PACIFIC
ENVIRONMENTAL
GROUP, INC.

Non-Attainment Area Management Plan

Site 6277
San Leandro, California

Key revision:
① proposal for additional well downgradient of MW-1

Prepared for

Unocal

November 7, 1994

Prepared by

Pacific Environmental Group, Inc.
2025 Gateway Place, Suite 440
San Jose, California 95110

Project 310-0853A

(v I.1)

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PROFESSIONAL CERTIFICATION
Non-Attainment Area Management Plan

Site 6277
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 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 Senior Geologist whose seal and signature appears hereon.

Erin Garner
Senior Geologist
RG 4750

1. INTRODUCTION

Unocal is submitting this Non-Attainment Area (NAA) Plan for implementation at the Site 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 RWQCB and the LOP, Unocal requests issuance of a no further action letter [NFA] 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 and land use restriction such that natural processes are allowed to restore groundwater over the long term.

This document is composed of five parts with appendices. Following is a brief description of each part.

- Part 1 is an introduction.
- Part 2 of this NAA plan is a summary of site characterization data accomplished through the use of pre-formatted tables and figures..
- Part 3 is an description of the NAA plan for the site. This description identifies the NAA, the containment monitoring locations, risk management measures to protect human health and the environment, and the compliance monitoring program. This part incorporates a qualitative risk assessment of the NAA. The qualitative risk assessment delineates the critical exposure pathways and receptors. Based upon the selection of the critical exposure pathway and receptor, the most sensitive beneficial use of the groundwater is selected, and clean-up levels for groundwater are determined to protect the beneficial use.

- Part 4 is an evaluation of the NAA plan to demonstrate the completeness of the site characterization and the NAA plan measures for the protection of human health and the environment. This evaluation is facilitated by utilization of RWQCB staff guideline for interpretation of the Groundwater Basin Plan Amendment for NAA.
- Part 5 offers conclusions and recommendations for consideration of the site as a NAA.

The document is completed by incorporating a summary of references and relevant appendices.

2. SITE CHARACTERIZATION DATA

This part of the NAA Plan for Site 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 NAA at this site. The site characterization data has been summarized in a pre-formatted tabular format consistent with the guidance within ASTM ES 38. Where appropriate, such for appending groundwater and soil analytical data, appendices have been incorporated. A brief forecast of the contents of each table is summarized below:

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

Table 2-1
Site Description

Site 6277
San Leandro, California

Information Requirement	Discussion	Reference
Site Address	1580 East 14th Street, San Leandro, California	3Q94 Report, MPDS
Site Owner/Contact	Unocal Corporation / Mr. David Camille Property Owner: Mathew Coelho	3Q94 Report, MPDS 3Q94 Letter, KEI
Agency Contacts	Alameda County Health Care Services: Mr. Scott Seery RWQCB: Mr. Kevin Graves	3Q94 Letter, KEI 5/17/91 Letter, KEI 7/6/94 Letter, ACHCS 2Q93 Letter, KEI 1Q92 Letter, 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 Report, KEI
Topography	Site slopes gently southwesterly. The site is approximately three miles northeast of the San Francisco Bay shoreline.	7/23/91 Report, KEI
Surface Water Characterization	Pacific Environmental Group, Inc. knows of no known surface water on the site. Estudillo Canal located 500 feet west of site	
Climatic	Climatic conditions are presently unknown to Pacific Environmental Group, Inc..	

Table 2-2
Site Ownership & Activity Record

Site 6277
San Leandro, California

Information Requirement	Discussion	Reference
Past Production And Materials Handling Activities	No known production of useable materials. Waste oil produced by service station activities was stored in a waste oil tank. Gasoline products were stored in underground fuel storage tanks. The site is presently used as a Unocal service station.	3Q94 Report, MPDS
Waste Disposal Practices	Waste oil was put into a waste oil tank until it was removed in 3/89. Other waste disposal practices are presently unknown to Pacific Environmental Group, Inc..	3Q94 Report, MPDS
Chemicals Used	Chemicals used are unknown to Pacific Environmental Group, Inc..	
Site Ownership	Unocal Corporation	3Q94 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 Report, KEI
Potential Off-site Sources	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-Gas concentrations were found as high as 280 ppb, TPH-Diesel concentrations were found as high as 1,100 ppb, and benzene concentrations were less than 0.5 ppb.	5/10/93 Report, KEI
	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-Gas concentrations up to 9,760 ppb.	5/10/93 Report, KEI
	A former Richfield service station located to the east of the site where a SpeeDee oil change shop is now located.	5/10/93 Report, KEI
	A former auto wrecking yard lies approximately 500 feet southeast of the site.	5/10/93 Report, KEI
	Another former auto wrecking yard lies behind the former ABC auto repair shop.	5/10/93 Report, KEI
	Chlorinated solvents have consistently been found in upgradient wells MW3 and MW4. The source is unidentified or possibly a reported regional chlorinated solvent contamination plume.	5/10/93 Report, KEI

potential sources identified ?

Table 2-3
Summary of Current & Completed Site Activities

Site 6277
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, MW2 was destroyed and replaced with MW2A. All wells are sampled quarterly.	3Q94 Report, 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 to 280 ppm total oil and grease.	5/10/93 Report, 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-Gas values from24 to 150 ppm.	5/10/93 Report, 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 Well MW2 was overexcavated to a depth of 12 feet below grade in 4/90.	3Q94 Report, MPDS

Table 2-4
Hydrogeologic Conditions

Site 6277
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 Report, 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 MW5 and 10 to 13 feet and 20 feet (') below grade in MW6.	5/10/93 Report, KEI
Vadose Zone Thickness And Geology	The vadose zone thickness ranges from 0' to 6.4' below ground surface. The geology consists of the materials as described above.	5/10/93 Report, KEI
Depth To Groundwater	Depth to groundwater ranges from 6.42' to 11.16' below ground surface.	3Q94 Report, MPDS
Thickness Of Aquifer	The aquifer is at least 6.42' below ground surface deep. Its total vertical extent is presently unknown	3Q94 Report, MPDS
Maximum Well Yield	The maxiumum well yield is 25.20 feet below ground surface at monitoring well MW2A.	3Q94 Report, MPDS
Flow Direction And Gradient	Groundwater flow direction is northerly with a gradient of 0.002.	3Q94 Report, MPDS
Description Of Any Confining Units	An alluvium layer consisting of clay was found from approximately 6.5' to 17' below grade.	5/10/93 Report, KEI
Current Groundwater Quality (TDS)	The current groundwater quality is presently unknown to Pacific Environmental Group, Inc..	

* need

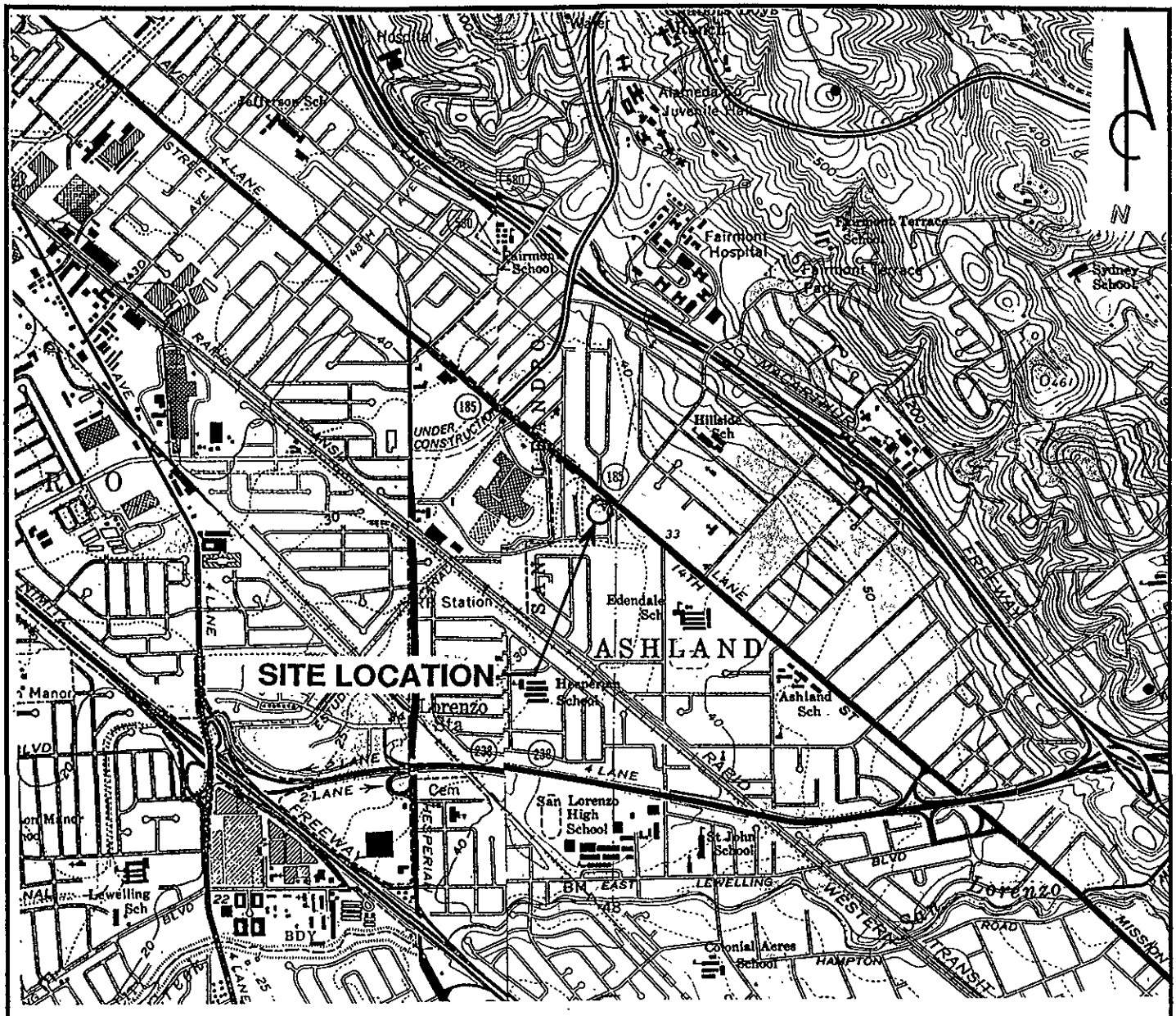
* need to note variations

Table 2-5
Analytic Summary Sheets

Site 6277
San Leandro, California

Information Requirement	Media (Soil/ Groundwater)	Compounds Detected					
		Benzene	Toluene	Xylenes	Ethylbenzene	TPH-Gas	Other: None
Analytic Method Used	Soil	EPA Method 8015 Mod/8020	EPA Method 8015 Mod/8020	EPA Method 8015 Mod/8020	EPA Method 8015 Mod/8020	EPA Method 8015 Mod/8020	N/A
	Groundwater	EPA Method 5030/8015/8020	EPA Method 5030/8015/8020	EPA Method 5030/8015/8020	EPA Method 5030/8015/8020	EPA Method 5030/8015/8020	N/A
Practical Quantification Limit	Soil	0.005 ppm (mg/kg)	0.005 ppm (mg/kg)	0.005 ppm (mg/kg)	0.005 ppm (mg/kg)	1.0 ppm (mg/kg)	N/A
	Groundwater	0.5 ug/L	0.5 ug/L	0.5 ug/L	0.5 ug/L	50 ug/L	N/A
Number of Samples Analyzed	Soil	11	11	11	11	11	N/A
	Groundwater	6	6	6	6	6	N/A
Summary of analytic data Identify Boring, Depth (if applicable), Concentration, and Date	Soil: Maximum Residual:	40 ppm Boring: SW2 Depth: 10' Date: 3/14/89	43 ppm Boring: SW11A Depth: 10.5' Date: 4/3/90	230 ppm Boring: SW11A Depth: 10.5' Date: 4/3/90	37 ppm Boring: SW11A Depth: 10.5' Date: 4/3/90	1,100 ppm Boring: SW11A Depth: 10.5' Date: 4/3/90	N/A
	Groundwater (Maximum)	250 ug/L Well: MW1 Date: 7/7/94	17 ug/L Well: MW1 Date: 9/13/89	200 ug/L Well: MW1 Date: 7/7/94	57 ug/L Well: MW1 Date: 7/7/94	2,100 ug/L Well: MW1 Date: 7/7/94	N/A
	Groundwater (Current)	250 ug/L Well: MW1 Date: 7/7/94	None Detected Well: All Date: 5/27/94	200 ug/L Well: MW1 Date: 7/7/94	57 ug/L Well: MW1 Date: 7/7/94	2,100 ug/L Well: MW1 Date: 7/7/94	N/A
	Groundwater (Minimum)	None Detected Date: 7/7/94	None Detected Date: 7/7/94	None Detected Date: 7/7/94	None Detected Date: 7/7/94	None Detected Date: 7/7/94	N/A
Background Concentrations	Presently Unknown	Presently Unknown	Presently Unknown	Presently Unknown	Presently Unknown	Presently Unknown	N/A
Trend	Groundwater	Stable	Decreasing	Stable	stable	Stable	N/A

Para TCE, etc



QUADRANGLE LOCATION

REFERENCES:

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

SCALE IN FEET

2000 0 2000

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

Figure 2-1
Site Location Map

Site 6277
San Leandro, California

HOLD FOR FIGURE

Figure 2-2
Extended Site Map

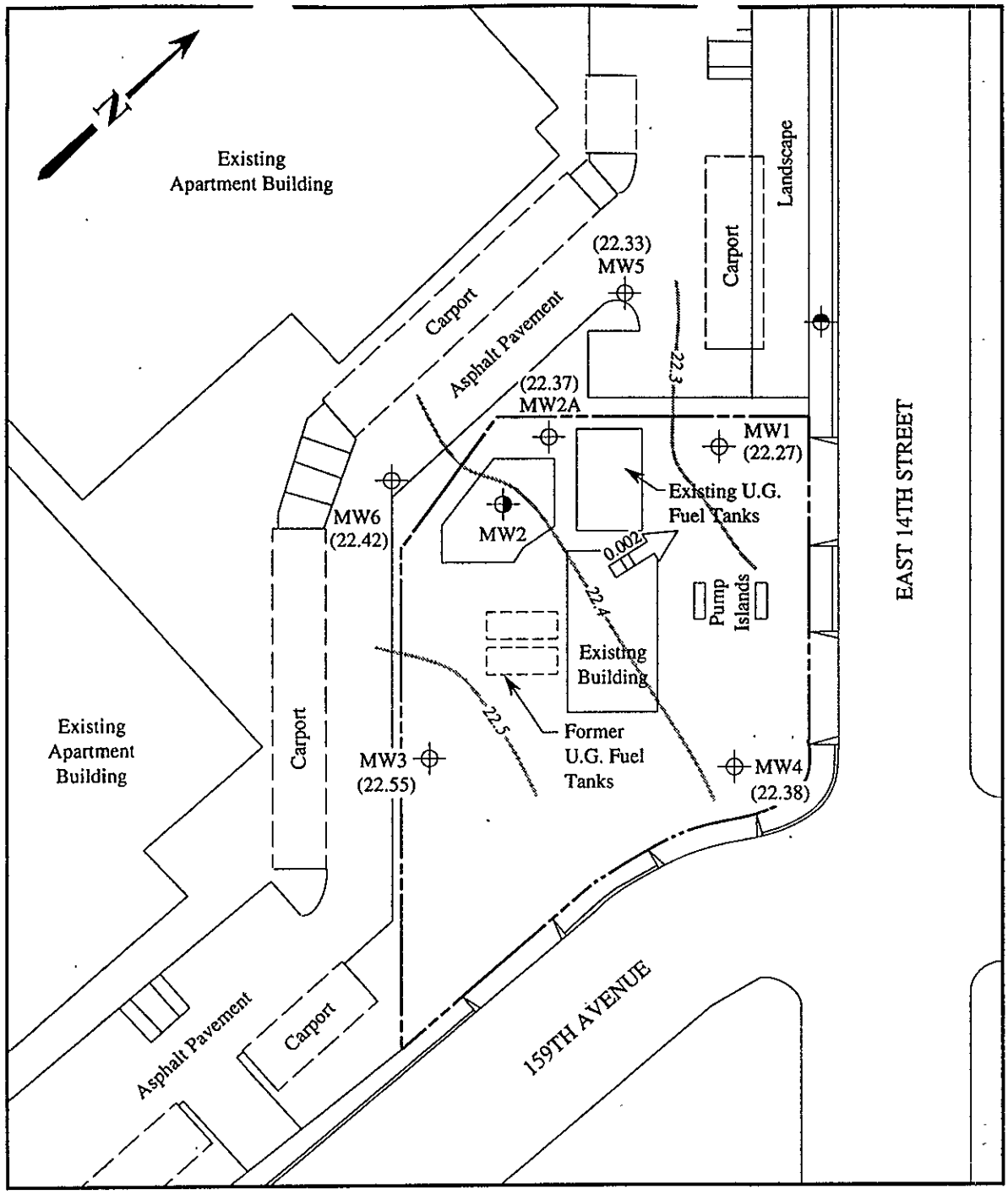
Site 6277
San Leandro, California

HOLD FOR FIGURE

Figure 2-3
Site Plan View

Site 6277
San Leandro, California

HOLD FOR FIGURE



LEGEND

- Monitoring well (existing)
- Monitoring well (previously attempted)
- Monitoring well (destroyed February1, 1990)
- ( ) Ground water elevation in feet above Mean Sea Level
- #.## Direction of ground water flow with approximate hydraulic gradient
- Contours of ground water elevation

0 60 120

Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE JULY 7, 1994 MONITORING EVENT

mpds SERVICES, INCORPORATED

UNOCAL SERVICE STATION #6277
15803 E. 14TH STREET
SAN LEANDRO, CALIFORNIA

FIGURE
1

Figure 2-4
Groundwater Elevation Map

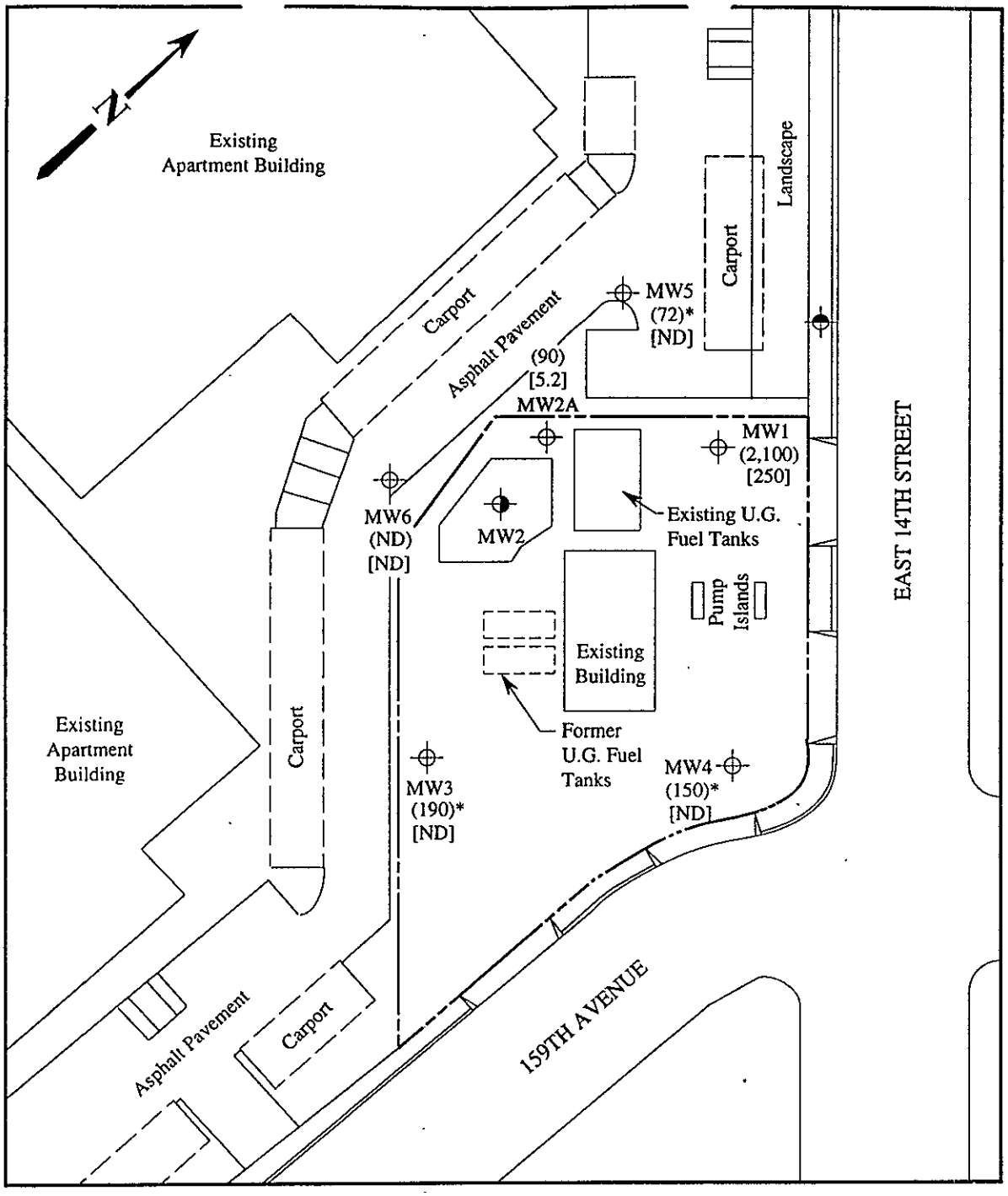
Site 6277
San Leandro, California

HOLD FOR FIGURE

Figure 2-5
Geologic Cross-Section

Site 6277
San Leandro, California

HOLD FOR FIGURE



LEGEND

- Monitoring well (existing)
- Monitoring well (previously attempted)
- Monitoring well (destroyed February 1, 1990)
- ( ) Concentration of TPH as gasoline in µg/L
- [ ] Concentration of benzene in µg/L

ND = Non-detectable

* The lab reported that the hydrocarbons detected did not appear to be gasoline.

Show location of former waste oil tank. (removed in 1989)

0 60 120

Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON JULY 7, 1994

mpds SERVICES, INCORPORATED

UNOCAL SERVICE STATION #6277
15803 E. 14TH STREET
SAN LEANDRO, CALIFORNIA

FIGURE
2

Figure 2-6
Dissolved Contaminant Plume Map

Site 6277
San Leandro, California

HOLD FOR FIGURE

3. NON-ATTAINMENT AREA MANAGEMENT PLAN

This part provides the description of the NAA, the management measures for residual environmental and human health risks, the containment monitoring program, and the contingency measures. The part begins with a description of 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. 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 soils and saturated groundwater regime. The downgradient extent of the NAA is bounded by containment monitoring points.

For Site 6277, the NAA coincides with the property boundary to the east and west, wells MW-3 and MW-4 to the southeast, and extending onto East 14 th street to the north. The NAA is represented on Figure 3-1.

The containment monitoring points for Site 6277 coincide with the downgradient extent of the NAA. The containment monitoring points are existing monitoring wells MW5, MW6 and proposed Well MW-7. The wells are represented on Figure 3-1.

3.2 Assessment Of Human Health And Environmental Risks

The goal of this risk assessment process is to qualitatively assess the current and potential human health and environmental impacts of the proposed NAA for Site 6277. The intent is to identify obvious environmental impacts (if any), potentially affected sensitive receptors (schools, homes, waterbodies, etc.), and significant exposure pathways (drinking water wells, recreation use of streams, vapor transport, etc.). Given that this risk assessment is submitted

in conjunction with the NAA plan that manages groundwater quality, this potential exposure pathway of constituents within the groundwater system deserves special management. This qualitative risk assessment intent is to consider risk posed by other potential exposure pathways, such as volatilization.

This qualitative risk assessment is accomplished by in several steps. First, we establish the constituents of concern, those constituents where the risks will be the subject of the risk assessment. For the constituents of concern, a site specific exposure pathway assessment is performed. The intent of the pathway assessment is to determine whether other pathways aside from the groundwater pathway pose a human or environmental health risk requiring management. The pathway analysis is conducted consistent with ASTM Emergency Standard ES 38, Guide for Risk-Based Corrective Action at Petroleum Release Sites.

To manage the risk associated with a NAA, groundwater cleanup levels are determined for application at the containment monitoring location. The determination of the groundwater cleanup level is conducted consistent with methodology 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 Site 6277 are TPH-Gas, Benzene, Toluene, Ethylbenzene, and Xylene (BTEX). These consituents have been monitored and analyzed since June of 1989 and are presently found in detectable levels only at monitoring well MW3. All monitoring wells will continue to be monitored for these consituents to determine any changes in concentration values.

?

what about tetrachloroethane.

3.2.2 Exposure Pathway Analysis

Contamination at NAA Site 6277 has two possible source areas: (1) the former waste oil tank and (2) the former gasoline underground storage tanks. Within these areas, contamination may have occured during failure of either product and/or waste storage or piping. All contamination occuring at ground surface to a depth of at least two feet below ground surface has been contained to soil which was overexcavated then disposed of.

3.2.3 Water Quality Objectives for Containment Monitoring Locations

Water quality objectives for NAA Site 6277 are consistent with the State Water Resources Control Board Resolution 88-63. For this site, water quality objectives for the containment monitoring locations are and will remain to be not detectable (ND) concentrations of all consitutents of concern.

3.3 Management Measures For The NAA

Groundwater Quality Objectives for the Containment Monitoring Location

- Deed notifications/restrictions
- Indemnification Agreements
- Site operation, maintenance, health and safety plans
- Utility worker notice

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 for participation in such a regional program as no such program requirements have been defined.

3.5 Contingency Plan

A contingency planning activities would be invoked in the event that the water quality objectives are exceeded at the compliance monitoring location. If an exceedance is observed within the compliance monitoring program, the corresponding monitoring well would be resampled. If the exceedance is validated, then the RWQCB and the LOP would be notified of the exceedance. The response to the contingent event would be proportioned to the extent of the exceedance. For example, if separate-phase hydrocarbon were discovered, a bailing program would be immediately initiated. Conversely, if the measured groundwater concentration is just above the water quality objective, and increased groundwater monitoring frequency may be recommended.

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

3.6 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 represented on Table 3-2, and identifies the monitoring frequency and analytic parameters for the containment monitoring points. Reporting would be provided within 45 days of the monitoring event. The letter reports would include a summary of table of analytic results and an evaluation of the results to the water quality objects.

Table 3-1
Groundwater Quality Goals for Containment Monitoring

Site 6277
San Leandro, California

Constituent	Numerical Limitation (mg/L)	Reference
Benzene	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63
Ethlybenzene	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63
Toluene	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63
Xylenes	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63
Total Petroleum Hydrocarbons as Gas	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63
Total Petroleum Hydrocarbons as Diesel	ND (Below detectable limits)	State Water Resources Control Board Resolution 88-63

Table 3-2
Compliance Monitoring Program

Site 6277
San Leandro, California

Monitoring Well Designation	Monitoring Frequency	Analytic Parameters (See Notes)	Comment
MW1	Annual	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 6/6/89
MW2A	Annual	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 6/6/89
MW3	Annual	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 6/6/89
MW4	Annual	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 6/6/89
MW5	~~Quarterly 1 year~~, Semi-annual 2 years, Annual thereafter	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 4/2/93
MW6 MW-7	~~Quarterly 1 year~~, Semi-annual 2 years, Annual thereafter quarterly; semi; annual	BTEX, TPH-Gas	3Q94 Report, MPDS Monitored since 4/2/93

Reference to Analytic Parameters:

- BTEX: Benzene, Toluene, Ethylbenzene, and Total Xylenes
- TPH-Gas: Total Petroleum Hydrocarbons Measured as Gasoline

N

EXISTING APARTMENT BUILDING

CARPORT

MW-5 *

CARPORT

*

EXISTING UNDERGROUND FUEL STORAGE TANK COMPLEX

MW-2A

MW-1

MW-6 *

MW-2 Ø

PRODUCT ISLANDS

FORMER UNDERGROUND FUEL STORAGE TANKS

STATION BUILDING

NON-ATTAINMENT AREA

CARPORT

EXISTING APARTMENT BUILDING

MW-3

MW-4

CARPORT

159TH AVENUE

EAST 14TH STREET

LEGEND

MW-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

MW-2 Ø DESTROYED WELL LOCATION AND DESIGNATION

* CONTAINMENT MONITORING WELL LOCATION

CHECK PRINT 11/04/94

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE

0 50 100 FEET

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

SITE MAP

FIGURE: 2

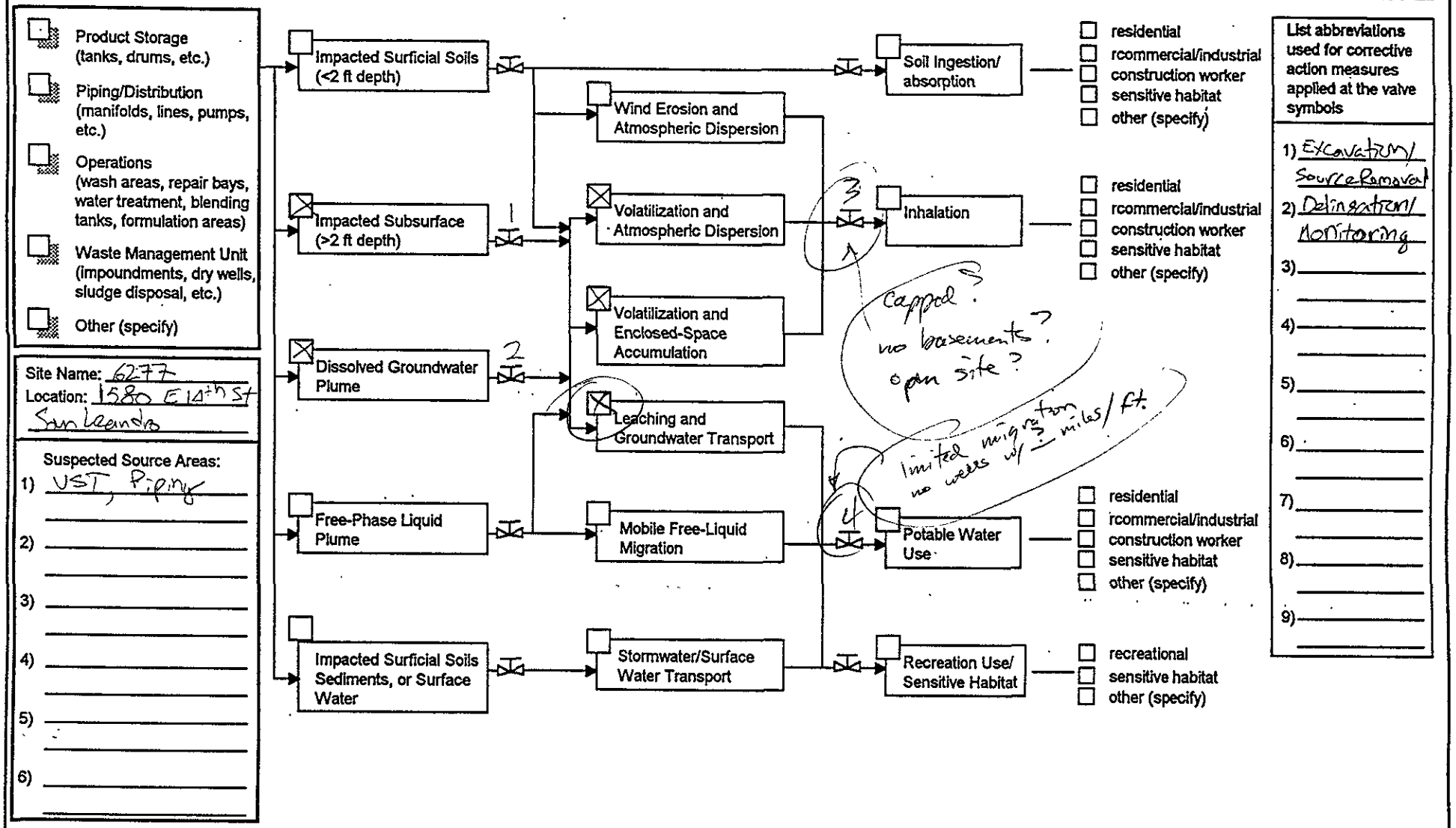
PROJECT: 310-085 3A

Figure 3-1
Non-Attainment Area and Containment Monitoring Locations

Site 6277
San Leandro, California

HOLD FOR FIGURE

Primary Sources	Secondary Sources	Transport Mechanisms	Exposure Pathways	Receptor Characterization	Corrective Action Options



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 √

Step 2: Identify Receptors, Compare Site Conditions with Tier 1 Levels
- identify receptors
- check applicable boxes for potential receptors and RBSL value(s) exceeded √

Step 3: Identify Potential Corrective Measures
- complete Tier 1 Summary Report
- fill in exposure pathway shut-off valves, record the abbreviation for the corrective measure above the valve, and record the abbreviation on the right-hand-side table.

PACIFIC ENVIRONMENTAL GROUP, INC.

UNOCAL
Address
City, State

EVALUATION FLOWCHART

FIGURE: 1
PROJECT: 310-077.9A

h:\project\310077\9A\EVALFLOW.VSD

Figure 3-2
Exposure Pathway Analysis

Site 6277
San Leandro, California

HOLD FOR FIGURE

4. EVALUATION AS A CATEGORY I NON-ATTAINMENT AREA USING RWQCB GUIDANCE

RWQCB guidance is applied in this section to demonstrate the adequacy of site characterization work summarized in Part 2, and the adequacy of the completeness of the NAA Management Plan represented in Part 3. The qualifying criteria for a Category I NAA are represented with the Groundwater Basin Plan Amendment and within RWQCB Staff Guidelines. The Basin Plan Amendment provides both general requirements and specific criteria. These criteria are evaluated in turn, respectfully.

4.1 General Category I NAA Requirements

Within the introductory discussion for Category I NAA, two general conditions are established for consideration as a NAA. These general conditions are reiterated, and consistency of the site conditions at Site 6277 to these requirements is 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 workplans that were submitted to the regulatory agencies, including the Regional Water Quality Control Board. Reports submitted were signed (where appropriate) by qualified preofessionals.
- *Lateral And Vertical Definition Of Soil And Groundwater Pollution Have Been Adequately Defined:* A review of existing soil and groundwater analytical data indicate that soil and groundwater have been adequately defined, provided an additional well is installed along East 14th Street. See Figure 2-6.

4.2 Specific Category I NAA Criteria

Four specific criteria must be adequately addressed for RWQCB consideration of Site 6277 as a NAA site. 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. We have evaluated conditions at Site 6277 applying the staff guidance. The summary of the evaluation is provided in the subsequent text, with consideration of the staff guidance within tables that correspond to each criteria.

- *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 represented 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 represented within Table 4-2.

- *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 clean-up at Site 6277 has been evaluated consistent with the RWQCB guidance, and has been found to be not cost effective. This evaluation is represented 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 represented in Part 3 of this document has been written to specifically satisfy these guidelines, and as such inherently satisfies the requirements. This evaluation is represented within Table 4-4.

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

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.

RWQCB Guidance for Evaluation of Criteria A	Evaluation of Guidance	Reference
The pollution plume is slow-moving or stable due to low permeability geologic materials or such factors as adsorption and biodegradation.	Analysis has been performed to demonstrate a stable plume.	Table 2-5
No significant potential horizontal migration pathways exist.	Site Hydrogeologic Conditions represent that no significant horizontal pathways exists.	Table 2-4
The pollution plume shall be of limited horizontal extent [generally less than 500 feet] and limited to the upper water-bearing zones.	The plume is approximately **180 feet** and thus is less than 500 foot guidance.	Figure 2-5 Figure 2-6
No significant vertical conduits shall exist within the plume area or the area between the plume and the compliance points.	There are no known vertical conduits within the site.	Figure 2-5 Figure 2-6

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

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

RWQCB Guidance for Evaluation of Criteria A	Evaluation of Guidance	Reference
Separate-phase hydrocarbons floating on the water table must be removed to the maximum extent feasible.	There are no separate-phase hydrocarbons floating on the water table. No free product has been detected in any wel to date.	3Q94 Report, MDPS
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.	All highly contaminated 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.	3Q94 Report, MDPS
For deeper groundwater conditions, hot spot or highly polluted soil removal or treatment shall be accomplished to the maximum extent feasible.	All highly contaminated 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.	3Q94 Report, MDPS
Vapor extraction and air sparging technology should be considered for source removal, as an alternative to soil removal, where soil conditions are appropriate.	All highly contaminated 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.	3Q94 Report, MDPS
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.	Soil contamination at the site is at none or very low concentrations. Groundwater contamination is at low levels.	3Q94 Report, MDPS
Unsaturated zone pollutant removal or treatment must also be to level that adequately protects public health.	All highly contaminated 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.	3Q94 Report, MDPS
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.	Pollution seems to be isolated and migration already limited. Capping, slurry walls, or other engineered methods are not necessary to isolate contaminant migration.	3Q94 Report, MDPS

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

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

RWQCB Guidance for Evaluation of Criteria A	Evaluation of Guidance	Reference
"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.	Soil and groundwater contamination at the site is at low concentrations. Further cleanup of the site will not be cost effective.	3Q94 Report, MDPS
The discharger shall provide qualitative risk and impact information including the type of factors contained in the discussion under the heading Category I.	A qualitative risk assessment has been performed consistence with this guidance.	Part 3.2

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

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.

RWQCB Guidance for Evaluation of Criteria A	*Evaluation of Guidance*	*Reference*
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.	This information is addressed in the Site Characterization Summary.	Table 2-1 Figure 2-2
The term "assessment of human health and environmental risks" means a qualitative assessment for most sites.	A qualitative risk assessment has been performed consistence with this guidance.	Part 3.2
The management measures should be selected to match the appropriate site-specific conditions.	Management measures were selected based upon site-specific conditions analyzed within the qualitative risk assessment.	Part 3.2
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.	Not Applicable to this site.	
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.	Not Applicable to this site.	
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.	A compliance monitoring program is included.	Part 3.6 Table 3-2

5. CONCLUSIONS AND RECOMMENDATIONS

Based upon the evaluation performed in Part 4, the Site 6277 adequately satisfies the requirements to be designated a Category I NAA. Upon acceptance of this NAA application, Unocal would implement the the NAA Management Plan described in Part 3. Beyond fulfilling the activities described in the Management Plan, Unocal requests issuance of a no further action letter [NFA] that would identify no further requirements at the site beyond those identified within the management plan. Unocal further requests that the approval modifications to the current groundwater monitoring program to reflect the water quality objectives and containment monitoring program described on Table 3-1, Table 3-2 respectfully.

6. REFERENCES

"1,2-DCA Concentrations in Wells Located at 1935 Washington Ave., San Leandro", Alameda County Health Care Services Agency, July 6, 1994

"Continuing Soil and Ground Water Investigation and Quarterly Report", Kaprealian Engineering Incorporated, May 10, 1993

"Drilling Permit Report", Kaprealian Engineering Incorporated, May 17, 1991

"Notice of Requirement to Reimburse", Alameda County Health Care Services Agency, March 10, 1992

"Quarterly Data Report", MPDS Services, Incorporated, August 3, 1994

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"Quarterly Summary Report", Kaprealian Engineering Incorporated, August 3, 1994

"Soil Sampling Report for Unocal SS #6277", Kaprealian Engineering Incorporated, March 27, 1989

"Unocal Service Station #6277", Kaprealian Engineering Incorporated, May 25, 1993

"Unocal Service Station #6277", Kaprealian Engineering Incorporated, June 17, 1992

"Work Plan / Proposal", Kaprealian Engineering Incorporated, July 23, 1991

7. APPENDICES