use and has been excepted from municipal drinking water use. No freshwater surface water body exists in the Lindbergh Hydrologic Subarea.

2. *Evaluate the extent and impacts of the LNAPL pool on and off-property.*

   Reference: Sections 2.2.3 and 2.2.5, Table 1, Figures 2 through 5 and Table 2 of Appendix A, Appendix B.

   Summary: The site is located at the northern boundary of a large contaminated area known as the "blob". Within the last 2 years, LNAPL has only been observed in monitor wells GW-2, GWL-3, and GWL-6. The total volume of LNAPL present on the groundwater is currently less than 1 gallon. However, the total volume of potential mobile LNAPL in soil above the water table and what may be trapped below the water table is approximately 4,950 gallons (Table 1).

3. *Evaluate the historical observations of free product.*

   Reference: Sections 2.2.3 and 2.2.5, Table 2 and Figures 22 and 23 of Appendix A

Summary: Historically, free product has been observed in monitor wells GWL-1, GWL-3, GWL-5, GWL-7, GW-1, GW-2, and GW-3. LNAPL was observed in more monitor wells when the water table was at a depth of approximately 20 feet below grade. Based on these data and groundwater quality data, it appears that LNAPL may be trapped below the water table in the vicinity of GW-2, GWL-3, GWL-4, and GWL-5.

4. *Evaluate hydrogeological characteristics affecting advective contaminant transport and attenuation mechanisms, and plume stability at the site.*

Reference: Section 2.2 and RWQCB Data Entry Form

Summary: Based on site-specific physical property data, the groundwater flow velocity at the site is approximately 15 feet per year. Advective transport of dissolved contaminants in groundwater appears to be more controlled by dewatering operations in the vicinity of the site rather than the regional groundwater flow velocity. In the absence of active dewatering, groundwater flow at the site is relatively slow. In addition, contaminant transport appears to be controlled by bioattenuation. Groundwater monitoring data indicate that the hydrocarbon "blob" in this area is somewhat stable.

5. *Provide an evaluation of technical feasibility of removing all LNAPL from groundwater at the site.*

Reference: Section 7.0

Summary: The feasibility study evaluated several remedial alternatives to remove LNAPL at the site. The intent of the preferred alternative is to remove all LNAPL to the extent practicable using excavation and groundwater extraction. The preferred alternative will remove hot spots in soil and groundwater where TPHg concentrations indicate that mobile LNAPL may be present. Based on the physical constraints at the site, it may not be technically feasible to remove *all* residual LNAPL at the site.

The results of a soil vapor extract test indicated that light-end LNAPL could be removed at an initial rate of approximately 12 gallons per day per well or approximately 100 gallons per day for the entire site. This rate typically drops off exponentially within the first two weeks of SVE operation and the long-term recovery rate is approximately 1 to 5 percent of the initial recovery rate. Based on these data, the long-term recovery rate is estimated to be approximately 5 gallons per day for the entire site. At this recovery rate, the time to remediate all the mobile LNAPL at the site is:

$$\frac{\text{Volume of LNAPL (4,950 gallons)}}{\text{LNAPL Removal Rate (5 gal/day)}} = 990 \text{ days to remove all mobile LNAPL}$$

$$= (2.7 \text{ years})$$

This recovery time does not include the time required to recover or bioremediate the heavy-end hydrocarbons. The preferred alternative considers removing the mobile LNAPL by excavation that could be completed within several months.

6. *Provide an estimate of the economic feasibility of removing all LNAPL from groundwater at the site.*

Reference: Section 7.0, Table 2

Summary: The economic feasibility of removing all LNAPL from groundwater at the site was evaluated for six alternatives. Only three of these alternatives will remove LNAPL within a reasonable timeframe. The estimated cost to remove all mobile LNAPL ranges from approximately $466,000 to $810,000. The estimated cost of removing mobile LNAPL by excavation is approximately $570,000.

7. *Tabulate the characteristics of the waste(s) left in-situ, including the type of LNAPL (e.g., gasoline, diesel fuel, etc.) and the chronology of past efforts to remove LNAPL from groundwater at the site.*

Reference: Section 2.2.4

Summary: The LNAPL at the site appears to be a mixture of gasoline and diesel. The percent gasoline in the LNAPL ranges from 75 to 95 percent. Accordingly, the percent diesel in the LNAPL ranges from 5 to 25 percent.

a) *Solubility of the fresh product versus on-site LNAPL.* Assumed LNAPL was fresh product in vapor risk calculations.
b) *Estimated/measured content of fuel constituents in the fresh product and residual concentrations observed in LNAPL currently at the site.* Assumed LNAPL was fresh product in vapor risk calculations.
c) *Vapor pressure of the fresh product versus on-site LNAPL.* Assumed LNAPL was fresh product in vapor risk calculations.
d) *A chronology of attempts to remove LNAPL from the site, including a short description of limitations encountered and an estimated total volume recovered to date.* Recoverable LNAPL occurred in monitor wells during the period from 1989 to approximately 1992. The estimated total volume recovered by conventional bailing techniques is less than 10 gallons.

8. *Provide an evaluation of the environmental persistency of water quality impairment at the site.*

Reference: Section 7.0

Summary: The estimated time that residual LNAPL will remain at the site is uncertain for several reasons. Because the site is a small portion of the "blob", residual LNAPL could remain until all off-site parties remediate residual LNAPL and all sources have been mitigated. If left to naturally attenuate, it is anticipated that residual LNAPL would be bioremediated within 100 years. The excavation and groundwater extraction alternative selected for the site under the preferred alternative is intended to remove all mobile LNAPL above and below the water table to the extent practicable. It is conceivable that this approach may in fact leave only a minor amount of residual LNAPL.

9. *Provide an evaluation of risks to human health from exposure to product and/or vapors from the residual LNAPL.*

Reference: Section 6.4, Appendix C.

Summary: If no remediation or engineering controls are implemented, the potential theoretical incremental excess cancer risk to humans from inhalation of benzene vapors from residual LNAPL is 3.3×10^{-5}. This is an unacceptable level of risk according to DEH. If only engineering controls are implemented, the incremental excess cancer risk to human health is 3.3×10^{-7} which is an acceptable level of risk. These data indicate that potential risks to human health can be managed by using engineering controls.

10. *Provide an evaluation of risk from fire and explosion hazards associated with residual LNAPL and/or associated vapors from the site.*

Reference: Section 4.0

Summary: A survey of utility cavities and vaults was performed in August 1998. No explosion or fire hazards were noted in the subject subsurface utilities during this survey. Soil gas data were also collected during August 1998. Methane concentrations as high as 18% were detected in the subsurface. The lower explosive limit (LEL) for methane is 5%. These data indicate that engineering controls are required to minimize explosion and fire hazards in future developments at the site.

11. *Provide an evaluation of risks to environmental (including ecological) receptors from exposure to product and/or vapors from residual LNAPL.*

Reference: Section 2.0

Summary: The nearest surface water body is located approximately 1,600 feet from the site. Based on these data, natural attenuation mechanisms, and the groundwater velocity, it appears unlikely that residual LNAPL will impact ecological receptors.

BENEFICIAL USES OF WATER RESOURCES
Data Entry Form

Site NAME: Former Unocal Station #2651

Site ADDRESS: 235 Market Street

CITY/COUNTY/ZIP: San Diego, 92121

Nearest Major Cross-Streets: Market and 3rd Street
2nd Street

Hydrologic Unit NAME and BASIN NUMBER: San Diego Mesa, HU 8.20
(*e.g.* San Diego Mesa, HU 8.20)

Nearest Surface Water (NAME): San Diego Bay

Approximate distance to Surface Water (in feet): 1600 Feet

Ground Water Exempted from MUN (RWQCB, 1994[1]): ☒ YES ☐ NO

Sensitive Aquifer (RWQCB, 1996[2]): ☐ YES ☒ NO

Designated Existing or Potential Beneficial Uses of Surface Water (check all that apply[1])

☐ MUN ☐ AGR ☐ IND ☐ PROC ☐ GWR ☐ FRSH ☐ POW ☐ SPWN

☐ REC1 ☐ REC2 ☐ BIOL ☐ WARM ☐ COLD ☐ WILD ☐ RARE

☐ NAV ☐ EST ☐ MAR ☐ COMM ☐ AQUA ☐ MIGR ☐ SHELL

Designated Existing or Potential Beneficial Uses of Ground Water (check all that apply[1])

☐ MUN ☐ AGR ☐ IND ☐ PROC ☐ FRSH ☐ GWR

San Diego RWQCB LNAPL FORM 1: May 1998

---

[1] RWQCB, 1994, Water Quality Control Plan for the San Diego Basin (9), dated September 8, 1994.

[2] RWQCB, 1996, Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Contaminated Sites, dated April 1, 1996.

Former Unocal Station #2651

Groundwater Velocity Calculations

Estimate velocity of groundwater from Darcy Equation:

$$V_W = K_h (I) / \theta$$

V_W = velocity of groundwater

K_h = hydraulic conductivity

I = groundwater gradient

θ = saturated porosity

Saturated porosity (%): 46%
(list the source of this information: laboratory measurement, reference text, other - provide explanation) Laboratory Measurement (Appendix A and B)

Hydraulic conductivity (also specify units): 1.26 x 10-3 cm/sec
(list the source of this information: laboratory measurement, aquifer pump test, aquifer slug test, reference text, other - provide explanation)
Laboratory Measurement (Appendix A and B) Value Used is Geometric mean of 7 analyses.

Groundwater gradient (unitless): 0.005
(list the source of this information: site-specific measurement, reference text, other - provide explanation)

Groundwater velocity - V_{YR} (ft/year): 15ft/year

Distance to nearest sensitive receptor (e.g., water well(s), surface water, habitat area)(in ft): 1600 ft (San Diego Bay)

Estimated time of travel to nearest receptor (Distance / V_{YR}) in years: 106 years

Provide an evaluation of mitigating attenuation factors, if any at this site. Include a list of assumptions and associated calculations as necessary to support the analysis. Attached other sheets as necessary.

San Diego RWQCB LNAPL FORM 2: May 1998

Bioattenuation of petroleum hydrocarbons. Research has indicated that hydrocarbon plumes stabilize with 700 feet, on average, from the original source location (LLNL, 1995).

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/11/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 31
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

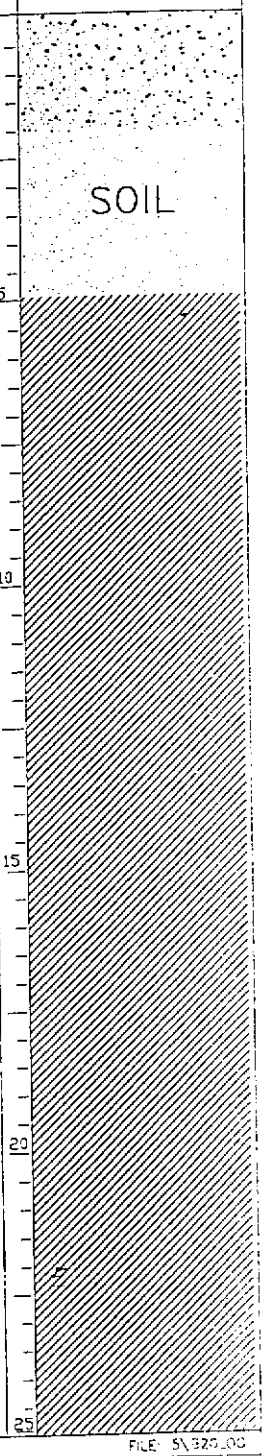
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 31
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B20

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							5" ASPHALT
	■	5 5 5	0.6	ND<1.0/ ND<0.0050		SM	SILTY SAND. MODERATE YELLOWISH BROWN. 15 – 20% SILT. 5% CLAY. FINE- TO MEDIUM-GRAINED SAND. LOW PLASTICITY. DAMP. HYDROCARBON ODOR.
5	■	50 (1")		1.1/ ND<0.0050		SM	SILTY SAND. MODERATE YELLOWISH BROWN. 15 – 20% SILT. 5% CLAY. FINE- TO MEDIUM-GRAINED SAND. LOW PLASTICITY. DAMP. HYDROCARBON ODOR. 2" RECOVERY. THICK WIRE SIMILAR TO CHAIN LINKS.
	■	8 8 10	0.7	ND<1.0/ ND<0.0050		SM	SILTY SAND. DARK YELLOWISH BROWN. 20 – 25% SILT. 5% CLAY. FINE- TO MEDIUM-GRAINED SAND. LOW PLASTICITY. DAMP. OIL ODOR.
10	■	12 30 40	1.0	3.0/0.010		SM	SILTY SAND. MODERATE BROWN. 20% SILT. TRACE CLAY. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. HYDROCARBON ODOR.
	■	9 8 14	20	1.3/0.078		SM	SILTY SAND. MODERATE BROWN. 20% SILT. TRACE CLAY. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. HYDROCARBON ODOR.
15	■	10 10 16	700	650/ ND<2.0	▼	SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. HYDROCARBON ODOR.
20	■		10	ND<1.0/ 0.0074		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: 5\326.DO

VAPOR EXTRACTION TECHNOLOGY, INC.

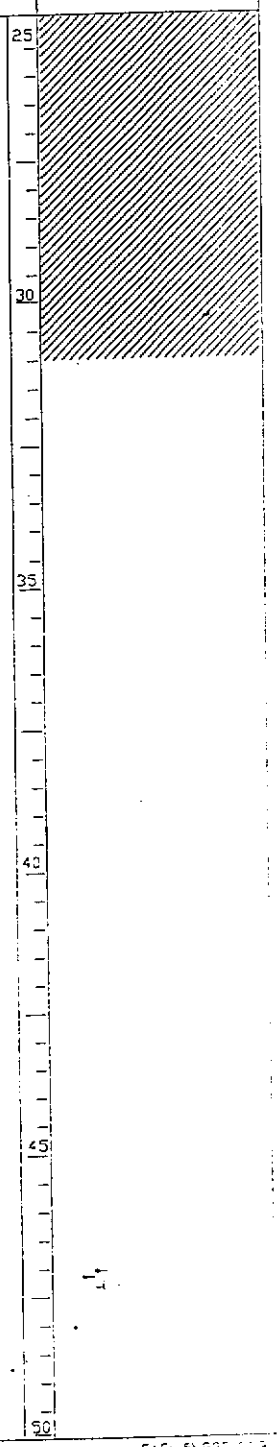
CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/11/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B20

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
25		12 24 46	20	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
30			10	ND<1.0/ 0.010		SP	POORLY GRADED SAND. MODERATE BROWN. 5% SILT. VERY FINE- TO MEDIUM-GRAINED SAND (MOSTLY VERY FINE-GRAINED). NONPLASTIC. WET. NO HYDROCARBON ODOR.
35							
40							
45							
50							

BORING CONSTRUCTION



VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/11/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 31.5
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

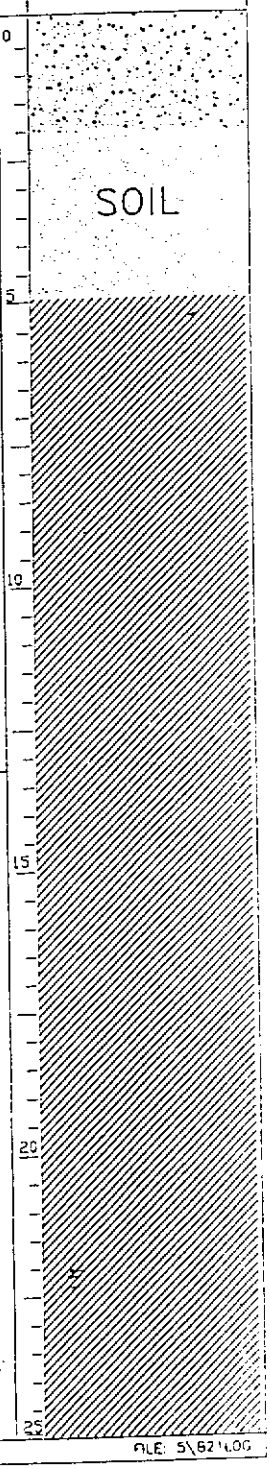
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 31.5
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B21

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							1" ASPHALT AND 4" CONCRETE
5		7, 17, 21	2.4	ND<1.0/ ND<0.0050		SM	SILTY SAND. DARK YELLOWISH BROWN. 30% SILT. 5 - 10% CLAY. VERY FINE- TO FINE-GRAINED SAND. LOW PLASTICITY. DAMP. SLIGHT HYDROCARBON ODOR.
10		4, 12, 15	7	ND<1.0/ ND<0.0050		SM	SILTY SAND. MODERATE YELLOWISH BROWN. 15% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. NO HYDROCARBON ODOR.
15		7, 14, 19	6	ND<1.0/ ND<0.0050	▼	SP	POORLY GRADED SAND. DARK YELLOWISH BROWN. TRACE SILT. TRACE CLAY. NONPLASTIC. DAMP. HYDROCARBON ODOR.
20		10, 15, 21	50	2200/5.5		SP	POORLY GRADED SAND WITH GRAVEL. MODERATE YELLOWISH BROWN. UP TO 25% GRAVEL AT ONE END OF SLEEVE. VERY FINE-GRAINED SAND. GRAVEL IS WELL-ROUNDED. NONPLASTIC. WET. STRONG HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: S\B21.LOG

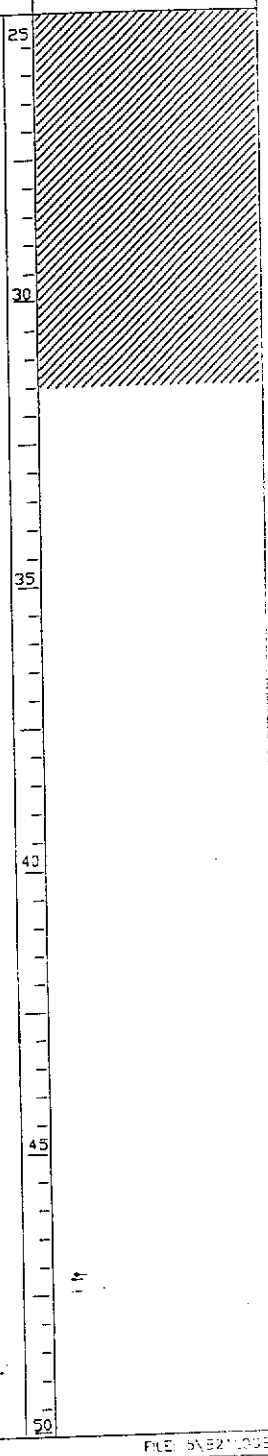
VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/11/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B21

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS	BORING CONSTRUCTION
25		15 15	14	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.	
30			4	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. FINE-GRAINED SAND AT TOP OF SAMPLE, COARSE-GRAINED SAND AT BOTTOM. NONPLASTIC. WET. HYDROCARBON ODOR.	
35								
40								
45								
50								



FILE: 5\B21.DOC

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 31.5
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

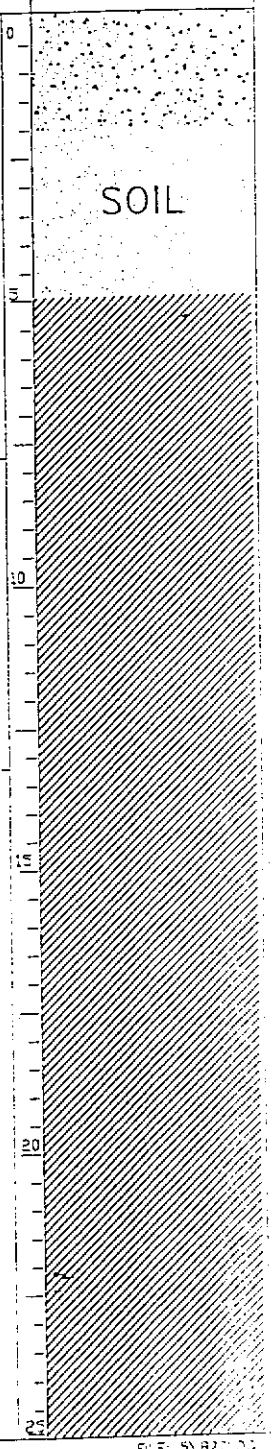
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 31.5
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B22

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							OLD HIGHLY CRACKED CONCRETE
5		4, 4, 6	0	ND<1.0/ ND<0.0050		ML/CL	CLAYEY SILT. MODERATE BROWN. 30 – 40% CLAY. 5% FINE- TO MEDIUM-GRAINED SAND. HIGH PLASTICITY. DAMP. NO HYDROCARBON ODOR.
10		12, 19, 27	0.8	ND<1.0/ ND<0.0050		SP/SM	POORLY GRADED SAND WITH SILT. MODERATE BROWN. 10% SILT. <5% CLAY. VERY FINE-GRAINED SAND. NON TO LOW PLASTICITY. DAMP. HYDROCARBON ODOR.
15			180	750/1.7		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. STRONG GASOLINE ODOR.
20		9, 18, 24	20	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. WET. STRONG GASOLINE ODOR.
25							

BORING CONSTRUCTION



FILE: 9\B22.DOC

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B22

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS	BORING CONSTRUCTION
25			60	84/ ND<0.40		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.	
30			5	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.	
35								
40								
45								
50								

FILE: 5\B22.DOB

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 35.5
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

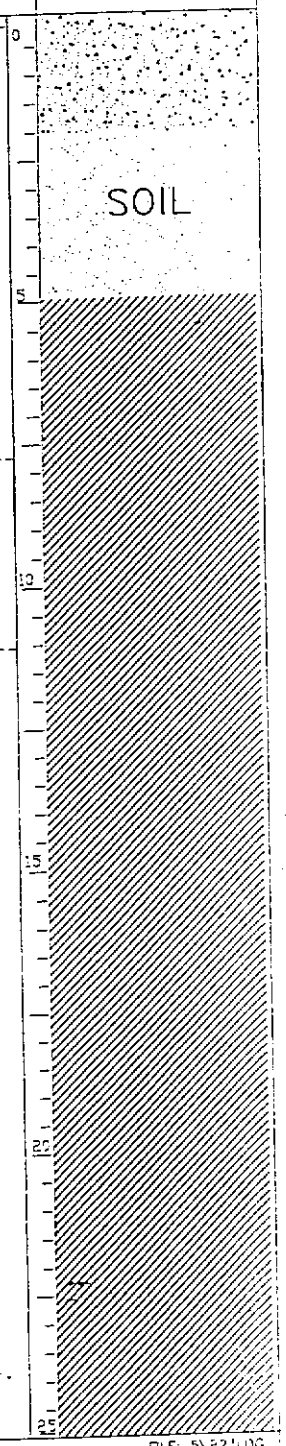
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 35.5
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B23

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							ASPHALT
5	■	5 7 8	200	520/3.6		SM	SILTY SAND. DARK YELLOWISH BROWN. 20 – 30% SILT. TRACE CLAY. FINE-GRAINED SAND. LOW TO NONPLASTIC. DAMP. STRONG HYDROCARBON ODOR.
10	■	4 4 5	100	10000/ 120		SP/ SM	POORLY GRADED SAND WITH SILT. MODERATE BROWN. 10 – 15% SILT. VERY FINE- TO MEDIUM-GRAINED SAND. AT 10.5 – 11 FEET: ASPHALTIC SAND; BLACK; LOOSE; TAR CONSISTENCY; VERY DIRTY.
						SP	POORLY GRADED SAND.
15	■		20	440/1.3	▼	SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. TRACE SILT. NONPLASTIC. DAMP. HYDROCARBON ODOR.
20	■		50	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. TRACE SILT. NONPLASTIC. DAMP. HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: 5\B23.LOG

VAPOR EXTRACTION TECHNOLOGY, INC.

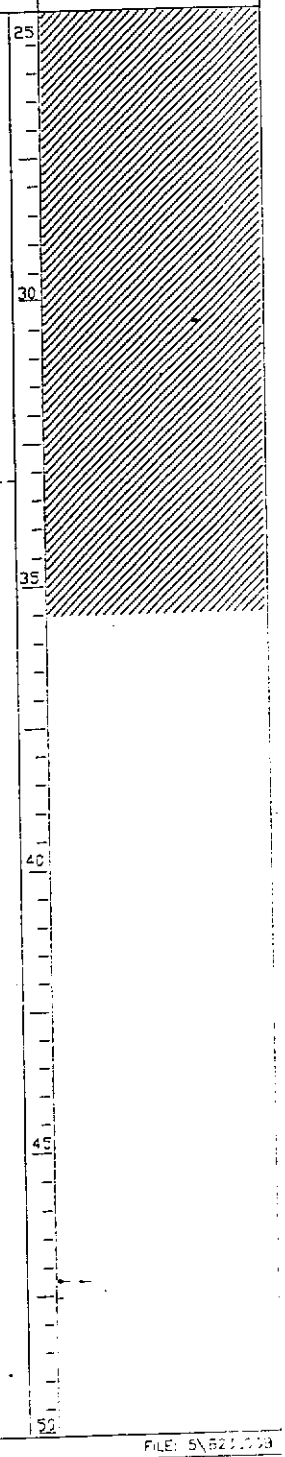
CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B23

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
25			10	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5 – 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. NO HYDROCARBON ODOR.
30			10	2.8/0.020		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5 – 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. VERY SLIGHT HYDROCARBON ODOR.
35			0	ND<1.0/ ND<0.0050		ML	SANDY SILT WITH CLAY. LIGHT BROWN. 30% VERY FINE-GRAINED SAND. <5% CLAY. LOW PLASTICITY. WET. NO HYDROCARBON ODOR.
40							
45							
50							

BORING CONSTRUCTION



FILE: S:\B23.DB

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 31
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

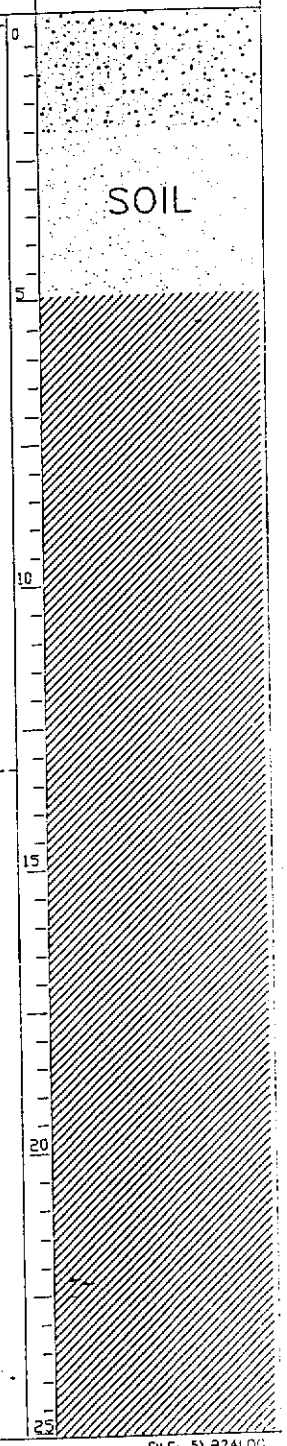
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 31
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B24

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							1.5" ASPHALT AND 8" CONCRETE
5		7, 11, 13	10	ND<1.0/ ND<0.0050		SM	SILTY SAND. DARK YELLOWISH BROWN. 30% SILT. 5 - 10% CLAY. VERY FINE-GRAINED SAND. LOW PLASTICITY. DAMP. NO HYDROCARBON ODOR.
10		14, 15, 15	220	ND<1.0/ ND<0.0050		SM	SILTY SAND. OLIVE GRAY. 15% SILT. 5% CLAY. VERY FINE-GRAINED SAND. LOW PLASTICITY. DAMP. HYDROCARBON ODOR.
15			300	210/ ND<1.0	▼	SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. TRACE SILT. VERY FINE-GRAINED SAND. NONPLASTIC. MOIST. HYDROCARBON ODOR.
20		6, 18, 23	120	1.2/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: 5\B24LOG

VAPOR EXTRACTION TECHNOLOGY, INC.

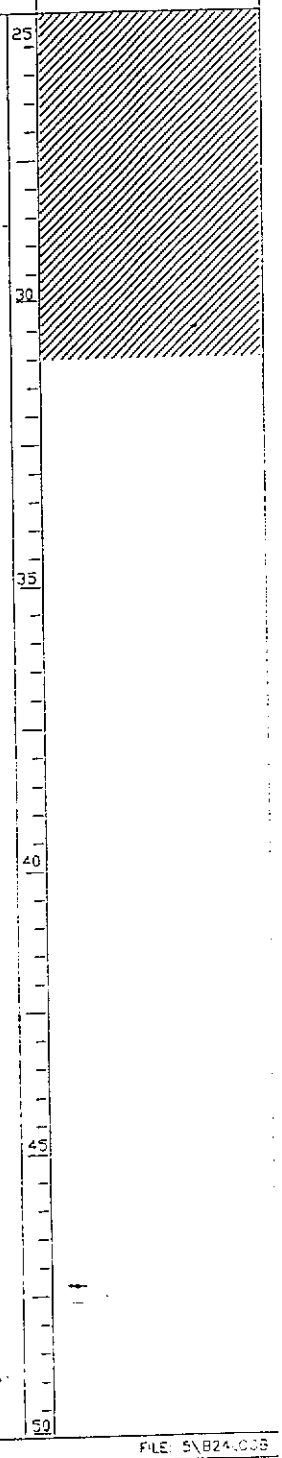
CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/12/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B24

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
25		2 5 10	100	ND<1.0/ ND<0.0050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. 5 - 10% FINES (MICA AND SILT). VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
30		12 19 23	70	ND<1.0/ ND<0.0050		SM	SILTY SAND. MODERATE BROWN. 20% SILT. 5% CLAY. VERY FINE- TO FINE-GRAINED SAND. LOW TO NONPLASTIC. WET. NO HYDROCARBON ODOR.
35							
40							
45							
50							

BORING CONSTRUCTION



FILE: S\B24.CDB

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

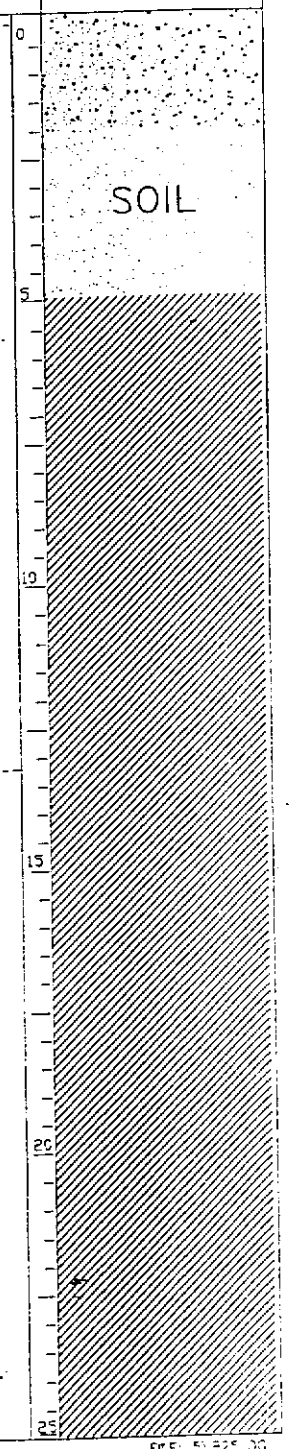
DATE INSTALLED: 8/13/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT):	31
BORING DIAMETER (IN):	6
BORING ANGLE (DEG):	0
GROUND SURFACE ELEVATION (FT MSL):	NA
SURVEYED TOP OF CASING (FT MSL):	NA
DRILLING COMPANY:	WEST HAZMAT
RIG TYPE:	CME-75
DRILLER NAME:	LOU
SAMPLE METHOD:	CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN):	140/36
VOC DETECTOR TYPE:	OVA 128-GC
WELL CASING TOTAL DEPTH (FT):	NA
WELL CASING DIAMETER (IN):	NA
WELL CASING TYPE:	NA
SCREEN DEPTH TOP TO BOTTOM (FT):	NA
SCREEN SLOT SIZE (IN):	NA
SURFACE COMPLETION:	CONCRETE
CONCRETE SEAL DEPTH (FT):	0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT):	NA
BENTONITE CHIPS SEAL DEPTH (FT):	5 TO 31
SAND PACK TYPE:	NA
SAND PACK DEPTH (FT):	NA

B25

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							CONCRETE
5		5, 10, 20	0	ND<10/ ND<0.050		SM	SILTY SAND. MODERATE YELLOWISH BROWN. 20 – 30% SILT. 5 – 10% CLAY. FINE- TO MEDIUM-GRAINED SAND. LOW PLASTICITY. DAMP. NO HYDROCARBON ODOR.
10		2, 9, 15	0	ND<10/ ND<0.050		SM	SILTY SAND. LIGHT BROWN. 15% SILT. TRACE CLAY. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. NO HYDROCARBON ODOR.
15		11, 19, 20	6	ND<10/ ND<0.050	▼	SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. TRACE SILT. VERY FINE-GRAINED SAND. NONPLASTIC. MOIST. SLIGHT HYDROCARBON ODOR.
20		9, 13, 24	1	ND<10/ ND<0.050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. SLIGHT HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: 5\B25.LOG

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/13/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B25

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS	BORING CONSTRUCTION
25		17 50 (5")	0	ND<10/ ND<0.050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5 – 10% FINES (MICA AND SILT). VERY FINE-GRAINED SAND. NONPLASTIC. WET. MEDIUM GRAVEL AT BOTTOM OF SAMPLE (3"). NO HYDROCARBON ODOR.	
30	NR						HEAVING SANDS. NO SAMPLE RECOVERY.	
35								
40								
45								
50								

FILE: 5\625.003

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/13/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 35
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

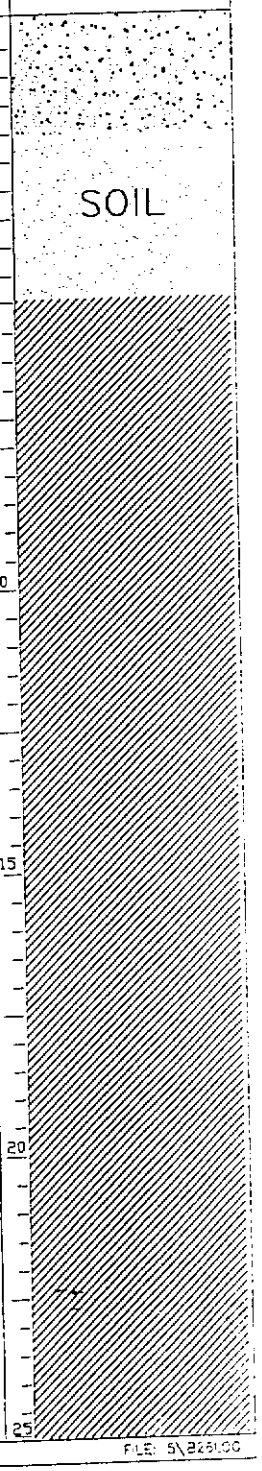
WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 35
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B26

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
0							ASPHALT
5		8, 13, 17	0	ND<10/ ND<0.050		ML	SANDY SILT. DARK YELLOWISH BROWN. 30% VERY FINE-GRAINED SAND. 5% CLAY. LOW PLASTICITY. DAMP. NO HYDROCARBON ODOR.
10		13, 18, 19	14	ND<10/ ND<0.050		SP	SILTY SAND WITH CLAY. MODERATE BROWN. 15% SILT. 5% CLAY. VERY FINE- TO FINE-GRAINED SAND. LOW PLASTICITY. DAMP. SLIGHT HYDROCARBON ODOR.
		6, 8, 11	0	ND<10/ ND<0.050		SP	POORLY GRADED SAND WITH SILT. MODERATE BROWN. 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. MOIST. NO HYDROCARBON ODOR.
15		4, 12, 12	300	ND<10/ ND<0.050 ND<10/ ND<0.050 ND<10/ ND<0.050		SP	POORLY GRADED SAND WITH SILT. MODERATE BROWN. 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. MOIST. NO HYDROCARBON ODOR.
		9, 10, 12	200	ND<20/ ND<0.10 34/ ND<0.050 150/0.088	▼	SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. TRACE SILT. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. SLIGHT HYDROCARBON ODOR.
		12, 15, 12	30	290/0.24 440/0.53 1300/1.7		SP/ SM	POORLY GRADED SAND WITH SILT. MODERATE YELLOWISH BROWN. 5 - 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
20		10, 13, 16	30	ND<10/ ND<0.050 ND<10/ 0.073 150/0.23		SP/ SM	POORLY GRADED SAND WITH SILT. MODERATE YELLOWISH BROWN. 5 - 10% SILT. VERY FINE-GRAINED SAND. NONPLASTIC. WET. HYDROCARBON ODOR.
25							

BORING CONSTRUCTION



FILE: 5\B26LOG

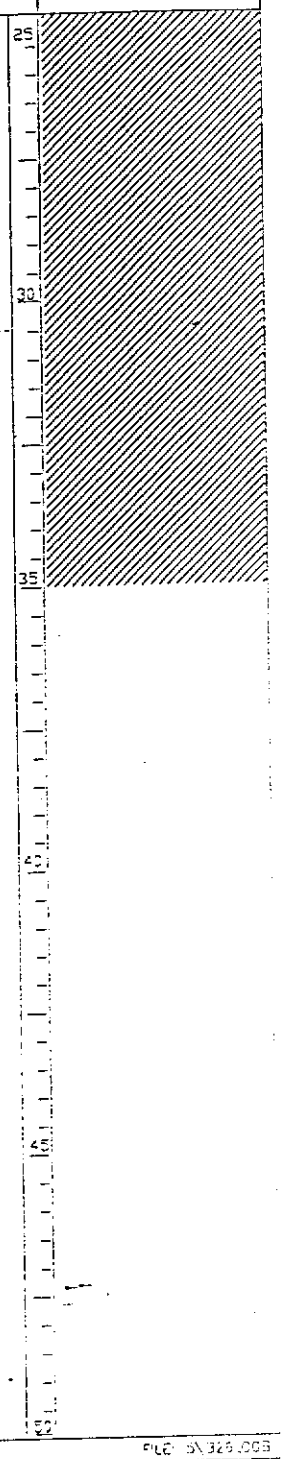
VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/13/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

B26

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB TPH/BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS	BORING CONSTRUCTION
25		19 37 50	0	ND<10/ ND<0.050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. 5% SILT. VERY FINE-GRAINED SAND.	
30		9 17 32	0	ND<10/ ND<0.050 ND<10/ ND<0.050		SM	SILTY SAND. MODERATE BROWN. 30% SILT. 5 - 10% CLAY. VERY FINE-GRAINED SAND. LOW PLASTICITY. WET. NO HYDROCARBON ODOR.	
35		37 50 (6")	0	ND<10/ ND<0.050 ND<10/ ND<0.050		SM	SILTY SAND. MODERATE BROWN. 30% SILT. 5 - 10% CLAY. 10% GRAVEL. VERY FINE-GRAINED SAND. LOW PLASTICITY. WET. NO HYDROCARBON ODOR.	
40								
45								
50								



FILE: S\326.DGB

VAPOR EXTRACTION TECHNOLOGY, INC.

CLIENT: UNOCAL CORPORATION
LOCATION ID: FORMER SERVICE STATION #2651
LOCATION ADDRESS: 235 MARKET ST., SAN DIEGO

DATE INSTALLED: 8/13/98
GEOLOGIST: DC
VET PROJECT NO: 029-058

BORING TOTAL DEPTH (FT): 25
BORING DIAMETER (IN): 6
BORING ANGLE (DEG): 0
GROUND SURFACE ELEVATION (FT MSL): NA
SURVEYED TOP OF CASING (FT MSL): NA

DRILLING COMPANY: WEST HAZMAT
RIG TYPE: CME-75
DRILLER NAME: LOU
SAMPLE METHOD: CA. MODIFIED SPLIT-SPOON
HAMMER WEIGHT(LBS)/DROP(IN): 140/36
VOC DETECTOR TYPE: OVA 128-GC

WELL CASING TOTAL DEPTH (FT): NA
WELL CASING DIAMETER (IN): NA
WELL CASING TYPE: NA
SCREEN DEPTH TOP TO BOTTOM (FT): NA
SCREEN SLOT SIZE (IN): NA

SURFACE COMPLETION: CONCRETE
CONCRETE SEAL DEPTH (FT): 0 TO 2 (SOIL 2 TO 5)
BENTONITE GROUT SEAL DEPTH (FT): NA
BENTONITE CHIPS SEAL DEPTH (FT): 5 TO 25
SAND PACK TYPE: NA
SAND PACK DEPTH (FT): NA

B27

DEPTH (FEET)	SAMPLE	BLOWS PER 1/2 FT	CHEM ANALYSIS FIELD: TOTAL VOL. VAPORS WITH OVA (PPM)	CHEM ANALYSIS LAB: TPH/ BENZENE (PPM)	WATER LEVEL (NON-STATIC)	SOIL CLASS (USCS)	SOIL DESCRIPTIONS
							4" ASPHALT
0							
5		27 35 50	200	1900/3.0		SM/ FILL	SILTY SAND. DARK YELLOWISH BROWN. 20% SILT. ASPHALT DEBRIS. FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. DAMP. STRONG HYDROCARBON ODOR.
10		13 18 19	1000+	3400/5.3		SM	SILTY SAND. OLIVE GRAY. 15% SILT. TRACE CLAY. VERY FINE-GRAINED SAND. NONPLASTIC. DAMP. STRONG HYDROCARBON ODOR.
		6 8 11	400	3800/5.0 3400/ ND<5.0 880/7.6		SM	SILTY SAND WITH CLAY. DARK YELLOWISH BROWN. 20% SILT. 5 - 10% CLAY. VERY FINE-GRAINED SAND. LOW PLASTICITY. DAMP. STRONG HYDROCARBON ODOR.
15		4 12 12	280	940/8.0 2000/16 1700/ ND<4.0		SM	SILTY SAND. DARK YELLOWISH BROWN. 20% SILT. TRACE CLAY. TRACE GRAVEL. VERY FINE-GRAINED SAND. LOW PLASTICITY. DAMP. STRONG HYDROCARBON ODOR.
		9 10 12	900	3200/11 690/ ND<1.0 850/ ND<2.0	▼	SM	SILTY SAND. LIGHT OLIVE GRAY. 15% SILT. TRACE CLAY. VERY FINE-GRAINED SAND. LOW PLASTICITY. DAMP. STRONG HYDROCARBON ODOR.
		12 15 12	800	1500/3.1 3800/7.2 3400/30		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. WET. STRONG HYDROCARBON ODOR.
20		10 13 16	1000+	3600/32 2300/21 30/0.30		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. WET. STRONG HYDROCARBON ODOR.
		13 16 17	50	11/0.12 510/4.6 ND<10/ ND<0.050		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. VERY FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. WET. STRONG HYDROCARBON ODOR.
		9 17 22	1000+	160/1.1 15/0.16 ND<10/ 0.071		SP	POORLY GRADED SAND. MODERATE YELLOWISH BROWN. <5% SILT. 5 - 10% FINES (MICA AND SILT). VERY FINE- TO MEDIUM-GRAINED SAND. NONPLASTIC. WET. STRONG HYDROCARBON ODOR.
25	NR						

BORING CONSTRUCTION: SOIL

FILE: 5\B27.DO

APPENDIX F

MONITORING WELL TABLE AND LOGS