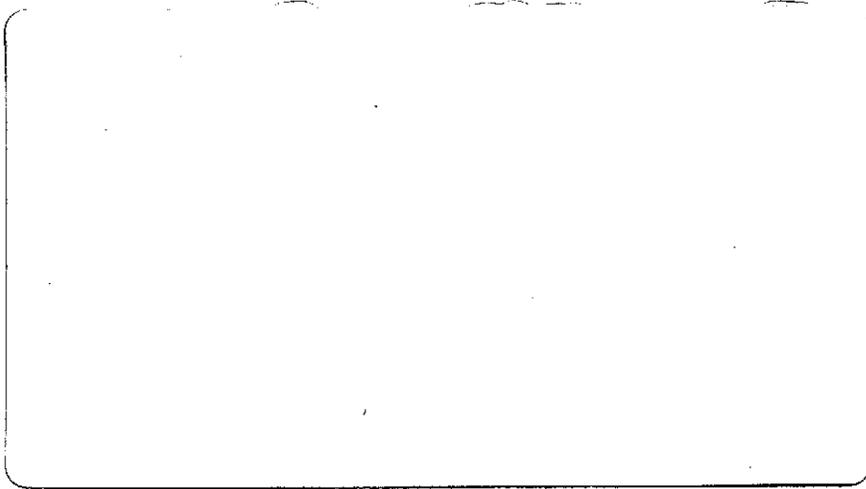


91 DEC 18 PM 5:35



**ROUX**

ENVIRONMENTAL CONSULTING & MANAGEMENT

1350 Arnold Drive, Suite 201  
Martinez, California 94553  
Tel. (510) 370-2275 • Fax (510) 370-2235

**SITE INVESTIGATION WORK PLAN**

**ARCO Facility No. 2185**  
9800 East 14th Street  
Oakland, California

December 18, 1991

*Prepared for:*

**ARCO Products Company**  
P.O. Box 5811  
San Mateo, California

*Prepared by:*

**ROUX ASSOCIATES**  
1855 Gateway Boulevard, Suite 770  
Concord, California 94520  
(510) 602-2333

**TITLE:** Site Investigation Work Plan  
ARCO Facility No. 2185  
9800 East 14th Street  
Oakland, California

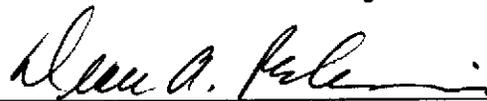
**DATE:** December 18, 1991

**PROJECT NO:** A119W02

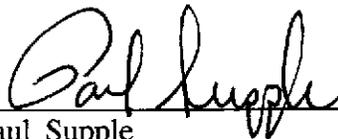
**SUBMITTED BY:** Roux Associates  
1855 Gateway Boulevard, Suite 770  
Concord, California 94520

This work was done under the direction of the undersigned California Registered Geologist.

**PREPARED BY:**



\_\_\_\_\_  
Dean A. Richesin  
Certified Engineering Geologist No. 1055



\_\_\_\_\_  
Paul Supple  
Senior Hydrogeologist

## CONTENTS

	<i>Page</i>
1.0 INTRODUCTION .....	1
2.0 SITE DESCRIPTION .....	1
3.0 PREVIOUS INVESTIGATIONS .....	2
4.0 GEOLOGY AND HYDROGEOLOGY .....	5
5.0 PROPOSED INVESTIGATION .....	5
5.1 Drilling and Soil Sampling Procedures .....	6
5.2 Monitoring Well Installation and Ground Water Sampling Procedures .....	8
5.3 Laboratory Analyses .....	9
5.4 Ground Water Flow Determination .....	10
5.5 Site Health and Safety Plan .....	10
6.0 REPORT PREPARATION .....	11
7.0 PROJECT SCHEDULE .....	11
8.0 REFERENCES .....	12

## TABLES

Table 1	Summary of Soil Analyses: Soil Borings B1-B8
Table 2	Summary of Soil Analyses: Former Tank Cavity and Product Line Trenches

## FIGURES

Figure 1	Location of Site
Figure 2	Site Plan
Figure 3	Location of Former Tank Cavity and Product Line Trench Soil Samples
Figure 4	Location of Vault Boxes, PVC Piping and New Underground Storage Tanks
Figure 5	Location of Proposed Monitoring Wells
Figure 6	Typical Monitoring Well Construction

## APPENDICES

Appendix A	Site Health and Safety Plan
------------	-----------------------------

## 1.0 INTRODUCTION

Soil contamination was discovered during a preliminary drilling investigation, and underground storage tank (UST) and line replacement activities at ARCO Products Company (ARCO) Facility No. 2185, located at 9800 14th Street, Oakland, California (Site). A UST Unauthorized Release form was issued for this Site on November 7, 1991. This Work Plan describes the proposed procedures for the initial phase of investigation work at the Site. Additional investigation work will be planned and performed at the Site based on the findings of the initial work.

The purpose of this investigation is to evaluate the lateral and vertical extent of petroleum hydrocarbon contamination and determine the direction of ground water flow at the Site. The proposed investigation will consist of drilling and sampling soil borings and installing ground water monitoring wells. The activities described in this Work Plan will be performed by Roux geologists and hydrogeologists under the direction of Mr. Dean Richesin, California Certified Engineering Geologist No. 1055.

## 2.0 SITE DESCRIPTION

ARCO Facility No. 2185 is an operating self-service gasoline station and ARCO AM/PM mini-market located at the southeast corner of the intersection of East 14th Street and 98th Avenue in Oakland, California (Figure 1). The Site is a relatively flat asphalt and concrete-covered lot, at an elevation of about 25 feet above mean sea level (USGS, 1968).

Topography in the area is relatively flat, sloping very gently (less than 1 percent) toward the west.

The tanks removed in October, 1991 included three single-wall USTs (one 8,000-gallon steel UST, and two 10,000-gallon steel USTs) formerly located in a common tank cavity west of the ARCO AM/PM building (Figure 2). At the conclusion of UST replacement activities, Site features will include an ARCO AM/PM building, two pump islands, and four newly installed, double-wall 10,000-gallon fiberglass USTs located in the northeast corner of the Site.

### 3.0 PREVIOUS INVESTIGATIONS

In May 1991, Roux conducted a preliminary tank replacement assessment at the Site (Roux, 1991a). The purpose of the assessment was to evaluate soil conditions with respect to hydrocarbon contamination in the area of the existing USTs prior to planned removal of the tanks. The investigation consisted of drilling and sampling four soil borings in the area of the existing USTs, and drilling two soil borings and installing two vapor extraction wells (Figure 2).

The boreholes encountered alluvial sediments consisting predominantly of clay and silt to a depth of 17 feet below ground surface (bgs). Ground water was encountered at depths ranging from 12 to 17 feet bgs. Laboratory analyses of soil samples collected from the boreholes drilled adjacent to the existing tanks indicated elevated concentrations of total

petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethylbenzene and total xylenes (BTEX) (Table 1).

On June 6, 1991, Roux conducted a limited soil performance test (LSPT) to determine whether subsurface soil conditions at the Site are favorable to soil venting remediation techniques (Roux, 1991b). A vacuum was applied to one of the test wells while the other well was monitored for an air pressure decrease. These test results indicate that the subsurface conditions at the Site are not amenable to soil venting remediation techniques.

On September 10, 1991, Roux drilled four soil borings to evaluate the soil conditions in the area of the new UST field (Roux, 1991c). Laboratory analyses of soil samples from these boreholes detected low levels of hydrocarbons in soil borings B7 and B8 (Table 1). These borings are located along the side of the new UST complex nearest to the pump islands (Figure 2).

On October 30, 1991, three USTs were excavated and removed from the Site by ARCO's tank replacement contractor, Paradiso Construction Co. of Oakland, California (Paradiso). The locations of the removed tanks relative to Site structures are shown on Figure 2. Due to visible soil contamination encountered in the former tank cavity, the cavity was over-excavated prior to sampling. Paradiso over-excavated the former tank cavity to a depth of about 16 feet, one foot below the static water level, and widened the tank cavity in all directions from 3 to 6 feet. On November 1, 1991, 14 soil samples were collected by Roux from the sidewalls of the former tank cavity (Figure 3). The samples were analyzed for TPH-G and for BTEX by Sequoia Analytical of Concord, California (Table 2). On

Your general workplan including the installation of MWS and Soil Sampling is acceptable & should proceed immediately. ~~After the~~ There is no reason why this remediation should wait until after the new tank & line replacement, however the County will relent and allow this with the proviso that this proposed work is commenced immediately <sup>after tank & line replacement & an acceptable response to the following County concerns.</sup>

Due to the likelihood of dissolved petroleum TPHg and BTEX from the existing contaminated soil left in place the County would like Area to state

the specific GW remediation which will be performed in this event. ~~What levels of dissolved petroleum constituents will initiate this remediation?~~ How will the effectiveness of the remediation be measured?

Provide a <sup>potential</sup> timeframe for initiation of remediation based on the conclusion of the UAT replacement.

Because of the closeness of the ~~the~~ contaminated pit to ~~the~~ E 14<sup>th</sup> St, what will be done to ensure that <sup>GW</sup> contamination has not migrated off the property? Where would additional MW(s) be located in the event that contamination is found in MW2 - MW4?

November 5, 1991, former product and vent lines were excavated and removed by Paradiso. Due to visible soil contamination encountered below the product dispensers, some over-excavation was conducted prior to sampling. Fourteen soil samples were collected from below the removed lines and dispensers (Figure 3). These samples were also analyzed for TPH-G and BTEX by Sequoia Analytical (Table 2).

The over-excavation of the former tank cavity and below the dispensers removed contaminated soil from these apparent source areas, but the analyses of the soil samples indicate that significant levels of gasoline contamination remain at the Site in the vicinity of the former product dispensers and the former tank cavity (Roux, 1991d). The bottom five feet of the former tank cavity will be filled with pea gravel, and the remainder of the cavity with clean fill material.

As a part of the tank replacement construction activities, three vault boxes and assorted horizontal piping are to be installed to facilitate further investigation and remediation of the Site. The vault boxes will be installed at locations where ARCO proposes drilling soil borings and installing monitoring wells and recovery systems. One vault box will be installed near the northwest corner of the Site; one vault box will be installed near the southwest corner the Site, and one vault box will be installed in the middle of the former tank cavity (Figure 4). PVC piping will be installed in subsurface trenches between the vault boxes. This piping will enable connection of the wells to a treatment system with a reduced amount of trenching across the Site.

*plate 5*  
(what about additional wells for gradient + direction)  
unclear the reasoning of this  
how?

#### 4.0 GEOLOGY AND HYDROGEOLOGY

The Site is located in the San Francisco Bay Region of California. Shallow subsurface deposits in the region generally consist of heterogeneous mixture of moderately to poorly sorted, clay, silt, sand, and gravel (Helley et al, 1979).

Native soils encountered in excavations completed at the Site during tank replacement activities and in soil borings previously drilled at the Site by Roux consist predominantly of silt and silty clay. Ground water stabilized at a depth of about 15 feet bgs in the former UST cavity in November, 1991 (Roux, 1991d). The estimated direction of ground water flow at the Site is to the west, based on the local topography, drainage and regional flow considerations.

#### 5.0 PROPOSED INVESTIGATION

The proposed investigation will consist of drilling and sampling four soil borings and installing and sampling four ground water monitoring wells (Figure 5).

Soil borings/ground water monitoring wells MW-1 through MW-4 will be installed to determine the impact of petroleum hydrocarbons on ground water beneath the Site. The soil boring for monitoring wells will be advanced to 15 feet below the water table. Based on information from the previous investigations, it is anticipated that the depth to ground water is about 15 feet bgs (Roux, 1991d). Monitoring well MW-1 will be located near the

east side of the Site. Monitoring well MW-1 will be used in conjunction with the other wells to determine the direction of ground water flow at the Site. Monitoring wells MW-2 through MW-4 will be located along the west side of the Site.

### 5.1 Drilling and Soil Sampling Procedures

Roux will obtain well installation permits for the proposed wells from the Alameda County Flood Control and Water Conservation District prior to drilling. Roux will also call Underground Service Alert (USA) to have utilities in the immediate vicinity of the Site marked. The monitoring wells and soil borings will be drilled by a contractor licensed in the state of California as a Water Well Driller. Boreholes will be drilled using a truck-mounted drill rig equipped with 10-inch outside diameter, continuous flight, hollow stem augers.

Samples for soil characterization and possible laboratory analysis will be collected at 5-foot intervals by driving a 2-inch diameter, 18-inch long, California Modified, Split Spoon Sampler ahead of the auger. The California Sampler will contain three clean 2-inch diameter, 6-inch long, brass liners. The number of blows to drive the sampler each 6 inches will be counted and recorded on the geologic logs.

One brass liner from each California Sampler collected above the water table will be retained for possible soil analysis. Immediately after the sampler is recovered from the borehole and opened, the ends of one liner will be covered with aluminum foil and plastic

end caps. The ends will then be wrapped with duct tape. Each sample will be labeled with the Site location, date, time, identification code, and sampler's initials. Each sample will be placed in a plastic bag and stored on ice in a closed cooler chest until delivered to the laboratory. Chain-of-custody documentation will be maintained for all samples.

The contents of the remaining liners from each California Sampler will be examined by the field geologist. Soils from the samplers will be described using the Unified Soil Classification System. The field geologist will also make qualitative notes concerning moisture content, evidence of contamination (i.e. soil staining and odor), hydraulic conductivity, porosity and other pertinent features. Geologic logs for each borehole will be prepared under the direction of a California Registered Geologist.

All downhole drilling and sampling equipment will be steam cleaned prior to use at each borehole. Sampling equipment used during drilling will be scrubbed with a brush and a non-phosphate detergent solution and rinsed with clean water.

Drill cuttings will be temporarily stored on-site. The soil will be placed on, and covered with, plastic sheets. A composite sample will be collected from the stockpiled drill cuttings and analyzed for hydrocarbon content. Proper disposal methods will be determined based upon the laboratory results.

## 5.2 Monitoring Well Installation and Ground Water Sampling Procedures

The monitoring wells will be installed through four of the vault boxes previously installed at the Site (Figure 5). After the borehole for each monitoring well is advanced to 15 feet below the water table, a 20-foot long, threaded, 4-inch diameter, PVC slotted section (.020-inch slot) and an appropriate length of blank PVC riser pipe will be placed in the borehole. The screen zone and at least one foot above and below it will be backfilled with a #3 sand filter pack. A two-foot thick layer of bentonite pellets will be emplaced above the sand pack. The remaining annular space will be filled with a cement-bentonite grout mixture to within two feet of ground surface. The wellheads will be secured with a 4-inch diameter, water tight, locking well cap. A typical monitoring well construction diagram is shown on Figure 6.

After the monitoring wells are installed, they will be developed by bailing or pumping about five to ten casing volumes of water from each well. The wells will be allowed to stabilize for at least 48 hours after development. The monitoring wells will then be checked for floating product. If floating product is detected in a well, the thickness of floating product will be measured with an oil-water interface probe. If the monitoring well contains floating product, it will not be purged or sampled. Water produced during development and sampling will be stored on-site in sealed 55-gallon drums for proper disposal by ARCO.

A ground water sample will be collected from the monitoring wells after three to five casing volumes of water have been purged from each well. The temperature, pH, and conductivity of ground water will be measured and recorded periodically prior to sample collection. If

the well is pumped dry before three casing volumes of water have been removed, then the well will be allowed to recover to 80 percent of its initial volume before sampling. The water samples will be inspected for the presence of hydrocarbon odor and sheen. Equipment used to develop and purge the monitoring wells will be decontaminated prior to and after use. Decontamination will consist of scrubbing with a brush and non-phosphate detergent solution and then rinsing with clean water.

The ground water samples will be collected using a clean, disposable, bottom loading, polyethylene bailer. Clean polypropylene cord will be used to lower the bailers into the wells. Water samples will be decanted from the bailer into 40-milliliter VOA vials with teflon lined lids. VOA vials will be inspected to insure that no air bubbles are trapped in the container. The VOA vials will be labeled, placed in sealed plastic bags and stored on ice in a closed cooler chest until delivered to the laboratory. Chain-of-Custody documentation will be maintained for all samples.

### 5.3 Laboratory Analyses

Soil samples collected from each borehole will be analyzed by a state certified laboratory for TPH-G by U.S. Environmental Protection Agency (USEPA) Method 8015 and BTEX by USEPA Method 8020. In addition, selected soil samples collected from the boreholes will be analyzed by a geotechnical laboratory for sediment grain size.

The ground water samples collected from monitoring wells will be analyzed by a state certified laboratory for TPH-G by USEPA Method 8015 and for BTEX by USEPA Method 602.

#### 5.4 Ground Water Flow Determination

A permanent reference mark will be placed on top of each ground water monitoring well casing to provide a consistent measuring point from which water level readings can be taken. The reference marks will be surveyed to the nearest 0.01 feet with respect to mean sea level by a land surveyor licensed in the State of California.

The newly installed wells will be developed and the water levels allowed to equilibrate. Water level measurements will be taken using an electronic water level indicator. The water level elevations will be used to construct a ground water surface map for the Site. The direction of ground water flow and gradient(s) will then be determined.

#### 5.5 Site Health and Safety Plan

A Site-specific Health and Safety Plan is included in Appendix A. The plan describes the basic safety requirements for work at the Site. It is applicable to both personnel of Roux and to subcontractors of Roux. The Roux field geologist will be the Site safety officer on-site. Personnel at the Site will be briefed on the contents of the Site Health and Safety Plan before work begins. A copy of the plan will be kept at the work site and will be available for reference by appropriate parties during the work.

## 6.0 REPORT PREPARATION

A report will be prepared which summarizes data gathered during the investigation. The report will contain a description of field methods, laboratory procedures, laboratory reports and chain-of-custody documents. The report will also contain cross sections and maps (as appropriate) to illustrate sample locations and the extent of contamination. A draft report will be prepared for ARCO for review and comments, prior to being finalized for submittal to the Alameda County Department of Environmental Health (ACDEH) and the Regional Water Quality Control Board (RWQCB).

## 7.0 PROJECT SCHEDULE

Drilling at the Site will be scheduled following approval of the Work Plan by the ACDEH, and completion of tank and line replacement activities at the Site. Prior to the commencement of field activities, well permits will be secured from Alameda County Flood Control and Water Conservation District. The ACDEH will be notified 48 hours in advance of scheduled drilling and/or ground water sampling. After all laboratory results are received, the final report will be submitted to the ACDEH within six weeks.

## 8.0 REFERENCES

- Helley, E.J., K.R. LaJoie, W.E. Spangle, and M.L. Blair. 1979. Flatland Deposits of the San Francisco Bay Region, California-Their Geology and Engineering Properties and Their Importance to Comprehensive Planning. U.S. Geological Professional Paper 943.
- Roux Associates. 1991a. Preliminary Tank Replacement Assessment, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, August 8, 1991.
- Roux Associates. 1991b. Letter Report, Limited Soil Performance Test, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, August 28, 1991.
- Roux Associates. 1991c. Limited Subsurface Soil Investigation, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, November 22, 1991.
- Roux Associates. 1991d. Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California, in preparation.
- U.S. Geological Survey. 1968. San Leandro, California, 7.5-Minute Topographic Quadrangle Map.

TABLE 1: Summary of Soil Sample Analyses: Soil Borings B1-B8 (Roux, 1991a,c)  
 ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California

Sample Designation	Date	Depth (feet bgs)	TPH-G(1)	BTEX Distinction(1)			
				Benzene	Toluene	Ethylbenzene	Xylenes
B1-5	5/14/91	5	ND	0.021	ND	ND	0.012
B1-10	5/14/91	10	350	1.1	0.65	4.9	19
B2-5	5/14/91	5	ND	0.034	ND	ND	ND
B2-10	5/14/91	10	280	1.3	0.34	3.4	10
B3-5	5/14/91	5	1.6	0.015	ND	0.021	0.048
B3-10	5/14/91	10	38	ND	0.24	0.31	2
B4-5	5/14/91	5	ND	ND	ND	ND	0.017
B4-10	5/14/91	10	110	0.4	0.2	0.72	0.24
B5-5	9/10/91	5	ND	ND	ND	ND	ND
B5-11	9/10/91	11	ND	ND	ND	ND	ND
B5-13	9/10/91	13	ND	ND	ND	ND	ND
B6-5	9/10/91	5	ND	ND	ND	ND	ND
B6-10	9/10/91	10	ND	ND	ND	ND	ND
B7-5	9/10/91	5	ND	ND	ND	ND	ND
B7-11	9/10/91	11	1.7	0.04	0.013	0.0079	0.078
B7-13	9/10/91	13	1.7	0.27	0.0083	0.04	0.028
B8-5	9/10/91	5	ND	ND	ND	ND	ND
B8-11	9/10/91	11	1.7	0.054	0.0094	0.012	0.019
B8-13	9/10/91	13	1.3	0.013	0.0073	0.0053	0.0069

FOOTNOTES:

(1) = Concentrations reported in mg/kg (ppm)

TPH-G = Total Petroleum Hydrocarbons As Gasoline (USEPA 8015)

BTEX Distinction (USEPA 8020)

ND = Not Detected

bgs = below ground surface

TABLE 2: Summary of Soil Analyses: Former Tank Cavity and Product Line Trenches  
ARCO Facility No. 2185, Oakland, California

Sample Designation	Date	Depth (feet bgs)	TPH-G(1)	BTEX Distinction (1)			
				Benzene	Toluene	Ethylbenzene	Xylenes
<u>Former Tank Cavity</u>							
SW-1	11/1/91	14	810	3.4	1	13	50
SW-2	11/1/91	6	ND	ND	ND	ND	ND
SW-3	11/1/91	14	370	1.6	17	8.8	53
SW-4	11/1/91	14	220	0.73	1.2	2.8	15
SW-5	11/1/91	6	1.1	0.014	0.0069	0.012	0.034
SW-6	11/1/91	14	230	0.84	2.3	2.4	15
SW-7	11/1/91	14	1,100	5.9	28	15	90
SW-8	11/1/91	6	1.3	0.11	0.0054	ND	0.016
SW-9	11/1/91	14	500	3.7	0.92	7.1	32
SW-10	11/1/91	14	750 ✓	5.9	5.3	10	61
SW-11	11/1/91	6	ND	ND	ND	ND	0.012
SW-12	11/1/91	14	210 ✓	1.6	0.26	3.2	5
<u>Product Line Trenches</u>							
LINE-1	11/5/91	3	ND	ND	ND	ND	ND
LINE-2	11/5/91	3	ND	ND	ND	ND	ND
LINE-3	11/5/91	5	1,400	0.51	87	55	350
LINE-4	11/6/91	11	450	2.6	24	8.7	56
LINE-5	11/6/91	8	18	ND	0.029	0.042	0.38
LINE-6	11/6/91	8	ND	ND	ND	ND	ND
LINE-7	11/6/91	8	5.1	0.032	0.047	0.058	0.013
LINE-8	11/6/91	8	240	0.17	2.8	2.8	15
LINE-9	11/6/91	9.5	5,400	22	330	120	640
LINE-10	11/6/91	8	2,600	5	130	53	29
LINE-11	11/6/91	3	1.4	ND	0.014	0.012	0.1
LINE-12	11/6/91	3	ND	ND	ND	ND	ND
LINE-13	11/6/91	3	13	ND	0.026	0.05	0.7
LINE-14	11/6/91	3	ND	ND	ND	ND	ND

**FOOTNOTES**

(1) = Concentrations reported in mg/kg (ppm)

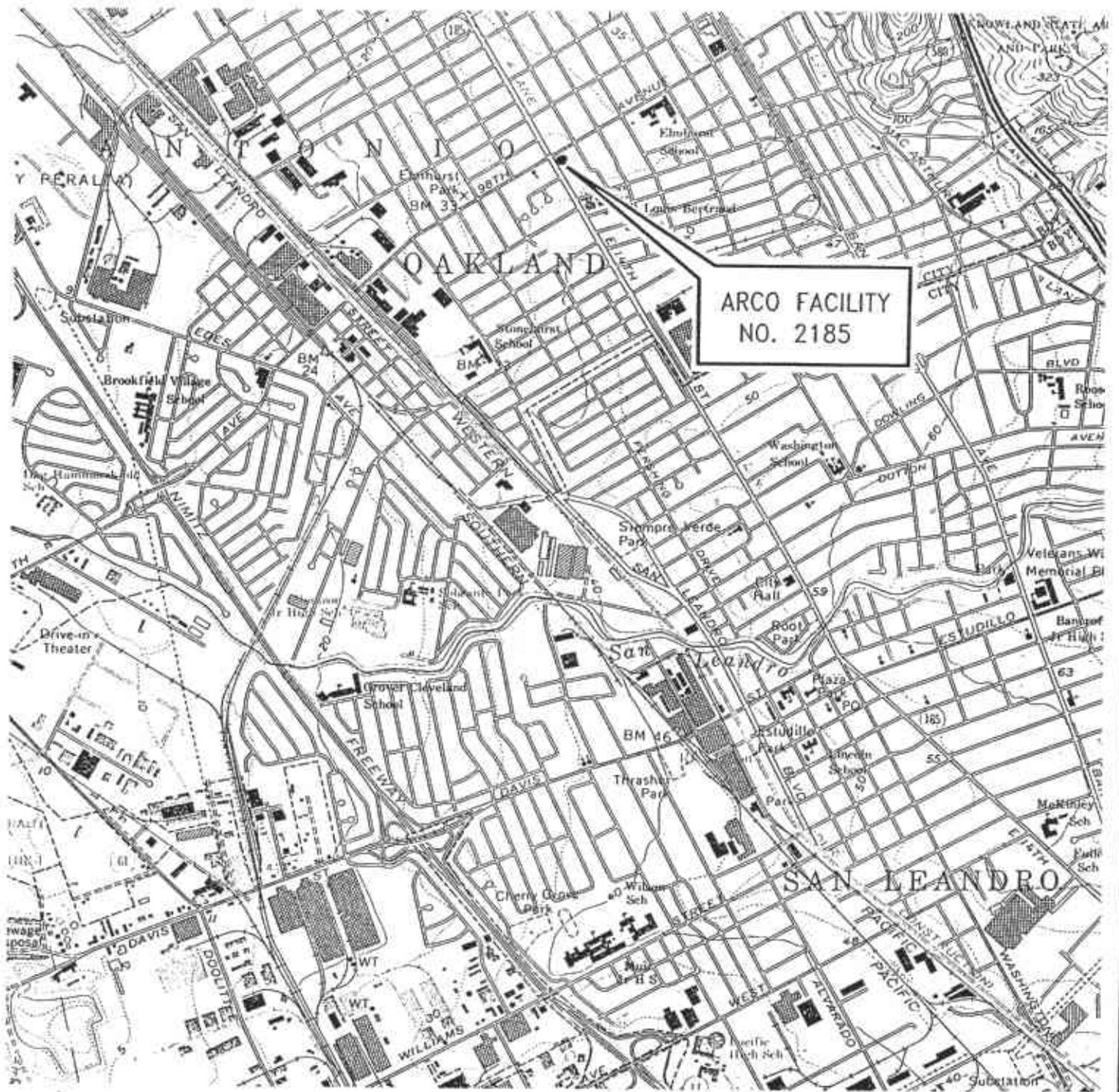
TPH-G = Total Petroleum Hydrocarbons As Gasoline (Modified USEPA 8015)

BTEX Distinction (USEPA 8020)

NA = Not Analyzed

ND = Not Detected

bgs = Below ground surface



ARCO FACILITY  
NO. 2185



SOURCE:

USGS 7.5 MINUTE QUADRANGLE  
SAN LEANDRO, CALIFORNIA 1968

TITLE:

LOCATION OF SITE

ARCO FACILITY NO. 2185

PREPARED FOR:

ARCO PRODUCTS COMPANY



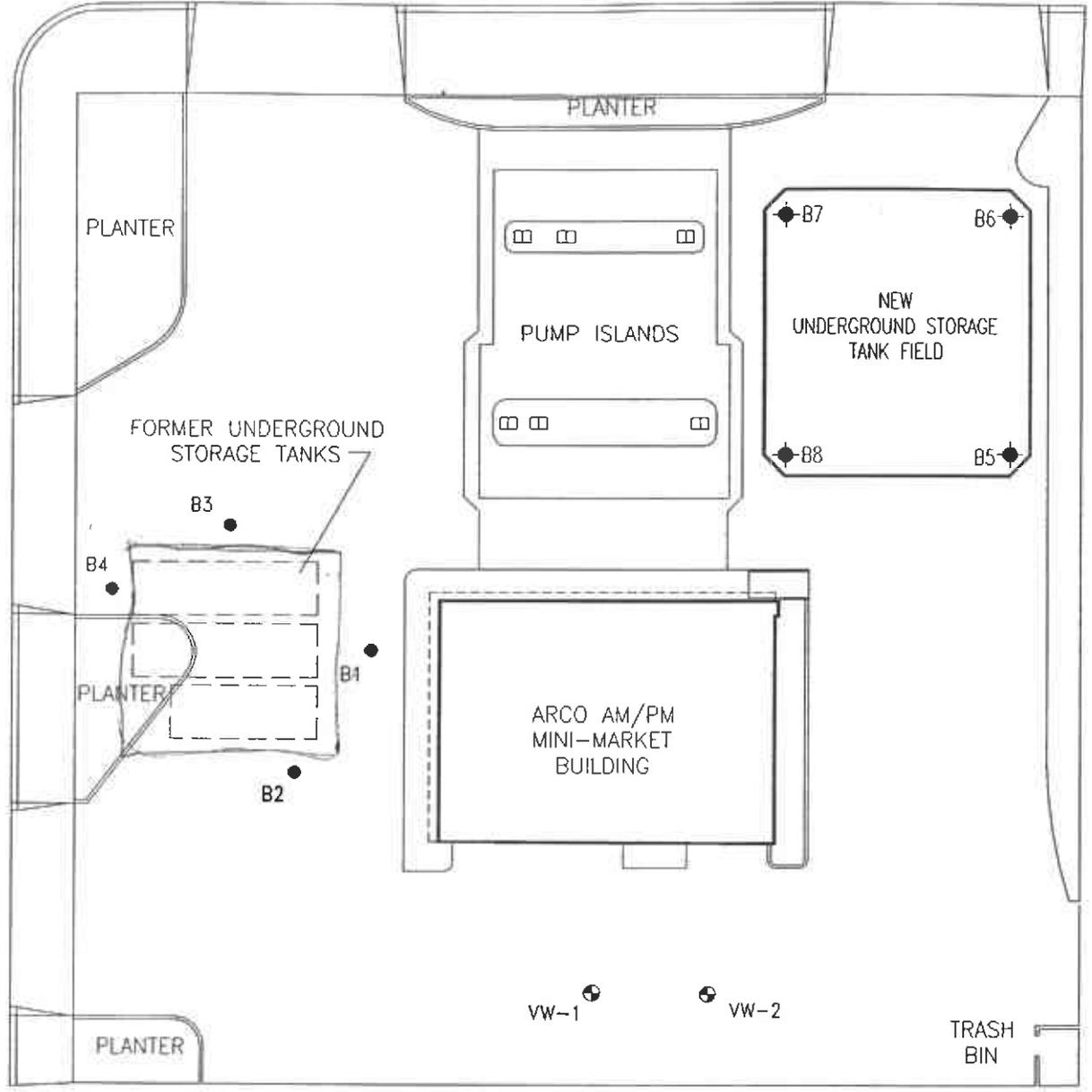
COMPILED BY:	T.R.	DATE:	12/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO.	A119W02	FILE #	AR2185XX

FIGURE  
1

98th AVENUE



EAST 14th STREET



**EXPLANATION**

- B1 SOIL BORING LOCATION AND DESIGNATION (MAY, 1991)
- ◆ B5 SOIL BORING LOCATION AND DESIGNATION (SEPTEMBER, 1991)
- ⊕ VW-1 VAPOR EXTRACTION WELL LOCATION AND DESIGNATION

**SOURCE:**

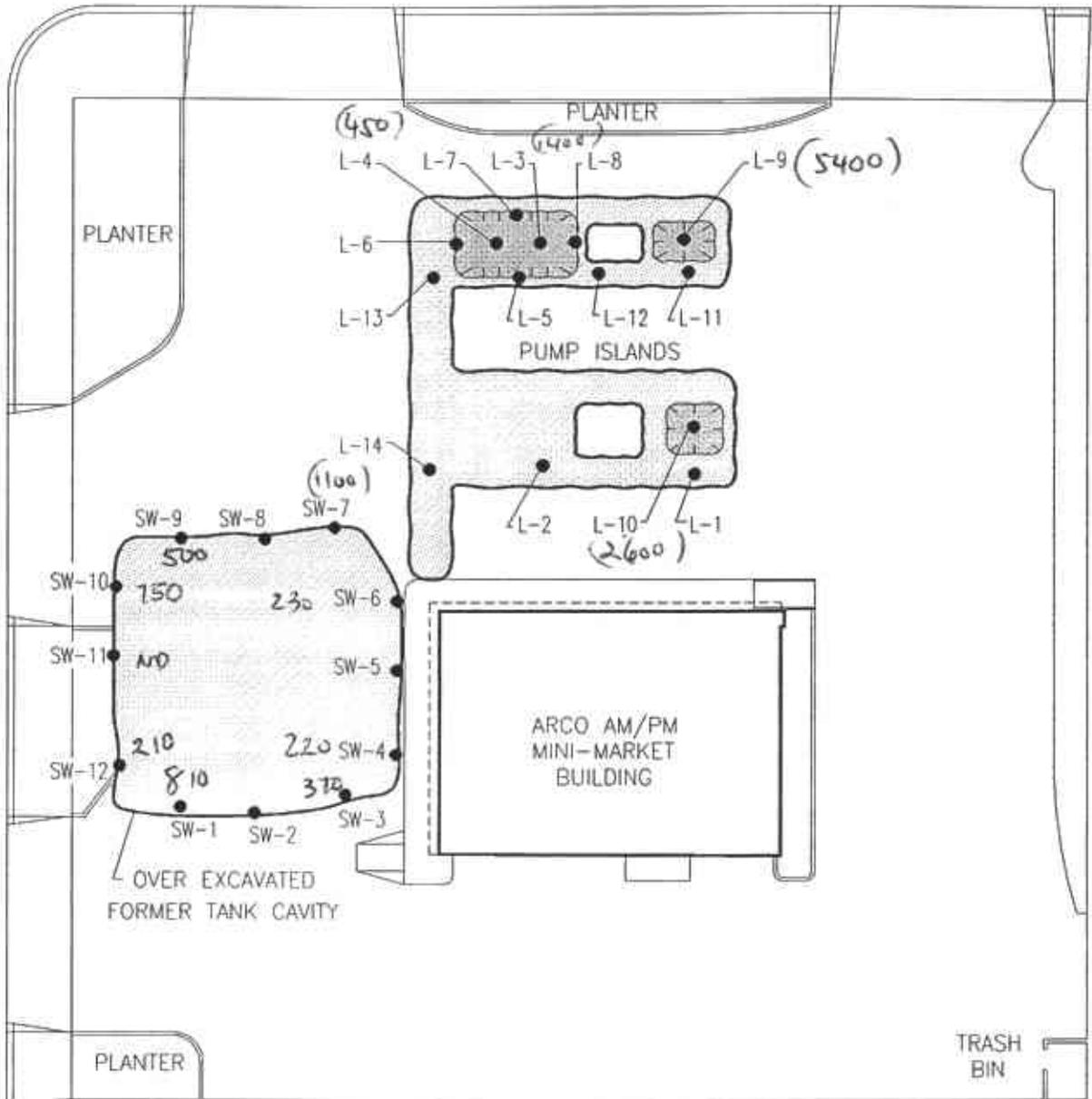
MAP MODIFIED FROM BLUEPRINT PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS (1986)

TITLE:			
SITE PLAN			
ARCO FACILITY NO. 2185			
PREPARED FOR:			
ARCO PRODUCTS COMPANY			
<b>ROUX</b> ROUX ASSOCIATES ENVIRONMENTAL CONSULTING & MANAGEMENT	COMPILED BY:	T.R.	DATE: 12/91
	PREPARED BY:	R.P.	SCALE: AS SHOWN
	PROJECT MANAGER:	P.S.	REVISION: 0
	PROJECT NO.	A119W02	FILE #: AR2185XX
			FIGURE <b>2</b>

98th AVENUE



EAST 14th STREET



**EXPLANATION**



EXCAVATED AREAS



EXTENDED EXCAVATED AREAS



TANK CAVITY SOIL SAMPLE LOCATION AND DESIGNATION



PRODUCT LINE TRENCH SOIL SAMPLE LOCATION AND DESIGNATION

**SOURCE:**

MAP MODIFIED FROM BLUEPRINT PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS (1986)

TITLE:

LOCATION OF FORMER TANK CAVITY  
AND  
PRODUCT LINE TRENCH SOIL SAMPLES  
ARCO FACILITY NO. 2185

PREPARED FOR:

ARCO PRODUCTS COMPANY

**ROUX**  
ROUX ASSOCIATES  
ENVIRONMENTAL CONSULTING  
& MANAGEMENT

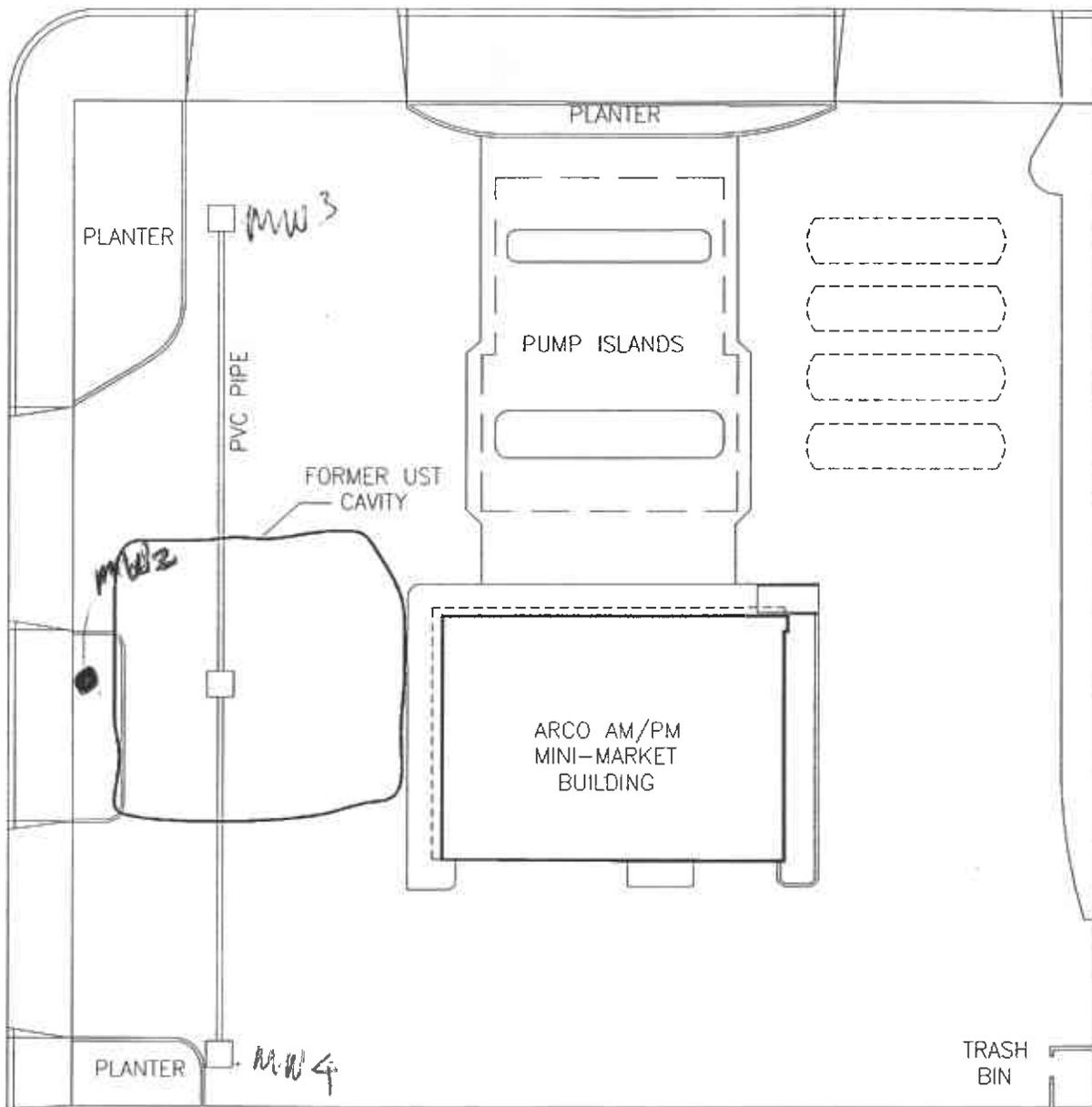
COMPILED BY:	G.M.	DATE:	11/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO.	A119W02	FILE #:	AR2185XX

FIGURE  
**3**

98th AVENUE



EAST 14th STREET



EXPLANATION

-  NEW UNDERGROUND STORAGE TANK
-  VAULT BOX LOCATION

SOURCE:

MAP MODIFIED FROM BLUEPRINT PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS (1986)

TITLE:

LOCATION OF  
VAULT BOXES, PVC PIPING,  
AND NEW UNDERGROUND STORAGE TANKS

ARCO FACILITY NO. 2185

PREPARED FOR:

ARCO PRODUCTS COMPANY

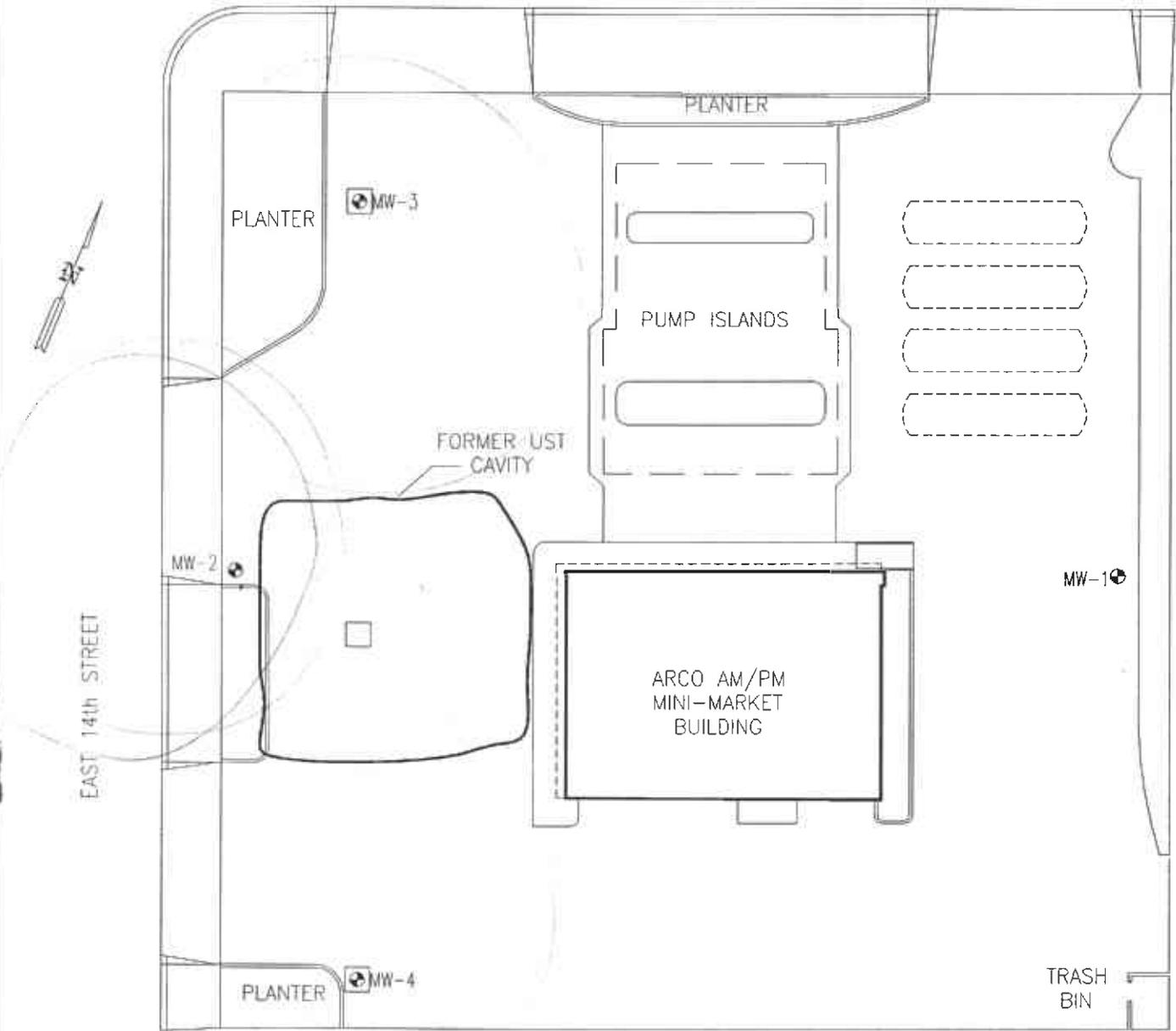


COMPILED BY:	P.S.	DATE:	12/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO	A119W02	FILE #	AR2185XX

FIGURE

4

98th AVENUE



EXPLANATION

● MW-1

PROPOSED MONITORING WELL LOCATION AND DESIGNATION



NEW UNDERGROUND STORAGE TANK



VAULT BOX LOCATION

SOURCE:

MAP MODIFIED FROM BLUEPRINT PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS (1986)

TITLE:

LOCATIONS OF PROPOSED MONITORING WELLS

ARCO FACILITY NO. 2185

PREPARED FOR:

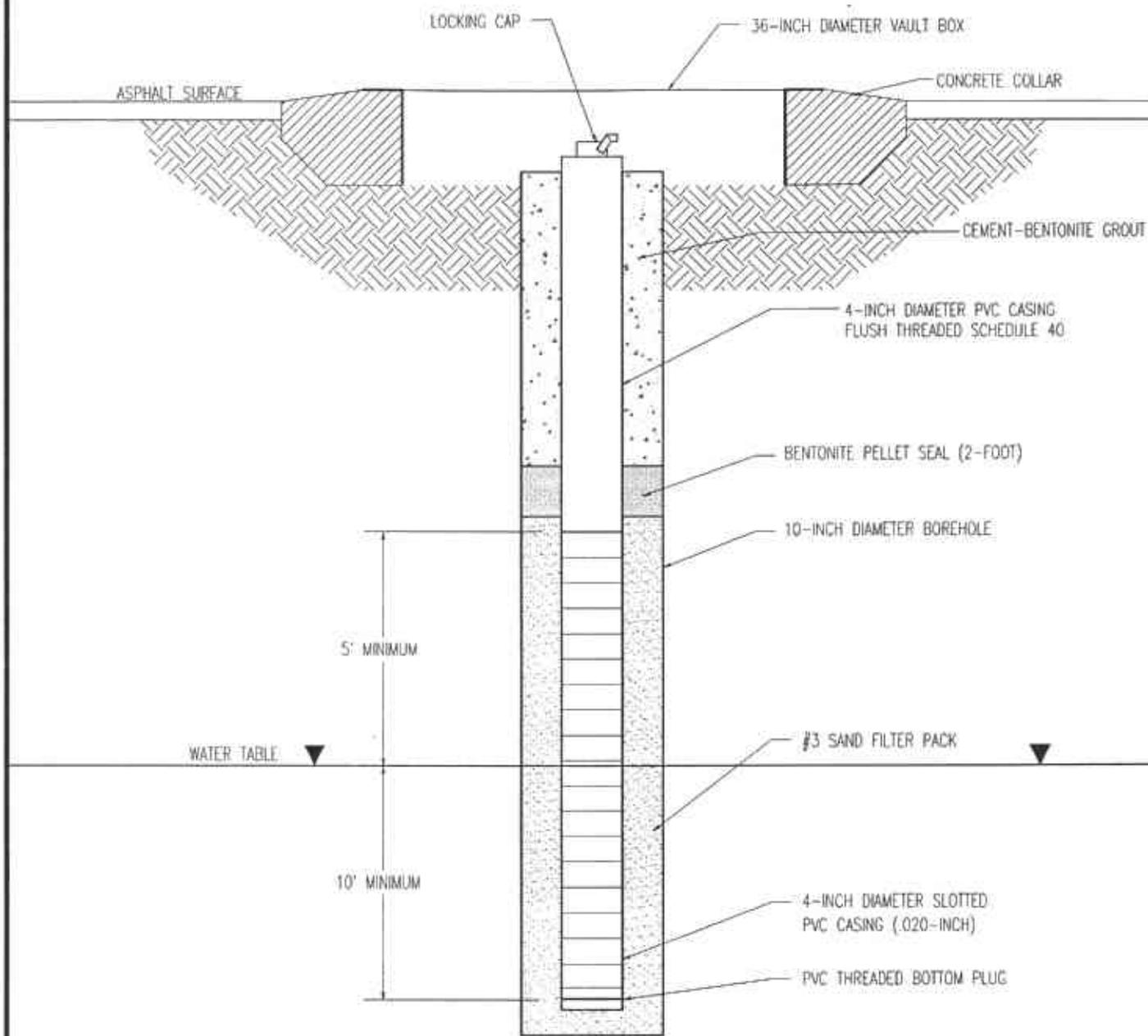
ARCO PRODUCTS COMPANY

**ROUX**  
 ROUX ASSOCIATES  
 ENVIRONMENTAL CONSULTING & MANAGEMENT

COMPILED BY:	P.S.	DATE:	12/91
PREPARED BY:	R.P.	SCALE:	AS SHOWN
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO.	A119W02	FILE #:	AR2185XX

FIGURE

5



TITLE:

TYPICAL MONITORING WELL  
CONSTRUCTION

ARCO FACILITY NO. 2185

PREPARED FOR:

ARCO PRODUCTS COMPANY

**ROUX**  
ROUX ASSOCIATES  
ENVIRONMENTAL CONSULTING  
& MANAGEMENT

COMPILED BY:	T.R.	DATE:	12/91
PREPARED BY:	R.P.	SCALE:	N.T.S.
PROJECT MANAGER:	P.S.	REVISION:	0
PROJECT NO.	A119W02	FILE #:	AR2185XX

FIGURE

6

**APPENDIX A**  
**Site Health and Safety Plan**

**SITE HEALTH AND SAFETY PLAN  
SITE INVESTIGATION**

**ARCO Facility No. 2185**  
9800 East 14th Street  
Oakland, California

*Prepared by:*

**ROUX ASSOCIATES, INC.**  
1350 Arnold Drive, Suite 201  
Martinez, California  
(510)370-2275

**SITE-SPECIFIC GENERAL  
HEALTH AND SAFETY PLAN**

**Table of Contents**

	<b>Page</b>
1.0 GENERAL .....	1
2.0 HEALTH AND SAFETY PERSONNEL DESIGNATIONS .....	3
3.0 SITE HISTORY AND PHYSICAL DESCRIPTION .....	4
4.0 SITE-RELATED INCIDENTS, COMPLAINTS AND ACTIONS .....	4
5.0 WASTE DESCRIPTION AND CHARACTERIZATION .....	4
6.0 HAZARD ASSESSMENT .....	5
7.0 TRAINING REQUIREMENTS .....	5
8.0 ZONES, PROTECTION AND COMMUNICATIONS .....	6
9.0 MONITORING PROCEDURES FOR SITE OPERATIONS .....	8
10.0 SAFETY CONSIDERATIONS FOR SITE OPERATIONS .....	9
11.0 DECONTAMINATION PROCEDURES .....	11
12.0 DISPOSAL PROCEDURES .....	11
13.0 EMERGENCY PLAN .....	12
14.0 AUTHORIZATIONS .....	14
15.0 FIELD TEAM REVIEW .....	14
16.0 APPROVAL PAGE .....	14

## 1.0 GENERAL

This Site-specific Health and Safety Plan (HASP) has been prepared in accordance with 29CFR 1910.120 and Roux Associates, Inc. Standard Operating Procedures. It addresses all activities associated with the proposed investigation at 9800 East 14th Street, Oakland, California (Site) and will be implemented by the designated Site Health and Safety Officer (SHSO) during Site work.

Compliance with this HASP is required for all persons and third parties who enter this Site. Assistance in implementing this HASP can be obtained from the Roux Associates, Inc. Health and Safety Manager. The content of this HASP may undergo revision based upon additional information made available. Any changes proposed must be reviewed and approved by the Roux Associates, Inc. Health and Safety Manager or his designee.

Responsibility	Name	Telephone Number
Site Manager (SM)	Paul Supple	(510) 370-2275
Site Health and Safety Officer (SHSO)	Todd Ramsden	(510) 370-2275
Field Team Leader (FTL)	Todd Ramsden	(510) 370-2275
Site Emergency Coordinator (SEC)	Paul Supple	(510) 370-2275

### WORK DESCRIPTION:

Work at the Site covered by this Work Plan will consist of drilling of boreholes to evaluate soil conditions with respect to possible hydrocarbon contamination. The drilling will be conducted using a truck mounted hollow stem auger drill rig. The work will also include the collection of soil samples from the boreholes for laboratory analysis. Vapor extraction wells and ground water monitoring wells will be installed in the boreholes.

**EMERGENCY INFORMATION**

Type	Name	Telephone Numbers
Police	OPD	911
Fire	OFD	911
Hospital (Figure A1) 13855 East 14th Street	Humana Hospital	510/ 357-6500
Poison Control Center		800/ 523-2222

**ENVIRONMENTAL EMERGENCY**  
(e.g., release or spill)

Type	Name	Telephone Numbers
Roux Health and Safety Manager	Linda Wilson	516/673-7200
Office Health and Safety Supervisor	James Reilly	510/370-2275
Site Health and Safety Officer	Todd Ramsden	510/370-2275
Field Team Leader	Todd Ramsden	510/370-2275
Site Manager	Paul Supple	510/ 370-2275

## 2.0 HEALTH AND SAFETY PERSONNEL DESIGNATIONS

### Corporate Health and Safety Manager

The Corporate Health and Safety Manager (CHSM) has overall responsibility for development and implementation of the HASP. He also shall approve any changes to the HASP due to modification of procedures or newly proposed Site activities.

Health and safety related duties and responsibilities will be assigned only to qualified individuals by the CHSM. Before personnel may work on-Site, currentness of acceptable medical examination and acceptability of health and safety training must be approved by the CHSM.

### Office Health and Safety Supervisor

The Office Health and Safety Supervisor (OHSS) serves as the local area office designee of the CHSM and aids the CHSM in assuring that the policies and procedures of the HASP are implemented by the SHSO. The OHSS is responsible for providing the appropriate monitoring and safety equipment and other resources necessary in implementing the HASP. The OHSS ensures that all personnel designated to work on-Site are qualified according to applicable EPA, OSHA and state requirements.

### Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) will be present on-Site during the conduct of field operations, will be responsible for health and safety activities and has the authority to make all health and safety related decisions. The determination of hazard levels will be made by the SHSO in consultation with the CHSM. The SHSO has stop-work authorization which he or she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation, such as detrimental weather conditions. Authorization to proceed with work will be issued by the OHSS or CHSM in consultation with the Site Manager after such action. The SHSO or SM will initiate and execute all contact with emergency facilities and personnel when this action is appropriate. Assistant SHSOs may be designated by the SHSO if required but must be pre-qualified and approved by the OHSS.

**3.0 SITE HISTORY AND PHYSICAL DESCRIPTION**

ARCO Facility No. 2162 is located on the southeast corner of the intersection of East 14th Street and 98th Avenue. The Site is approximately one mile west of Interstate 580 at an elevation of 20 feet above sea level.

The Site is a retail gasoline and service station. The building which houses the mini-market is located in the center of the Site. Two pump islands are located near the north side of the Site. The work area is paved and essentially flat.

**4.0 SITE-RELATED INCIDENTS, COMPLAINTS AND ACTIONS**

None have been reported for the Site based on information available at the time this HASP was prepared.

**5.0 WASTE DESCRIPTION AND CHARACTERIZATION**

- Waste Types

Liquid	<u>  X  </u>	Solid	<u>    </u>	Gas	<u>    </u>
Sludge	<u>    </u>	Semi-Solid	<u>    </u>	Other	<u>    </u>

- Characteristics

Corrosive	<u>    </u>	Toxic	<u>  X  </u>	Inert	<u>    </u>
Flammable	<u>  X  </u>	Volatile	<u>  X  </u>	Carcinogen	<u>    </u>
Radioactive	<u>    </u>	Reactive	<u>    </u>	Other	<u>    </u>

- Containment

P.T.	<u>    </u>	Process Vessel	<u>    </u>	Tank	<u>  X  </u>
Pond	<u>    </u>	Piping	<u>  X  </u>	Lab Pack	<u>    </u>
Lagoon	<u>    </u>	Drum	<u>    </u>	Other	<u>    </u>
Lake	<u>    </u>	Tank Car	<u>    </u>		

The wastes at this Site could potentially be the soils being excavated and sampled. These soils may be contaminated with petroleum hydrocarbons, such as gasoline, at concentrations up to, and potentially greater than 10,000 ppm. Gasoline contains quantities of benzene, toluene, ethylbenzene and xylenes. Exposure to these compounds may be hazardous to health (Table 1).

## 6.0 HAZARD ASSESSMENT

In addition to the chemical hazards already noted, work at this jobsite may present hazards such as:

- Chemical Hazards - Gasoline contaminated soils are present at the Site. Gasoline contains quantities of benzene, toluene, ethylbenzene and xylenes. These compounds may be hazardous to health (Table 1).
- Ambient Air Hazards - Exposure to gasoline compounds, benzene, toluene, ethylbenzene and xylenes may be hazardous to health (Table 1). Dust of volatile organic vapors may contain BTEX compounds.
- Heat/Cold Stress - Heat/cold stress are possible due to working in protective clothing and gloves.
- Noise - Noise heard from heavy machinery on-site.
- General Safety Hazards - The general safety hazard from machine traffic on-site. Overhead electrical power line must be observed. Underground utilities must be identified prior to drilling operations.

## 7.0 TRAINING REQUIREMENTS

### 7.1 Basic Training

All Site personnel who will perform work in areas where there exists the potential for toxic exposure will be health and safety trained prior to performing work on-Site per OSHA (29CFR 1910.120(e)).

### 7.2 Site Specific Training

Site Specific Training will be provided by the SHSO and FTL. It will address the activities, procedures, and monitoring equipment for the Site operations. This training will also allow field workers to clarify anything they do not understand and to reinforce their

responsibilities regarding safety and operations for their particular activity. Site-specific training will be documented and kept as part of the project records.

### 7.3 Safety Briefings

Project personnel will be given briefings by the FTL or SHSO on an as-needed basis to assist them in conducting their activities safely.

### 7.4 Record Keeping Requirements

All record keeping requirements mandated by OSHA (29CFR 1910.120) will be strictly followed.

## 8.0 ZONES, PROTECTION AND COMMUNICATIONS

### 8.1 Site Zones

The area of the Site where work will be conducted (the work zone) will be surrounded by a temporary fence consisting of cones and caution tape. No personnel shall work in the work zone without a buddy. All workers within the work zone shall wear the proper personal protective equipment (see section 8.2). No unauthorized persons will be allowed in the work zone during Site activities.

### 8.2 Personal Protection

#### 8.2.1 General

The level of protection to be worn by field personnel will be defined and controlled by the SHSO with approval of the CHSM. Protection may be upgraded or downgraded by the SHSO on the basis of action levels presented for the activities listed below:

Task	Level of Protection
• Drilling	D
• Sampling	D
• Decontamination	D

### 8.2.2 Respiratory Protection and Clothing

All work at this Site should be performed in Level D protection:

- Tyvek Suits or coveralls
- Rubber Gloves
- Steel Toed Boots
- Hard Hats
- Eye Protection, As Required
- Noise Protection, As Required

Personal protective equipment for Level C, if necessary, will include:

- Full facepiece air-purifying respirator, NIOSH/MSHA approved
- Emergency escape respirator
- Tyvek Suits
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective, steel toe and shank

### 8.2.3 Safety Equipment

Basic emergency and first aid equipment will be available in or near the work zone, as appropriate. This shall include first aid kit, fire extinguishers, and other safety related equipment.

### 8.3 Communications

- Telephones -- A telephone will be at the Site for communication with emergency support services/facilities.
- Hand Signals -- To be employed in high noise areas such as when working with heavy equipment.

## 9.0 MONITORING PROCEDURES FOR SITE OPERATIONS

### 9.1 Monitoring During Site Operations

It is not anticipated that project personnel exposure will exceed the TLVs or PELs of the gasoline compounds. However proper personal protective equipment will be worn while working at the Site. In addition, the SHSO will monitor the breathing zone and ambient air, frequently during Site operations, using a Thermo Environmental Instruments Model 580 organic vapor meter (OVM). If the OVM readings are consistently exceeding 100 ppm (1/3 of the TLV for gasoline) in the breathing zone, personnel will be required to withdraw from the Site and the level of personal protection will be upgraded before entering the Site.

### 9.2 Medical Surveillance Requirements

Medical surveillance specifies any special medical monitoring and examination requirements as well as stipulates that all Roux Associates, Inc. personnel and subcontractors are required to pass the medical surveillance examination or equivalent for hazardous waste work required by 29 CFR 1910.120. As a minimum, the examination will include:

- Complete medical and work histories
- EKG
- Urinalysis
- Physical Exam
- Eye Exam
- Blood Chemistry
- Pulmonary Function Test
- Audiometry

The examination will be taken annually, at a minimum, and upon termination of employment with the company. Additional medical testing may be required by the CHSM or OHSS in consultation with the company physician and the SHSO if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

---

## 10.0 SAFETY CONSIDERATIONS FOR SITE OPERATIONS

### 10.1 General

All field sampling will be performed under the level of personal protection described in Section 8.0. In this section, non-monitoring, safety-related procedures are described.

### 10.2 Site Walk-Through

Safety considerations during Site walk-through are important since this activity will precede all other field operations. Staff will maintain line of sight with each other at all times. Air monitoring will be performed as indicated in Section 9.0 and will be used to alert the walk-through team if a dangerous situation exists. It will also assist in prescribing levels of protection for future Site operations, designating Site layout and identifying areas of particular hazard, if any.

### 10.3 Heavy Equipment and Drill Rig Safety

Drilling crews are confronted with all of the hazards associated with operating any heavy equipment. They must be responsible for housekeeping around the rig because of the rods, auger sections, rope, and hand tools cluttering the operation. Maintenance is a constant requirement. Overhead and buried utilities require special precautions because of electrical and natural gas hazards. Electrical storms may have an affinity for a standing derrick. The hoist or cathead rope poses specific hazards that must be respected. Always use a clean, dry, sound rope. Keep hands away from the test hammer! Hearing loss, while not an immediate danger, is considerable over time. Use hearing protection!

From a safety standpoint, it is always important to be continually aware of the equipment around you. It poses a serious hazard if not operated properly, or if personnel near machinery cannot be seen by operators.

The SHSO will be present on Site during all invasive operations, including drilling, and will provide health and safety monitoring to ensure that appropriate levels of protection and safety procedures are utilized.

### 10.4 Excavation and Backfill Operations

No such activities are anticipated.

### 10.5 Sampling

Personnel will wear prescribed clothing, especially eye protection and chemical resistant gloves when sampling. Sample bottles may be bagged prior to sampling to ease decontamination procedures. The sampling team must be aware of emergency evacuation

procedures described in this HASP and the location of all emergency equipment, including spill containment materials, prior to sampling. Contamination avoidance shall be practiced at all times. Personnel will utilize the buddy system and maintain communications. In some situations, additional monitoring by the SHSO may be needed to confirm or establish the proper level of protection before the sampling team can proceed.

### 10.6 Sample Handling

Personnel responsible for the handling of samples shall wear the prescribed level of protection described in Section 8.0. Samples shall be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions will be noted. Lab personnel shall be advised of sample hazard level and the potential contaminants present. This will be accomplished by a phone call to the lab coordinator and/or inclusion of a written statement with the samples. If necessary the SHSO will review safety procedures for handling Site samples to assist or assure that these practices are appropriate for the type of suspected contaminants in the sample.

### 10.7 Waste Disposal

All waste disposal operations shall be monitored by the SHSO and carried out under the appropriate level of personal protection described in Section 8.0. Personnel shall wear the prescribed clothing, especially eye protection and chemical resistant gloves, when handling waste materials. Contamination avoidance shall be practiced at all times. Also see Section 12.0.

### 10.8 Heavy Equipment Decontamination

A steam cleaner will be utilized on Site to decontaminate the equipment.

### 10.9 Confined Space Entry

No such activities are anticipated.

### 10.10 Additional Safe Work Practices

The SHSO is to be referred to for specific concerns on each individual Site task. The safety rules listed below must be strictly followed:

- Always employ the buddy system
- Practice contamination avoidance, both on-Site and off-Site;
- Plan activities ahead of time;
- Do not climb over/under obstacles;
- Be alert to your own physical condition;
- Watch your buddy for signs of fatigue, exposure, heat or cold stress, etc.;
- Report all accidents, no matter how minor, immediately to the SHSO or FTL; and
- **KNOW YOUR HEALTH AND SAFETY PLAN**

## 11.0 DECONTAMINATION PROCEDURES

### 11.1 Contamination Prevention

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

#### Personnel

- Do not walk through areas of obvious or known contamination;
- Do not handle or touch contaminated materials directly;
- Make sure all personal protective equipment (PPE) does not have any cuts or tears prior to donning;
- Fasten all closures on suits, covering them with tape, if necessary;
- Take particular care to protect any skin injuries;
- Stay upwind of airborne contaminants; and
- Do not carry cigarettes, gum, etc. into contaminated areas.

#### Sampling/Monitoring

- When required by the SHSO, cover instruments with clear plastic, leaving an opening for sampling and exhaust ports; and
- Bag sample containers prior to the placement of sample material.

#### Heavy Equipment

- Care should be taken to limit the amount of contamination that comes in contact with heavy equipment;
- If contaminated tools are to be placed on non-contaminated equipment for transport to the decontamination pad, plastic should be used to keep the equipment clean; and
- Excavated soils should be contained and kept out of the way of workers.

### 11.2 Decontamination

At the conclusion of Site activities each day, or when leaving the work zone, personnel and equipment shall be thoroughly decontaminated.

## 12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way so as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-Site. All potentially contaminated materials (e.g., soil, clothing, gloves, etc.) will be bagged or drummed, as necessary, and segregated for disposal. All contaminated materials shall be disposed of in accordance with appropriate regulations. All

non-contaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste.

### 13.0 EMERGENCY PLAN

As a result of hazards on-Site and the conditions under which operations are conducted, the possibility of an emergency exists. An emergency plan is required by OSHA (29CFR 1910.120) to be available for use and is included below. A copy of this plan shall be posted in the Support zone at each work Site.

The Site Emergency Coordinator(s) shall implement this emergency plan whenever conditions at the Site warrant such action.

#### 13.1 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of particulates, etc., an air horn or other appropriate device will be sounded by the FTL or SHSO for approximately ten seconds indicating the initiation of evacuation procedures. All persons in both the restricted and non-restricted areas will evacuate and assemble in a safe area as identified by the Site Emergency Coordinator(s). The Site Emergency Coordinator(s) will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SHSO or FTL must see that access for emergency equipment is provided and that all combustion apparatus has been shutdown once the alarm has been sounded. Once the safety of all personnel is established, the fire department and other emergency response groups will be notified by telephone of the emergency.

#### 13.2 Potential or Actual Fire or Explosion

If the potential for a fire exists or if an actual fire or explosion occurs, the following procedure will be implemented:

- Immediately evacuate the Site as described above (Section 13.1) and
- Notify fire and police  
Fire Department: 911  
Police Department: 911

#### 13.3 Environmental Incident (Release or Spread of Contamination)

In the event of an environmental incident, the Site Emergency Coordinator(s) shall instruct a person on-Site to immediately contact police and fire authorities to inform them of the possible or immediate need for nearby evacuation. If a significant release has occurred, the

National Response Center and other appropriate groups should be contacted. Those groups will alert governmental, national or regional response teams as necessary.

Type	Name	Telephone #
Fire Department	OFD	911
Police Department	OPD	911
National Response Center (Release or Spill)		(800)424-8802
Health and Safety Manager	Linda Wilson	(516)673-7200

#### 13.4 Personal Injury

Emergency first aid shall be applied on-Site as deemed necessary to stabilize the patient. Other emergency response will be taken as necessary.

#### 13.5 Overt Personnel Exposure

If an overt exposure to toxic materials should occur, the exposed person shall be treated on-Site as follows:

**Skin Contact:** Wash/rinse affected area thoroughly with copious amounts of soap and water, then provide appropriate medical attention. Eyes should be rinsed for at least fifteen (15) minutes upon chemical contamination.

**Inhalation:** Move to fresh air and/or if necessary, decontaminate and transport to the hospital.

**Ingestion:** Decontaminate and transport to emergency medical facility.

### 13.6 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Heavy rainfall;
- Potential for heat stress;
- Potential for cold stress and cold-related injuries:
- Limited visibility;
- Potential for electrical storms:
- Potential for malfunction of H & S monitoring equipment or gear; and
- Potential for accidents.

### 14.0 AUTHORIZATIONS

Personnel authorized to enter the Site while operations are being conducted must be approved by the SHSO, FTL and Site Manager. Authorization will involve completion of appropriate training courses, medical examination requirements as specified by OSHA 29CFR 1910,120, and review and sign-off of this HASP. All personnel must utilize the buddy system or trained escort, and check in with the FTL.

### 15.0 FIELD TEAM REVIEW

See attached form.

### 16.0 APPROVAL PAGE

See Attached form.

### 17.0 ATTACHMENTS

- Injury/Incident Report
- Site Safety Follow-up Report
- Field Change Request
- OSHA Poster
- Hospital Location Map





TABLE 1. Toxicological, Physical, and Chemical Properties of Gasoline Constituents  
ARCO Facility No. 2185, 9800 East 14th Street, Oakland, California

COMPOUND	CAS #	TLV (mg/m <sup>3</sup> )	PEL (mg/m <sup>3</sup> )	ROUTES OF EXPOSURE	TOXIC PROPERTIES	TARGET ORGANS	CARCINOGEN	PHYSICAL AND CHEMICAL PROPERTIES
Benzene	71-43-2	100 ppm	100 ppm	Inhalation, Absorption, Ingestion, Contact	Sensory Irritant Bone Marrow Depressant, Central Nervous (CNS) Depressant	Blood, CNS, Skin Bone, Marrow, Eyes, Respiratory System	OSHA, ACGIH, IARC, NTP	Liquid, Aromatic Odor, Boiling Point = 176F, Flash Point = 12F, Vapor Density = 2.7
Ethyl- benzene	100-41-4	100 ppm	100 ppm	Inhalation, Absorption, Ingestion,	CNS Depressant, Sensory Irritant Narcosis	Eyes, Upper Respiratory System	No	Liquid, Aromatic Odor, Boiling Point = 277F, Flash Point = 59F, Vapor Density = 3.66
Toluene	108-88-3	100 ppm	100 ppm	Inhalation, Absorption,	CNS Depressant Sensory Irritant, Dermatitis	CNS, Liver Kidneys, Skin	No	Liquid Aromatic Odor, Boiling Point = 231F, Flash Point = 40F, Vapor Density = 3.14
Xylenes	1330-20-7	100 ppm	100 ppm	Inhalation, Absorption, Ingestion, Contact	CNS Depressant, Sensory Irritant, Dermatitis, Abdominal Pain	CNS, Eyes, GI Tract, Blood Liver, Kidneys, Skin	No	Liquid Aromatic Odor, Boiling Point 281F-292F, Flash Point = 81-90F, Vapor Density = 3.7
Gasoline	8006-61-9	300 ppm	300 ppm	Inhalation, Absorption, Ingestion, Contact	CNS Depressant, Sensory Irritant, Dermatitis, Pulmonary Edema	CNS, Eyes, Skin, Respiratory System	No	Liquid Aromatic Odor, Flash Point = 50F, Vapor Density = 3.0-4.0

References:

"NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards". Mackinson, Frank W., Stricoff, R. Scott, Partridge, Jr., Lawrence J.; Government Printing Office, 1981.

"Documentation of Threshold Limit Values and Biological Exposure Indices". American Conference of Governmental Industrial Hygienists, 5th Edition, 1986.

"Guide to Occupational Exposure Values". American Conference of Governmental Industrial Hygienists, 1990.

"Dangerous Properties of Industrial Materials". Sax, Irving N., Lewis, Sr., Richard J. Van Norstrand Reinhold Company, 7th Edition, Volume III, 1989.

SITE: ARCO Facility No. 2185

DIRECTION TO HUMANA HOSPITAL: Southeast on East 14th Street for 3 miles. The hospital is on the corner of E 36 Avenue and East 14th Street, on the left.

HUMANA HOSPITAL  
415-357-6500

