GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(510) 352-4800

December 9, 1991

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

Attention: Mr. Paul Smith

Reference: Shell Service Station
350 Grand Avenue
Oakland, California
WIC 204-5510-0204

Mr. Smith:

As requested by Mr. Paul Hayes of Shell Oil Company, we are forwarding a copy of the December 9, 1991 Site Update report for the above referenced location. This report presents the results of the 1991 fourth quarter ground-water sampling.

Should you have any questions or comments please do not hesitate to call.

Sincerely,

John Werfal
Project Manager

enclosure

cc: Paul Hayes, Shell Oil Company.
Tom Callaghan, Regional Water Quality Control Board

GeoStrategies Inc.

SITE UPDATE

Shell Service Station
350 Grand Avenue
Oakland, California
WIC 204-5510-0204

766702-6

December 9, 1991

GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(510) 352-4800

December 9, 1991

Shell Oil Company
P.O. Box 5278
Concord, California 94520

Attn: Mr. E. Paul Hayes

Re: SITE UPDATE
Shell Service Station
350 Grand Avenue
Oakland, California

Gentlemen:

This Site Update has been prepared by GeoStrategies Inc. (GSI) and presents the results of the 1991 fourth quarter ground-water sampling performed by Gettler-Ryan Inc. (G-R) for the above referenced site (Plate 1). The scope of work presented in this document was performed at the request of Shell Oil Company. Field work and laboratory analysis methods were performed to comply with current State of California Water Resources Control Board (SWRCB) guidelines.

SITE BACKGROUND

There are currently three monitoring wells at the site; Wells S-1 through S-3 (Plate 2). These wells were installed in January, 1991 by GSI to evaluate the vertical and horizontal extent of petroleum hydrocarbons in soils and shallow groundwater beneath the site.

Quarterly monitoring and sampling of wells began in January 1991. Ground-water samples have been analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) and as Diesel (TPH-Diesel) according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) according to EPA Method 8020.

CURRENT QUARTERLY SAMPLING RESULTS

Potentiometric Data

Prior to ground-water sampling, depth to water-level measurements were obtained in each well using an electronic oil-water interface probe. Static ground-water levels were measured from the surveyed top of well box and recorded to the nearest ± 0.01 foot. Corresponding elevations to Mean Sea Level (MSL) have been plotted on Plate 3 and are summarized in Table 1. The static ground-water level in Well S-3 appears anomalous and was not used for contouring.

Floating Product Measurements

Each well was checked for the presence of floating product using a portable oil-water interface probe. A clear acrylic bailer was used to confirm interface probe results. Floating product was not detected in the wells this quarter.

Ground-water Analytical Data

Ground-water samples were collected on October 9, 1991. The samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) and as Diesel (TPH - Diesel) according to EPA Method 8015 (Modified), and for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020 by International Technology (IT) Analytical Services, a State of California certified laboratory located in San Jose, California.

TPH-Gasoline was detected in Wells S-1 and S-2 at concentrations of 0.12 parts per million (ppm) and 29. ppm, respectively. Benzene was detected in Wells S-1 and S-2 at concentrations of 0.010 and 6.3 ppm, respectively. TPH-Diesel was detected in Wells S-1 and S-2 at concentrations of 0.26 and 32. ppm, respectively. These data are summarized in Table 2 and included in Appendix A. Chemical isoconcentration maps for TPH-Gasoline, TPH-Diesel and benzene are presented on Plates 4, 5, and 6. Historical chemical analytical data are presented in Table 3.

Quality Control

The Quality Control sample for this quarter's sampling was a trip blank. This sample was prepared in the laboratory using organic-free water to evaluate laboratory sample handling procedures. The results of QC sample analyses are presented in Table 2.

If you have any questions, please call.

GeoStrategies Inc. by,

Ellen C. Fortenmiller for

Stephen J. Carter
Geologist

John F. Vargas
Senior Geologist
R.G. 5046

REGISTERED GEOLOGIST
JOHN F. VARGAS
NO. 5046
STATE OF CALIFORNIA

SJC/JFV/kjj

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Ground-water Elevation Map
Plate 4. TPH-G/TPH-D Benzene Concentration Map

Appendix A: Laboratory Analytical Report and Chain-of-Custody

QC Review: JP

766702-6

TABLE 1

FIELD MONITORING DATA

WELL NO.	MONITORING DATE	CASING DIA. (IN)	TOTAL WELL DEPTH (FT)	WELL ELEV. (FT)	DEPTH TO WATER (FT)	PRODUCT THICKNESS (FT)	STATIC WATER ELEV. (FT)	PURGED WELL VOLUMES	pH	TEMPERATURE (F)	CONDUCTIVITY (uMHOS/cm)
S-1	09-Oct-91	3	17.6	20.84	9.62	----	11.22	2	7.19	70.1	676
S-2	09-Oct-91	3	15.0	21.24	10.26	----	10.98	2	6.67	71.9	680
S-3	09-Oct-91	3	15.1	22.70	12.98	----	9.72	2	6.51	70.1	451

TOC?
gw elev?

Notes: 1. Static water elevations referenced to Mean Sea Level (MSL).
2. Physical parameter measurements represent stabilized values.

TABLE 2

GROUND-WATER ANALYSIS DATA

WELL NO	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TPH-D (PPM)
S-1	09-Oct-91	15-Oct-91	0.120	0.010	<0.0005	<0.0005	<0.0005	0.26^
S-2	09-Oct-91	16-Oct-91	29.000	6.3	0.51	1.7	2.4	32*
S-3	09-Oct-91	15-Oct-91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.05
TB	----	14-Oct-91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	0.06

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS
Benzene 0.001 ppm Xylenes 1.750 ppm Ethylbenzene 0.680 ppm

CURRENT DHS ACTION LEVELS
Toluene 0.1000 ppm

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel

PPM = Parts Per Million
TB = Trip Blank

Note: 1. All data shown as <x are reported as ND (none detected).
2. DHS Action Levels and MCLs are subject to change pending State review.

^ Compounds detected and calculated as high boiling hydrocarbons consist of compounds eluting within the chromatographic range of diesel, but not characteristic of the standard diesel pattern.

* Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline.

766702-6

TABLE 3

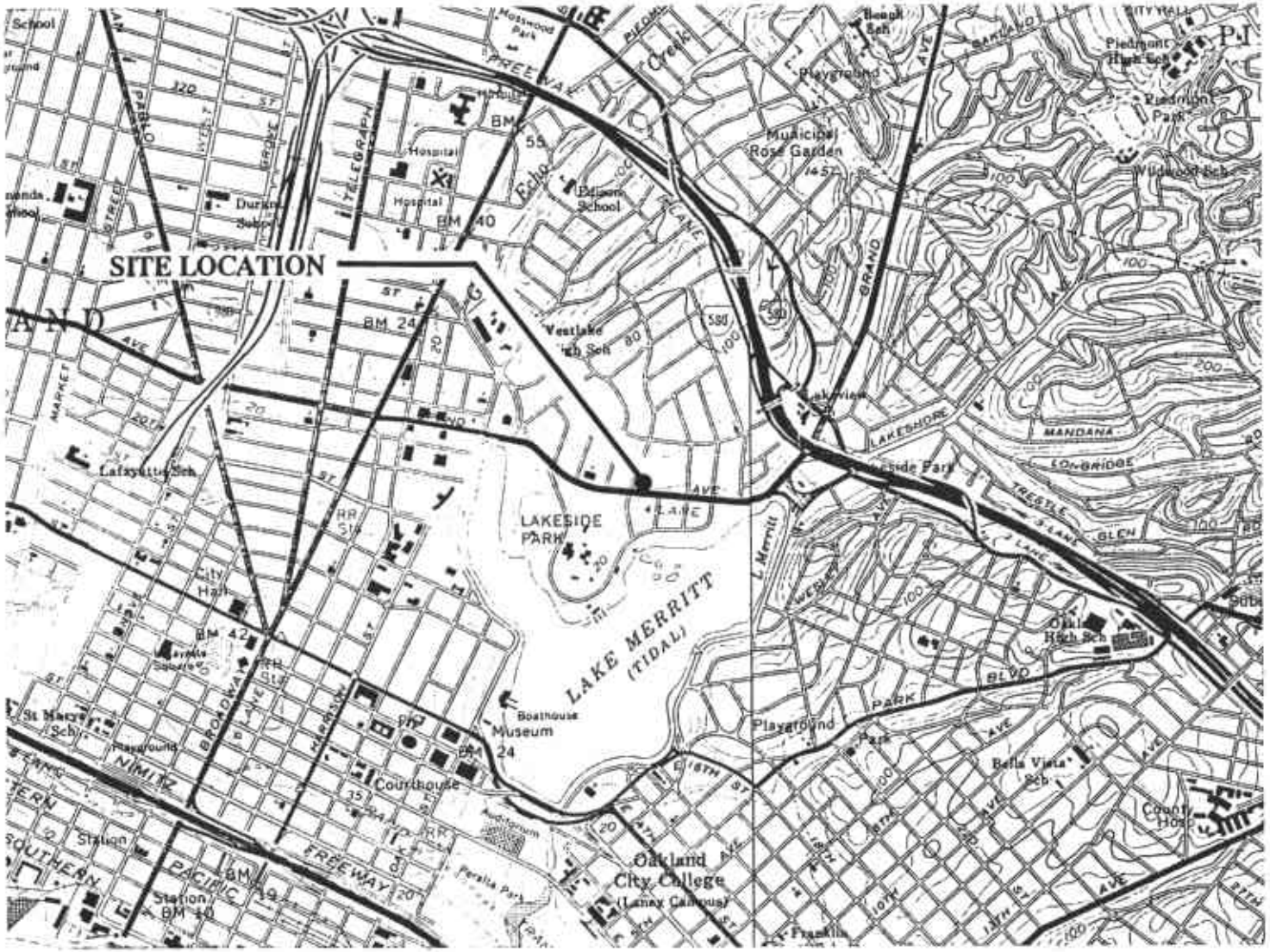
HISTORICAL GROUND WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TPH-D (PPM)
23-Jan-91	S-1	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.05
25-Apr-91	S-1	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.05
19-Jul-91	S-1	<0.05	0.0068	<0.0005	<0.0005	<0.0005	<0.05
09-Oct-91	S-1	0.12	0.010	<0.0005	<0.0005	<0.0005	0.26^
23-Jan-91	S-2	2.5	0.55	0.015	0.033	0.042	1.2
25-Apr-91	S-2	32.	2.9	0.48	1.4	2.3	20.*
19-Jul-91	S-2	21.	4.7	0.43	1.2	2.4	30.*
09-Oct-91	S-2	29.	6.3	0.51	1.7	2.4	32.*
25-Apr-91	S-3	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	N/A
19-Jul-91	S-3	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	N/A
09-Oct-91	S-3	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	N/A

Current Regional Water Quality Control Board Maximum Contaminant Levels
Benzene 0.001 ppm Xylenes 1.750 ppm Ethylbenzene 0.680 ppm

Current DHS Action Levels Toluene 0.1000 ppm

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million
* Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline.
^ Compounds detected and calculated as high boiling hydrocarbons consist of compounds eluting within the chromatographic range of diesel, but are not characteristic of the standard diesel standard pattern.
NOTE: 1. DHS Action levels and MCL's are subject to change pending State of California review.
2. All data shown as <X are reported as ND (none detected).



Base Map: USGS Topographic Map

GeoStrategies Inc.

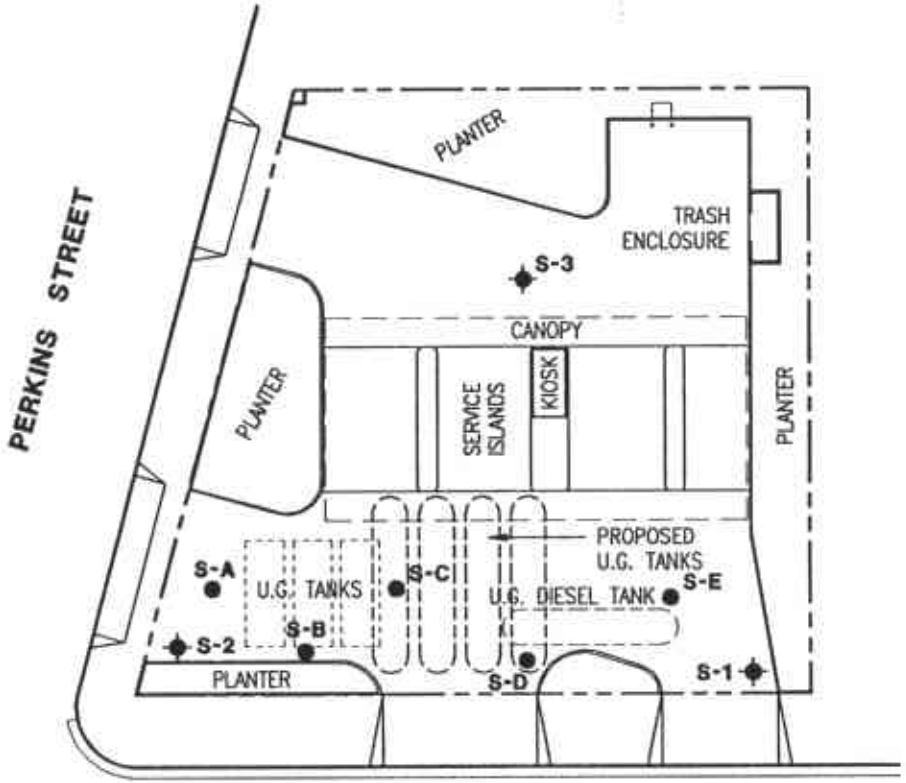
VICINITY MAP
Shell Service Station
350 Grand Avenue
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7667		3/91	

EXPLANATION

- Ground–water monitoring well
- Soil boring



Base Map: Shell Site Plan dated 12-21-89

N

0 40

Scale in Feet

GeoStrategies Inc.

SITE PLAN
Shell Service Station
350 Grand Avenue
Oakland, California

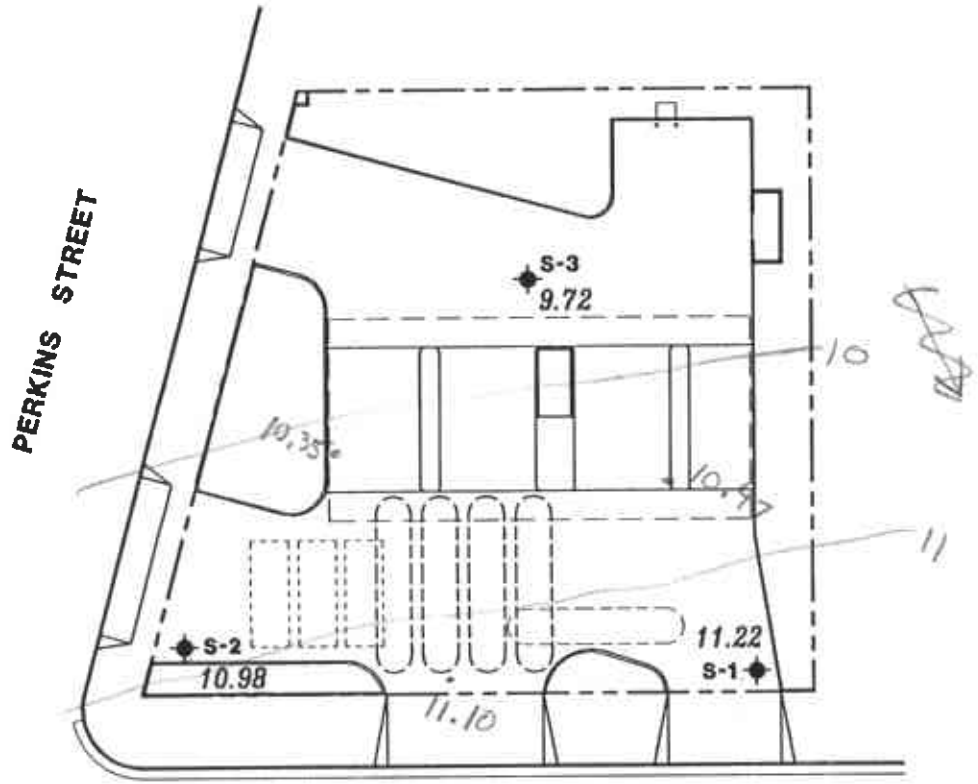
PLATE **2**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
766702-6	EFS	12/91	

EXPLANATION

✦	Ground–water monitoring well
99.99	Ground–water elevation in feet referenced to Mean Sea Level (MSL) measured on October 9, 1991

Notes: 1. Elevations may be influenced by irrigation practices and/or site construction activities.



N-NW gradient

N

0 40

Scale in Feet

Base Map: Shell Site Plan dated 12-21-89

GeoStrategies Inc.

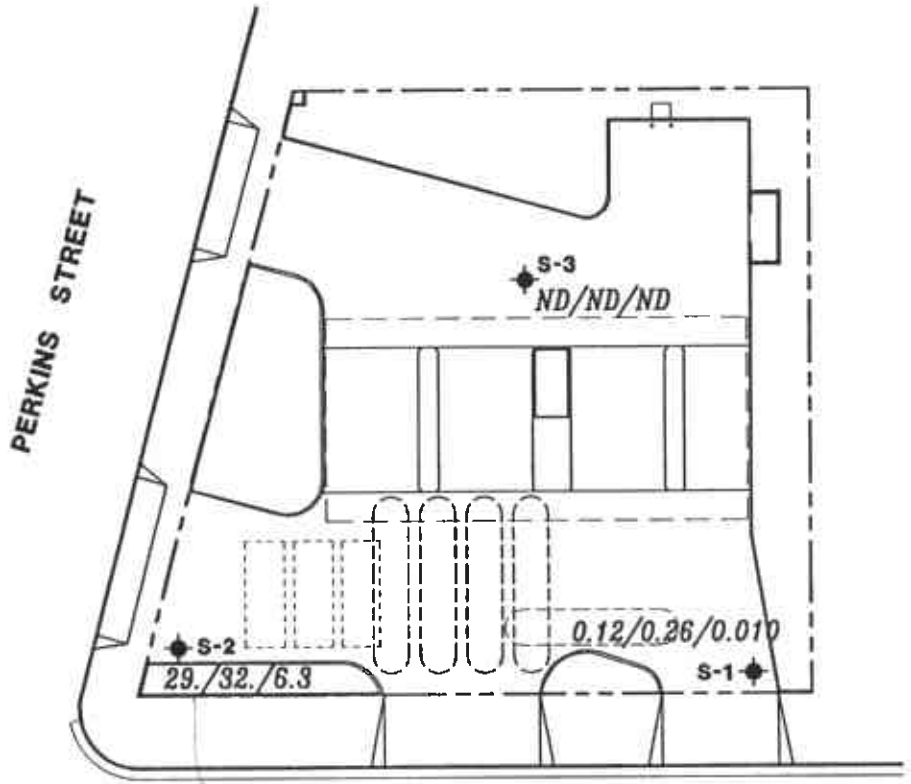
GROUND–WATER ELEVATION MAP
Shell Service Station
350 Grand Avenue
Oakland, California

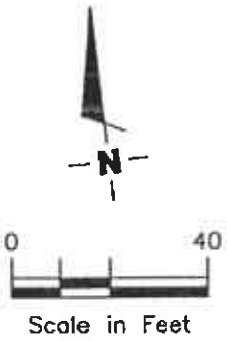
PLATE **3**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
766702–6	EFJ	12/91	

EXPLANATION

- ✦ Ground–water monitoring well
- *A/B/C* TPH–G/TPH–D(Total Petroleum Hydrocarbons calculated as Gasoline/ Diesel)/Benzene concentrations in ppm sampled on October 9, 1991
- *ND* Not Detected (See laboratory reports for detection limits)





Base Map: Shell Site Plan dated 12–21–89

GeoStrategies Inc.

TPH–G/TPH–D/BENZENE CONCENTRATION MAP
Shell Service Station
350 Grand Avenue
Oakland, California

PLATE **4**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
766702–6	CFS	12/91	

APPENDIX A
ANALYTICAL LABORATORY REPORT
AND CHAIN-OF-CUSTODY

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Shell Oil Company
Gettler-Ryan
2150 West Winton
Hayward, CA 94545
Tom Paulson

Date: 10/28/91

Work Order: T1-10-130 P.O. Number: MOH 880-021 Vendor #I0002402

This is the Certificate of Analysis for the following samples:

Client Work ID: GR3667/350 Grand Ave Oakland
Date Received: 10/10/91
Number of Samples: 4
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Hamid Allameh
Petroleum GC Team Leader

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **S-1**
SAMPLE DATE: **10/09/91**
LAB SAMPLE ID: **T110130-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		10/15/91
Low Boiling Hydrocarbons	Mod.8015		10/15/91
High Boiling Hydrocarbons	Mod.8015	10/14/91	10/16/91

PARAMETER	DETECTION LIMIT	DETECTED	
Low Boiling Hydrocarbons calculated as Gasoline	0.05	0.12	
BTEX			
Benzene	0.0005	0.010	
Toluene	0.0005	None	
Ethylbenzene	0.0005	None	
Xylenes (total)	0.0005	None	
High Boiling Hydrocarbons calculated as Diesel	0.05	0.26	@

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	99.
1,3-Dichlorobenzene (BTEX)	100.
nC32 (Diesel)	80.

Comments:
@ Compounds detected and calculated as high boiling hydrocarbons consist of compounds eluting within the chromatographic range of diesel, but are not characteristic of the standard diesel standard pattern.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **S-2**
SAMPLE DATE: **10/09/91**
LAB SAMPLE ID: **T110130-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		10/16/91
Low Boiling Hydrocarbons	Mod.8015		10/16/91
High Boiling Hydrocarbons	Mod.8015	10/14/91	10/17/91

PARAMETER	DETECTION LIMIT	DETECTED	
Low Boiling Hydrocarbons calculated as Gasoline	2.5	29.	
BTEX			
Benzene	0.025	6.3	
Toluene	0.025	0.51	
Ethylbenzene	0.025	1.7	
Xylenes (total)	0.025	2.4	
High Boiling Hydrocarbons calculated as Diesel	0.5	32.	#

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	100.
1,3-Dichlorobenzene (BTEX)	99.
nC32 (Diesel)	81.

Comments:
Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **S-3**
SAMPLE DATE: **10/09/91**
LAB SAMPLE ID: **T110130-03**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		10/15/91
Low Boiling Hydrocarbons	Mod.8015		10/15/91
High Boiling Hydrocarbons	Mod.8015	10/14/91	10/16/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	None
BTEX		
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.0005	None
High Boiling Hydrocarbons calculated as Diesel	0.05	None

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	94.
1,3-Dichlorobenzene (BTEX)	97.
nC32 (Diesel)	62.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **S-3 MS/MSD**
SAMPLE DATE: **10/09/91**
LAB SAMPLE ID: **T110130-03E**
EXTRACTION DATE:
ANALYSIS DATE: **10/15/91**
ANALYSIS METHOD: **Mod. 8015**

QUALITY CONTROL REPORT

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	MS Result	MSD Result	MS %Rec	MSD %Rec	RPD
Gasoline	ND<50.	2500.	2231.	2174.	89.	87.	2.

SURROGATES	MS %Rec	MSD %Rec
1,3-Dichlorobenzene	100.	100.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **Trip Blank**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T110130-04**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		10/14/91
Low Boiling Hydrocarbons	Mod.8015		10/14/91
High Boiling Hydrocarbons	Mod.8015	10/14/91	10/16/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	None
BTEX		
Benzene	0.0005	None
Toluene	0.0005	None
Ethylbenzene	0.0005	None
Xylenes (total)	0.0005	None
High Boiling Hydrocarbons calculated as Diesel	0.05	0.06

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	95.
1,3-Dichlorobenzene (BTEX)	98.
nC32 (Diesel)	98.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T110130-05A**
EXTRACTION DATE: **10/14/91**
ANALYSIS DATE: **10/16/91**
ANALYSIS METHOD: **Mod. 8015**

QUALITY CONTROL REPORT

Laboratory Spike(LS) and Laboratory Spike Duplicate(LSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	LS Result	LSD Result	LS %Rec	LSD %Rec	RPD
Diesel	None	1000.	1121.	1038.	112.	104.	7.

SURROGATES	LS %Rec	LSD %Rec
C32	90.	67.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 10/28/91
Client Work ID: GR3667/350 Grand Ave Oakland

Work Order: T1-10-130

TEST CODE **QC** TEST NAME **Quality Control**

Quality control (QC) samples are analyzed and used to assess the laboratory control measures. Routine QC samples include method blanks, spikes and duplicates. The purpose of the method blank (MB) analysis is to demonstrate that artifacts of the test do not yield false positives. The laboratory control spike (LS) and /or matrix spike (MS) analysis is used to evaluate the ability of the test to recover analytes of interest, i.e. accuracy. Accuracy is expressed as percent (%) recovery. The laboratory spike duplicate (LSD), matrix spike duplicate (MSD), or duplicate sample (DUP) is used to determine the precision of the test, by comparing the result from the original spike (or sample) to the duplicate spike (or sample). Precision is expressed as relative percent difference (RPD).

The results of appropriate QC samples from QC batches associated with the listed samples are included in this report.

TEST CODE **TPHN** TEST NAME **TPH High Boiling by 8015**

The method of analysis for high boiling hydrocarbons s taken from the LUFT field manual. Samples are extracted with solvent and examined by gas chromatography using a flame ionization detector. Results in soils are corrected for moisture content and are reported on a dry soil basis unless otherwise noted.

TEST CODE **TPHVB** TEST NAME **TPH Gas,BTEX by 8015/8020**

The method of analysis for low boiling hydrocarbons is taken from EPA Methods modified 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector in series with a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline. Results in soils are corrected for moisture content and are reported on a dry soil basis unless otherwise noted.

Gettler - Ryan Inc. T1-10-130 ENVIRONMENTAL DIVISION **2797 Chain of Custody**

COMPANY Shell Oil Company JOB NO.

JOB LOCATION 350 Grand Ave / Perkins

CITY Oakland PHONE NO. 783-7500

AUTHORIZED Tom Paulson DATE 10-9-91 P.O. NO. 3667.01

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
S-1	5	Liquid	10-9-91 / 13:12	THC (gas) BTXE, TPH as Diesel	Cool 10/10/91 J.D.
S-2	5	"	" / 13:24	"	"
S-3	4	"	" / 14:00	"	"
trip	2	"	-1-	"	"

RELINQUISHED BY: Guadalupe Sanchez 10-9-91 15:00

RECEIVED BY: Rebij #1 10-9-91 15:00

RELINQUISHED BY: Rebij # 10-10-91 08:00 12:05

RECEIVED BY: [signature] 10-10-91 08:00

RELINQUISHED BY: [signature] 10-10-91 12:45

RECEIVED BY LAB: Josephine DeCarli 10/10/91 12:50

DESIGNATED LABORATORY: IT SCV DHS #: 137

REMARKS: Normal TAT

WIC # 204-5510-0204

EXP CODE 5461

ENG: Jack Brantad

DATE COMPLETED 10-9-91 FOREMAN Guadalupe Sanchez