

1828 TRIBUNE ROAD SUITE A  
SACRAMENTO, CA 95815  
916-649-3570  
800-395-3570  
FAX: (916) 649-3819

ENVIRONMENTAL  
PROTECTION  
96 JUL 25 PM 1:47

July 23, 1996  
Project No. 05-000428



Mr. Barney Chan  
Hazardous Materials Specialist  
Alameda County Environmental Health Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-6577

Subject: **Tank Removal Results Report and  
Work Plan for Soil and Groundwater Sampling**  
444 Hegenberger Road, Oakland, California

ENVIRONMENTAL  
ENGINEERING

Dear Mr. Chan:

INDUSTRIAL  
HYGIENE

Northwest Envirocon, Inc. (NWE) has prepared this letter to present the results of field observations and soil sample analyses during removal of an underground storage tank and an oil/water separator at the subject site (Plates 1 and 2). In addition, this letter contains a plan for advancement of soil borings and collection of soil and groundwater samples at the subject site.

CONSTRUCTION  
MANAGEMENT

### **Underground Tank and Oil/Water Separator Removal and Sampling**

On June 10, 1996, in accordance with a permit issued by the Alameda County Health Care Services Agency (County) and the City of Oakland Fire Department, the underground tank and oil/water separator were excavated and removed. The location and size (approximately 550-gallon capacity) of the underground tank indicate that it was used to store waste oil during the period when the site operated as a service station. The oil/water separator may or may not have been associated with the service station use.

LABORATORY  
SERVICES

MAINTENANCE  
ENGINEERING

After soil overlying the waste oil tank was removed and the tank was exposed, it was found to contain a significant quantity of oily fluid. The waste oil tank was rinsed and pumped out under the direction of NWE's subcontractor (Accutite Environmental Engineering, Inc. (Accutite)). At 1:30 p.m., with County and Fire Department representatives observing, the waste oil tank was removed and inspected. Prior to removal, an explosimeter was used to read oxygen and volatile vapor concentrations within the tank. Readings were within limits set for legally transporting the tank. After removal, at least one small hole was observed along a seam at one end of the tank. Soil surrounding the tank contained a faint hydrocarbon odor and a septic odor. Soil recovered from beneath the waste oil tank was screened for the presence of organic vapors with a photoionization device (PID). The results indicated the presence

ASBESTOS  
SERVICES

ENVIRONMENTAL  
TRAINING

of organic vapors at a concentration of 67 parts per million (ppm). PID readings are used only as an indication of potential contamination. Background PID values can range up to 50 ppm. The PID is most sensitive to lighter hydrocarbon compounds (gasoline and the gasoline constituents benzene, toluene, ethylbenzene, and xylenes) and may not detect vapors in the heavier hydrocarbon range (diesel and motor oil). A single soil sample was collected at a depth of approximately 8 feet below grade from beneath the waste oil tank (designated WOT @ 8').

At the time the tank was removed, groundwater was not present in the waste oil tank excavation. At one location, it appeared that groundwater was seeping into the pit. Groundwater is known to be present within 10 feet of the ground surface at nearby sites. An inspection of the tank hole three days later indicated the presence of water at the bottom of the excavation.

The oil/water separator apparently was used to collect rinse or runoff water from a drain covered by a grate at the surface of a concrete slab (there was no underground influent piping). Accutite disconnected the effluent piping and removed the concrete oil/water separator. The concrete appeared intact with no obvious cracks or holes. One soil sample was collected from beneath the oil/water separator at a depth of approximately 5 feet below grade (designated OWS @ 5'). PID screening of soil recovered from beneath the oil/water separator indicated the presence of organic vapors at concentrations up to 62 ppm.

In accordance with the requirements of the County, soil samples WOT @ 8', OWS @ 5', and a third soil sample collected from the soil removed from the waste oil tank excavation (designated STKP) were submitted for laboratory analysis of:

- Benzene, toluene, ethylbenzene, total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) by EPA Methods 8020 and 8015-modified.
- Total petroleum hydrocarbons as diesel (TPHd) by EPA Method 8015-modified.
- Oil and grease by ~~ASTM~~ Standard Methods 5520, E and F.
- The metals lead, chromium, cadmium, nickel, and zinc by EPA Method 6010.
- Volatile halocarbons by EPA Method 8010.

- Polychlorinated biphenyl compounds (PCBs) and polynuclear aromatic compounds (PNAs) by EPA Method 8270.

The soil sample analytical results are compiled in Table 1. Copies of certified laboratory reports are contained in Attachment A.

**Table 1. Soil Sample Analytical Results**  
**June 10, 1996**  
**444 Hegenberger Road, Oakland, California**  
**(all concentrations in milligrams per Kilogram)**

ANALYTES	WOT @ 8'	OWS @ 5'	STKP
Benzene	6.7	1.0	0.019
Toluene	0.68	0.24	0.0063
Ethylbenzene	8.1	0.17	0.015
Total Xylenes	7.6	0.68	0.022
Total petroleum hydrocarbons as gasoline	560	65	2.6
Total petroleum hydrocarbons as diesel	<200	<350	<50
Oil and Grease	360	1800	540
Volatile Halocarbons <sup>1</sup> - EPA Method 8010	<0.0050	<0.0050	<0.0050
EPA Method 8270 Compounds		<i>PRG Incl</i>	
Napthalene	1.7	0.36 <i>800</i>	<0.33
Fluoranthene	<0.33	0.68 <i>27000</i>	<0.33
Pyrene	<0.33	0.99 <i>20000</i>	<0.33
Benzo(a)anthracene	<0.33	0.88 <i>2.6</i>	<0.33
Chrysene	<0.33	1.1 <i>24</i>	<0.33
Benzo(b)fluoranthene	<0.33	1.7 <i>2.6</i>	<0.33
Benzo(k)fluoranthene	<0.33	0.46 <i>26</i>	<0.33
Benzo(a)pyrene	<0.33	1.1 <i>.26</i>	<0.33
Indeno(1,2,3-c,d)pyrene	<0.33	0.97 <i>2.6</i>	<0.33
Dibenz(a,h)anthracene	<0.33	0.41 <i>.26</i>	<0.33
Benzo(g,h,i)perylene	<0.33	1.1	<0.33
All Other 8270 compounds	ND <sup>2</sup>	ND	ND
Lead	11	96	32
Chromium	46	41	35
Cadmium	<1.0	<1.0	5
Nickel	61	51	43
Zinc	54	150	66

<sup>1</sup>The laboratory report states that dichloromethane detected in each sample "is more than likely due to laboratory contamination."

<sup>2</sup>ND indicates compounds not present at levels exceeding the detection limit; see copies of certified laboratory reports for detection limit specified.

After the analytical results were received, they were forwarded to Alameda County for review. In accordance with Alameda County policy, it is our understanding that the County contacted Ms. Sandra Hutson of the Edward Pike Company (NWE's client) directly on Monday, June 17, 1996, to notify Ms. Hutson that the sample results indicated additional sampling of soil and perhaps groundwater underlying the site would be required by the County. At that time, the County also indicated that the site will become part of the local oversight program (LOP). In correspondence dated June 18, 1996, signed by you, the County provided written notification of the site's transfer to the LOP and a written request for additional sampling. Your June 18, 1996, correspondence requested that a work plan for additional sampling be submitted by July 19, 1996. I contacted you by voice mail and requested an extension of the submittal deadline until July 26, 1996.

### **Additional Soil and Groundwater Sampling**

Based on the results of soil sampling conducted at the time the former waste oil tank and oil/water separator were removed, and in accordance with a request from the County, NWE recommends that soil borings be advanced and soil and groundwater samples be collected from selected locations on the subject Property. Collected samples will be analyzed for petroleum constituents.

### Scope of Services

The actions described in this proposal are intended to assess the presence or absence of petroleum constituents in soil and groundwater at selected locations beneath the subject Property. Field work will be conducted in accordance with the protocols described in Attachment A. The intended Scope of Services is outlined below:

#### **Task I**

Update the existing site Health and Safety Plan for the subject site and secure appropriate permits for the proposed work from the County. As part of this task, NWE will also notify underground utility locating services, contract with a licensed driller, and schedule field activities.

#### **Task II**

Three soil borings will be advanced to collect soil and groundwater samples around the former waste oil tank location. The borings will be advanced to groundwater at locations approximately 10 feet from the north, southwest, and southeast sides of the limits of the existing excavation (Plate 2). Soil samples will be collected at depths of 5 and 8 feet below grade. NWE will use the Hydropunch™ (or similar) sampling method to collect groundwater samples. With this method,

monitoring wells are not constructed and the soil borings will be abandoned after soil and groundwater sample collection.

A single soil boring will be advanced near the center of the former oil/water separator (Plate 2). Since the excavation at this location is only 5 feet deep, it is still possible that petroleum constituents have not reached groundwater. A soil sample will be collected at a depth of approximately 8 feet below grade and a groundwater sample will be collected using the Hydropunch™ (or similar) methodology.

OK

If field observations indicate obvious soil and/or groundwater contamination at the initial soil boring locations, additional borings and Hydropunch™ sampling locations are proposed at locations further from the excavations to assess the lateral extent of petroleum constituents.

The groundwater samples and selected soil samples will be transported to a California-certified laboratory under proper chain-of-custody procedures for analysis. After collection of groundwater samples, each boring will be backfilled with a mixture of Portland cement and 5% bentonite (or similar) to prevent percolation of surface water. Soil cuttings and decontamination water will be stored on site in 55-gallon drums, properly labeled and secured, pending receipt of analytical results and characterization for disposal. The backfilling process will be inspected by the lead regulatory agency, if necessary.

#### Task III

Selected soil samples and <sup>?</sup>both groundwater samples will be submitted for laboratory analysis of BTEX, TPHg, TPHd, and oil and grease. The County has indicated that the PNAs detected in the sample collected beneath the oil/water separator were at such low concentrations that additional analyses for these constituents is not necessary. Sample analyses will be done on a standard, two-week-turn-around basis.

I didn't say this should be done for PNA in GW

#### Task IV

After receipt of analytical results, NWE will compile and evaluate site data and prepare a letter report which will be submitted to the client for review. The report will contain an assessment of sampled soil and groundwater quality and will include tables of analytical results, a site map illustrating soil boring locations, and soil boring logs.

Mr. Barney Chan  
July 23, 1996  
Page 6

Schedule


Prior to initiation of work, NWE will recommend to our client that 1) application be made to the California Leaking Underground Storage Tank Fund to determine the eligibility of this site for reimbursement, and 2) this work plan (once approved by the County) be used to solicit bids for the Scope of Services described in this plan from at least three qualified consultants.

If NWE is selected to proceed with this project, the proposed soil borings/Hydropunch™ locations would be permitted within two weeks of selection and field work would be conducted within 10 days of permit approval. Normal laboratory turn-around-time is 10 working days. NWE will prepare a results report within 5 working days of receipt of laboratory results.

Please contact me immediately if you have any questions.

Sincerely,

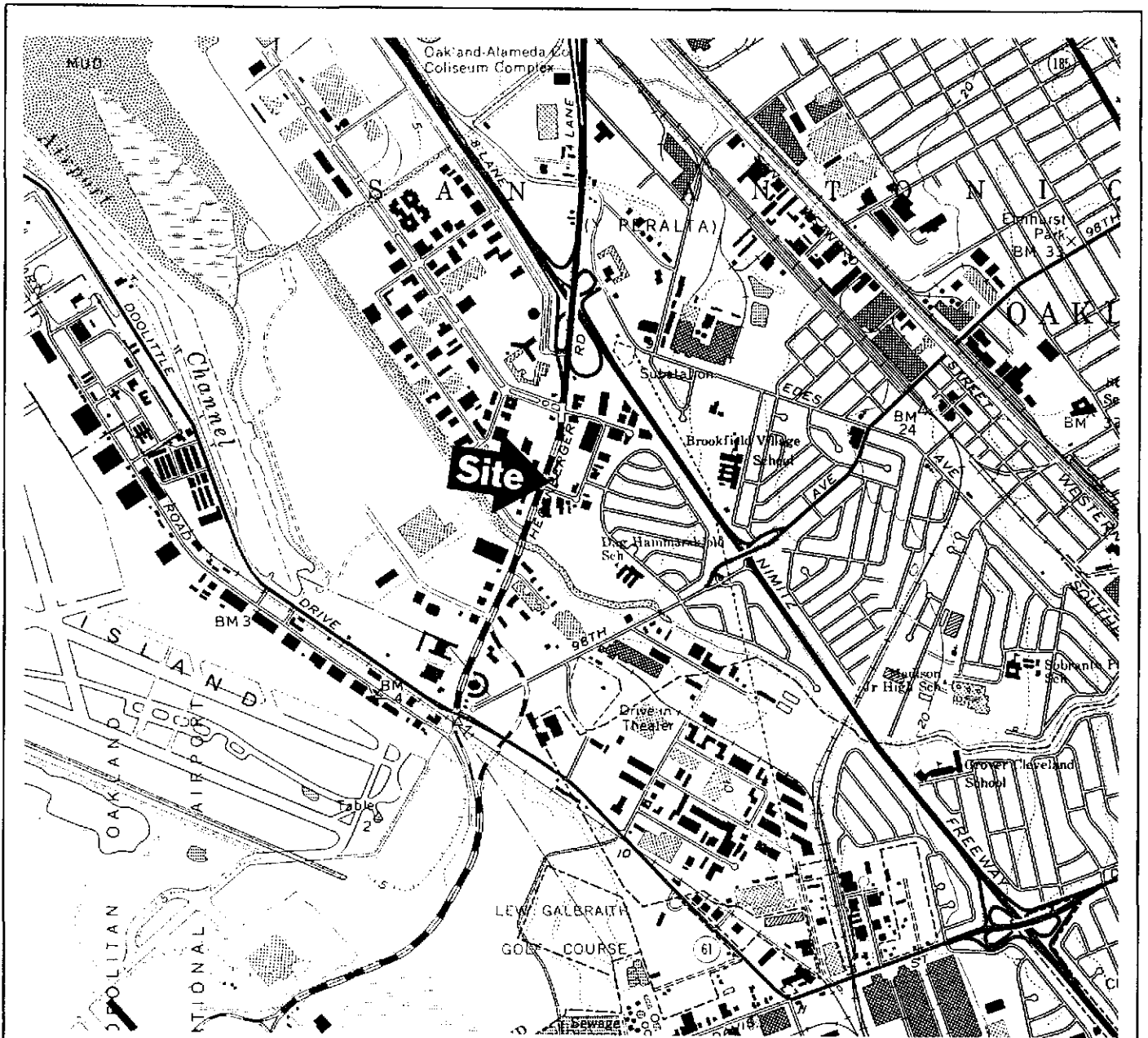
**NORTHWEST ENVIROCON, INC.**



Dale A. van Dam, R.G.  
Hydrogeologist

DAvD:davd

cc: Ms. Sandra Hutson, The Edward Pike Company



↑  
NORTH



**Northwest Envirocon, Inc.**  
Environmental Consulting

USGS 7.5 Minute Topographic Map  
Oakland Quadrangle  
444 Hegenberger Road  
Oakland, California

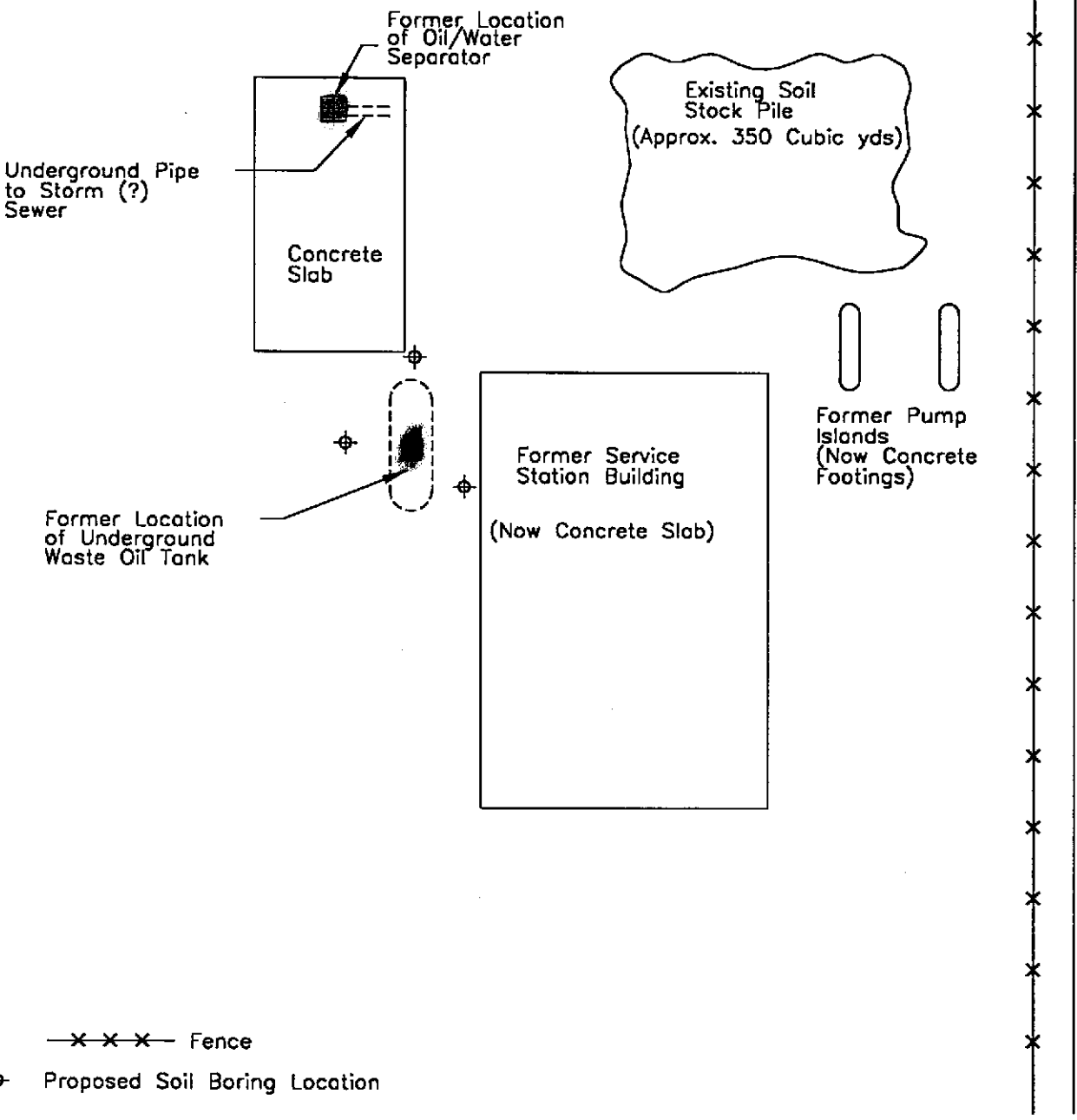
JOB NUMBER:  
05-000428

DATE:  
July 1996

PLATE:  
1

# HEGENBERGER LOOP

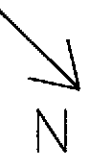
HEGENBERGER ROAD



—x—x—x— Fence

⊕ Proposed Soil Boring Location

Drawing Not to Scale



Northwest Envirocon, Inc.  
Environmental Consulting  
1828 Tribute Rd. Suite A  
Sacramento, CA. 95815

Sample Location Map

Plate

Former Service Station  
444 Hegenberger Road  
Oakland, California

2

JOB NUMBER  
05-000428

DATE  
7-22-96



**ATTACHMENT A**  
**SOIL SAMPLE ANALYTICAL RESULTS**

Dale van Dam  
El Dorado Environmental  
2221 Goldorado Trail  
El Dorado, CA 95623

Subject : 3 soil samples  
Project Name : Hegenberger-Oakland  
Project Number : 05-000428  
P.O. Number : P960500362DVD  
Location : 444-Hegenberger Road, Oakland

Dear Mr. van Dam,

Chemical analysis on the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. USEPA protocols for sample storage and preservation were followed.

WEST Laboratory is certified by the State of California (# 1346). If you have any questions regarding procedures or results, please call me at 916-753-9500.

Sincerely,



Joel L. Kiff

Subject : 3 soil samples  
Project Name : Hegenberger-Oakland  
Project Number : 05-000428  
P.O. Number : P960500362DVD  
Location : 444-Hegenberger Road, Oakland

## Case Narrative

Dichloromethane detected in the EPA 8010 analyses is more than likely due to laboratory contamination.

  
Joel L. Kiff

**Volatile Halocarbons**

Sample Name : WOT @ 8'

Project Name : Hegenberger-Oakland

Project Number : 05-000428

Sample Date : 06/10/96

Date Analyzed : 06/14/96

Analysis Method : EPA 8010

Date Received : 06/10/96

Dilution : 1:10

Sample Matrix : Soil

Lab Number : 14871-01

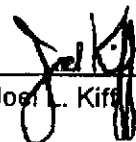
Parameter	MRL	Measured Conc.	Units
Chloromethane	0.050	< 0.050	mg/Kg
Vinyl Chloride	0.050	< 0.050	mg/Kg
Bromomethane	0.050	< 0.050	mg/Kg
Chloroethane	0.050	< 0.050	mg/Kg
Trichlorofluoromethane	0.050	< 0.050	mg/Kg
1,1-Dichloroethene	0.050	< 0.050	mg/Kg
<b>Dichloromethane</b>	<b>0.050</b>	<b>0.14</b>	mg/Kg
t-1,2-Dichloroethene	0.050	< 0.050	mg/Kg
1,1-Dichloroethane	0.050	< 0.050	mg/Kg
c-1,2-Dichloroethene	0.050	< 0.050	mg/Kg
Chloroform	0.050	< 0.050	mg/Kg
1,1,1-Trichloroethane	0.050	< 0.050	mg/Kg
Carbon Tetrachloride	0.050	< 0.050	mg/Kg
1,2-Dichloroethane	0.050	< 0.050	mg/Kg
Trichloroethene	0.050	< 0.050	mg/Kg
1,2-Dichloropropane	0.050	< 0.050	mg/Kg
Bromodichloromethane	0.050	< 0.050	mg/Kg
c-1,3-Dichloropropene	0.050	< 0.050	mg/Kg
t-1,3-Dichloropropene	0.050	< 0.050	mg/Kg
1,1,2-trichloroethane	0.050	< 0.050	mg/Kg
Tetrachloroethene	0.050	< 0.050	mg/Kg
Dibromochloromethane	0.050	< 0.050	mg/Kg
Chlorobenzene	0.050	< 0.050	mg/Kg
Bromoform	0.050	< 0.050	mg/Kg
1,1,2,2-Tetrachloroethane	0.050	< 0.050	mg/Kg
1,3-Dichlorobenzene	0.050	< 0.050	mg/Kg
1,4-Dichlorobenzene	0.050	< 0.050	mg/Kg
1,2-Dichlorobenzene	0.050	< 0.050	mg/Kg
2-Chlorotoluene (Surr.)		130	% Recovery

MRL = Method Reporting Limit Conc. = Concentration

B = Analyte was detected in Method Blank.

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :


  
Joseph L. Kiff

**Volatile Halocarbons**

Sample Name : OWS @ 5'

Project Name : Hegenberger-Oakland

Project Number : 05-000428

Sample Date : 06/10/96

Date Analyzed : 06/14/96

Analysis Method : EPA 8010

Date Received : 06/10/96

Dilution : 1:1

Sample Matrix : Soil

Lab Number : 14871-02

Parameter	MRL	Measured Conc.	Units
Chloromethane	0.0050	< 0.0050	mg/Kg
Vinyl Chloride	0.0050	< 0.0050	mg/Kg
Bromomethane	0.0050	< 0.0050	mg/Kg
Chloroethane	0.0050	< 0.0050	mg/Kg
Trichlorofluoromethane	0.0050	< 0.0050	mg/Kg
1,1-Dichloroethene	0.0050	< 0.0050	mg/Kg
<b>Dichloromethane</b>	<b>0.0050</b>	<b>0.015</b>	mg/Kg
t-1,2-Dichloroethene	0.0050	< 0.0050	mg/Kg
1,1-Dichloroethane	0.0050	< 0.0050	mg/Kg
c-1,2-Dichloroethene	0.0050	< 0.0050	mg/Kg
Chloroform	0.0050	< 0.0050	mg/Kg
1,1,1-Trichloroethane	0.0050	< 0.0050	mg/Kg
Carbon Tetrachloride	0.0050	< 0.0050	mg/Kg
1,2-Dichloroethane	0.0050	< 0.0050	mg/Kg
Trichloroethene	0.0050	< 0.0050	mg/Kg
1,2-Dichloropropane	0.0050	< 0.0050	mg/Kg
Bromodichloromethane	0.0050	< 0.0050	mg/Kg
c-1,3-Dichloropropene	0.0050	< 0.0050	mg/Kg
t-1,3-Dichloropropene	0.0050	< 0.0050	mg/Kg
1,1,2-trichloroethane	0.0050	< 0.0050	mg/Kg
Tetrachloroethene	0.0050	< 0.0050	mg/Kg
Dibromochloromethane	0.0050	< 0.0050	mg/Kg
Chlorobenzene	0.0050	< 0.0050	mg/Kg
Bromoform	0.0050	< 0.0050	mg/Kg
1,1,2,2-Tetrachloroethane	0.0050	< 0.0050	mg/Kg
1,3-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
1,4-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
1,2-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
2-Chlorotoluene (Surr.)		124	% Recovery

MRL = Method Reporting Limit Conc. = Concentration

B = Analyte was detected in Method Blank.

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :

  
 Joel L. Kiff

**Volatile Halocarbons**

Sample Name : STKP

Project Name : Hegenberger-Oakland

Project Number : 05-000428

Sample Date : 06/10/96

Date Analyzed : 06/14/96

Analysis Method : EPA 8010

Date Received : 06/10/96

Dilution : 1:1

Sample Matrix : Soil

Lab Number : 14871-03

Parameter	MRL	Measured Conc.	Units
Chloromethane	0.0050	< 0.0050	mg/Kg
Vinyl Chloride	0.0050	< 0.0050	mg/Kg
Bromomethane	0.0050	< 0.0050	mg/Kg
Chloroethane	0.0050	< 0.0050	mg/Kg
Trichlorofluoromethane	0.0050	< 0.0050	mg/Kg
1,1-Dichloroethene	0.0050	< 0.0050	mg/Kg
<b>Dichloromethane</b>	<b>0.0050</b>	<b>0.017</b>	mg/Kg
t-1,2-Dichloroethene	0.0050	< 0.0050	mg/Kg
1,1-Dichloroethane	0.0050	< 0.0050	mg/Kg
c-1,2-Dichloroethene	0.0050	< 0.0050	mg/Kg
Chloroform	0.0050	< 0.0050	mg/Kg
1,1,1-Trichloroethane	0.0050	< 0.0050	mg/Kg
Carbon Tetrachloride	0.0050	< 0.0050	mg/Kg
1,2-Dichloroethane	0.0050	< 0.0050	mg/Kg
Trichloroethene	0.0050	< 0.0050	mg/Kg
1,2-Dichloropropane	0.0050	< 0.0050	mg/Kg
Bromodichloromethane	0.0050	< 0.0050	mg/Kg
c-1,3-Dichloropropene	0.0050	< 0.0050	mg/Kg
t-1,3-Dichloropropene	0.0050	< 0.0050	mg/Kg
1,1,2-trichloroethane	0.0050	< 0.0050	mg/Kg
Tetrachloroethene	0.0050	< 0.0050	mg/Kg
Dibromochloromethane	0.0050	< 0.0050	mg/Kg
Chlorobenzene	0.0050	< 0.0050	mg/Kg
Bromoform	0.0050	< 0.0050	mg/Kg
1,1,2,2-Tetrachloroethane	0.0050	< 0.0050	mg/Kg
1,3-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
1,4-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
1,2-Dichlorobenzene	0.0050	< 0.0050	mg/Kg
2-Chlorotoluene (Surr.)		107	% Recovery

MRL = Method Reporting Limit Conc. = Concentration

B = Analyte was detected in Method Blank.

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :


  
Joel L. Kiff

**8270 (PCB's,PNA's)**

Sample Name : WOT @ 8'

Project Name : Hegenberger-Oakland  
Project Number : 05-000428  
Sample Date : 06/10/96  
Date Prepared : 06/12/96  
Prep. Method : EPA 3550Date Analyzed : 06/13/96  
Analysis Method : M EPA 8270  
Date Received : 06/10/96  
Dilution : 1:1  
Sample Matrix : Soil  
Lab Number : 14871-01

Parameter	MRL	Measured Conc.	Units
Naphthalene	0.33	1.7	mg/Kg
Acenaphthylene	0.33	<0.33	mg/Kg
Acenaphthene	0.33	<0.33	mg/Kg
Fluorene	0.33	<0.33	mg/Kg
Phenanthrene	0.33	<0.33	mg/Kg
Anthracene	0.33	<0.33	mg/Kg
Fluoranthene	0.33	<0.33	mg/Kg
Pyrene	0.33	<0.33	mg/Kg
Benzo(a)anthracene	0.33	<0.33	mg/Kg
Chrysene	0.33	<0.33	mg/Kg
Benzo(b)fluoranthene	0.33	<0.33	mg/Kg
Benzo(k)fluoranthene	0.33	<0.33	mg/Kg
Benzo(a)pyrene	0.33	<0.33	mg/Kg
Indeno(1,2,3-c,d)pyrene	0.33	<0.33	mg/Kg
Dibenz(a,h)anthracene	0.33	<0.33	mg/Kg
Benzo(g,h,i)perylene	0.33	<0.33	mg/Kg
PCB 1016	1.5	<1.5	mg/Kg
PCB 1221	1.5	<1.5	mg/Kg
PCB 1232	1.5	<1.5	mg/Kg
PCB 1242	1.5	<1.5	mg/Kg
PCB 1248	1.5	<1.5	mg/Kg
PCB 1254	1.5	<1.5	mg/Kg
PCB 1260	1.5	<1.5	mg/Kg
Pentachlorophenol	1.5	<1.5	mg/Kg
Creosote	2.0	<2.0	mg/Kg
Nitrobenzene-d5		81	% Recovery
2-Fluorobiphenyl		88	% Recovery
Terphenyl-d14		105	% Recovery
Phenol-d5		84	% Recovery
2-Fluorophenol		80	% Recovery
2,4,6-Tribromophenol		96	% Recovery

MRL = Method Reporting Limit

Conc. = Concentration

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :

  
 Joel L. Kiff

**8270 (PCB's,PNA's)**

Sample Name : OWS @ 5'

Project Name : Hegenberger-Oakland  
Project Number : 05-000428  
Sample Date : 06/10/96  
Date Prepared : 06/12/96  
Prep. Method : EPA 3550Date Analyzed : 06/13/96  
Analysis Method : M EPA 8270  
Date Received : 06/10/96  
Dilution : 1:1  
Sample Matrix : Soil  
Lab Number : 14871-02

Parameter	MRL	Measured Conc.	Units
Naphthalene	0.33	0.36	mg/Kg
Acenaphthylene	0.33	<0.33	mg/Kg
Acenaphthene	0.33	<0.33	mg/Kg
Fluorene	0.33	<0.33	mg/Kg
Phenanthrene	0.33	<0.33	mg/Kg
Anthracene	0.33	<0.33	mg/Kg
Fluoranthene	0.33	0.68	mg/Kg
Pyrene	0.33	0.99	mg/Kg
Benzo(a)anthracene	0.33	0.88	mg/Kg
Chrysene	0.33	1.1	mg/Kg
Benzo(b)fluoranthene	0.33	1.7	mg/Kg
Benzo(k)fluoranthene	0.33	0.46	mg/Kg
Benzo(a)pyrene	0.33	1.1	mg/Kg
Indeno(1,2,3-c,d)pyrene	0.33	0.97	mg/Kg
Dibenz(a,h)anthracene	0.33	0.41	mg/Kg
Benzo(g,h,i)perylene	0.33	1.1	mg/Kg
PCB 1016	1.5	<1.5	mg/Kg
PCB 1221	1.5	<1.5	mg/Kg
PCB 1232	1.5	<1.5	mg/Kg
PCB 1242	1.5	<1.5	mg/Kg
PCB 1248	1.5	<1.5	mg/Kg
PCB 1254	1.5	<1.5	mg/Kg
PCB 1260	1.5	<1.5	mg/Kg
Pentachlorophenol	1.5	<1.5	mg/Kg
Creosote	2.0	<2.0	mg/Kg
Nitrobenzene-d5		70	% Recovery
2-Fluorobiphenyl		82	% Recovery
Terphenyl-d14		92	% Recovery
Phenol-d5		76	% Recovery
2-Fluorophenol		71	% Recovery
2,4,6-Tribromophenol		88	% Recovery

MRL = Method Reporting Limit

Conc. = Concentration

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :

  
 Joe L. Kiff



**8270 (PCB's,PNA's)**

Sample Name : STKP

Project Name : Hegenberger-Oakland  
Project Number : 05-000428  
Sample Date : 06/10/96  
Date Prepared : 06/14/96  
Prep. Method : EPA 3550Date Analyzed : 06/12/96  
Analysis Method : M EPA 8270  
Date Received : 06/10/96  
Dilution : 1:1  
Sample Matrix : Soil  
Lab Number : 14871-03

Parameter	MRL	Measured Conc.	Units
Naphthalene	0.33	<0.33	mg/Kg
Acenaphthylene	0.33	<0.33	mg/Kg
Acenaphthene	0.33	<0.33	mg/Kg
Fluorene	0.33	<0.33	mg/Kg
Phenanthrene	0.33	<0.33	mg/Kg
Anthracene	0.33	<0.33	mg/Kg
Fluoranthene	0.33	<0.33	mg/Kg
Pyrene	0.33	<0.33	mg/Kg
Benzo(a)anthracene	0.33	<0.33	mg/Kg
Chrysene	0.33	<0.33	mg/Kg
Benzo(b)fluoranthene	0.33	<0.33	mg/Kg
Benzo(k)fluoranthene	0.33	<0.33	mg/Kg
Benzo(a)pyrene	0.33	<0.33	mg/Kg
Indeno(1,2,3-c,d)pyrene	0.33	<0.33	mg/Kg
Dibenz(a,h)anthracene	0.33	<0.33	mg/Kg
Benzo(g,h,i)perylene	0.33	<0.33	mg/Kg
PCB 1016	1.5	<1.5	mg/Kg
PCB 1221	1.5	<1.5	mg/Kg
PCB 1232	1.5	<1.5	mg/Kg
PCB 1242	1.5	<1.5	mg/Kg
PCB 1248	1.5	<1.5	mg/Kg
PCB 1254	1.5	<1.5	mg/Kg
PCB 1260	1.5	<1.5	mg/Kg
Pentachlorophenol	1.5	<1.5	mg/Kg
Creosote	2.0	<2.0	mg/Kg
Nitrobenzene-d5		77	% Recovery
2-Fluorobiphenyl		84	% Recovery
Terphenyl-d14		100	% Recovery
Phenol-d5		78	% Recovery
2-Fluorophenol		76	% Recovery
2,4,6-Tribromophenol		99	% Recovery

MRL = Method Reporting Limit

Conc. = Concentration

E = Concentration exceeded calibration range. See higher dilution for correct value.

Approved By :

  
 Joe L. Kiff

Sample: WOT @ 8'

From : Hegenberger-Oakland (Proj. # 05-000428)

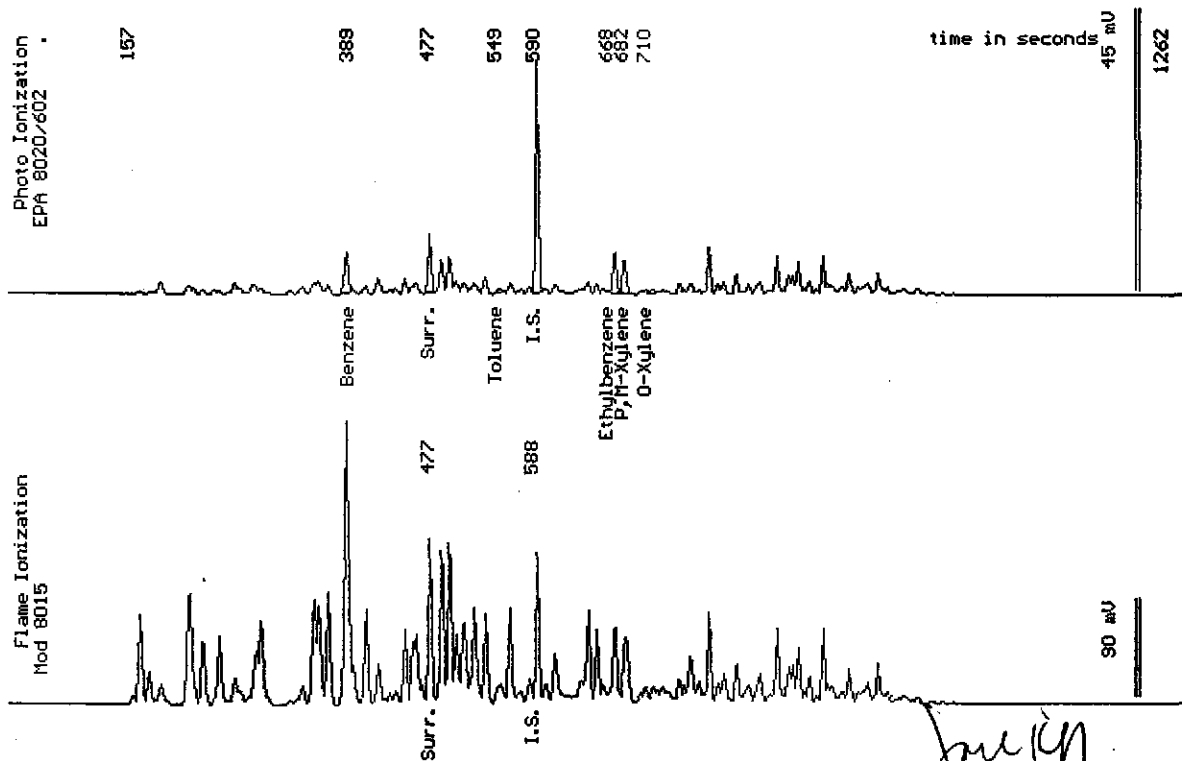
Sampled : 06/10/96

Dilution : 1:100

QC Batch : 2144T

Matrix : Soil

Parameter	(MRL) <small>ng/kg</small>	Measured Value <small>ng/kg</small>
Benzene	(.50)	6.7
Toluene	(.50)	.68
Ethylbenzene	(.50)	8.1
Total Xylenes	(.50)	7.6
TPH as Gasoline	(100)	560
Surrogate Recovery		100 %



Date Analyzed: 06-14-96  
 Column : 0.53mm X 60m Restek Rtx-1301

Joel Kiff  
 Senior Chemist

Sample: OWS @ 5'

From : Hegenberger-Oakland (Proj. # 05-000428)

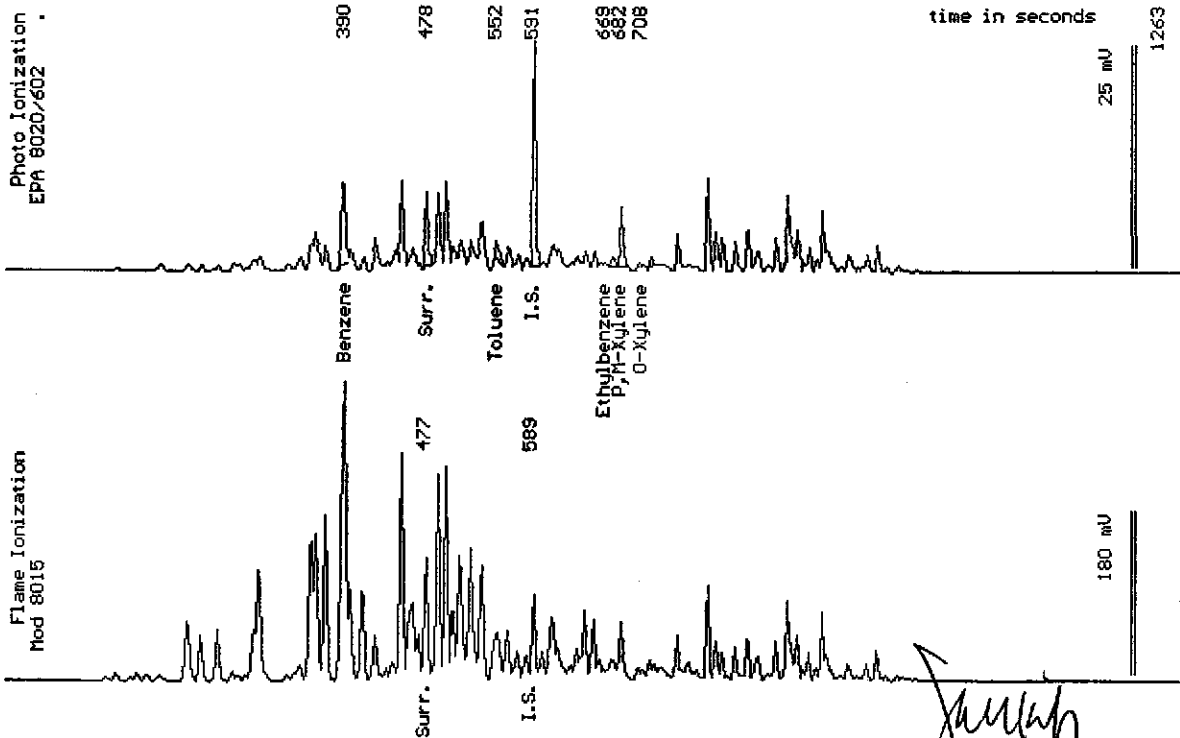
Sampled : 06/10/96

Dilution : 1:10

QC Batch : 2144T

Matrix : Soil

Parameter	(MRL) mg/kg	Measured Value mg/kg
Benzene	(.050)	1.0
Toluene	(.050)	.24
Ethylbenzene	(.050)	.17
Total Xylenes	(.050)	.68
TPH as Gasoline	(10)	65
Surrogate Recovery		124 %



Date Analyzed: 06-14-96  
 Column : 0.53mm X 60m Restek Rtx-1301

Joel Kiff  
 Senior Chemist

*Joel Kiff*

Sample: STKP

From : Hegenberger-Oakland (Proj. # 05-000428)

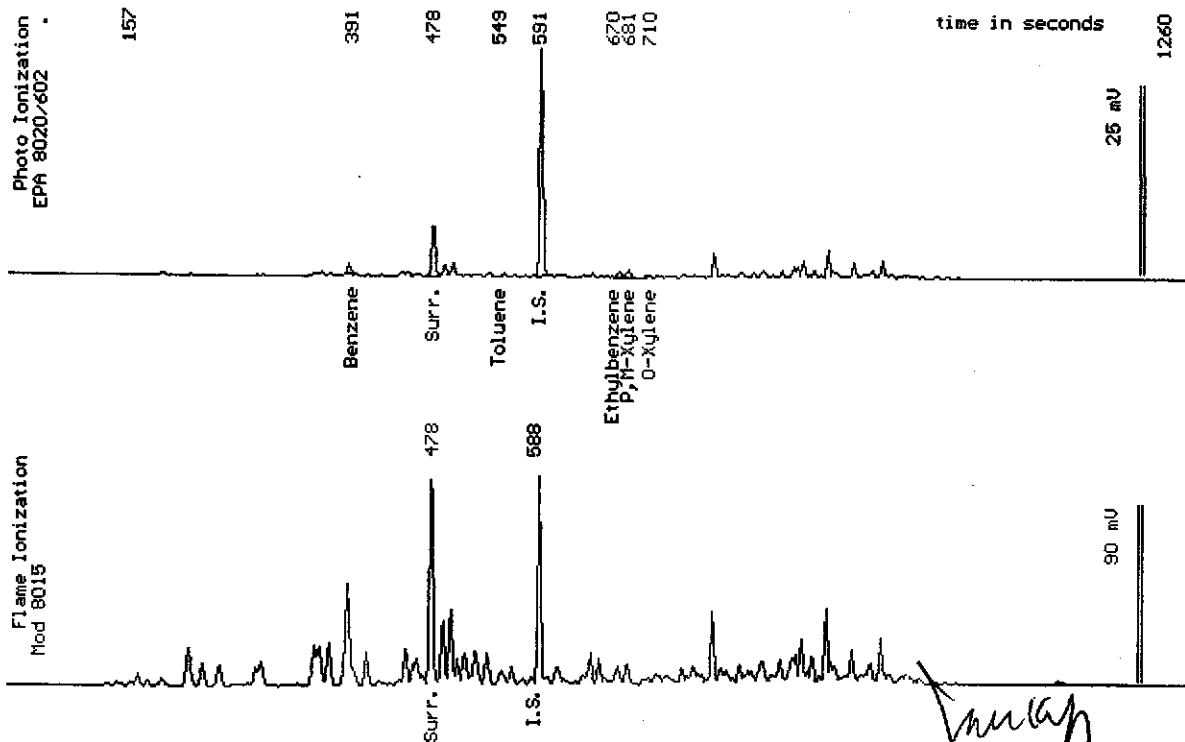
Sampled : 06/10/96

Dilution : 1:1

QC Batch : 2144T

Matrix : Soil

Parameter	(MRL) <small>ng/kg</small>	Measured Value <small>ng/kg</small>
Benzene	(.0050)	.019
Toluene	(.0050)	.0063
Ethylbenzene	(.0050)	.015
Total Xylenes	(.0050)	.022
TPH as Gasoline	(1.0)	2.6
Surrogate Recovery		100 %



Date Analyzed: 06-14-96  
Column : 0.53mm X 60m Restek Rtx-1301

*Joel Kiff*  
Joel Kiff  
Senior Chemist

# WEST LABORATORY


June 13, 1996  
Sample Log 14871

Oil and Grease, Hydrocarbons, Gravimetric (SM5520 E,F)  
From : Hegenberger-Oakland (Proj. # 05-000428)  
Received : 06/10/96  
Matrix : Soil

--all concentrations are units of mg/kg--

Sample	Date Sampled	Date Analyzed	MRL	(5520 E,F) Oil and Grease
WOT @ 8'	06/10/96	06/11/96	(50)	360
OWS @ 5'	06/10/96	06/11/96	(50)	1800
STKP	06/10/96	06/11/96	(50)	540

QC Batch: KS960602

  
Stewart Podolsky  
Senior Chemist

Sample Log 14871

14871-01

Sample: WOT @ 8'

From : Hegenberger-Oakland (Proj. # 05-000428)

Sampled : 06/10/96

Extracted: 06/11/96

Dilution : 1:5

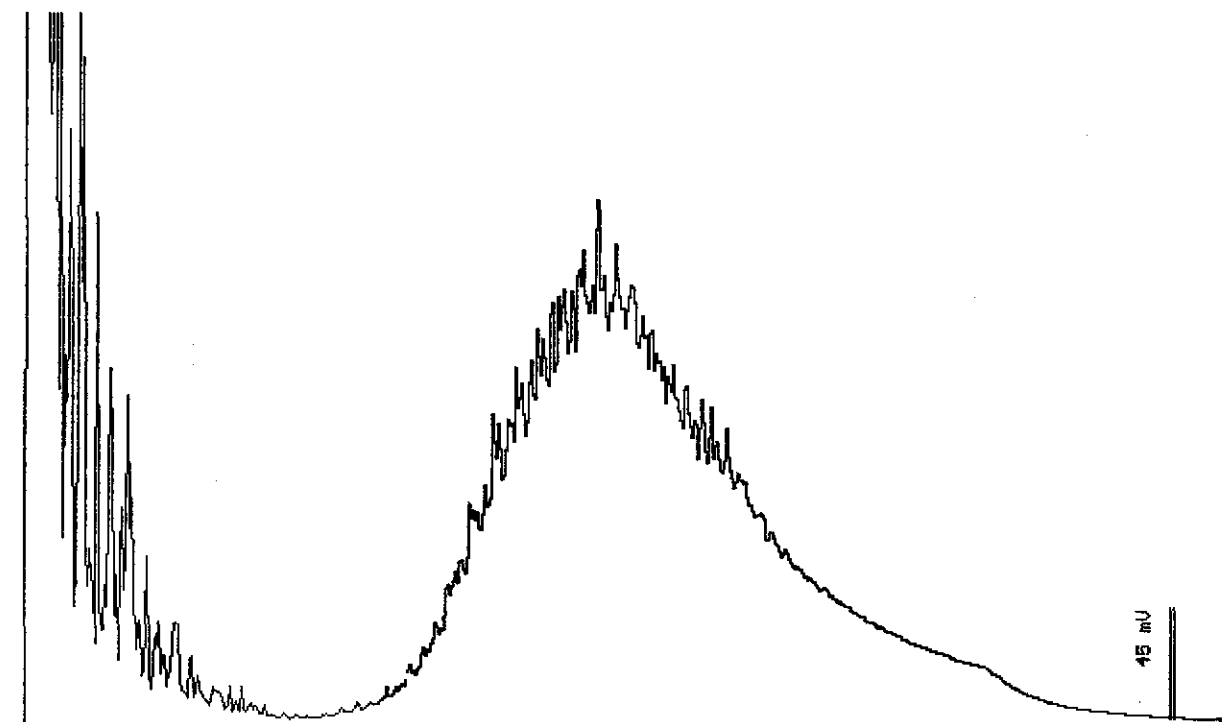
Matrix : Soil

QC Batch : DS960606

Run Log : 7325C

Parameter	(MRL) $\mu\text{g}/\text{kg}$	Measured Value $\mu\text{g}/\text{kg}$
TPH as Diesel	(200)	<200 *

\* Increased reporting limit due to gasoline and oil range interference.



EPA Mod 8015

Date: 06-12-96 Time: 22:34:12  
Column : 0.53mm ID X 15m Rtx-1 (Restek Corporation)

*S. Podolsky*  
Stewart Podolsky  
Senior Chemist

Sample Log 14871

14871-02

Sample: OWS @ 5'

From : Hegenberger-Oakland (Proj. # 05-000428)

Sampled : 06/10/96

Extracted: 06/11/96

Dilution : 1:25

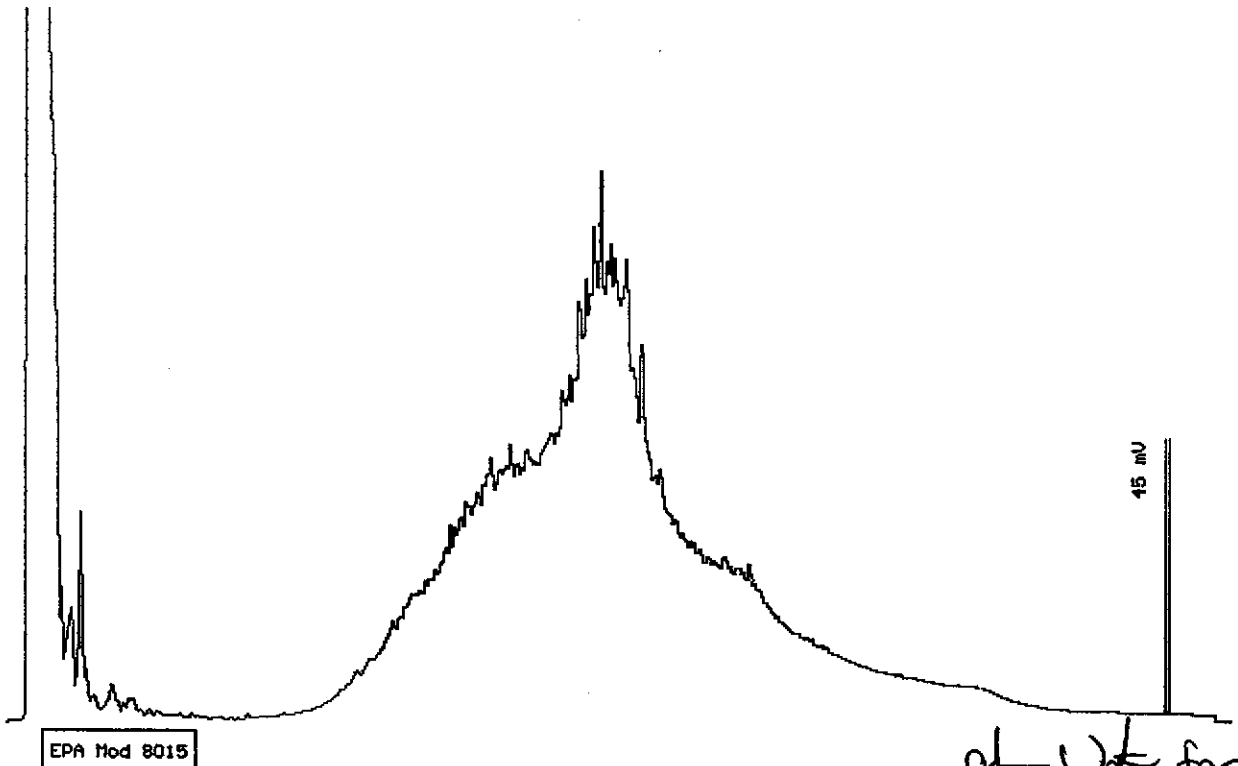
Matrix : Soil

QC Batch : DS960606

Run Log : 7325E

Parameter	(MRL) mg/kg	Measured Value mg/kg
TPH as Diesel	(350)	<350 *

\* Increased reporting limit due to oil range interference.



Date: 06-14-96 Time: 00:47:40  
Column : 0.53mm ID X 15m Rtx-1 (Restek Corporation)

*Stewart Podolsky*  
Stewart Podolsky  
Senior Chemist

Sample Log 14871

14871-03

Sample: STKP

From : Hegenberger-Oakland (Proj. # 05-000428)

Sampled : 06/10/96

Extracted: 06/11/96

Dilution : 1:5

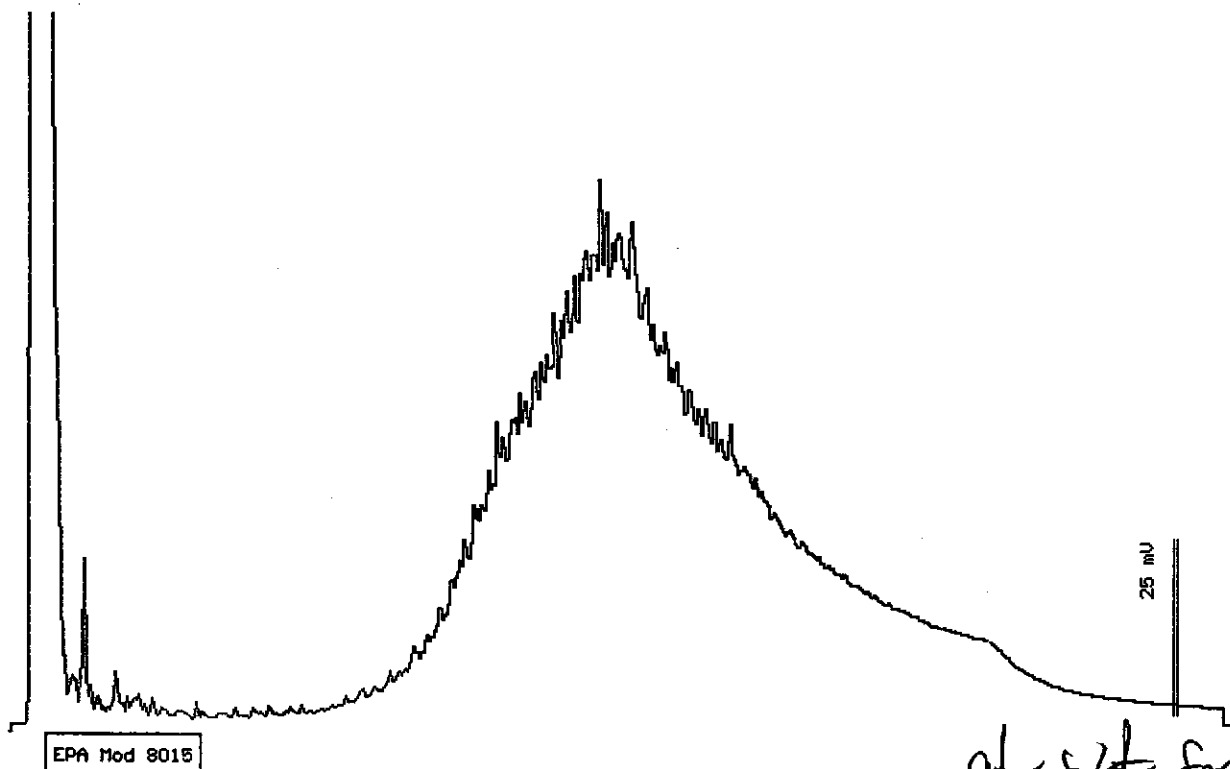
Matrix : Soil

QC Batch : DS960606

Run Log : 7325E

Parameter	(MRL) <small>mg/kg</small>	Measured Value <small>mg/kg</small>
TPH as Diesel	(50)	<50 *

\* Increased reporting limit due to oil range interference.



Date: 06-14-96 Time: 01:20:42  
Column : 0.53mm ID X 15m Rtx-1 (Restek Corporation)

*al wab for*  
Stewart Podolsky  
Senior Chemist





Alpha Analytical Laboratories Inc. • 860 Waugh Lane, H-1, Ukiah, California 95482  
(707) 468-0401

### CHEMICAL EXAMINATION REPORT

W.E.S.T. Labs  
1046 Olive Dr #3  
Davis, CA 95616  
Attn: Ann Lack

Date Printed  
6/13/96

Page  
1

Batch Number 96-0612-007    Receipt Date 06/12/96 09:15    Client WESTLAB    Client P.O. 14871    Send Via Mail

Batch 96-0612-007 consisted of 3 Samples and 15 Tests

METHOD	EXTRACTED	TEST DATE	RESULT	UNITS	PQL	DILUTION
--------	-----------	-----------	--------	-------	-----	----------

Sample 1    WOT @ 8' Hegenberger - Oakland  
Project #05-000428

Sample Type: Soil    Sampled by: N/A

Sampled: 6/10/96 13:50

#### Metals

Lead	EPA 6010	6/13/96	11	mg/kg	5.0
Chromium	EPA 6010	6/13/96	46	mg/kg	5.0
Cadmium	EPA 6010	6/13/96	ND	mg/kg	1.0
Nickel	EPA 6010	6/13/96	61	mg/kg	10.0
Zinc	EPA 6010	6/13/96	54	mg/kg	10.0

Sample 2    OWS @ 5' Hegenberger - Oakland  
Project #05-000428

Sample Type: Soil    Sampled by: N/A

Sampled: 6/10/96 14:15

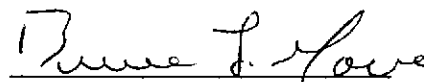
#### Metals

Lead	EPA 6010	6/13/96	94	mg/kg	5.0
Chromium	EPA 6010	6/13/96	41	mg/kg	5.0
Cadmium	EPA 6010	6/13/96	ND	mg/kg	1.0
Nickel	EPA 6010	6/13/96	51	mg/kg	10.0
Zinc	EPA 6010	6/13/96	150	mg/kg	10.0

PQL - Practical Quantitation Limit    ND - None Detected  
\* - Indicates Detection Limit altered due to Sample Dilution

#### NOTES:

Bruce L. Gove  
Laboratory Director

  
Date Printed: 6/13/96



Alpha

Alpha Analytical Laboratories Inc. • 860 Waugh Lane, H-1, Ukiah, California 95482  
(707) 468-0401

**CHEMICAL EXAMINATION REPORT**

W.E.S.T. Labs  
1046 Olive Dr #3  
Davis, CA 95616  
Attn: Ann Lack

Date Printed  
6/13/96

Page  
2

Batch Number	Receipt Date	Client	Client P.O.	Send Via
96-0612-007	06/12/96 09:15	WESTLAB	14871	Mail

	METHOD	EXTRACTED	TEST DATE	RESULT	UNITS	PQL	DILUTION
--	--------	-----------	-----------	--------	-------	-----	----------

(continued from previous page)

Sample 3      STKP Hegenberger - Oakland  
Project #05-000428

Sample Type: Soil      Sampled by: N/A      Sampled: 6/10/96 15:30


Metals

Lead	EPA 6010	6/13/96	32	mg/kg	5.0
Chromium	EPA 6010	6/13/96	35	mg/kg	5.0
Cadmium	EPA 6010	6/13/96	5	mg/kg	1.0
Nickel	EPA 6010	6/13/96	43	mg/kg	10.0
Zinc	EPA 6010	6/13/96	66	mg/kg	10.0

PQL - Practical Quantitation Limit      ND - None Detected  
\* - Indicates Detection Limit altered due to Sample Dilution

NOTES:

Bruce L. Gove  
Laboratory Director

  
Date Printed: 6/13/96



1046 Olive Drive, Suite 2  
Davis, CA 95616

Phone#: 916-753-9500  
Fax#: 916-753-6091  
Sample Receiving#: 916-757-0920

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: *Dale van Dam* Phone #: *800 395 3570*

Company/Address: *Northwest Environcon* FAX #: *416 649 3819*

Project Number: *05-000428* P.O.#: *P960500362DVD* Project Name: *Hegenberger - Oakland*

Project Location: *444 Hegenberger Rd., Oakland, CA* Sampler Signature: \_\_\_\_\_

ANALYSIS REQUEST

For Lab Use ONLY

Sample ID	Sampling		Container (Type/Amount)				Method Preserved				Matrix		BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/M8015)	TPH as Diesel (M8015)	TPH as Motor Oil (M8015)	EPA 601/8010 Chlorinated HCs	EPA 608/8080 - Pesticides	EPA 608/8080 - PCB's	EPA 624/8240	EPA 625/8270 (PCB's & SVOC's)	CAM - 17 Metals	LEAD(60107421239.2)	Cd, Cr, Pb, Zn, Ni	dil & Grav 5520 BFF	TAT				
	DATE	TIME	VOA	SLEEVE	1L GLASS	1L PLASTIC	HCl	HNO <sub>3</sub>	ICE	NONE	WATER	SOIL																		
<i>01 W.O.T. @ 8'</i>	<i>6/10/96</i>	<i>1:50 P</i>		<i>1</i>									<i>X</i>	<i>X</i>	<i>X</i>						<i>X</i>			<i>X</i>	<i>X</i>					
<i>02 O.W.S. @ 5'</i>	<i>6/10/96</i>	<i>2:15 P</i>		<i>1</i>									<i>X</i>	<i>X</i>	<i>X</i>						<i>X</i>			<i>X</i>	<i>X</i>					
<i>03 ST.K.P.</i>	<i>6/10/96</i>	<i>3:30 P</i>		<i>1</i>									<i>X</i>	<i>X</i>	<i>X</i>						<i>X</i>			<i>X</i>	<i>X</i>					

*Need Results 6/14/96 a.m.*  
12 hour / 24 hour / 48 hour / 1 week / 2 weeks

*14871*  
WEST Lab Number

Relinquished by: <i>[Signature]</i>	Date: <i>6/10/96</i>	Time: <i>6:05 P.</i>	Received by: _____
Relinquished by: _____	Date: _____	Time: _____	Received by: _____
Relinquished by: _____	Date: <i>06/10/96</i>	Time: <i>1805</i>	Received by Laboratory: <i>[Signature]</i>

Remarks: *Call Dale van Dam w/ question @ phone # above or 916/626-3898*

Bill To: *Northwest Environcon, Inc.*

**ATTACHMENT B**

**NORTHWEST ENVIROCON**  
**STANDARD OPERATING PROCEDURES**  
**FOR FIELD WORK**

**NORTHWEST ENVIROCON  
STANDARD OPERATING PROCEDURES  
FOR FIELD WORK**

## TABLE OF CONTENTS

1.0 SAFETY PROCEDURES.....	3
1.1 Safety Training And Medical Monitoring.....	3
1.2 Preparatory Safety Procedures.....	3
1.3 On-Site Safety Procedures.....	3
2.0 SOIL BORING PROCEDURES.....	4
3.0 SOIL SAMPLING PROCEDURES.....	5
4.0 GROUNDWATER MONITORING WELL PROCEDURES.....	5
4.1 Groundwater Monitoring Well Installation.....	5
4.2 Groundwater Monitoring Well Development.....	5
5.0 GROUNDWATER SAMPLING AND MEASUREMENT PROCEDURES.....	6
5.1 Groundwater Sampling Procedures.....	6
5.2 Measuring Depth to Groundwater and Groundwater Gradient.....	6
6.0 SAMPLE HANDLING AND SELECTION PROCEDURES.....	6
6.1 Chain of Custody Procedures.....	6
6.2 Sample Preservation and Transportation.....	7
6.3 Laboratory Selection.....	7

## 1.0 SAFETY PROCEDURES

### 1.1 Safety Training And Medical Monitoring

All of NWE's field personnel will be trained in health and safety procedures in accordance with 29 CFR 1910.12. Records of this training, and related medical monitoring, will be kept in employee personnel files. Any subcontracting company selected for the project also must be in compliance with 29 CFR 1910.12. However, it is the responsibility of the subcontracting firm to provide its employees with safety equipment, training, and supervision.

### 1.2 Preparatory Safety Procedures

**Work Plans, Permits and Inspections.** If necessary, the project manager will obtain approval of a work plan, and will acquire any necessary permits from regulatory authorities. In addition, the project manager (or other appointed personnel) will arrange for any necessary regulatory inspections.

**Underground Utilities.** Before field work begins, USA (Underground Service Alert) will be contacted to identify the underground utilities at the site. As appropriate, other techniques may be used to supplement the USA service. These could include: reviewing facility records; interviewing facility personnel, and/or employing geophysical utility location techniques.

**Health and Safety Plans.** A site-specific health and safety plan will be completed for each project involving field work. Once completed, the project manager will distribute a copy of the plan to all project personnel, who will familiarize themselves with its contents.

The health and safety plan will include the following elements:

- the name and address of the site;
- the name of the project manager, project engineers, and subcontracting workers;
- a description of the site;
- the known and suspected environmental conditions at the site;
- the steps to be taken to reduce risk from contaminant exposure;
- the physical hazards at (or near) the site;
- the steps to be taken to reduce risk of injury from physical hazards;
- the planned site activities;
- the required safety equipment;
- the appropriate conditions for using the safety equipment;
- the required safety procedures;
- any special procedures and precautions to be taken;
- the permissible exposure limits allowed;
- the contingency procedures and training;
- the emergency phone numbers
- the directions to the nearest hospital;
- the signatures of field personnel

### 1.3 On-Site Safety Procedures

**Safety Meetings.** On-site safety meetings will be held at the start of each working day, and at the beginning of new work activities.

**Confined Spaces.** On-site personnel will observe regulations governing confined spaces. Personnel will not enter unshored trenches or vertical-walled excavations deeper than four feet.

**Utility Avoidance.** Soil borings (except manual borings) and/or trenches will be located at least 10 feet from overhead utility lines. Subsurface excavations will be placed at safe distance from any identified or suspected underground utilities. Since underground utility identification procedures are not always completely accurate, extreme caution will be taken when beginning to drill or excavate a new area. Field personnel will use hand augers or probes to advance all borings to a depth of five feet below grade. Drilling will then proceed with caution through the upper five to ten feet of soil.

**Utility Damage.** If a utility line is damaged during field work, creating an emergency situation, the field personnel will contact the local emergency service. Then, field personnel will notify other on-site persons who may be affected by the situation, and take appropriate steps to insure the personal safety of all persons affected by the situation. If a utility is damaged, but no emergency conditions exist, the appropriate company or government agency will be quickly notified.

**Procedure for Dealing with Injured Personnel.** Any employee injured on the site will be immediately given first aid. If the injuries allow, the employee will be removed from the contaminated zone, decontaminated (if required), and transported to the nearest hospital (if warranted). Emergency personnel will be contacted in the case of extreme injury, including any serious injury involving the spine or head. Emergency personnel will also be contacted if there is a risk of fire or explosion, an electrical hazard, a gas leak, a need for victim extrication, or a risk of injury to rescuing personnel.

## 2.0 SOIL BORING PROCEDURES

Before site drilling begins, any appropriate permits will be obtained. If necessary, a work plan will be submitted to the appropriate regulatory agency, and approval of this work plan will be obtained.

Soil borings will be drilled using the drilling method specified in the project work plan proposal. The drilling subcontractors used, if any, will be in compliance with the appropriate health and safety and licensing regulations.

The depths of the borings will depend on site conditions, and the nature of the investigation. A geologist will log the soils encountered by examining soil samples and cuttings. The geologist will also note any evidence of soil discoloration, or unusual odors. In addition, the cuttings and soil samples will be screened for volatile constituents, using a photoionization device. The presence of groundwater in the bore hole will be noted.

Drill cuttings suspected of being contaminated will be placed in DOT-approved drums and stored on site until laboratory results are received. If the cuttings are found to contain actionable levels of contamination, the client will be notified that the cuttings require treatment or disposal as hazardous materials.

Upon the completion of the boring, the bore hole will be backfilled with a mixture of Portland Cement and 5% bentonite, or such other materials specified by local regulatory agencies.

To minimize the possibility of cross-contamination between bore holes, the augers, samplers, sampling tubes and other down-hole drilling equipment will be steamed clean. Sampling tools and other down-hole equipment will also be rinsed in clean water and an industrial-grade detergent (such as Alconox or tri-sodium phosphate) between sampling attempts within the same bore hole. Rinse water from this process will be collected and drummed in DOT-approved drums. If the rinse water is found to contain actionable levels of contamination, the client will be notified that the water requires treatment or disposal as a hazardous material.



### 3.0 SOIL SAMPLING PROCEDURES

A standard split- spoon sampler lined with three brass or stainless steel tubes will be driven into the soil with a down-hole hammer. Except in the case of hand-augured samples, blow counts will be recorded as the sampler is driven into the subsurface. Once fully driven into the soil, the sampler will be extracted, and the tubes will be removed and examined by the geologist.

One of the three soil samples obtained will be prepared for potential laboratory analyses. To do this, the end of the tube will be covered with Teflon tape, and then capped. The tube will be labeled and placed on ice.

When analyzing the sample for volatile constituents, such as toluene, care will be taken to avoid the contamination of the sample with a toluene-containing substance, such as felt pen ink and duct tape adhesive. The sample will be exposed to the atmosphere for as short a time as possible, to avoid the volatilization of these constituents.

The remaining soil sample(s) will be used to log the subsurface lithology, and to identify evidence of contamination (if any), as discussed in Section 2.0. The data obtained will be recorded on the boring logs, at the depth of the collected sample.

The samples are to be transported either to a laboratory or to the nearest NWE office, under proper chain of custody procedures (Section 6.1). Samples will be kept under refrigeration at all times.

### 4.0 GROUNDWATER MONITORING WELL PROCEDURES

#### 4.1 Groundwater Monitoring Well Installation

Before constructing a groundwater monitoring well, all appropriate permits and any other necessary regulatory approval will be obtained. If necessary, arrangements for a regulatory inspection of the well will be made.

The bore holes for monitoring wells will be drilled with a hollow-stem auger drill rig or another appropriate method. During the drilling of the bore holes, soil samples may be collected for analyses or field inspection, as described in Section 3.0.

Once the boring is complete, a casing of PVC pipe (or other appropriate material) will be inserted into the bore hole. The casing will consist of clean, factory-slotted screens and blank casing. The length and placement of the screen interval will correspond to the terms of the well permit. The base of the well will be sealed as appropriate. An appropriate gravel pack, consisting of factory-sorted and washed sand will be placed in the annular space between the casing and the bore hole. The gravel pack will extend at least one foot above the top of the screened interval. In the case of very shallow screened intervals, these general well specifications may be modified with the approval of the permitting agency. Overlying the gravel pack will be a seal of at least one foot of hydrated bentonite pellets, over which will be placed cement or cement grout. The well head will be finished either with a traffic-rated, flush mounted box, or with an above-ground well head protective cover. Any cover used will be locked.

#### 4.2 Groundwater Monitoring Well Development

The newly installed groundwater monitoring well will be developed to remove any drilling-related fluids and to allow for representative area groundwater to enter well. Using a pump or hand bailer, three times the well volume, if possible, will be purged. The purged water will be placed in labeled DOT-approved drums, pending laboratory analyses. If laboratory analyses indicate the purged water contains actionable levels of contamination, the client will be notified that the purged water requires treatment or disposal as hazardous waste.

## **5.0 GROUNDWATER SAMPLING AND MEASUREMENT PROCEDURES**

### **5.1 Groundwater Sampling Procedure**

Using a disposable Teflon bailer, groundwater will be observed for the presence of floating petroleum products or for oily sheens. If observed, the thickness of the product will be noted.

All sampling equipment will be cleaned before sampling. Any equipment to be used during the sampling of more than one well will be cleaned between wells. The equipment will be cleaned by washing it with laboratory-grade detergent and rinsing with distilled water. If possible, the wells will be sampled beginning with the well considered least contaminated, and ending with the well considered most contaminated. The equipment used to prepare any quality control samples will be cleaned and handled in the same manner as the equipment used to sample the monitoring wells.

Before sampling, groundwater will be purged from each monitoring well until the discharge water is stabilized in terms of its pH, temperature, and conductivity. "Stabilization" is defined as a variation of less than 10 per cent for the values of each category. Water purged from the wells will be stored on site in appropriately labeled, DOT-approved drums. If laboratory analyses indicate the purge water contains actionable levels of contamination, the client will be notified that the water requires treatment or disposal as a hazardous material.

The water samples will be collected using a clean disposable bailer. The samples will be decanted into appropriately sized and preserved containers, in a manner that minimizes the exposure of the water to air. Samplers will ensure that no air bubbles are present in the vials.

### **5.2 Measuring Depth to Groundwater and Groundwater Gradient**

Using a water probe, the depth to groundwater will be measured from the top of the well casing. Water elevations will be corrected for the presence of floating product, if necessary.

A minimum of three groundwater monitoring wells (not containing floating product) are necessary to calculate the groundwater gradient. To ensure an accurate gradient, it is essential that the wells measured for the calculations draw groundwater from the same source.

The elevation of each well head will be surveyed to an accuracy of 0.01 feet. If a topographic benchmark is available, the absolute elevation of the well heads will be determined; otherwise, the relative elevations of groundwater encountered in each monitoring well will be calculated, by subtracting the depth to groundwater in each well from the corresponding well head elevation. The groundwater gradient will then be calculated geometrically.

## **6.0 SAMPLING HANDLING AND SELECTION PROCEDURES**

### **6.1 Chain of Custody Procedures**

The samples collected will be in the custody of NWE staff member, until delivered to the custody of the laboratory. Once collected, the NWE geologist will note the sample number, and the date and the time of collection. The chain of custody form will also identify the samplers name, NWE's address and telephone number, and the project location.

The sampler will retain custody of the samples by doing one or more of the following: keeping the samples in his or her possession; keeping the samples in view; keeping the samples in a locked storage area; or keeping the

samples in an otherwise secured area. If custody is to be transferred to another NWE employee, the recipient employee will sign the chain of custody form, noting the time and date.

The chain of custody will note any special instruction to the laboratory, or any other important details about the samples. All of the following would be examples of special information that will be noted in the form:

- samples which need to be split;
- methods of sample preservation used;
- any sampling problems encountered;
- any noteworthy description of the sample; and
- QA/QC information.

When the custody of the samples is transferred to the laboratory, a laboratory employee will sign and date the chain of custody form, and note the time. A copy of the form will be retained by the laboratory, while another copy of the form will be kept by the project manager. The laboratory employee will inspect the container for evidence of tampering, and sample integrity.

### **6.2 Sample Preservation and Transportation**

Samples will be collected in the appropriate containers, cleaned and preserved according to laboratory recommendations. Once collected, samples will be preserved as the laboratory directs. When sample refrigeration is called for, the samples will be placed on ice in the field, and will be transported to the laboratory or to the nearest NWE office. Once in its custody, it is the responsibility of the laboratory to maintain the temperature of the samples. If transported to the nearest NWE office, the samples will be placed in a cold refrigerator.

The samples will be transported to the laboratory in one of the following ways: by being driven to the laboratory by an NWE employee; by being driven to the laboratory by a laboratory employee or contract courier service; or by being shipped by mail, bus, or other means. When shipped, the container must be sealed to prevent tampering. Seals can be formed by taping the case shut and signing (or otherwise marking) the tape seal. The chain of custody form will be placed within the sample container.

### **6.3 Laboratory Selection**

Only state-certified laboratories will be selected to conduct sample analyses.