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Non-Attainment Area Management Plan

**Unocal Service Station 6277
15803 East 14th Street at 159th Street
San Leandro, California**

Prepared for

Unocal Corporation

January 10, 1996

Prepared by

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Project 310-085.3A

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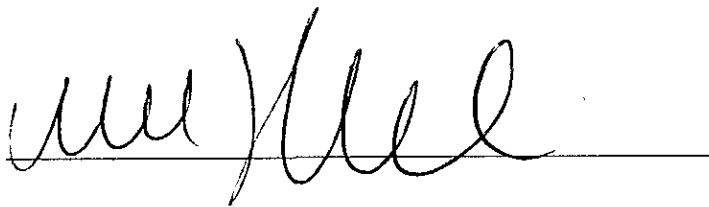
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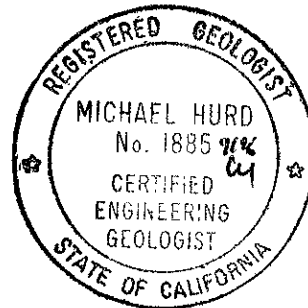
**PROFESSIONAL CERTIFICATION
NON-ATTAINMENT AREA MANAGEMENT PLAN
Unocal Service Station 6277
15803 East 14th Street at 159th Avenue
San Leandro, California**

Pacific Environmental Group, Inc. (PACIFIC) has prepared this Non-Attainment Area (NAA) Plan for the referenced site. This plan has been prepared according to the guidelines of the Groundwater Amendment to the Water Quality Control Plan, San Francisco Bay Region.

This NAA Plan has been prepared by the staff of PACIFIC under the professional supervision of the Certified Engineer Geologist whose seal and signature appears hereon.



Michael Hurd
Senior Geologist
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1.0 INTRODUCTION

Unocal Corporation (Unocal) is submitting this Non-Attainment Area (NAA) Plan for implementation at Unocal Service Station 6277. The plan provides for management and containment of the remaining human health and environmental risks at the referenced facility. Upon acceptance of the management plan by the Regional Water Quality Control Board (RWQCB) and the Local Oversight Program (LOP), Unocal requests the issuance of a No Further Action (NFA) letter that would identify no further requirements at the site beyond those stipulated within the management plan.

This plan is designed to fulfill the intent of State Water Resources Control Board (State Board) Resolution 68-16 which mandates protection of present and potential beneficial uses of groundwater by maintaining protection of all groundwater beyond the compliance points. The plan is also designed to fulfill the intent of State Board Resolution 88-63 which mandates that all groundwater be suitable (or be restored to suitability) for municipal supply by specifying deed or land use restriction such that natural processes are allowed to restore groundwater over the long term.

This document is composed of five sections:

- Section 1.0 as introduction.
- Section 2.0 is a summary of the site characterization data presented in tables and figures.
- Section 3.0 identifies the NAA, containment monitoring locations, risk management measures to protect human health and the environment, the compliance monitoring program, and incorporates a qualitative risk assessment of the NAA.
- Section 4.0 is an evaluation of the NAA plan to demonstrate the completeness of the site characterization and NAA measures for the protection of human health and the environment.
- Section 5.0 offers recommendations and conclusions for the site as a NAA.

The document is completed with references.

2.0 SITE CHARACTERIZATION DATA

This section of the NAA Plan for Unocal Service Station 6277 presents a summary of existing site conditions, including investigative results to date, potential beneficial uses of land, groundwater, surface water, and the suitability of implementing a NAA at this site. The site characterization data has been summarized in a pre-formatted table consistent with the guidelines given in ASTM ES 38. Where appropriate, appendices have been incorporated.

- Table 2-1 - Site Description
- Table 2-2 - Site Ownership and Activity Record
- Table 2-3 - Summary of Current and Completed Site Activities
- Table 2-4 - Hydrogeologic Conditions
- Table 2-5 - Analytical Summary Sheets

Table 2-1
Site Description

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Information Requirement	Discussion	Reference
Site Address	1580 East 14th Street, San Leandro, California	8/3/94 Report, MPDS
Site Owner/Contact	Unocal Corporation / Mr. David Camille Property Owner: Mathew Coelho	8/3/94 MPDS 3Q94, KEI
Agency Contacts	Alameda County Health Care Services: Mr. Dale Klettke RWQCB: Mr. Kevin Graves	3Q94, KEI 5/17/91, KEI 7/6/94, ACHCSA 2Q93, KEI 1Q92, KEI
Local Land Use	The vicinity surrounding the site is a mixed commercial/residential area. East of the site is a SpeeDee oil change shop. Southeast of the site is a former ABC Auto Repair shop as well as a sign shop and a recreational vehicle storage lot. The site is surrounded on the northwest, west, and southwest by an apartment complex. Northeast of the site is a vacant lot.	5/10/93, KEI Figures 1 through 3
Topography	Site slopes gently southwesterly. The site is approximately three miles northeast of the San Francisco Bay Shoreline.	7/23/91, KEI
Surface Water Characterization	No known surface water on the site. Estudillo Canal located 500 feet west of site.	

Table 2-2
Site Ownership and Activity Record

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Information Requirement	Discussion	Reference
Materials Handling Activities	Gasoline dispensing.	8/3/94 MPDS
Waste Disposal Practices	Waste oil tank (removed in 3/89)	8/3/94 MPDS
Site Ownership	Unocal Corporation	8/3/94 Report, MPDS
Potential Sources and Spill Events including: location, type and volume of materials released, time and duration of release, and affected media (soil, groundwater, surface water, etc.)	Former waste oil tank and former gasoline underground storage tanks area contain soil and groundwater contamination. Materials are assumed to be waste oil and gasoline. Time and duration of any releases is unknown. Affected media are soil and groundwater.	3/27/89 KEI
Potential Off-Site Sources	<p>The Okada property at 16109 Ashland Ave. has three monitoring wells associated with a underground storage tank removal. Groundwater flow direction is to the west. TPH-g concentrations were found as high as 280 ppb, TPH-d concentrations were found as high as 1,100 ppb, and benzene concentrations were less than 0.5 ppb.</p> <p>A former USA petroleum station at 15120 Hesperian Blvd., approximately 2,300 feet west of the site) had three underground storage tanks removed on 5/24/89. Soil samples had TPH-g concentrations up to 9,760 ppb.</p> <p>A former Richfield service station located to the east of the site where a Speedee oil change shop is now located.</p>	<p>5/10/93 KEI</p> <p>5/10/93 KEI</p> <p>5/10/93 KEI</p>

Table 2-2 (continued)
Site Ownership and Activity Record

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Information Requirement	Discussion	Reference
Potential Off-Site Sources (cont.)	<p>A former auto wrecking yard lies approximately 500 feet southeast of the site.</p> <p>Another former auto wrecking yard lies behind the former ABC auto repair shop.</p> <p>Chlorinated solvents have consistently been found in upgradient Wells MW-3 and MW-4. The source is unidentified or possibly a reported regional chlorinated solvent contamination plume.</p>	<p>5/10/93 Report, KEI</p> <p>5/10/93 KEI</p>

Table 2-3
Summary of Current and Completed Site Activities

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Corrective Action Activities	Description	Reference
Six Monitoring Wells	Four monitoring wells were installed on 6/6/89 and two more on 4/2/93. On 2/1/90, MW-2 was destroyed and replaced with MW-2A. All wells are sampled quarterly.	8/3/94 MPDS
Waste Oil Tank Removed	One 550 gallon steel tank was removed on 3/13/89. The tank was made of steel with a tar and wrap coating with no apparent holes or cracks observed in them. Soil samples contained 41 ppm to 280 ppm total oil and grease.	5/10/93 KEI
Two Underground Storage Tanks Removed	Two 10,000 gallon steel gasoline tanks were removed on 3/13/89. The tanks were made of steel with a tar and wrap coating with no apparent holes or cracks observed in them. Soil samples indicated TPH-g values from 24 to 150 ppm.	5/10/93 KEI
Contaminated Soil Overexcavated	Contaminated soil detected in the fuel tank pit and waste oil tank pit was overexcavated to a depth to 11 feet below grade in 3/89. Contaminated soil detected in the vicinity of MW-2 was overexcavated to a depth of 12 feet below grade in 4/90.	8/3/94 MPDS

Table 2-4
Hydrogeologic Conditions
 Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro California

Information Requirement	Discussion	Reference
Regional Geologic Framework through depth of principal aquifer and any other potentially impacted units	The regional underlain by late Pleistocene alluvium consisting of weakly consolidated, poorly-sorted, irregularly bedded fluvial deposits of clay, silt, sand, and gravel with a reported thickness of at least 150 feet. This alluvium overlays bedrock and deformed older sedimentary deposits on the alluvial plain marginal to the San Francisco Bay.	5/10/93 KEI
Site Geologic Framework Through Depth Of Principal Aquifer And Any Other Potentially Impacted Units	The site is situated approximately 1,700 to 3,600 feet southwest of various mapped splays of the active Hayward fault. The site is underlain by fill materials to a depth of 1 to 5 feet below grade. The fill is in turn underlain by alluvium to the maximum depth explored (25.5 feet below grade). This alluvium consists of clay and silty clay, sandy or clayey gravel. Clayey silt layers encountered 18 to 21 feet below grade in MW-5 and 10 to 13 feet and 20 feet below grade in MW-6.	5/10/93 KEI
Vadose Zone Thickness And Geology	The vadose zone thickness ranges from the surface to 6.4 feet below ground surface. The geology consists of the materials as described above.	5/10/93 KEI
Depth To Groundwater	Depth to groundwater ranges from 6.42 feet to 11.16 feet below ground surface.	8/3/94 MPDS
Thickness Of Aquifer	The aquifer is at least 6.42 feet below ground surface deep. Its total vertical extent is presently unknown.	8/3/94 MPDS
Maximum Well Yield	NA	
Flow Direction And Gradient	Groundwater flow direction is northerly with a gradient of 0.002 ft/ft.	8/3/94 MPDS Figure 4 Figure 5
Description Of Any Confining Units	An alluvium layer consisting of clay was found from approximately 6.5 feet to 17 feet below grade.	5/10/93 KEI

Current Groundwater Quality (TDS)	Unknown	
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Table 2-5
Analytic Summary Sheets
 Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Information Requirement	Media (Soil/ Ground- water)	Compounds Detected					
		Benzene	Toluene	Xylenes	Ethylbenzene	TPH-g	Other: TCE & PCE
Analytic Method Used	Soil EPA Method	8020	8020	8020	8020	8015 Mod	NA
	Ground-water EPA Method	8020	8020	8020	8020	5030/8015	8010
Practical Quantification Limit	Soil ppm, mg/kg	0.005	0.005	0.005	0.005	1.0	NA
	Ground-water µg/L	0.5	0.5	0.5	0.5	50	TCE - 10 PCE - 10
Number of Samples Analyzed	Soil	11	11	11	11	11	N/A
	Ground-water	86	86	86	86	86	23

Table 2-5 (continued)
Analytic Summary Sheets
 Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Information Requirement	Media (Soil/ Ground- water)	Compounds Detected					
		Benzene	Toluene	Xylenes	Ethylbenzene	TPH-g	Other: TCE & PCE
Summary of analytic data	Soil: Maximum Residual: depth & date	40 ppm Boring: SW2 10' 3/14/89	43 ppm Boring: SW11A 10.5' 4/3/90	230 ppm Boring: SW11A 10.5' 4/3/90	37 ppm Boring: SW11A 10.5' 4/3/90	1,100 ppm Boring: SW11A 10.5' 4/3/90	N/A
Identify Boring, Depth (if applicable), Concentration, and Date	Ground-water Max ppm (µg/L) well & date	250 MW-1 7/7/94	17 MW-1 9/13/89	200 MW-1 7/7/94	57 MW-1 7/7/94	2,100 MW-1 7/7/94	TCE - 38 MW-1, 4/94 PCE - 1400 MW-3, 7/92
	Ground-water ppm Current well & date	250 MW-1 7/7/94	ND All Wells 5/27/94	200 MW-1 7/7/94	57 MW-1 7/7/94	2,100 MW-1 7/7/94	TCE - 38 PCE - 390 MW-1 4/94
	Ground-water ppb (Minimum)	ND 7/7/94	ND 7/7/94	ND 7/7/94	ND 7/7/94	ND 7/7/94	N/A
Background Concentrations	Ground-water	Unknown	Unknown	Unknown	Unknown	Unknown	N/A
Trend	Ground-water	Stable	Decreasing	Stable	Stable	Stable	Fluctuating

3.0 NON-ATTAINMENT AREA MANAGEMENT PLAN

This section provides the description of the NAA, the management measures for residual environmental and human health risks, the containment monitoring program, and the contingency plan. The section begins with a description of a NAA including the delineation of the NAA and identification of the containment monitoring points. In conjunction with this description of the NAA, management plan elements are incorporated for containing and managing remaining human health, water quality and groundwater pollution concerns. This section is constructed consistent with the guidelines within Criteria D for Category I NAAs and includes an assessment of human health and environmental risks, management measures for the NAA, contingency options, a commitment to mitigating measures, and a compliance monitoring plan.

3.1 Description of Non-Attainment Area

The NAA is a limited zone of groundwater pollution where concentrations above water quality objectives are permissible. At a minimum, the zone should encompass the pollutant plume in both the vadose soil and saturated groundwater region.

The containment monitoring points for Unocal Service Station 6277 coincide with the downgradient extent of the NAA. The containment monitoring points are the existing Monitoring Wells MW-5 and the proposed monitoring well MW-7. Monitoring Well MW-7 would be installed further downgradient from the existing monitoring wells. For Unocal Service Station 6277, the NAA coincides with the property boundaries of the service station. The NAA is shown on Figure 6.

3.2 Assessment of Human Health and Environmental Risks

The goal of the risk assessment process is to qualitatively assess the current and potential human health and environmental impacts of the proposed NAA for Unocal Service Station 6277. The intent is to identify obvious environmental impacts, potentially affected sensitive receptors (schools, homes, waterbodies, etc.) and any significant exposure pathways (drinking water wells, recreational use of streams, vapor transport, etc.). Since the risk assessment is submitted in conjunction with the NAA plan that manages groundwater quality, the potential exposure pathway of constituents within the groundwater deserves special

management. The purpose of the qualitative risk assessment is to consider the risks posed by other potential exposure pathways, such as volatilization.

The qualitative risk assessment was accomplished in several steps. The contaminants addressed in the risk assessment were identified, then a site-specific exposure pathway was analyzed for each chemical. The intent of the pathway assessment was to determine whether other pathways, aside from groundwater, could pose a human health or environmental risk that would require management. The pathway analysis was performed consistent with ASTM Emergency Standard ES 38, Guide for Risk-Based Corrective Action at Petroleum Release Sites.

To manage the risks associated with a NAA, groundwater cleanup levels were determined for application at the containment monitoring location. The groundwater cleanup levels conform with the methodology prescribed by ASTM ES 38 and the Groundwater Amendment to the Water Quality Control Plan.

3.2.1 Selection of Constituents of Concern

The constituents of concern for NAA Unocal Service Station 6277 are total petroleum hydrocarbons calculated as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), plus tetrachloroethene (PCE), and trichloroethene (TCE). These constituents have been monitored and analyzed since 1989. The TPH-g and BTEX compounds are currently found in detectable levels in Monitoring Wells MW-1 through MW-5. The TCE and PCE are currently only found in detectable levels in Monitoring Well MW-1.

3.2.2 Risk Assessment: Exposure Pathway Analysis

Contamination at NAA Unocal Service Station 6277 has three possible source areas: (1) the former underground gasoline storage tanks, (2) the fuel lines and pump islands, and (3) the waste oil tank. Within these areas, contamination may have occurred during failure of either product and/or waste storage piping or overfilling of tanks. Therefore, soil and groundwater are the most likely impacted sources. The impacted soil should not be a significant pathway however, because it has been overexcavated and disposed of properly. The groundwater plume has been monitored and/or purged as was necessary, and there appears to be little groundwater transport and/or leaching. No drinking water or irrigation wells are located within the proposed NAA, however there are some wells within 0.5 miles of the site. Also, inhalation is not a significant pathway since the site is capped with cement and asphalt.

3.2.3 Water Quality Objectives for Containment Monitoring Locations

Water quality objectives for NAA Unocal Service Station 6277 are consistent with the State Board Resolution 88-63. For this site, water quality objectives for the containment monitoring locations are and will remain non-detectable for BTEX compounds, 100 ppb for TPH-g, and non-detectable levels for TCE and PCE (Table 3.1).

3.3 Management Measures for the NAA

- Property transaction disclosure
- Indemnification Agreements
- Site Operation, Maintenance, and Health and Safety Plans
- Utility Worker Notification

3.4 Commitment to Mitigating Measures

The Groundwater Basin Plan Amendment solicits a commitment to mitigating measures, such as participation in a regional groundwater monitoring or protection program. While this commitment is sought, there is not a need for this site to participate in a regional program because the program requirements have not yet been defined.

3.5 Compliance Monitoring Program

The intent of the compliance monitoring program is to demonstrate that water quality objectives are being achieved at the containment monitoring point. A monitoring program is presented in Table 3-2 and identifies the monitoring frequency and analytic parameters for the containment monitoring points. Monitoring Well MW-5 will be monitored and sampled annually for 3 years, all other monitoring wells will be dropped from the monitoring program. A new, off-site, compliance monitoring well (MW-7) is proposed further downgradient from the plume. This monitoring well would help delineate the plume's extent. Reports will be provided within 45 days of the monitoring and sampling day. The reports will include a table and summary of the analytical data and a discussion and/or evaluation of the water quality data.

3.6 Contingency Plan

Contingency plan activities would be invoked in the event that the water quality objectives were exceeded at the compliance monitoring location. If a significant increase was observed within the compliance monitoring program, the corresponding monitoring well would be sampled again. If the increase was validated, then the RWQCB and the LOP would be

notified. The response to excess hydrocarbon concentrations or halogenated volatile organics concentration in groundwater would be proportional to the increase. For example, if separate-phase hydrocarbons were discovered, a bailing program would be immediately initiated. Conversely, if the measured groundwater concentration is slightly above the water quality objective, increased frequency of groundwater monitoring could be recommended.

In the event of a validated increase, the RWQCB and the LOP would be notified in writing within 15 days of confirmation of data and provided with a corrective action plan within 60 days of confirmation.

Table 3-1
Groundwater Quality Goals for Containment Monitoring

Unocal Service Station 6277
15803 East 14th Street at 159th Street
San Leandro, California

Constituent	Numerical Limitation ($\mu\text{g/L}$)	Reference
BTEX	ND	Res 68-16
TPH-g	100	
Trichloroethene	ND	
Tetrachloroethene	ND	

- BTEX: Benzene, Toluene, Ethylbenzene, and Xylenes
- TPH-g: Total Petroleum Hydrocarbons Calculated as Gasoline
- ND: Non-Detectable Levels

Table 3-2
Compliance Monitoring Program

Unocal Service Station 6277
15803 East 14th Street at 159th Street
San Leandro, California

Monitoring Well Designation	Monitoring Frequency	Analytic Parameters (See Notes)	Comment
MW-5	Annually 3 years	BTEX, TPH-g, TCE, PCE	
Proposed MW-7	Quarterly 1 yr. Annually 2 yrs	BTEX, TPH-g, TCE, PCE	

Reference to Analytic Parameters:

- BTEX: Benzene, Toluene, Ethylbenzene, and Xylenes
- TPH-g: Total Petroleum Hydrocarbons Calculated as Gasoline
- TCE: Trichloroethene
- PCE: Tetrachloroethene

4.0 EVALUATION AS A CATEGORY 1 NON-ATTAINMENT AREA

RWQCB guidance is applied in this section to demonstrate the adequacy of the site characterization work and the completeness of the NAA Management Plan. The qualifying criteria for a Category 1 NAA appear in the Groundwater Basin Plan Amendment and the RWQCB Staff Guidelines. The Basin Plan Amendment provides both general requirements and specific criteria.

4.1 General Category 1 NAA Requirements

Within the introductory discussion for Category 1 NAA, two general conditions are established for consideration as a NAA. These general conditions are reiterated and the consistency of the site conditions at Unocal Service Station 6277 to these requirements are presented.

- *Site Investigations Have Been Conducted Pursuant to Resolution 92-49:* Based on PACIFIC's review of existing information on the site, the investigation was performed in a phased approach following the initial discovery of hydrocarbons in soil and/or groundwater. Work was performed pursuant to work plans that were submitted to the regulatory agencies, including the RWQCB. Reports submitted were signed (where appropriate) by qualified professionals.
- *Lateral and Vertical Definition of Soil and Groundwater Pollution Have Been Adequately Defined:* A review of existing soil and groundwater analytical data indicates that the impacted soil has been adequately defined, however the extent of the groundwater plume has not been identified. The hydrocarbon, TCE, and PCE concentrations in groundwater on-site are not high, thus a NAA is requested. The proposed new Monitoring Well MW-7 would help to further delineate the downgradient extent of the plume.

4.2 Specific Category 1 NAA Criteria

Four specific criteria must be adequately addressed for RWQCB consideration of Unocal Service Station 6277 as a NAA. While the Groundwater Basin Plan Amendments offer the

regulatory wording for these criteria, the RWQCB and LOPs have been provided additional guidance within a RWQCB staff memorandum from Steven Ritchie dated June 29, 1994. PACIFIC has evaluated the conditions at Unocal Service Station 6277 applying the staff guidelines. The summary of the evaluation is provided in the subsequent text and tables.

- *Criteria A: The discharger has demonstrated (e.g., pump tests, groundwater monitoring, transport modeling), and will verify (e.g., groundwater monitoring) that no significant pollutant migration will occur due to hydrogeologic or chemical characteristics.*

Based upon analysis of site conditions, no significant pollutant migration will occur due to hydrogeologic or chemical characteristics. This evaluation is presented within Table 4-1.

- *Criteria B: Adequate source removal and/or isolation is undertaken to limit future migration of pollutants to groundwater.*

Based upon evaluation of source removal activities, sufficient removal actions have been conducted to limit future migration of pollutants to groundwater. This evaluation is presented within Table 4-2 and Figure 7.

- *Criteria C: Dissolved-phase cleanup is not appropriate or cost effective due to limited water quality impacts or human health risks.*

Consideration of the feasibility of dissolved-phase cleanup at Unocal Service Station 6277 has been evaluated consistent with the RWQCB guidance, and has been found to not be cost effective, due to low concentrations of hydrocarbons, TCE, and PCE. This evaluation is presented within Table 4-3.

- *Criteria D: An acceptable plan is submitted for containing and managing the remaining human health and environmental risks, if any, posed by residual soil and groundwater pollution. This plan should include as assessment of human health and environmental risks; management measures (e.g. deed notification or restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility worker notice; etc.) contingency options and a commitment to mitigating measures such as participation in a regional groundwater monitoring or protection program.*

The Non-Attainment Area Management Plan presented in Section 3.0 of this document has been written to specifically satisfy these guidelines and satisfies the requirements. This evaluation is presented within Table 4-4.

Table 4-1
Evaluation of Criteria A for Category I Non-Attainment Areas

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Criteria A. The discharger has demonstrated (e.g., pump tests, groundwater monitoring, transport modeling), and will verify (e.g., groundwater monitoring) that no significant pollutant migration will occur due to hydrogeologic or chemical characteristics.

<i>RWQCB Guidance for Evaluation of Criteria A</i>	Evaluation of Guidance	Reference
<i>The pollution plume is slow-moving or stable due to low permeability geologic materials or such factors as adsorption and biodegradation.</i>	Analysis has been performed to demonstrate a stable to decreasing plume concentration.	Table 2-5 Figures 8 and 9
<i>No significant potential horizontal migration pathways exist.</i>	Site Hydrogeologic Conditions represent that no significant horizontal pathways exists.	Table 2-4
<i>The pollution plume shall be of limited horizontal extent [generally less than 500 feet] and limited to the upper water-bearing zones.</i>	Plume's extent will be defined by the proposed monitoring well, MW-7.	Figure 5
<i>No significant vertical conduits shall exist within the plume area or the area between the plume and the compliance points.</i>	There are no known vertical conduits within the site.	Table 2-4

Table 4-2
Evaluation of Criteria B for Category I Non-Attainment Areas

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Criteria B. Adequate source removal and/or isolation is undertaken to limit future migration of pollutants to groundwater.

<i>RWQCB Guidance for Evaluation of Criteria A</i>	Evaluation of Guidance	Reference
<i>Separate-phase hydrocarbons floating on the water table must be removed to the maximum extent feasible.</i>	There are no separate-phase hydrocarbons floating on the water table. No free product has been detected in any well to date.	8/3/94 MPDS
<i>For shallow water table conditions, highly polluted soils in the vadose zone and the capillary fringe should be removed or treated to the maximum extent feasible to minimize continued leaching to groundwater.</i>	All impacted soils have been removed from the area of source pollution and disposed of in the proper facility. Remaining soils have low or non-detectable levels of contamination.	8/3/94 MPDS
<i>For deeper groundwater conditions, hot spot or highly polluted soil removal or treatment shall be accomplished to the maximum extent feasible.</i>	NA	
<i>Vapor extraction and air sparging technology should be considered for source removal, as an alternative to soil removal, where soil conditions are appropriate.</i>	NA	

Table 4-2 (continued)
Evaluation of Criteria B for Category I Non-Attainment Areas

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

<i>RWQCB Guidance for Evaluation of Criteria A</i>	Evaluation of Guidance	Reference
<i>After highly polluted source areas are removed or treated, further pollutant removal shall be considered by the discharger based upon an analysis of the degree of cleanup required to prevent plume migration to the containment monitoring point(s) above the agreed upon level.</i>	Soil contamination at the site is at none or very low concentrations. Groundwater contamination is low so further action is not warranted.	8/3/94 MPDS
<i>Unsaturated zone pollutant removal or treatment must also be to level that adequately protects public health.</i>	All impacted soils have been removed from the area of source pollution and disposed of in the proper facility. Remaining soils have low or no concentration levels of contamination.	8/3/94 MPDS
<i>Capping, slurry walls, or other engineered methods may be proposed by the discharger to isolate the pollution and limit migration. A demonstration of effectiveness must be submitted.</i>	Pollution seems to be isolated. Capping, slurry walls, or other engineered methods are not necessary to isolate contaminant migration.	8/3/94 MPDS

Table 4-3
Evaluation of Criteria C for Category I Non-Attainment Areas

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Criteria C. Dissolved-phase cleanup is not appropriate or cost effective due to limited water quality impacts or human health risks.

<i>RWQCB Guidance for Evaluation of Criteria A</i>	Evaluation of Guidance	Reference
<i>“Do the limited benefits justify the likely cost and time of cleanup.” It may be cost effective in some cases to apply short-term dissolved cleanup measures to achieve a significant reduction in maximum residual concentrations.</i>	Concentrations at the site are low, thus further cleanup would not be cost effective.	8/3/94 MPDS
<i>The discharger shall provide qualitative risk and impact information including the type of factors contained in the discussion under the heading <u>Category I.</u></i>	A qualitative risk assessment has been performed consistent with this guidance.	Section 3.2 Figure 7

Table 4-4
Evaluation of Criteria D for Category I Non-Attainment Areas

Unocal Service Station 6277
 15803 East 14th Street at 159th Street
 San Leandro, California

Criteria D. An acceptable plan is submitted for containing and managing the remaining human health and environmental risks, if any, posed by residual soil and groundwater pollution. This plan should include as assessment of human health and environmental risks; management measures (e.g. deed notification or restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility worker notice; etc.) contingency options and a commitment to mitigating measures such as participation in a regional groundwater monitoring or protection program.

<i>RWQCB Guidance for Evaluation of Criteria A</i>	<i>Evaluation of Guidance</i>	<i>Reference</i>
<i>The plan must contain information on site-specific conditions such as the current and anticipated land and water uses and the type of activity at the site and surrounding area.</i>	This information is addressed in the Site Characterization Summary.	Table 2-1
<i>The term "assessment of human health and environmental risks" means a qualitative assessment for most sites.</i>	A qualitative risk assessment has been performed consistent with this guidance.	Section 3.2
<i>The management measures should be selected to match the appropriate site-specific conditions.</i>	Management measures were selected based upon site-specific conditions analyzed within the qualitative risk assessment.	Section 3.2
<i>For areas zoned commercial or industrial with numerous contributing sources, an acceptable plan may consider containing the residual groundwater pollution at the perimeter of the area in accordance with this policy.</i>	Not applicable to this site.	

But, as plume migrating off-site

Table 4-4 (continued)
Evaluation of Criteria D for Category I Non-Attain

Unocal Service Station 6277
15803 East 14th Street at 159th Street
San Leandro, California

<i>RWQCB Guidance for Evaluation of Criteria A</i>	<i>Evaluation of Guidance</i>	<i>Reference</i>
<i>Management measures and mitigation for plume areas that cross property boundaries will require a more detailed evaluation by the discharger and shall involve notification and participation by all affected property owners.</i>	Not Applicable to this site.	
<i>The plan will include a compliance monitoring program. Based upon a demonstration of stable or decreasing trends in plume chemical concentration, the Board will review requests to discontinue compliance monitoring after 5 years of data, or less depending upon the site-specific conditions.</i>	A compliance monitoring program is included.	Section 3.2

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the evaluation performed in Section 4.0, the Unocal Service Station 6277 adequately satisfies the requirements to be designated a Category 1 NAA. Upon acceptance of this NAA application, Unocal would implement the NAA Management Plan described in Section 3.0. Beyond fulfilling the activities described in the Management Plan, Unocal requests the issuance of a NFA letter that would identify no further requirements at the site beyond those identified within the management plan. Unocal further requests that the modifications to the current groundwater monitoring program be approved to reflect the water quality objectives and containment monitoring program as described on Tables 3-1 and 3-2.

REFERENCES

- Alameda County Health Care Services Agency. *Notice of Requirement to Reimburse*. March 10, 1992.
- Alameda County Health Care Services Agency. *1,2-DCA Concentrations in Wells Located at 1935 Washington Ave., San Leandro*. July 6, 1994.
- Kaprealian Engineering Incorporated. *Continuing Soil and Ground Water Investigation and Quarterly Report*. May 10, 1993.
- Kaprealian Engineering Incorporated. *Drilling Permit Report*. May 17, 1991.
- Kaprealian Engineering Incorporated. *Quarterly Summary Report*. August 3, 1994.
- Kaprealian Engineering Incorporated. *Soil Sampling Report for Unocal SS #6277*. March 27, 1989.
- Kaprealian Engineering Incorporated. *Unocal Service Station #6277*. May 25, 1993.
- Kaprealian Engineering Incorporated. *Unocal Service Station #6277*. June 17, 1992.
- Kaprealian Engineering Incorporated. *Work Plan / Proposal*. July 23, 1991.
- MPDS Services, Incorporated. *Quarterly Data Report*. February 7, 1994.
- MPDS Services, Incorporated. *Quarterly Data Report*. August 3, 1994.

NAAP SUMMARY SHEET:

- **Site:** 6277
- **Client:** Unocal
- **LOP:** Alameda County Health Department
- **Job Number:** 310.085.3a
- **City:** San Leandro

Figure 8
 Summary Plot of Groundwater Elevation vs.
 Groundwater Benzene Concentrations

Unocal Service Station 6277
 15803 East 145th Street at 159th Avenue
 San Leandro, California

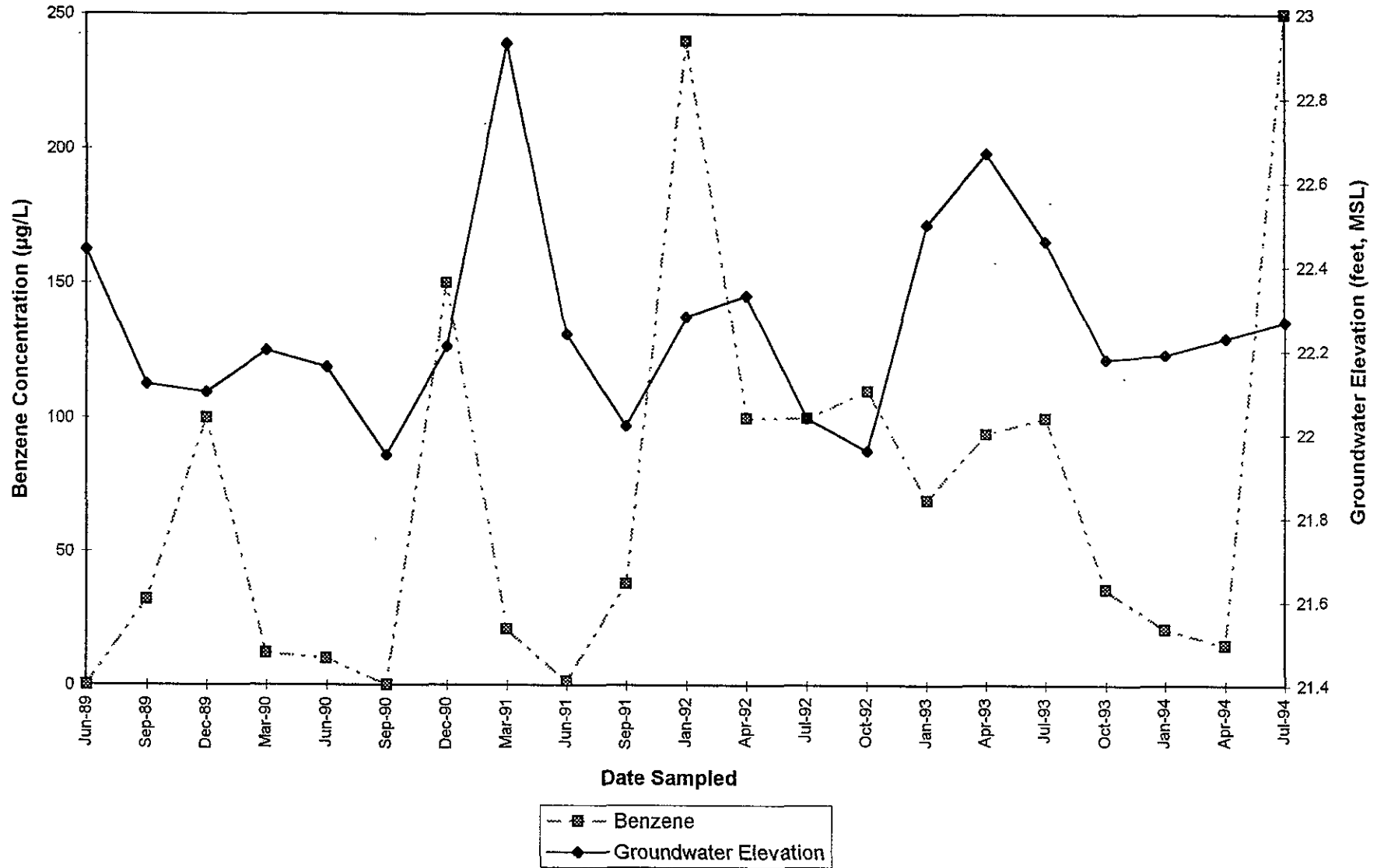
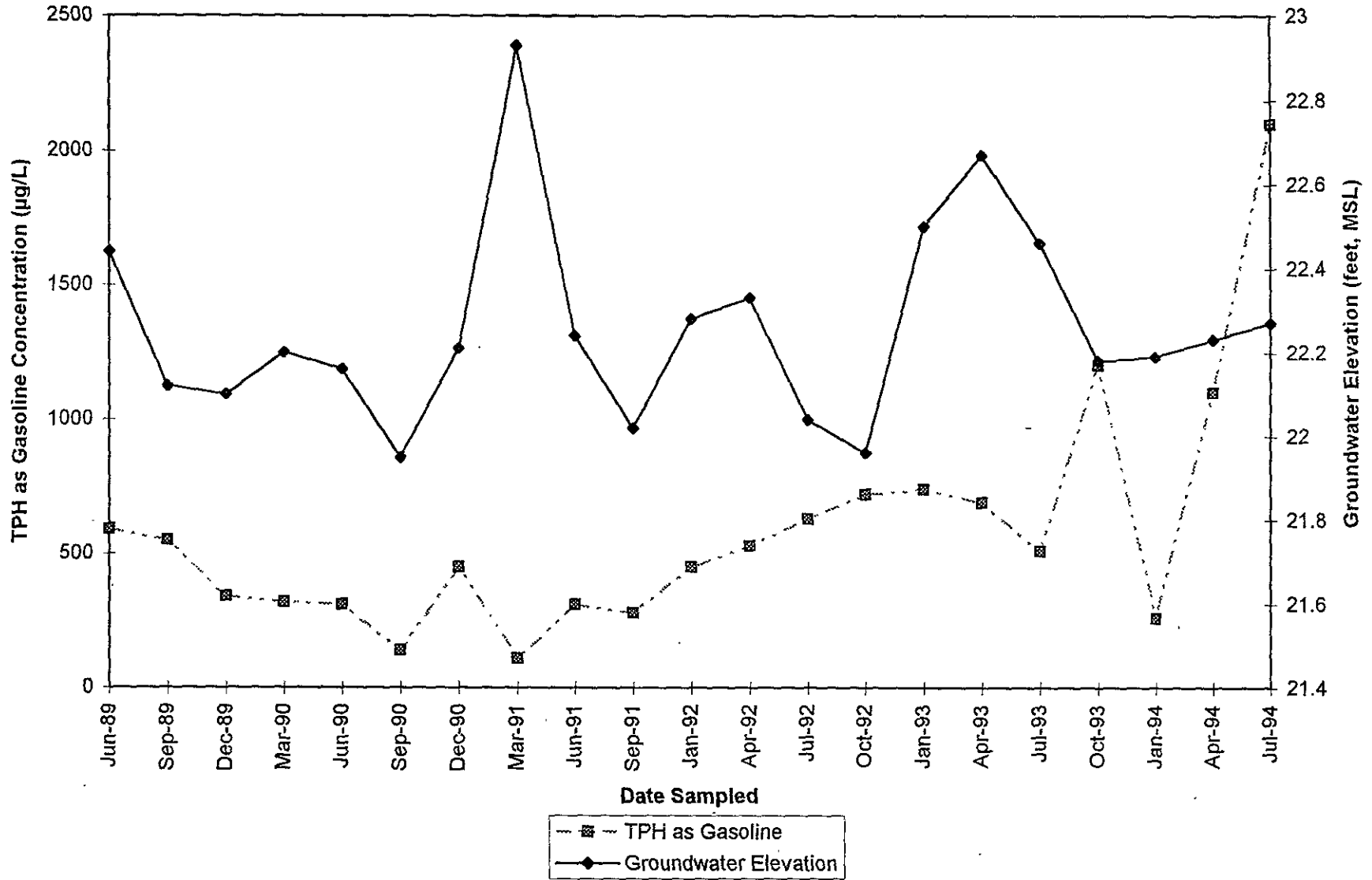
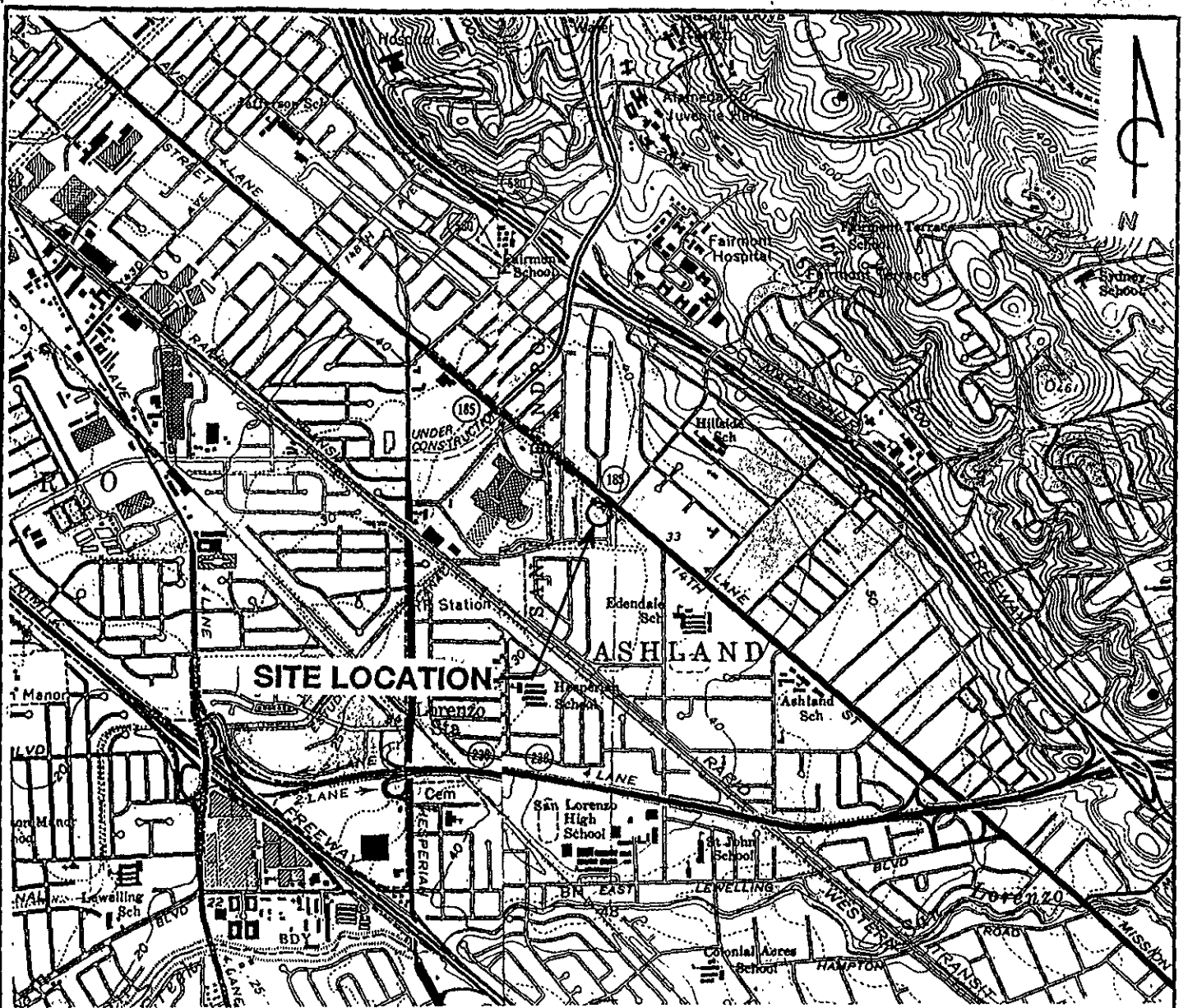


Figure 9
**Summary Plot of Groundwater Elevation vs.
 Groundwater TPH as Gasoline Concentrations**

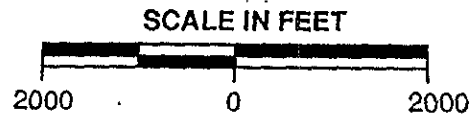
Unocal Service Station 6277
 15803 East 14th Street at 159th Avenue,
 San Leandro, California





QUADRANGLE
LOCATION

REFERENCES:
 USGS 7.5 MIN. TOPOGRAPHIC MAP
 TITLED: SAN LEANDRO, CALIFORNIA
 DATED: 1959 REVISIED: 1980
 TITLED: HAYWARD, CALIFORNIA
 DATED: 1959 REVISIED: 1980



PACIFIC
ENVIRONMENTAL
GROUP, INC.

UNOCAL SERVICE STATION 6277
 15803 East 14th Street at 159th Avenue
 San Leandro, California

SITE LOCATION MAP

FIGURE:
1
PROJECT:
310-085.3A



EXISTING APARTMENT BUILDING

CARPORT

CARPORT

EXISTING UNDERGROUND FUEL STORAGE TANK COMPLEX

MW-5

LEGEND

MW-1 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

MW-6

MW-2A

MW-1

FORMER UNDERGROUND FUEL STORAGE TANKS

PRODUCT ISLANDS

STATION BUILDING

EXISTING APARTMENT BUILDING

CARPORT

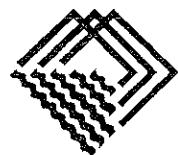
MW-3

MW-4

EAST 14TH STREET

159TH AVENUE

CARPORT



PACIFIC ENVIRONMENTAL GROUP, INC.

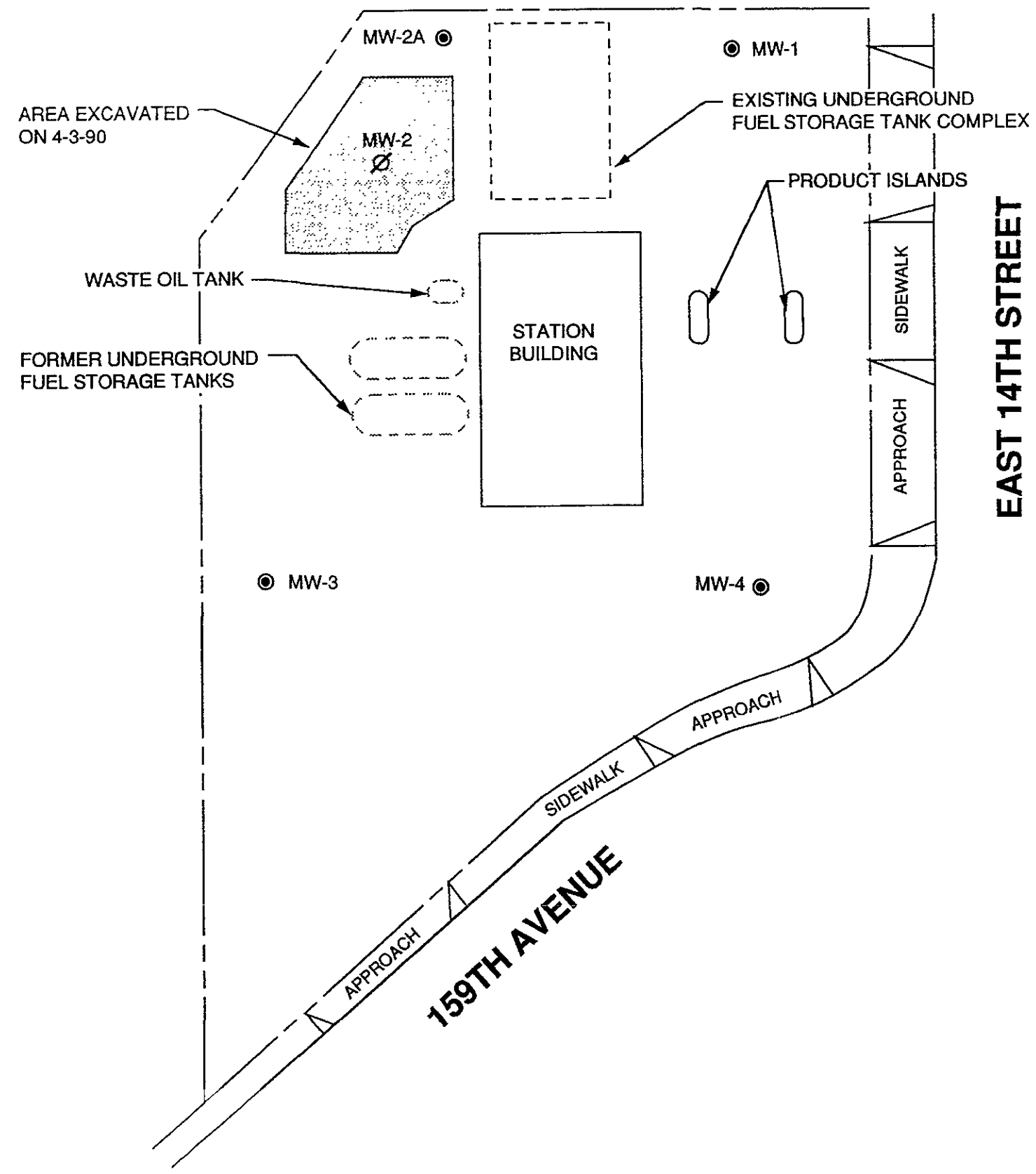
SCALE



UNOCAL SERVICE STATION 6277
15803 East 14th Street at 159th Avenue
San Leandro, California

EXTENDED SITE MAP

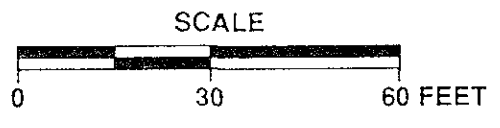
FIGURE 2
PROJECT 310-085 3A



- LEGEND**
- MW-1 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
 - MW-2 ∅ DESTROYED WELL LOCATION AND DESIGNATION



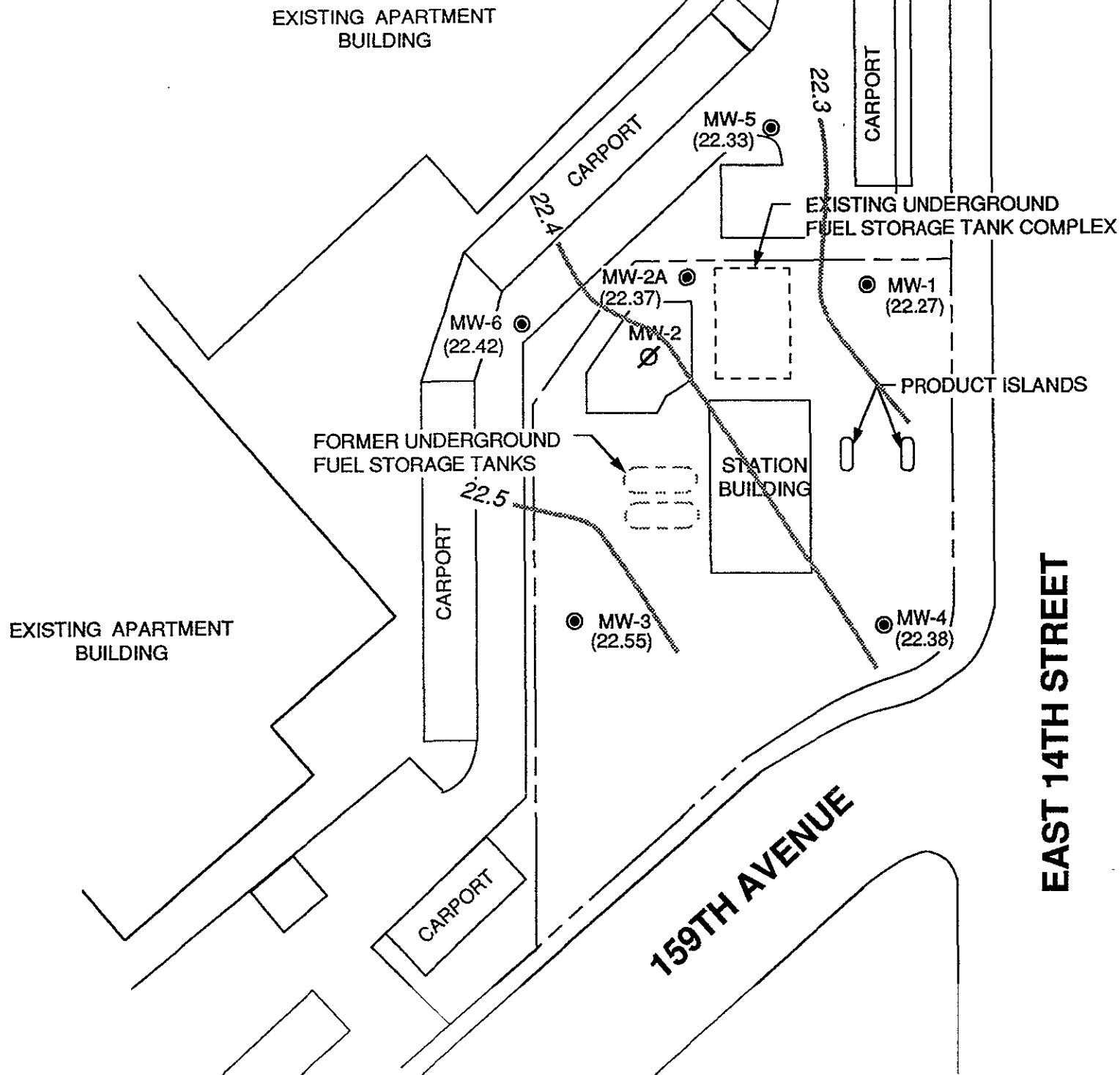
PACIFIC ENVIRONMENTAL GROUP, INC.



UNOCAL SERVICE STATION 6277
15803 East 14th Street at 159th Avenue
San Leandro, California

SITE MAP

FIGURE:
3
PROJECT
310-085.3A



LEGEND

- MW-1 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-2 ∅ DESTROYED WELL LOCATION AND DESIGNATION
- (22.55) GROUNDWATER ELEVATION IN FEET - MSL, 7-7-94
- 22.5 — GROUNDWATER ELEVATION CONTOUR IN FEET - MSL, 7-7-94

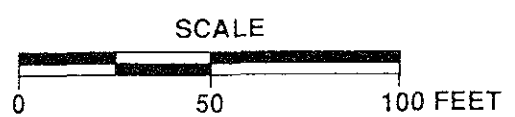


APPROXIMATE DIRECTION OF GROUNDWATER FLOW

APPROXIMATE GRADIENT = 0.002



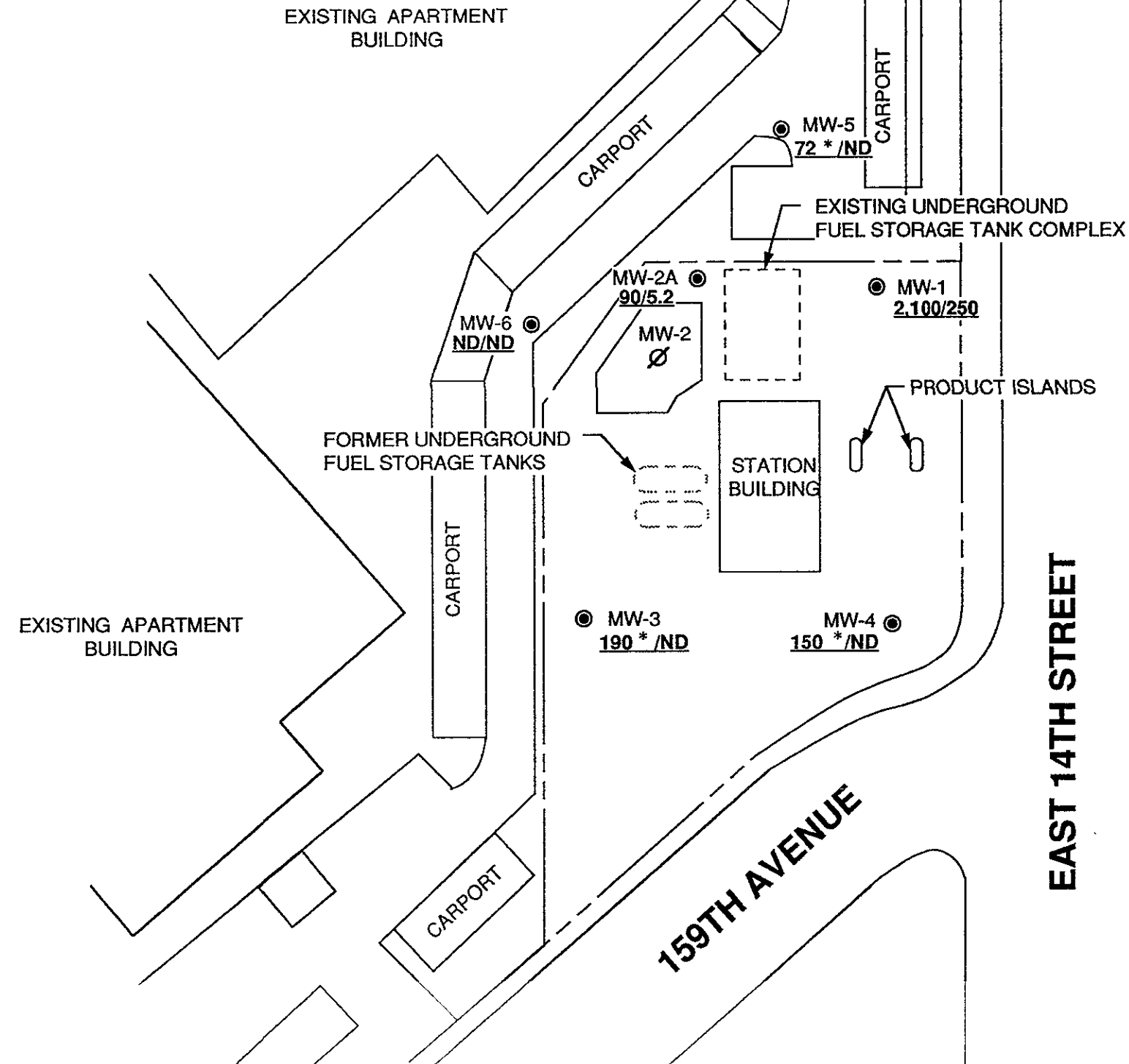
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UNOCAL SERVICE STATION 6277
15803 East 14th Street at 159th Avenue
San Leandro, California

GROUNDWATER ELEVATION CONTOUR MAP

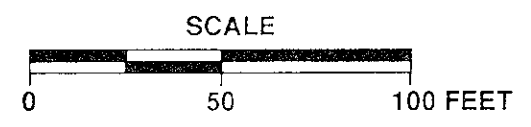
FIGURE. 4
PROJECT: 310-085 3A



- LEGEND**
- MW-1 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
 - MW-2 Ø DESTROYED WELL LOCATION AND DESIGNATION
 - 90/5.2 TPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 7-7-94
 - ND NOT DETECTED
 - * THE LAB REPORTED THAT THE HYDROCARBONS DETECTED DID NOT APPEAR TO BE GASOLINE



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UNOCAL SERVICE STATION 6277
15803 East 14th Street at 159th Avenue
San Leandro, California

DISSOLVED CONTAMINANT MAP

FIGURE 5
PROJECT 310-085.3A



TT

T

EXISTING APARTMENT BUILDING

EXISTING APARTMENT BUILDING

EXISTING APARTMENT BUILDING

CARPORIT

CARPORIT

CARPORIT

CARPORIT

FORMER UNDERGROUND FUEL STORAGE TANKS

EXISTING UNDERGROUND FUEL STORAGE TANK COMPLEX

MW-2A

MW-2

MW-6

STATION BUILDING

PRODUCT ISLANDS

MW-3

MW-4

* MW-5

MW-7 *

NON-ATTAINMENT AREA

EAST 14TH STREET

159TH AVENUE

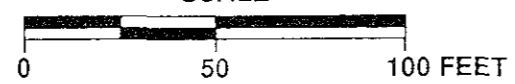
LEGEND

- MW-1 ● GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-2 ∅ DESTROYED WELL LOCATION AND DESIGNATION
- MW-7 ⊕ PROPOSED GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- * CONTAINMENT MONITORING WELL LOCATION



PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE

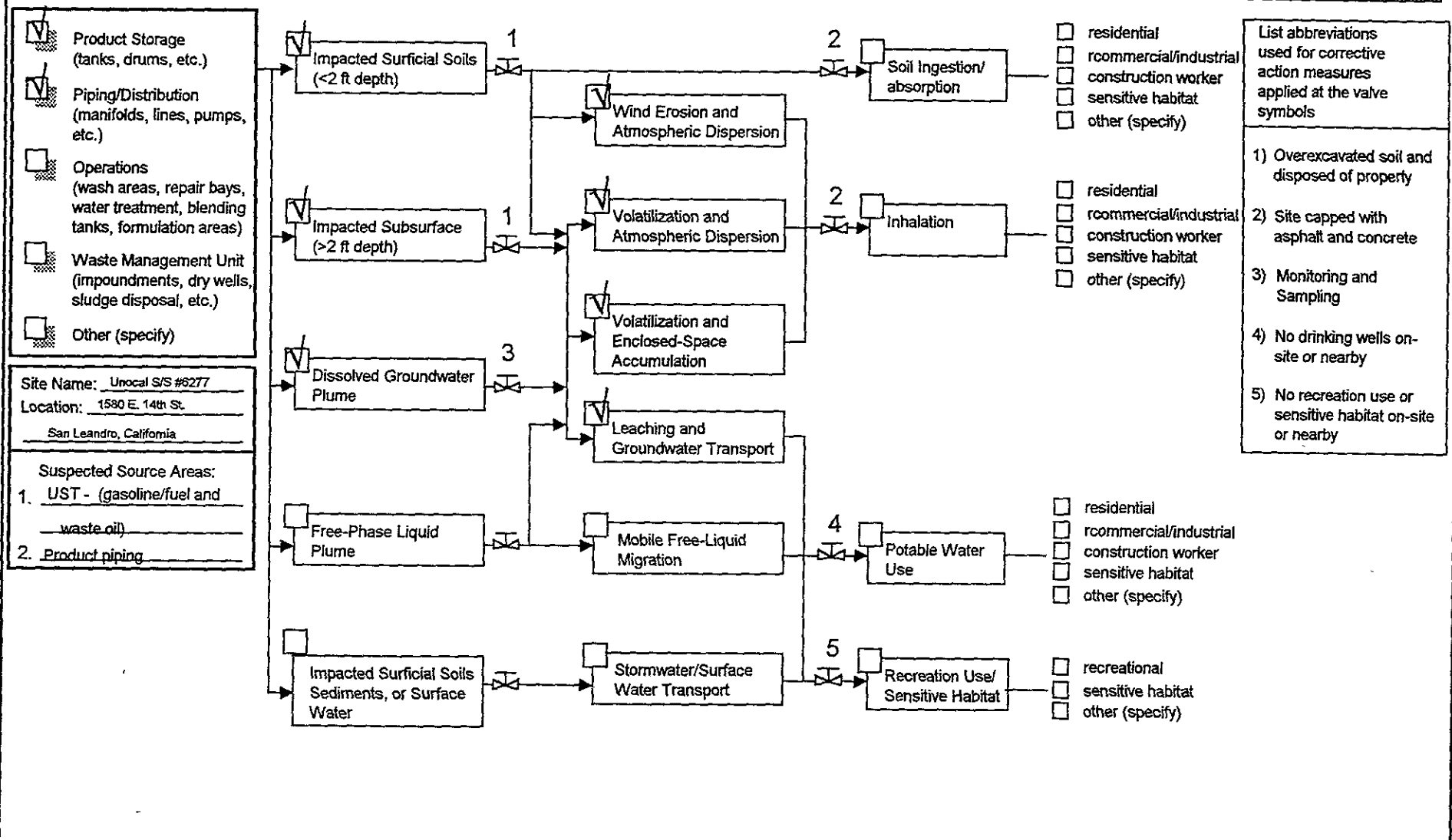


UNOCAL SERVICE STATION 6277
15803 East 14th Street at 159th Avenue
San Leandro, California

NON ATTAINMENT AREA AND CONTAINMENT MONITORING LOCATIONS

FIGURE
6
PROJECT.
310-085.3A

Primary Sources	Secondary Sources	Transport Mechanisms	Exposure Pathways	Receptor Characterization	Corrective Action Options
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Step 1: Characterize Site Sources and Exposure Pathways - complete Tier 1 worksheets - check applicable boxes for sources, release mechanisms, and actual or imminent exposure pathways <input checked="" type="checkbox"/>	Step 2: Identify Receptors, Compare Site Conditions with Tier 1 Levels - identify receptors - check applicable boxes for potential receptors and RBSL value(s) exceeded <input checked="" type="checkbox"/>	Step 3: Identify Potential Corrective Measures - complete Tier 1 Summary Report - fill in exposure pathway shut-off valves, <input type="checkbox"/> record the abbreviation for the corrective measure above the valve, and record the abbreviation on the right-hand-side table
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3100853A IE VALFLOW_VSD

Figure 8: Summary Plot of Groundwater Elevation vs. Groundwater Benzene Concentrations at Site 6277, MW-1

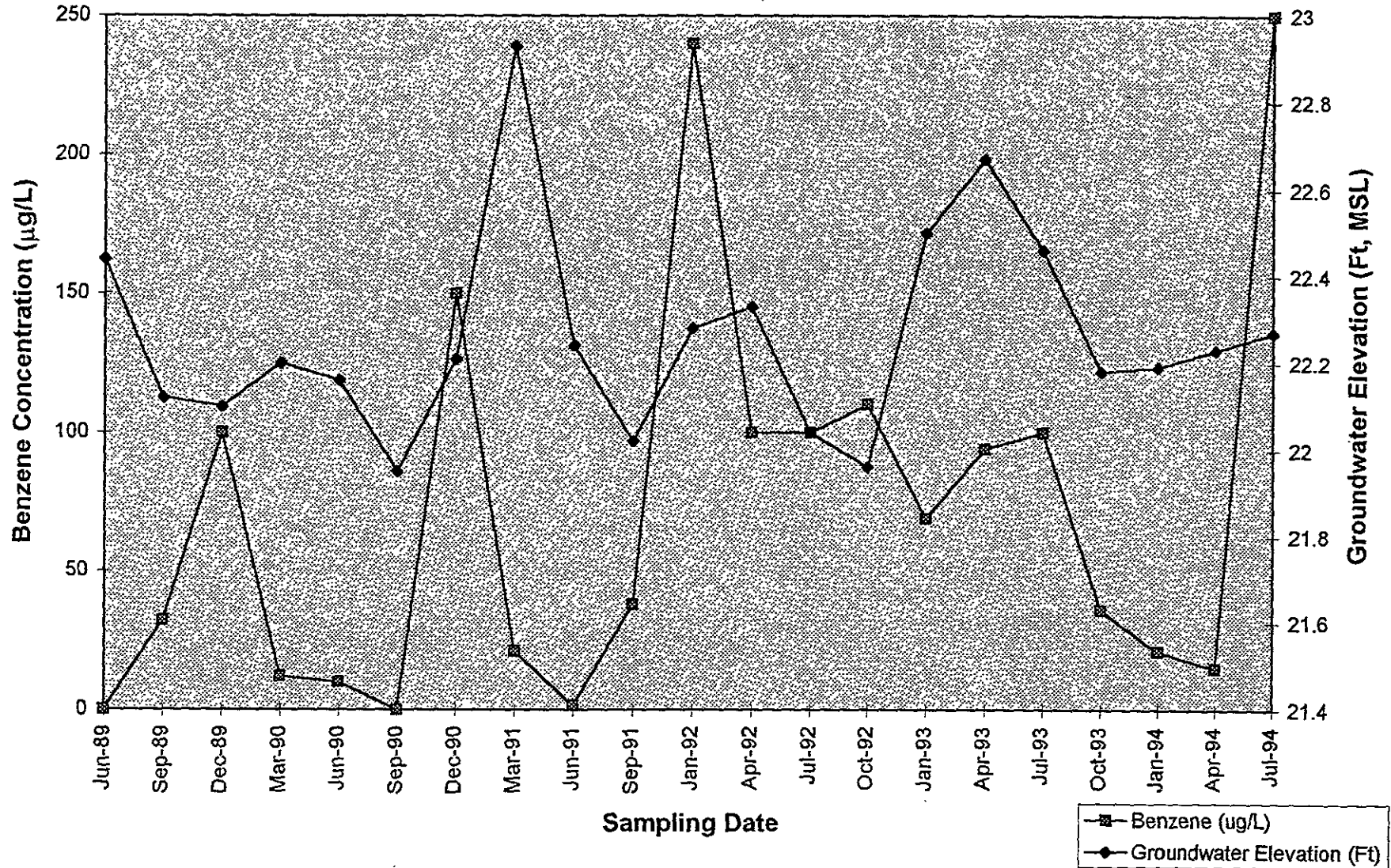


Figure 9: Summary Plot of Groundwater Elevation vs. Groundwater TPH-Gas Concentrations at Site 6277, MW-1

