Texaco Refining
and Marketing Inc

108 Cutting Boulevard
Richmond CA 94804

August 14, 1995

ST10245

ENV - STUDIES, SURVEYS, & REPORTS
Management Plan and Work Plan for Non-Attainment Area Closure
2200 E. 12th Street
Oakland, California

Mr. Thomas Peacock
Alameda County Health Department
1131 Harbor Way Pkwy.
Alameda, CA 94502-6577

Dear Mr. Peacock:

Enclosed for your review is the *Non-Attainment Area Management Plan and Work Plan* for the Former Texaco/Current Exxon Service Station at 2200 E. 12th Street, Oakland, California. This Plan presents an alternative view of environmental site management, based on the Non-Attainment Zone (NAZ) rationale adopted by the San Francisco Bay Regional Water Quality Control Board and under draft consideration by the State Water Resources Control Board as part of Resolution 92-49. You will also note, upon reviewing the Plan, that it is also a work plan designed to achieve Non-Attainment Area Closure status.

Texaco is anxious to establish a feasible strategy to meet all State, County, and Local Agency requirements for this site and has thus developed the plan detailed in the enclosed report. To that end, Texaco would like to set up a meeting with your Agency, me, and Texaco's Consultant, Pacific Environmental, to discuss this report. Therefore, please review the Management Plan and Work Plan, and I will contact you shortly in order to facilitate such a meeting at your convenience.

If you have any questions or comments regarding this site, or would like to set up a meeting, please call me at (510) 236-9139. Thank you.

Best Regards,

Karen E. Petryna
Project Manager
Texaco Environmental Services

KEP:hs
U:\...\2200\CLSWPCVR.TP

Enclosure

cc: Mr. John Ryan
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PR:

Non-Attainment Area Management Plan and Work Plan

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Prepared for

Texaco Environmental Services Inc.

August 9, 1995

Prepared by

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

Project 340-057.9A

PACIFIC
ENVIRONMENTAL
GROUP, INC.

SUMMARY OF NON-ATTAINMENT AREA MANAGEMENT PLAN
2200 EAST 12TH STREET
OAKLAND, CALIFORNIA

- Former Texaco service station, presently operated by Exxon.
- **Primary and Secondary Sources Removed:**
  Nine monitoring wells were installed, the impacted soil was excavated and disposed of properly, the underground storage tanks were replaced, and a waste oil and fuel tank were removed.
- **Soil and Groundwater Hydrocarbon Concentrations:**
  Soil: The soil had maximum concentrations of 2.8 parts per million (ppm) benzene, 1.5 ppm toluene, 3.1 ppm xylenes, 12 ppm ethylbenzene, and 290 ppm total petroleum hydrocarbons calculated as gasoline (TPH-g) following excavation. These soil samples were collected in 1991 or before.

  Groundwater: Groundwater has been and continues to be monitored and sampled quarterly since 1989. The maximum groundwater concentrations for benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) and TPH-g are as follows: 420 parts per billion (ppb) benzene, 25 ppb toluene, 160 ppb xylenes, 66 ppb ethylbenzene, and 12,000 ppb TPH-g. These maximum concentrations were collected in June 1988, except for benzene and toluene which were collected in May 1995 and TPH-g in February 1993. All maximum concentrations were collected from Monitoring Well MW-9B.
- **Soil Type and Depth to Water:**
  The site geology consists of clay with sand to a depth of 6 feet below ground surface (bgs). This is underlain by a sand and pebble layer approximately 2 feet thick. The sand and pebbles layer are over a sandy clay and clayey sand layer to a depth of 15 feet. Beneath this layer is a poorly graded sand with clay to 16.5 feet. The depth to groundwater is

from 11 to 13.5 feet bgs. The overall groundwater flow direction is west-northwest, with a gradient of 0.01 ft/ft.

- **Plume Stability and Concentration Trends:**
  The extent of the hydrocarbons in groundwater appears to be centered around Monitoring Well MW-9B. The groundwater plume has been delineated due to the non-detectable levels of hydrocarbons in downgradient wells, MW-9H and MW-9F. However, hydrocarbons continue to be detected on site in Monitoring Well MW-9B, but these levels are decreasing naturally over time.

- **Contaminant Pathway Analysis:**
  Human Health: A qualitative risk assessment was performed on 2200 East 12th Street to determine if any potential pathways pose a risk to human health. These potential routes can be seen on the flow chart on Figure 8. There is little potential for humans to contact the plume because no drinking water wells are in the Non-Attainment Area (NAA) and volatilization is not a likely pathway due to the site being capped by asphalt and cement.

  Environment: A qualitative risk assessment was performed on 2200 East 12th Street to determine if any potential pathways pose a risk to the environment. The potential routes can be seen on Figure 8. There is little risk to the environment due to limited interaction of wildlife with the NAA zone and the overexcavation and removal of the impacted soil. Also, the site is capped with cement and asphalt, thus limiting volatilization. There is no surface water located near the proposed NAA.

- **Nearby Beneficial Uses:**
  The nearest surface water, East Bay MUD Mokelumne Aqueduct, is approximately 30 miles northeast from the site.

- **Compliance Monitoring Plan:**
  In order to be certain that the groundwater plume is not migrating, a compliance monitoring program will be implemented. This program will reveal if water quality objectives for the previously listed contaminants are being achieved at the containment monitoring locations downgradient from the groundwater plume. Monitoring Wells MW-9H, and MW-9F, will be monitored and sampled annually for 5 years.

- **Contingency Plan:**
  A contingency plan has been established in the event that hydrocarbon levels are found to be increasing through the data obtained from the compliance

monitoring program. The contingency plan response will be proportional to the increase in contaminant concentration.

- **Description of the Non-Attainment Area:**
  The boundaries of the NAA coincide with the area enclosed by Monitoring Wells MW-9C and MW-9I and the center of streets 22nd Avenue and East 12th Street, this encloses Monitoring Well MW-9B. The downgradient, containment monitoring locations are Wells MW-9H and MW-9F and the NAA are shown on Figure 7.

- **Water Quality Goals:**
  The water quality goals for the NAA are as follows:

  - BTEX compounds: non-detectable levels

  - TPH-g: non-detectable levels

- **Dissolved-Phase Cleanup is Not Appropriate or Cost Effective:**
  Contaminants' concentrations are not large enough to perform groundwater extraction or other remediation processes.

The former Texaco service station at 2200 East 12th Street in Oakland proposes to meet the requirements for a Category 1 NAA, using Regional Water Quality Control Board guidance. With this evaluation of past, present, and future actions at 2200 East 12th Street, it is clear that this Non-Attainment Management Plan satisfies all the requirements designated by the Category 1 NAA and should be granted.

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PROFESSIONAL CERTIFICATION
NON-ATTAINMENT AREA MANAGEMENT PLAN/WORK PLAN
Former Texaco Service Station
2200 East 12th Street
Oakland, California

Pacific Environmental Group, Inc. (PACIFIC) has prepared this Non-Attainment Area (NAA) Plan and work 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 Senior Geologist whose seal and signature appears hereon.

Michael Hurd
Senior Geologist
CEG 1885

1.0 INTRODUCTION

Texaco Environmental Services Inc. (Texaco) is submitting this Non-Attainment Area (NAA) Plan and work plan for implementation at 2200 East 12th Street. In order to qualify for a NAA (Category 1), two general conditions must be met. These two conditions are: (1) site investigations have been conducted pursuant to Resolution 92-49, and (2) the lateral and vertical definition of hydrocarbon-impacted soil and groundwater have been adequately defined. As this report will document, both of these conditions have been satisfied.

The plan provides for management and containment of the remaining human health and environmental risks at the referenced facility and the abandonment of certain groundwater monitoring wells. Upon acceptance of the work plan and management plan by the Regional Water Quality Control Board (RWQCB) and the Local Oversight Program (LOP), Texaco 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 (SWRCB) 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 SWRCB 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 an NAA.

The document is completed with references.

2.0 SITE CHARACTERIZATION DATA

This part of the NAA Plan for 2200 East 12th Street 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 an NAA at this site. The site characterization data have been summarized in a preformatted table consistent with the guidelines given in American Society for Testing and Materials Emergency Standard 38 (ASTM ES 38).

- 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

The site location and surrounding areas are shown on Figures 1 through 3. Figures 4 and 5 present the impacted groundwater plume and groundwater elevation map.

Table 2-1
Site Description

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Information Requirement	Discussion	Reference
Site Address	2200 East 12th Street	HLA 09/19/89
Site Owner/Contact	Exxon is current owner Texaco former owner / Ms. Karen Petryna	Exxon letter 09/17/91
Agency Contacts	Alameda County Health Care Services Agency Thomas Peacock	
Local Land Use	Commercial and Light Industry	HLA 09/19/89
Topography	Land slopes gently to southwest towards Brooklyn Basin Tidal Canal	HLA 09/19/89
Surface Water Characterization	No surface water on site Nearest surface water, Brooklyn Basin/Oakland East Tidal Canal is 3,000 feet southwest of the site.	USGS Topograhical Map

Table 2-2
Site Ownership and Activity Record

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Information Requirement	Discussion	Reference
Materials Handling Activities	Dispensing of gasoline and fuel.	HLA 09/19/89
Waste Disposal Practices	One waste oil tank.	HLA 09/19/89
Site Ownership/Active?	Exxon present owner / Active	HLA 09/19/89
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.)	Surface spillage, overfilling during product delivery, or line and tank leakage prior to 1988. Unknown location, type, volume, time, and duration of release. Soil and groundwater affected.	HLA 09/19/89
Potential Off-Site Sources	None.	

Table 2-3
Summary of Current and Completed Site Activities

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Corrective Action Activities	Description	Reference
Underground Tanks Removed	Exxon replaced underground storage tanks, 9/2/91.	Exxon letter 09/17/91
Overexcavation Performed	Overexcavation to 7 feet deep disposed of at a Class III facility. Soil around waste oil tank and fuel oil tank removed.	HLA 03/07/91
Monitoring Wells Installed	Nine monitoring wells installed.	HLA 05/11/90
Monitoring and Sampling of Wells	Monitoring and sampling quarterly since 1988.	HLA 05/11/90

Table 2-4
Hydrogeologic Conditions

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Information Requirement	Discussion	Reference
Regional Geologic Framework through Depth of Principal Aquifer and any Other Potentially Impacted Units	Site is within the East Bay Plain which is an alluvial plain, covering 114 square miles of western Alameda Co. Site lies between the Temescal Formation and artificial fill. The Temescal Formation is an alluvial fan deposit consisting of clayey gravel, sandy silty clay, and sand-clay-silt mixtures. The fill consists mostly of silt, sand and clay mixtures dredged from bay along the shore of Alameda. Fill overlays soft bay mud. Most fill placed during 1920's.	HLA 09/19/89
Site Geologic Framework Through Depth of Principal Aquifer and any Other Potentially Impacted Units	Site had clay with sand to a depth of 6 feet, underlain by occasional sand lenses (approximate 2 feet thick), this layer is over a sandy clay and clayey sand layer to a depth of 15 feet. Beneath this is a poorly graded sand with clay to maximum depth explored, 16.5 feet below ground surface (bgs).	HLA 09/19/89
Unsaturated Zone Thickness and Geology	Vadose zone approximately 10 feet thick consisting of clayey sand and sandy clay.	HLA 09/19/89
Depth to Groundwater	Approximately 11 to 13.5 feet bgs initially, stabilized at 6.5 feet bgs.	HLA 05/11/90
Thickness of Aquifer	Unknown	
Flow Direction and Gradient	West-northwest flow with a gradient of 0.01 ft/ft.	HLA 05/11/90 Resna 4Q92
Description of any Confining Units	None known	
Current Groundwater Quality (TDS)	Unknown	

Table 2-5
Analytic Summary Sheets

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Information Requirement	Media (Soil/Groundwater)	Compounds Detected					
		Benzene	**Toluene**	**Xylenes**	**Ethyl-benzene**	**TPH as Gasoline**	**Other**
Analytic Method Used	Soil	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015	
	Groundwater	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015	
Practical Quantification Limit	Soil (ppm)	0.005	0.005	0.005	0.005	1.0	
	Groundwater (ppb)	0.5	0.5	0.5	0.5	50	
Number of Samples Analyzed	Soil	65	65	65	65	65	
	Groundwater	129	129	129	129	129	
Summary of analytic data	Soil maximum residual ppm	2.8 S-5	1.5 S-5	3.1 S-6	12 S-5	290 S-5	
	Groundwater maximum ppb date and location	420 5/95 MW-9B	25 5/95 MW-9B	160 6/88 MW-9B	66 6/88 MW-9B	12,000 2/93 MW-9B	

Table 2-5 (continued)
Analytic Summary Sheets

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Information Requirement	Media (Soil/Groundwater)	Compounds Detected					
		Benzene	**Toluene**	**Xylenes**	**Ethyl-benzene**	**TPH as Gasoline**	**Other**
	Groundwater maximum and location current as of 5/95 ppb	~~420~~ MW-9B	25 MW-9B	6.7 MW-9B	27 MW-9B	~~2,800~~ MW-9B	
	Groundwater minimum current ppb	ND	ND	ND	ND	ND	
Background Concentrations	Groundwater ppb	Unknown	Unknown	Unknown	Unknown	Unknown	
Trend	Groundwater	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	

ND = Not detected
ppm = Parts per million
ppb = Parts per billion

3.0 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, the contingency plan, and the plan to abandon some monitoring wells. The section begins with a description of an 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 1 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 hydrocarbon-impacted groundwater where concentrations above water quality objectives are permissible. At a minimum, the zone will encompass the plume in both the vadose soil and saturated groundwater region.

For 2200 East 12th Street, the NAA is bounded by monitoring wells, MW-9C and MW-9I, and the streets, East 12th Street and 22nd Avenue. The containment monitoring points are the existing, off-site monitoring wells, MW-9F and MW-9H. The NAA and the containment monitoring wells are 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 2200 East 12th Street. 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.). Given that this 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 this and other potential exposure pathways, such as volatilization.

tions, Monitoring Wells MW-9F and MW-9H, are and will remain non-detect for TPH-g and BTEX compounds. These water quality objectives are presented in Table 3-1.

3.3 Management Measures for the NAA

- Deed Notifications/Restrictions
- 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 points. A monitoring program is presented in Table 3-2 and identifies the monitoring frequency and analytic parameters for the containment monitoring points. Monitoring Wells MW-9B, MW-9C, MW-9F, and MW-9H will be monitored and sampled annually for 5 years. However, Monitoring Wells MW-9F and MW-9H are the compliance monitoring locations and as such these wells are the only ones in the monitoring program which must conform to the water quality objectives proposed for the NAA. The remaining wells will be dropped from the monitoring and sampling program and abandoned. Figures 8 and 9 present a summary plot of benzene and TPH-g versus groundwater elevation for Well MW-9B. Reports will be provided within 90 days of the monitoring and sampling day. The reports will include a table and summary of the analytical data, and a discussion/evaluation of the water quality data.

3.5.1 Well Abandonment

Once the RWQCB has accepted the NAA, groundwater Monitoring Wells MW-9A, MW-9D, MW-9G, and MW-9I, will be abandoned according to the Alameda County Flood Control and Water Conservation District guidelines. The casings and gravel pack will be pressure-grouted in-situ. A grout hose will be placed from the ground surface to the bottom of the casing, then neat cement grout (under pressure) will be injected into the casing from the bottom of the well

to the surface. During the pressure-grouting, equilibration periods will be taken to allow the pressurized grout time to penetrate the gravel pack outside the well casing.

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 an increase is observed within the compliance monitoring program, the corresponding monitoring well would be sampled again. If the event was validated, the RWQCB and the LOP would be notified of the increase. The response to the increasement would be proportional to the amount of the increase. For example, if separate-phase hydrocarbons (SPH) were discovered, a bailing program would be immediately initiated. Conversely, if the measured groundwater hydrocarbon concentration is slightly above the water quality objective, increased frequency of groundwater monitoring could be recommended.

In the event of a validated increasement, 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 Locations*

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Constituent	Numerical Limitation (µg/L)	Reference
Benzene	0.5	Res 68-16
Toluene	0.5	Res 68-16
Ethylbenzene	0.5	Res 68-16
Xylenes	0.5	Res 68-16
TPH-g	50	Res 68-16

* = Containment Monitoring Locations: MW-9H and MW-9F
µg/L = Micrograms per liter

Table 3-2
Compliance Monitoring Program

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Monitoring Well Designation	Monitoring Frequency	Analytic Parameters (see notes)
MW-9H*, MW-9F*, MW-9B, and MW-9C	Annually for 5 years	BTEX compounds and TPH-g
* = Compliance monitoring locations		

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 an NAA. These general conditions are reiterated and the consistency of the site conditions at 2200 East 12th Street 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 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 soil and groundwater have been adequately defined.

4.2 Specific Category 1 NAA Criteria

Four specific criteria must be adequately addressed for RWQCB consideration of 2200 East 12th Street 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 an RWQCB staff memorandum from Steven Ritchie dated June 29, 1994. PACIFIC has evaluated the conditions at 2200 East 12th Street applying the staff guidelines. The summary of each 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 appraisal 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 appraisal is presented within Table 4-2.

- *Criteria: 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 2200 East 12th Street has been evaluated consistent with the RWQCB guidance, and has been found to not be cost effective. This appraisal 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 NAA Management Plan presented in Section 3.0 of this document has been written to specifically satisfy these guidelines and requirements. This appraisal is presented within Table 4-4.

The qualitative risk assessment was completed 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 ES 38, *Guide for Risk-Based Corrective Action at Petroleum Release Sites.*

To manage the risks associated with an NAA, groundwater cleanup levels were determined for application at the containment monitoring location. The groundwater cleanup levels conformed 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 2200 East 12th Street are total petroleum hydrocarbons calculated as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds). Most of these constituents have been monitored and analyzed since 1988.

3.2.2 Exposure Pathway Analysis

Contamination at NAA 2200 East 12th Street 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 damage of tanks, failure of either product and/or waste storage piping, or overfilling of tanks.

The possibility of the contaminants moving through the environment was assessed with the Risk Assessment: Exposure Pathway Analysis (Figure 7). It is apparent from the figure that there is little opportunity for the hydrocarbons to migrate off site or impact humans and the environment. The impacted soil was overexcavated and the remaining groundwater plume, a limited area, has relatively low hydrocarbon concentrations. Also, due to extensive monitoring and sampling of the site, the plume has been shown to not be migrating horizontally off site. Volatilization should not be a factor due to the fact that the site is capped with asphalt and cement. There are no drinking water wells within 1/4 mile of the site and the nearest surface water is approximately 2,000 feet southwest of the site. As indicated by the above factors, humans and wildlife have little possibility for exposure to the hydrocarbon plume.

3.2.3 Water Quality Objectives for Containment Monitoring Locations

Water quality objectives for NAA 2200 East 12th Street are consistent with the SWRCB Resolution 88-63. For this site, water quality objectives for the containment monitoring loca-

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

Former Texaco Service Station
2200 East 12th Street
Oakland, California

Criteria A. The discharger has demonstrated (e.g., pump tests, groundwater monitoring, and 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 indicate that no significant horizontal pathways exist.	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 75 feet and thus less than the 500 foot guidance. The plume is limited to the upper water-bearing zones.	Table 2-4
No significant vertical conduits shall exist within the plume area or the area between the plume and the compliance points.	None known.	

need to check for utility trenches between compliance points.

Table 4-2
Evaluation of Criteria B for Category 1 Non-Attainment Areas

Former Texaco Service Station
2200 East 12th Street
Oakland, California

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.	No separate-phase hydrocarbons ever noted on site.	Table 2-5
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 polluted soils have been overexcavated and disposed of properly.	Table 2-3
For deeper groundwater conditions, hot spot or highly polluted soil removal or treatment shall be accomplished to the maximum extent feasible.	NA	
Vapor extraction and air sparging technology should be considered for source removal, as an alternative to soil removal, where soil conditions are appropriate.	NA	
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 and groundwater contamination concentrations are non-detect or low.	Texaco Report 03/22/94
Unsaturated zone pollutant removal or treatment must also be to a level that adequately protects public health.	Overexcavation performed and soils disposed of properly.	HLA 03/07/91

Table 4-2 (continued)
Evaluation of Criteria B for Category 1 Non-Attainment Areas

Former Texaco Service Station
2200 East 12th Street
Oakland, California

RWQCB Guidance for Evaluation of Criteria A	Evaluation of Guidance	Reference
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.	NA	
NA = Not applicable		

Table 4-3
Evaluation of Criteria C for Category 1 Non-Attainment Areas

Former Texaco Service Station
2200 East 12th Street
Oakland, California

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.	The limited benefits and low concentrations do not justify the cost and time of cleanup.	
The discharger shall provide qualitative risk and impact information including the type of factors contained in the discussion under the heading Category 1.	A qualitative risk assessment is provided.	Figure 7

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

Former Texaco Service Station
2200 East 12th Street
Oakland, 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.

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
The term "assessment of human health and environmental risks" means a qualitative assessment for most sites.	A qualitative risk assessment has been performed consistent with this guidance.	Figure 7
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.	NA	

Table 4-4 (continued)
Evaluation of Criteria D for Category 1 Non-Attainment Areas

Former Texaco Service Station
2200 East 12th Street
Oakland, California

RWQCB Guidance for Evaluation of Criteria A	Evaluation of Guidance	Reference
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.	NA	
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 3-5 Table 3-2
NA = Not applicable		

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the evaluation performed in Section 4.0, 2200 East 12th Street adequately satisfies the requirements to be designated a Category 1 NAA. Upon acceptance of the well abandonment and this NAA application, Texaco would implement the NAA Management Plan and abandon wells as described in Section 3.0. Beyond fulfilling the activities described in the management plan, Texaco requests the issuance of an NFA letter that would identify no further requirements at the site beyond those identified within the management plan. Texaco further requests that the approved modifications to the current groundwater monitoring program reflect the water quality objectives and containment monitoring program described on Tables 3-1 and 3-2.

REFERENCES

Exxon Letter to Texaco by Greg DeMarzo, September 17, 1991.

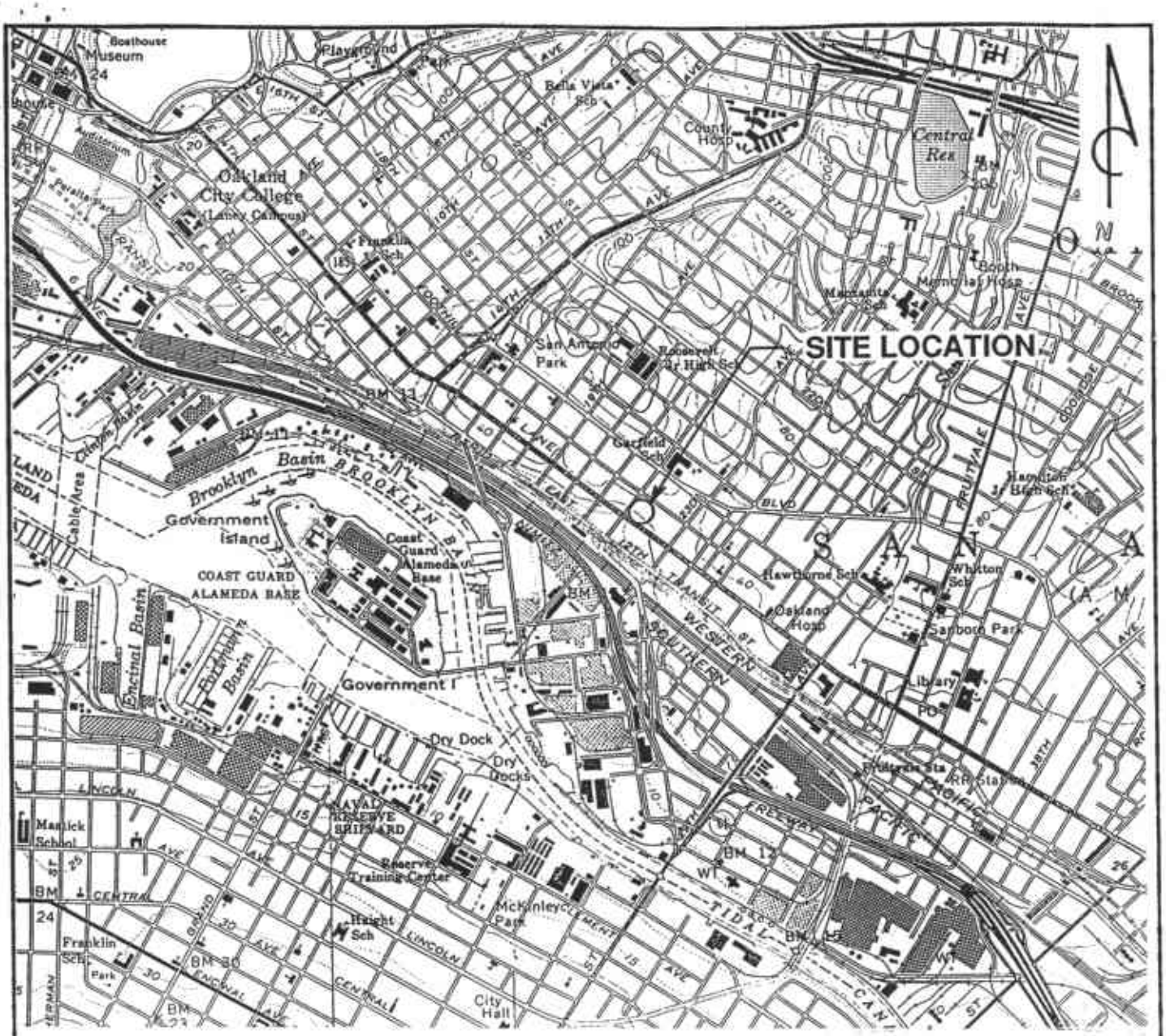
Harding Lawson Associates, *Environmental Assessment,* September 19, 1989.

Harding Lawson Associates, *Soil and Groundwater Remediation Plan*, May 11, 1990.

Harding Lawson Associates, *Quarterly Technical Report*, March 7, 1991.

RESNA, *Quarterly Groundwater Monitoring*, Fourth Quarter 1992.

Texaco Report by Digerness, R. and Petryna, K., *Environmental Studies, Surveys, and Reports,* March 22, 1994.



QUADRANGLE LOCATION

REFERENCES:

USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: OAKLAND EAST, CALIFORNIA
DATED: 1959 REVISED: 1980
TITLED: OAKLAND WEST, CALIFORNIA
DATED: 1959 REVISED: 1980

SCALE IN FEET

2000 0 2000

PACIFIC ENVIRONMENTAL GROUP, INC.

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

SITE LOCATION MAP

FIGURE: 1

PROJECT: 340-057.9A

SOURCE: MAP BY HARDING LAWSON ASSOCIATES

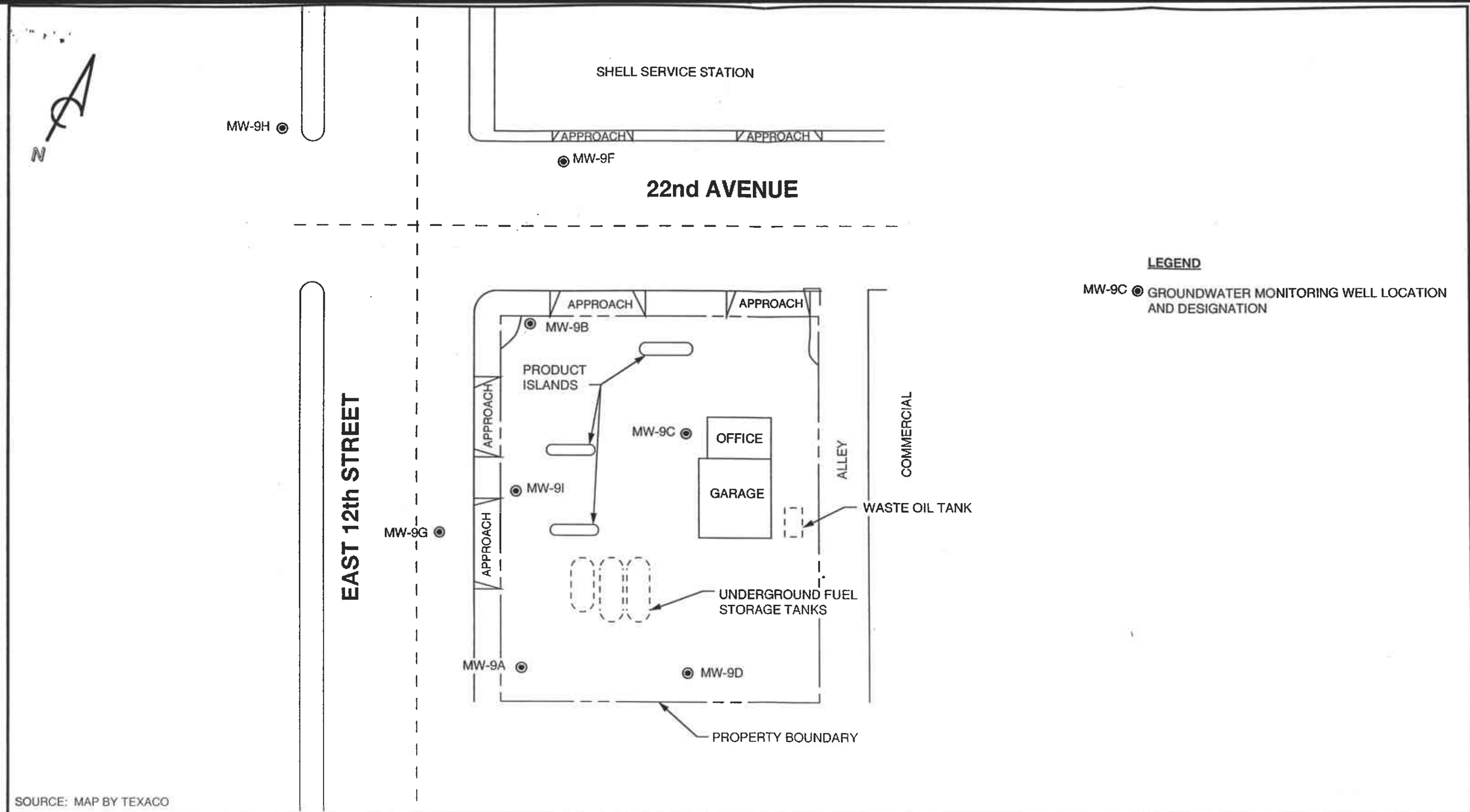
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 100 200 FEET

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

EXTENDED SITE MAP

FIGURE:
2
PROJECT:
340-057.9A



SOURCE: MAP BY TEXACO

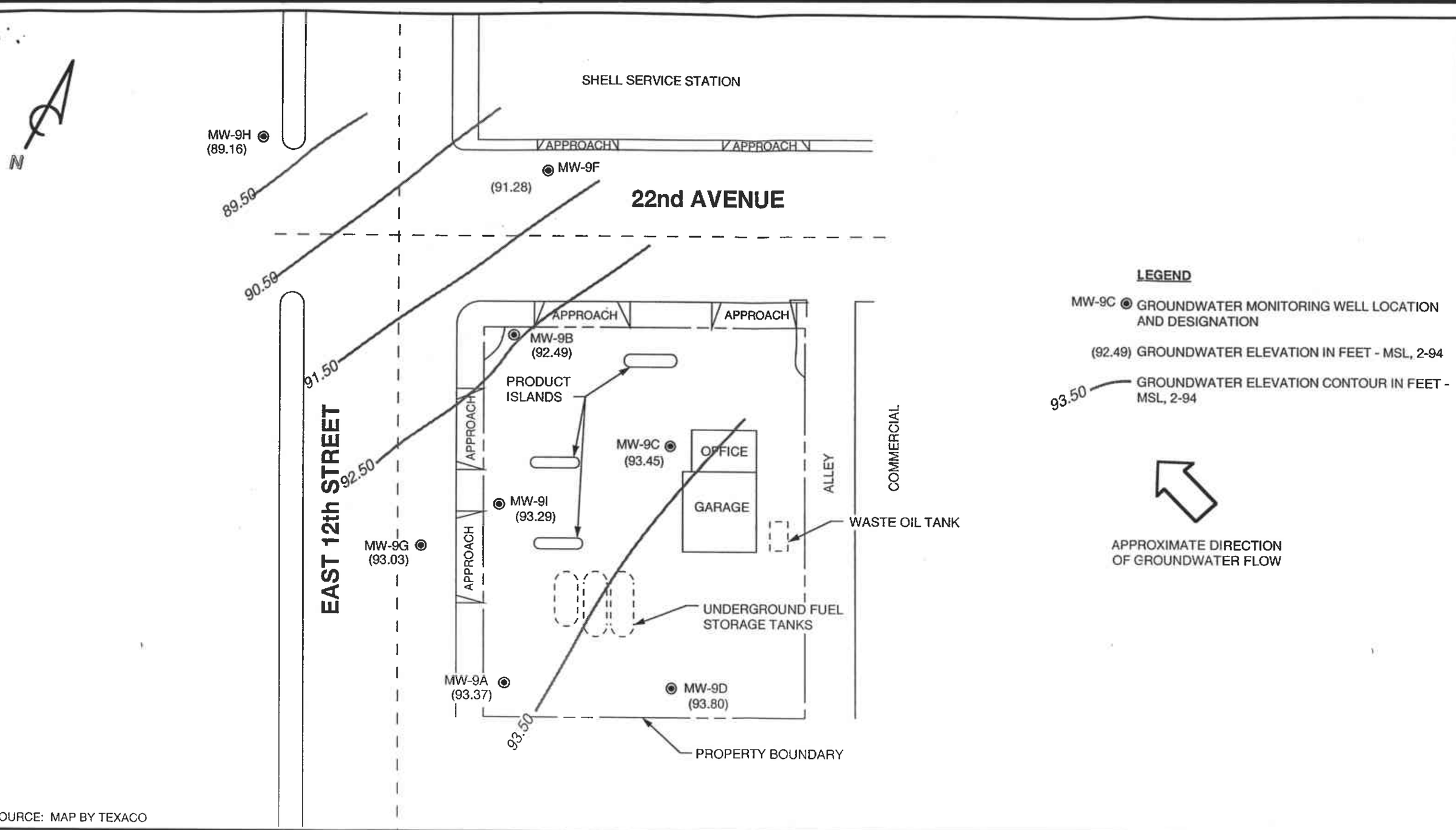
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 40 80 FEET

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

SITE PLAN VIEW

FIGURE:
3
PROJECT:
340-057.9A



SOURCE: MAP BY TEXACO

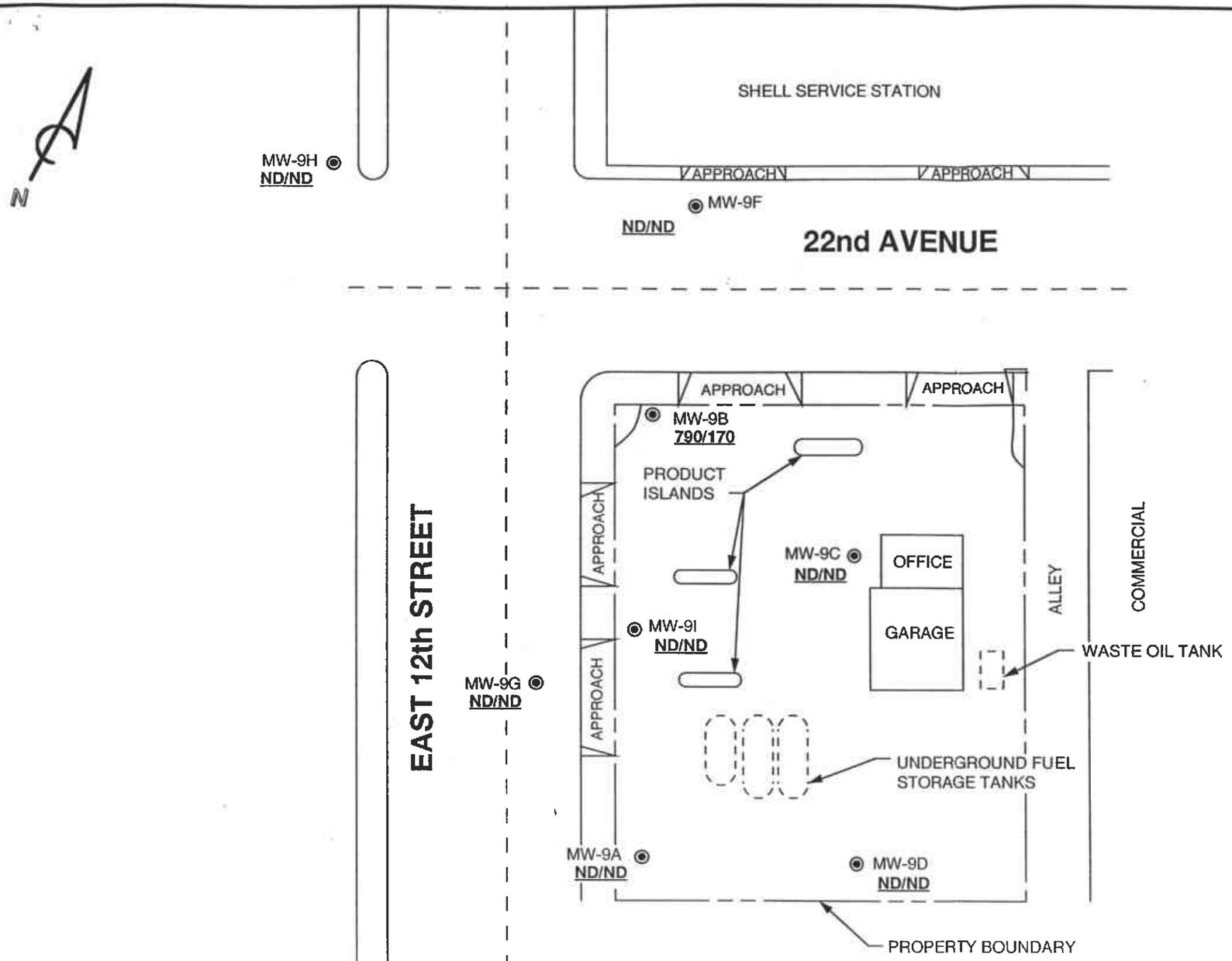
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 40 80 FEET

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

GROUNDWATER ELEVATION CONTOUR MAP

FIGURE:
4
PROJECT:
340-057.9A



LEGEND

MW-9C ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

790/170 TPH-g/BENZENE CONCENTRATION IN GROUNDWATER, IN PARTS PER BILLION, 2-94

ND NOT DETECTED

SOURCE: MAP BY TEXACO

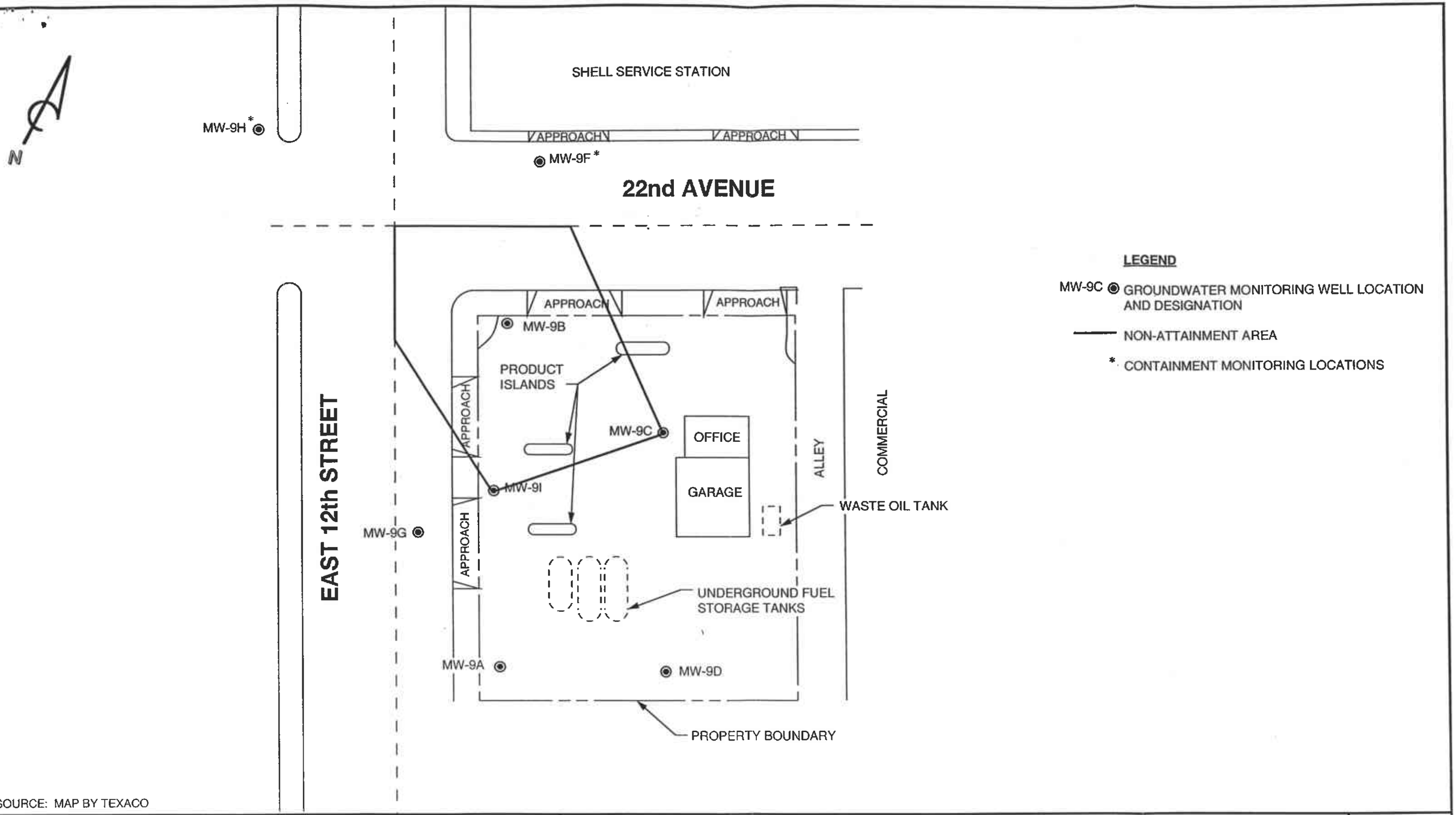
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 40 80 FEET

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

DISSOLVED CONTAMINANT MAP

FIGURE:
5
PROJECT:
340-057.9A



SOURCE: MAP BY TEXACO

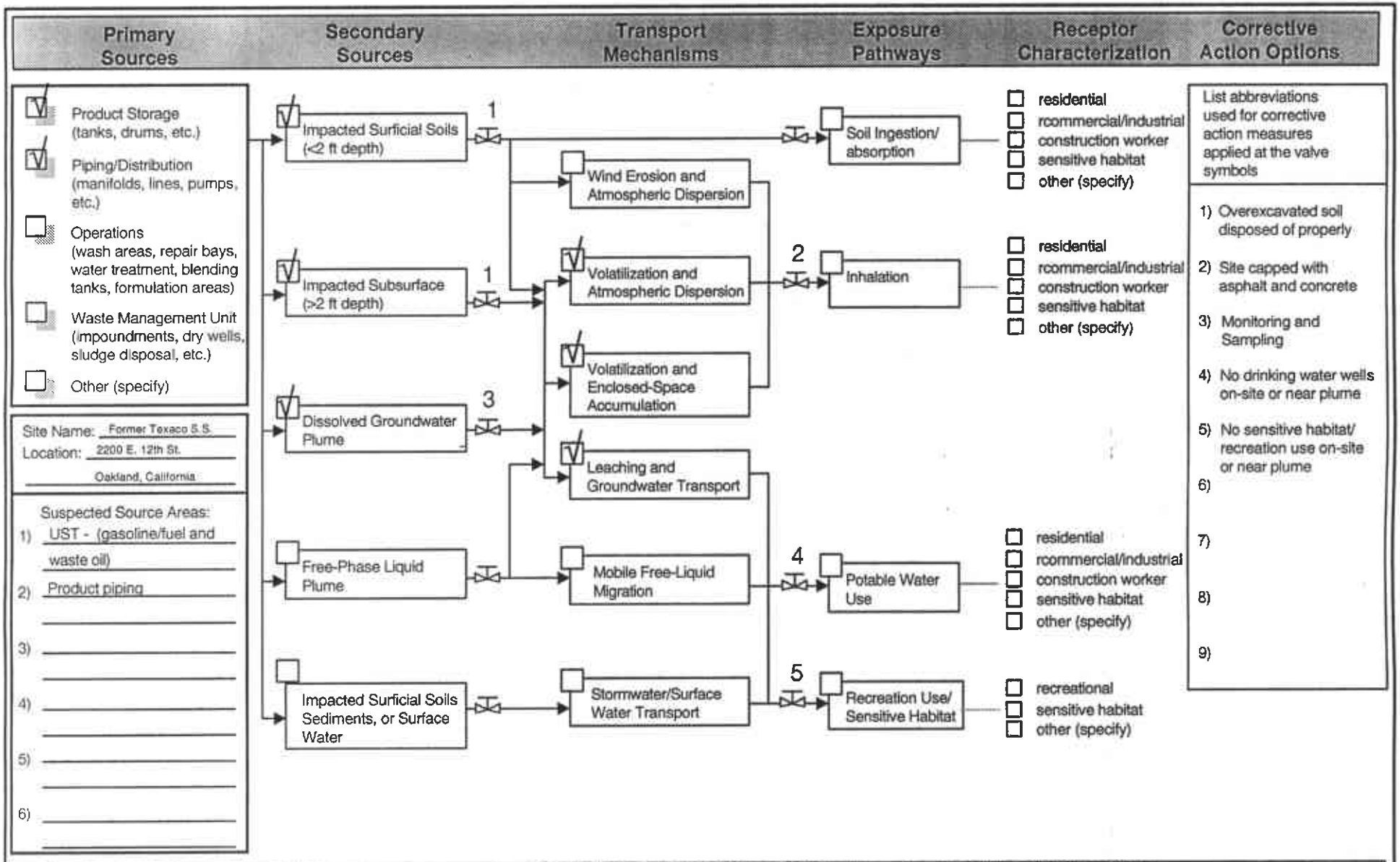
PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 40 80 FEET

FORMER TEXACO SERVICE STATION
2200 East 12th Street at 22nd Avenue
Oakland, California

NON-ATTAINMENT AREA AND CONTAINMENT MONITORING WELL LOCATIONS

FIGURE:
6
PROJECT:
340-057.9A



PACIFIC ENVIRONMENTAL GROUP, INC.

FORMER TEXACO SERVICE STATION
2200 E. 12th Street
Oakland, California

RISK ASSESSMENT: EXPOSURE PATHWAY ANALYSIS

FIGURE: **7**
PROJECT: 340-057.9A

\340\0579A\EVALFLOW.VSD

Figure 8: Summary Plot of Benzene vs. Groundwater Elevation, MW-9B

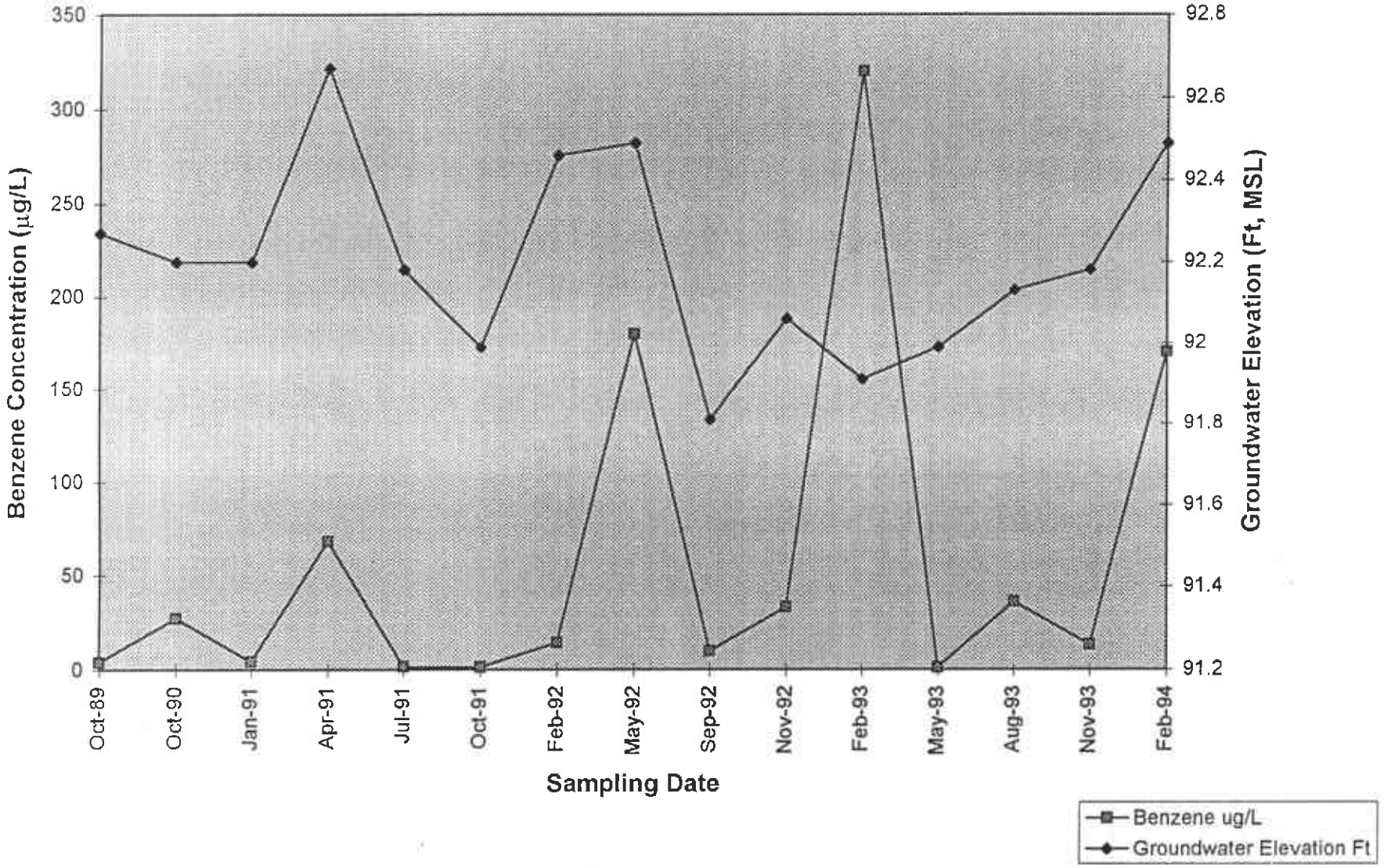


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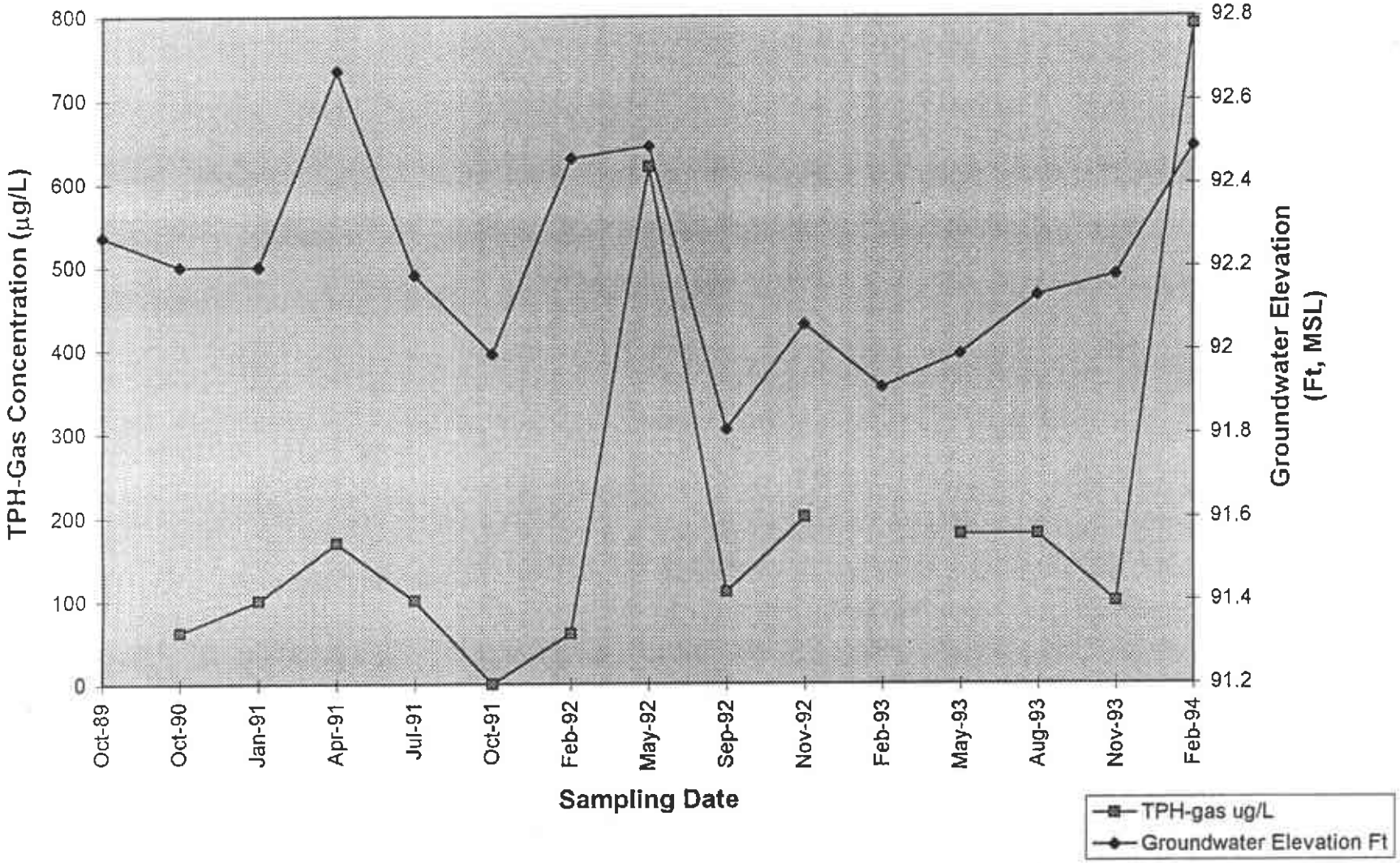
Figure 9: Summary Plot of TPH-Gas vs. Groundwater Elevation, MW-9B



3400579A/MW9BXLS