

Harding Lawson Associates



January 9, 1992

Alameda County Environmental Health Department  
80 Swan Way, Room 200  
Oakland, California 94621

Attention: Mr. Ed Howell

Gentlemen:

Quarterly Technical Reports  
Fourth Quarter 1991  
Three Shell Oil Company Sites  
East Bay Retail District

Enclosed are copies of quarterly technical reports for two Shell Oil Company sites in Alameda County on which Shell service stations are/or were located. These reports are issued to you on behalf of Shell Oil Company.

The sites for which reports are enclosed are specifically:

- 5755 Broadway, Oakland
- 6039 College Avenue, Oakland

We trust that this provides the information required at this time. Please call if you have questions.

Yours very truly,

HARDING LAWSON ASSOCIATES

A handwritten signature in cursive script that reads 'Terence J. McManus'.

Terence J. McManus  
Associate Environmental Scientist

TJM/tls 017/TJM1

cc: Shell Oil Company (without enclosure)  
Environmental Engineering  
P.O. Box 5278  
Concord, California 94520  
Attention: Mr. E. Paul Hayes

92 JAN 13 07 0:57

A Report Prepared for  
Shell Oil Company  
Environmental Engineering  
P.O. Box 5278  
Concord, California 94520

QUARTERLY TECHNICAL REPORT  
FOURTH QUARTER OF 1991  
SHELL SERVICE STATION  
5755 BROADWAY  
OAKLAND, CALIFORNIA  
SHELL WIC NO. 204-5510-0303

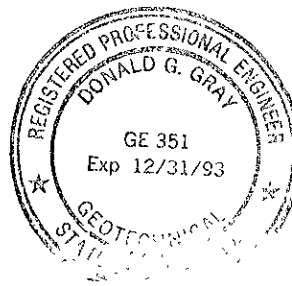
STIP 3618  
94618

HLA Job No. 4022,218.03

by

*Michael J. Brink* for MTB  
Michael J. Brink  
Project Engineer

*Donald G. Gray*  
Donald G. Gray  
Geotechnical Engineer



Harding Lawson Associates  
1355 Willow Way, Suite 109  
Concord, California 94520  
510/687-9660

January 2, 1992

## INTRODUCTION

This Quarterly Technical Report by Harding Lawson Associates (HLA) describes the status of our continuing evaluation of the presence of petroleum hydrocarbons in soil and groundwater in the vicinity of the Shell Oil Company (Shell) service station at 5755 Broadway in Oakland, California (Plate 1). This report discusses the site history and investigation progress through the fourth quarter of 1991, and summarizes activities we plan to undertake in the first quarter of 1992.

## SITE HISTORY

HLA understands that this facility was a Thrifty service station prior to 1972, when Shell leased the parcel for its current activities. The facility consists of three underground storage tanks (USTs), four canopy-covered dispenser islands, and a combined office building and cashier booth (Plate 2). The current USTs, each of 10,000-gallon capacity and double-wall fiberglass construction, were installed in late 1985 and are used for the storage of gasoline (regular leaded, unleaded, and super unleaded).

As part of a soil and groundwater assessment in June 1985, Gettler-Ryan Inc. (GRI) installed one soil boring (S-A) and a separate 4-inch-diameter monitoring well (S-1) on the site to depths of approximately 12 feet. Boring logs, well construction details, and results of analyses on samples were presented to

Shell in a letter from EMCON Associates (subcontractor to GRI) dated August 1, 1985. Low concentrations (up to 3 parts per million [ppm]) of total petroleum hydrocarbons (TPH) as gasoline were detected in soil samples from 5 to 10 feet deep in S-A, although a deeper soil sample (about 11.5 feet below grade) contained no detectable concentrations of TPH as gasoline. Table 1 shows these results, along with results of subsequent soil sampling and analyses performed by HLA.

A groundwater sample collected in 1985 from the monitoring well (S-1) had TPH as gasoline at 2,400 parts per billion (ppb), and benzene at 240 ppb (Table 2). These data indicated that petroleum hydrocarbons had entered the soil and groundwater on site.

On August 10, 1989, Shell retained HLA to complete the site assessment and evaluate the need for remediation. On August 15, 1989, HLA obtained a groundwater sample from S-1. That sample contained concentrations of TPH as gasoline and benzene (Table 2) in respective concentrations of 170 and 0.6 ppb.

In September 1989, HLA drilled two soil borings, S-2 and S-3. Drilling was performed under the direction of an HLA field engineer, who obtained soil samples and converted the borings to groundwater monitoring wells in the manner outlined in HLA's work plan dated October 13, 1989. HLA has monitored the wells quarterly since November 1989, including collection and analysis of water samples. Results of analyses on soil and groundwater samples are summarized in Tables 1 and 2, respectively.

## ACCOMPLISHMENTS DURING THE FOURTH QUARTER OF 1991

Groundwater Sampling

On November 22, 1991, HLA collected groundwater samples from S-1 through S-3. Before sampling, approximately three casing volumes of water was purged from each well while monitoring temperature, pH, dissolved oxygen, and conductivity. After these parameters stabilized, groundwater samples were collected with a Teflon<sup>TM</sup> bailer, and decanted directly into laboratory-prepared volatile organic analysis (VOA) vials. Between wells, all purging and sampling equipment was cleaned with an Alconox solution and rinsed with deionized water. The sample containers were labeled and placed into an ice-chilled cooler and delivered under chain-of-custody to Sequoia Analytical Laboratory, a state-certified chemical testing laboratory in Redwood City, California. Samples were analyzed for TPH as gasoline (USEPA Test Method 8015, modified) and for benzene, toluene, ethylbenzene, and total xylenes (BTEX [USEPA Test Method 8020]).

Chemical Test Results

The results of chemical analyses on groundwater samples are presented in Table 2; concentrations of TPH as gasoline and benzene are shown on Plate 2. The laboratory report and chain-of-custody are in the appendix. Results of analysis on groundwater from S-1 indicated 2.3, 0.46, and 0.65 ppb of benzene, toluene, and xylenes, respectively; TPH as gasoline and ethylbenzene were not detected in groundwater from S-1. Results

of analyses on groundwater from S-2 indicated 1,600 ppb of TPH as gasoline, and 110, 9.3, 29 and 150 ppb, respectively, for the BTEX compounds. The water sample from S-3 showed non-detectable concentrations of all compounds tested. As shown in Table 2, the concentrations of petroleum hydrocarbons in groundwater from S-1 and S-2 have fluctuated since these wells were installed. Data for S-3 have consistently shown non-detectable concentrations of TPH and BTEX components since that well was installed in September, 1989.

#### Water-level Measurements

Water-level measurements were obtained on November 22, 1991, using a chalked steel tape accurate to 0.01 feet. Well survey and water-level data are presented in Table 3. Shallow groundwater, as measured in S-1 through S-3, was between 4 and 5 feet below grade. The direction of groundwater flow, as inferred from the calculated direction of the hydraulic gradient, is to the south (Plate 2). The groundwater elevation has dropped slightly during the last quarter. The rate of groundwater movement was not determined in this study.

ANTICIPATED ACTIVITIES FOR THE FIRST QUARTER 1992

The following tasks are planned by Shell for the first quarter of 1992:

- Conduct quarterly monitoring activities, including measurement of water levels, checking for free product, and sampling of groundwater from each of the monitoring wells.
- Submit groundwater samples for TPH and BTEX analyses.
- Prepare a quarterly report with results of the monitoring activities and results of groundwater analyses.

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Table	1	Summary of Analyses on Soil Samples
Table	2	Summary of Analyses on Groundwater Samples
Table	3	Well-survey and Water-level Data

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Plate	2	Site Plan

APPENDIX

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Laboratory Report and Chain-of-Custody



TABLES

Table 1. Summary of Analyses on Soil Samples

<u>Sample Number</u>	<u>Depth (ft)</u>	<u>Sampling Date</u>	<u>TPH as Gasoline (ppm)</u>	<u>Benzene (ppm)</u>	<u>Toluene (ppm)</u>	<u>Ethyl-benzene (ppm)</u>	<u>Xylenes (ppm)</u>
S-A*	5.5	06/12/85	3	--	--	--	--
S-A*	10	06/12/85	2	--	--	--	--
S-A*	11.5	06/12/85	ND	--	--	--	--
S-2-1	3.0	09/18/89	92	.120	.800	.580	4.20
S-3-1	3.0	09/18/89	ND (10)	ND (.025)	.062	ND (.025)	.120

---

Detection limits in parentheses

ND = Not detected

TPH = Total petroleum hydrocarbons

\* From Emcon report dated 08/01/85

-- Not Tested

Table 2. Summary of Analyses on Groundwater Samples

Well Number	Sampling Date	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
S-1	07/03/85*	2,400	240	9.8	380	--
	08/15/89	170	0.6	ND (.5)	ND (1.5)	ND (1.5)
	11/13/89	90	1.2	ND (.5)	ND (1.5)	ND (1.5)
	01/18/90	ND (50)	57	3.1	5.7	10
	04/11/90	520	120	2.2	.44	6.0
	07/27/90	ND (30)	2.7	0.31	ND (.3)	0.47
	10/17/90	ND (30)	0.99	ND (.3)	ND (.3)	ND (.3)
	01/25/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	06/03/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	08/30/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	11/22/91	ND (30)	2.3	0.46	ND (.3)	0.65
S-2	09/22/89	260	15	2	1	13
	11/13/89	910	64	5.8	13	84
	01/18/90	1,100	74	5.6	13	45
	04/11/90	2,900	510	6.5	29	120
	07/27/90	700	210	2.5	18	33
	10/17/90	320	44	0.75	7.9	4.6
	01/25/91	450	140	1.8	6.2	15
	06/03/91	490	150	2.7	8.2	7.0
	08/30/91	70	0.37	ND (.3)	ND (.3)	ND (.3)
	11/22/91	1,600	110	9.3	29	150
S-3	09/22/89	ND (50)	ND (.5)	ND (.5)	ND (1.5)	ND (1.5)
	11/13/89	ND (50)	ND (.5)	ND (.5)	ND (1.5)	ND (1.5)
	01/18/90	ND (50)	ND (.5)	ND (.5)	ND (.5)	ND (.5)
	04/11/90	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	07/27/90	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	10/17/90	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	01/25/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	06/03/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	08/30/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)
	11/22/91	ND (30)	ND (.3)	ND (.3)	ND (.3)	ND (.3)

Detection limits in parentheses

ND = Not present above detection limits

ppb = Parts per billion

TPH = Total petroleum hydrocarbons

\* From EMCON report dated 08/01/85

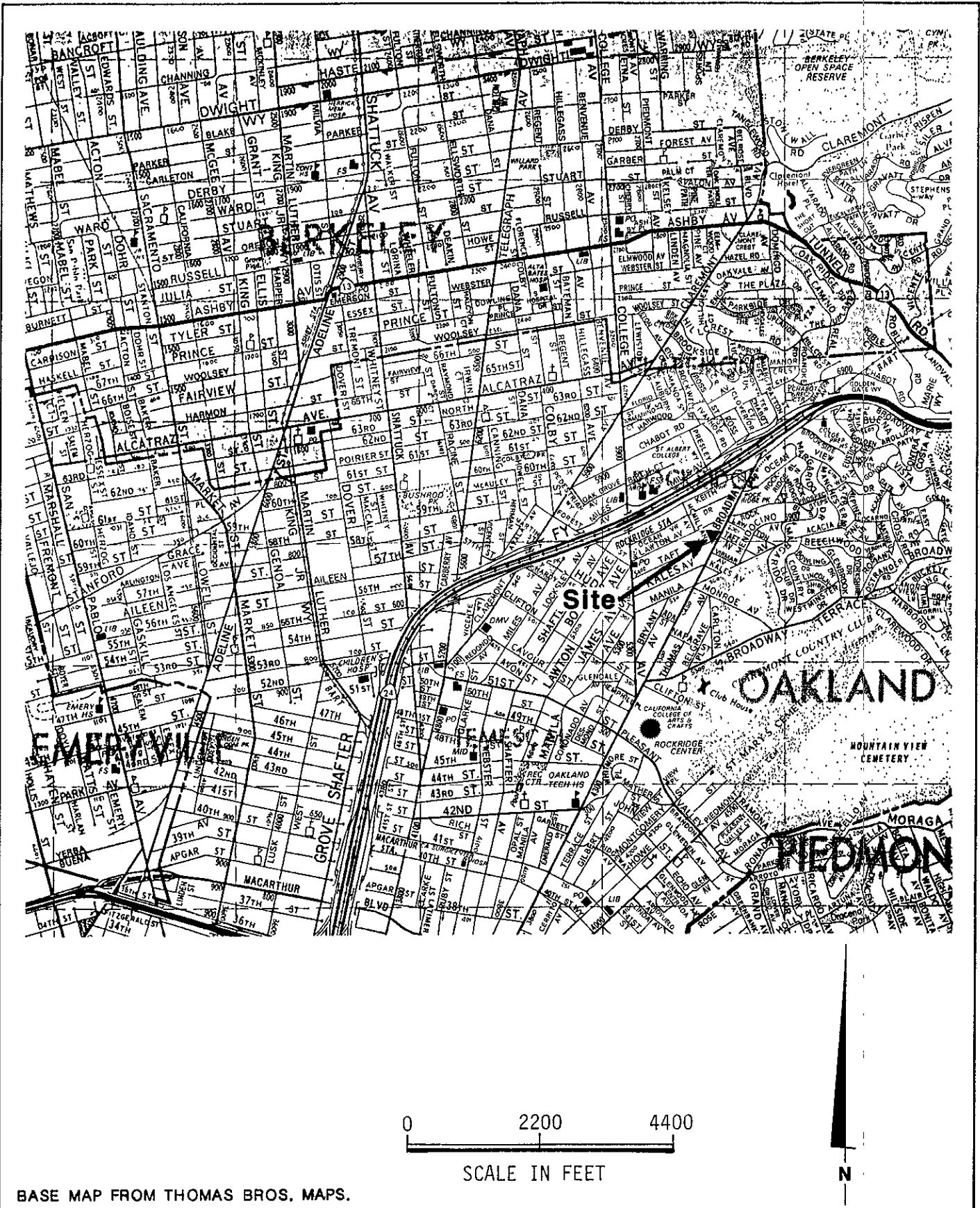
-- = Not tested

Table 3. Well-survey and Water-level Data

<u>Well Number</u>	<u>Date</u>	<u>Top of Casing (feet)</u>	<u>Depth to Groundwater (feet)</u>	<u>Relative Groundwater Elevation (feet)</u>
S-1	10/05/89	*100.00	3.80	96.20
	11/13/89		3.72	96.12
	01/18/90		2.87	97.13
	02/20/90		2.71	97.29
	04/11/90		3.36	96.64
	07/27/90		3.60	96.40
	10/17/90		4.09	95.91
	01/25/91		3.88	96.12
	06/03/91		3.51	96.49
	08/30/91		4.24	95.76
	11/22/91		4.29	95.71
	S-2	10/05/89	98.92	4.44
11/13/89			4.44	94.48
01/18/90			3.41	95.51
02/20/90			3.19	95.73
04/11/90			3.94	94.98
07/27/90			4.13	94.79
10/17/90			4.57	94.35
01/25/91			4.52	94.40
06/03/91			4.02	94.90
08/30/91			4.70	94.22
11/22/91			4.72	94.20
S-3		10/05/89	101.67	3.97
	11/13/89		3.76	97.91
	01/18/90		2.43	99.24
	02/20/90		2.27	99.40
	04/11/90		2.88	98.79
	07/27/90		3.55	98.12
	10/17/90		4.29	97.38
	01/25/91		3.84	97.83
	06/03/91		3.25	98.42
	08/30/91		4.73	96.94
	11/22/91		4.81	96.86

\* Temporary datum of 100.00 feet assigned to top-of-casing at well number S-1

ILLUSTRATIONS



BASE MAP FROM THOMAS BROS. MAPS.



**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

**Vicinity Map**  
 Shell Service Station  
 5755 Broadway  
 Oakland, California

PLATE

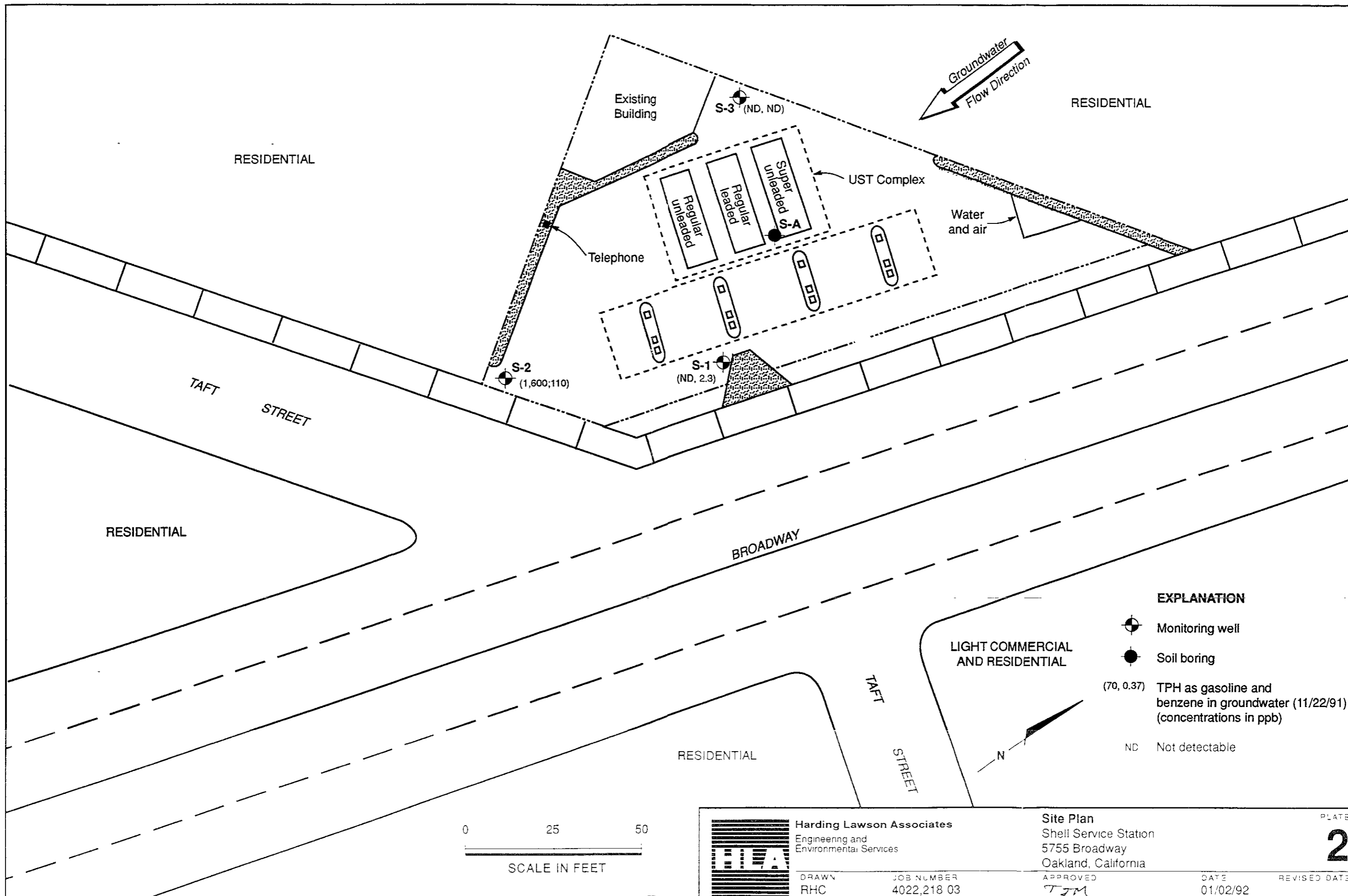
**1**

DRAWN KH JOB NUMBER 4022,218.03

APPROVED *[Signature]*

DATE 8/89

REVISED DATE



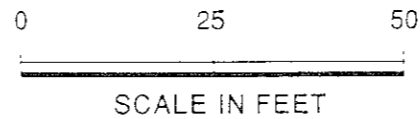
**EXPLANATION**

Monitoring well

Soil boring

(70, 0.37) TPH as gasoline and benzene in groundwater (11/22/91) (concentrations in ppb)

ND Not detectable



**Harding Lawson Associates**  
Engineering and Environmental Services

DRAWN RHC JOB NUMBER 4022,218 03

**Site Plan**  
Shell Service Station  
5755 Broadway  
Oakland, California

APPROVED TJM

DATE 01/02/92

REVISED DATE

PLATE

**2**

APPENDIX  
LABORATORY REPORT AND CHAIN-OF-CUSTODY





# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Harding Lawson Associates  
1355 Willow Way, Suite 109  
Concord, CA 94520  
Attention: Mike Brink

HARDING ASSOC.

Project: 5755 Broadway, Shell

DEC 9 1991

Enclosed are the results from 3 water samples received at Sequoia Analytical on November 22, 1991. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
1115111	Water, S-1	11/22/91	EPA 5030/8015/8020
1115112	Water, S-2	11/22/91	EPA 5030/8015/8020
1115113	Water, S-3	11/22/91	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Malle A. Springer  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Harding Lawson Associates  
1355 Willow Way, Suite 109  
Concord, CA 94520  
Attention: Mike Brink

Client Project ID: 5755 Broadway, Shell  
Matrix Descript: Water  
Analysis Method: EPA 5030/8015/8020  
First Sample #: 111-5111

Sampled: Nov 22, 1991  
Received: Nov 22, 1991  
Analyzed: Dec 2, 1991  
Reported: Dec 3, 1991

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

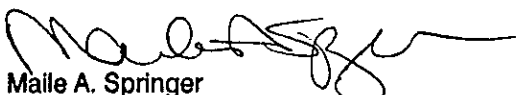
Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)
111-5111	S-1	N.D.	2.3	0.46	N.D.	0.65
111-5112	S-2	1600	110	9.3	29	150
111-5113	S-3	N.D.	N.D.	N.D.	N.D.	N.D.

**Detection Limits:**

30                      0.30                      0.30                      0.30                      0.30

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Maile A. Springer  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Harding Lawson Associates  
1355 Willow Way, Suite 109  
Concord, CA 94520  
Attention: Mike Brink

Client Project ID: 5755 Broadway, Shell

QC Sample Group: 1115111; 1115113

Reported: Dec 3, 1991

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
---------	---------	---------	---------------	---------

Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A.P. Maralit	A.P. Maralit	A.P. Maralit	A.P. Maralit
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Dec 2, 1991	Dec 2, 1991	Dec 2, 1991	Dec 2, 1991
QC Sample #:	GBLK120291	GBLK120291	GBLK120291	GBLK120291

Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	8.3	8.4	8.4	25
Matrix Spike % Recovery:	83	84	84	83
Conc. Matrix Spike Dup.:	8.2	8.3	8.3	25
Matrix Spike Duplicate % Recovery:	82	83	83	83
Relative % Difference:	1.2	1.2	1.2	0.0

SEQUOIA ANALYTICAL

Maile A. Springer  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Delta Environmental Consultants  
3330 Data Drive  
Rancho Cordova, CA 95670  
Attention: Mike Brink

Client Project ID: 3725 Tracy Blvd., Shell

QC Sample Group: 111-4566

Reported: Dec 3, 1991

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Laikhtman	M. Laikhtman	M. Laikhtman	M. Laikhtman
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Dec 3, 1991	Dec 3, 1991	Dec 3, 1991	Dec 3, 1991
QC Sample #:	GBLK120391	GBLK120391	GBLK120391	GBLK120391
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	10	10	10	31
Matrix Spike % Recovery:	100	100	100	103
Conc. Matrix Spike Dup.:	9.4	9.7	10	30
Matrix Spike Duplicate % Recovery:	94	97	100	100
Relative % Difference:	6.2	3	0.0	3.3

SEQUOIA ANALYTICAL

*Maile A. Springer*  
Maile A. Springer  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



**SHELL OIL COMPANY**  
RETAIL ENVIRONMENTAL ENGINEERING - WEST

**CHAIN OF CUSTODY RECORD**

Date: 11/22/91

Serial No.: \_\_\_\_\_

Page 1 of 1

Site Address:

5755 BROADWAY, OAKLAND

WIC#:

204-5510-0303

Shell Engineer:

PAUL HAYES

Phone No. 510

685-3852

Fax #: 685-3943

Consultant Name & Address:

HARDING LAWSON ASSOCIATES  
1355 WILLOW WAY, STE 109 CONCORD CA 94520

Consultant Contact:

MIKE BRINK

Phone No. 510

687-9660

Fax #: 687-9673

Comments:

Sampled By: Doreen Meyer

Printed Name:

Sample ID	Date	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal					Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
S-1	11/22/91		X		3	X		X							VoA	HCL	N	GROUNDWATER	111511
S-2	?		X		3	X		X							VoA	HCL	N	"	↓ 12
S-3			X		3	X		X							VoA	HCL	N	"	↓ 13

Relinquished By (signature):

Relinquished By (signature):

Relinquished By (signature):

Printed name:

Doreen Meyer

Printed name:

KEVIN WANS LAM BROOK

Printed name:

Date: 11/22/91

Time: 6:15pm

Date: 11/25/91

Time: 11:00 AM

Date:

Time:

Received (signature):

Kevin Van Lambrook

Received (signature):

M Nguyen

Received (signature):

11/25 11:30

Printed name:

KEVIN WANS LAM BROOK

Printed name:

NGUYEN

Printed name:

NGUYEN

Date: 11/25/91

Time: 9:30am

Date:

Time:

Date:

Time:

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN OF CUSTODY WITH INVOICE AND RESULTS

DISTRIBUTION

1 copy: Shell Oil Company  
Environmental Engineering  
P. O. Box 5278  
Concord, California 94520  
Attention: Mr. E. Paul Hayes

1 copy: Shell Oil Company  
Environmental Engineering  
P. O. Box 5278  
Concord, California 94520  
Attention: Ms. Lisa Foster

1 copy: San Francisco Bay Regional  
Water Quality Control Board  
2101 Webster Street, Suite 500  
Oakland, California 94607  
Attention: Mr. Tom Callaghan

1 copy: Alameda County Environmental  
Health Department  
80 Swan Way, Room 200  
Oakland, California 94621  
Attention: Mr. Ed Howell

MJB/DGG/pkp 032523M/R52

QUALITY CONTROL REVIEWER



---

Terence J. McManus  
Associate Environmental Scientist