REPORT OF REMEDIAL ACTIONS
UNDERGROUND STORAGE TANK REMOVAL
BULK PLANT 0046
BINGEN, WASHINGTON
FOR
UNOCAL

GeoEngineers

June 28, 1989

Consulting Geotechnical
Engineers and Geologists

Unocal
P.O. Box 76
Seattle, Washington 98111

Attention: Mr. Gary Gunderson

Report of Remedial Actions
Underground Storage Tank Removal
Bulk Plant 0046
Bingen, Washington
File No. 0161-181-4

INTRODUCTION

A summary of our observations at Unocal Bulk Plant 0046 is presented in this report. The site is located at 217 E. Steuben Street, Bingen, Washington. The portion of the facility which is the subject of this study is located in the southeast section of the bulk plant site.

GeoEngineers was contacted by Unocal on May 16, 1989 when petroleum-related soil contamination was encountered during the removal of a diesel storage tank at the bulk plant. We understand that Unocal's contractor, Northwest Field Services, obtained one soil sample from the tank excavation and tested it for total petroleum hydrocarbons by EPA Method 418.1. A TPH concentration of 1200 ppm was detected in the soil sample. The exact sampling location is not known.

SOIL EXCAVATION AND SAMPLING

Northwest Field Services removed one 6,000-gallon underground diesel storage tank from the location shown in Figure 1. A representative of our staff was not present to observe tank removal activities. The excavation extended to a total depth of 10 feet below grade in the western portion of

GeoEngineers, Inc.
2405 140th Ave. NE, Suite 105
Bellevue, WA 98005
Telephone (206) 746-5200
Fax. (206) 746-5068

the excavation and about 9 feet in the eastern portion. The excavation was left open with surplus soil stockpiled north of the tank excavation (Figure 1).

A GeoEngineers' representative visited the site on May 19, 1989 and obtained six soil samples for chemical analyses. We observed no evidence of ground water in the excavation. Soil samples 1 through 5 were obtained from the walls and floor of the excavation. Sample 6 was obtained approximately 6 feet southwest of the excavation, near the oil storage building. Soil sample locations are shown in Figure 1.

We conducted field screening on the soil samples for evidence of contamination using water sheen and volatile organics headspace field screening methods. Sheen testing involves placing soil in water and observing the water surface for signs of sheen. Headspace vapor screening involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a Bacharach TLV Sniffer is used to puncture the bag, the instrument withdraws the air from the bag, and the TLV Sniffer records the concentrations of combustible vapor in the air removed from the sample headspace.

The TLV Sniffer records vapor concentrations in parts per million (ppm) and is calibrated to hexane. The Sniffer is designed to quantify combustible gas concentrations in the range of 100 to 10,000 ppm. Field screening results are site specific. The results vary with temperature, soil type, type of contamination and soil moisture content.

A moderate sheen was observed during the field screening test on Samples 4 and 6. A slight sheen was observed during field screening on Samples 2, 3 and 5. Sheen was not observed on Sample 1. Headspace field

screening methods did not detect hydrocarbon vapor concentrations greater than 100 ppm in the soil samples. Field screening results are summarized in Table 1.

Soil samples 1 through 6 were submitted to Enviros Analytical Laboratory for analysis of total petroleum hydrocarbons (TPH) by EPA Method 418.1. Soil samples 1, 2, 3 and 6 were analyzed for volatile aromatic hydrocarbons (BETX) by EPA method 8020. Soil samples 4 and 5 were also analyzed for fuel hydrocarbons by modified EPA Method 8015. The results for these analyses are summarized in Table 1. Laboratory reports are attached.

The current Washington State Department of Ecology (Ecology) cleanup guidelines for petroleum-related contamination in soil are 200 ppm TPH, 660 ppb (0.66 ppm) benzene, 143 ppm toluene and 14 ppm ethylbenzene.

Neither gasoline nor diesel was detected in soil Samples 4 and 5. Concentrations of BETX either were not detected or were less than Ecology cleanup guidelines for the soil samples tested. TPH concentrations detected in Samples 3 (7920 ppm) and 6 (9200 ppm) exceeded Ecology cleanup guidelines. TPH concentrations ranged between 11 and 98 ppm in Samples 1, 2, 4 and 5.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our chemical analyses, residual soil contamination in the floor and three of the four walls of the underground diesel storage tank excavation is either nondetected or less than Ecology cleanup guidelines. Concentrations of TPH detected in the soil samples obtained from the south wall of the excavation and adjacent to the oil storage building were greater than cleanup guidelines. TPH contamination in the south wall of the excavation (sample 3) appears to have originated from the

oil storage building. Based on our visual observations, it appears that petroleum-related contamination may also extend beneath the oil storage building.

The petroleum-related soil contamination found at Bulk Plant 0046 is not amenable to cleanup by aeration or subsurface vapor extraction. Based on our experience, the most rapid and cost-effective remedial approach would be excavation of the contaminated soils at the time the facility is dismantled, and land-farming the soil on-site. As an alternative, it may be possible to legally dispose of contaminated soil at a sanitary landfill.

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We appreciate the opportunity to be of service on this project. Please call if you have questions concerning this report.

Respectfully submitted,

GeoEngineers, Inc.

Julia Fowler
Hydrogeologist

James A. Miller, P.E.
Principal

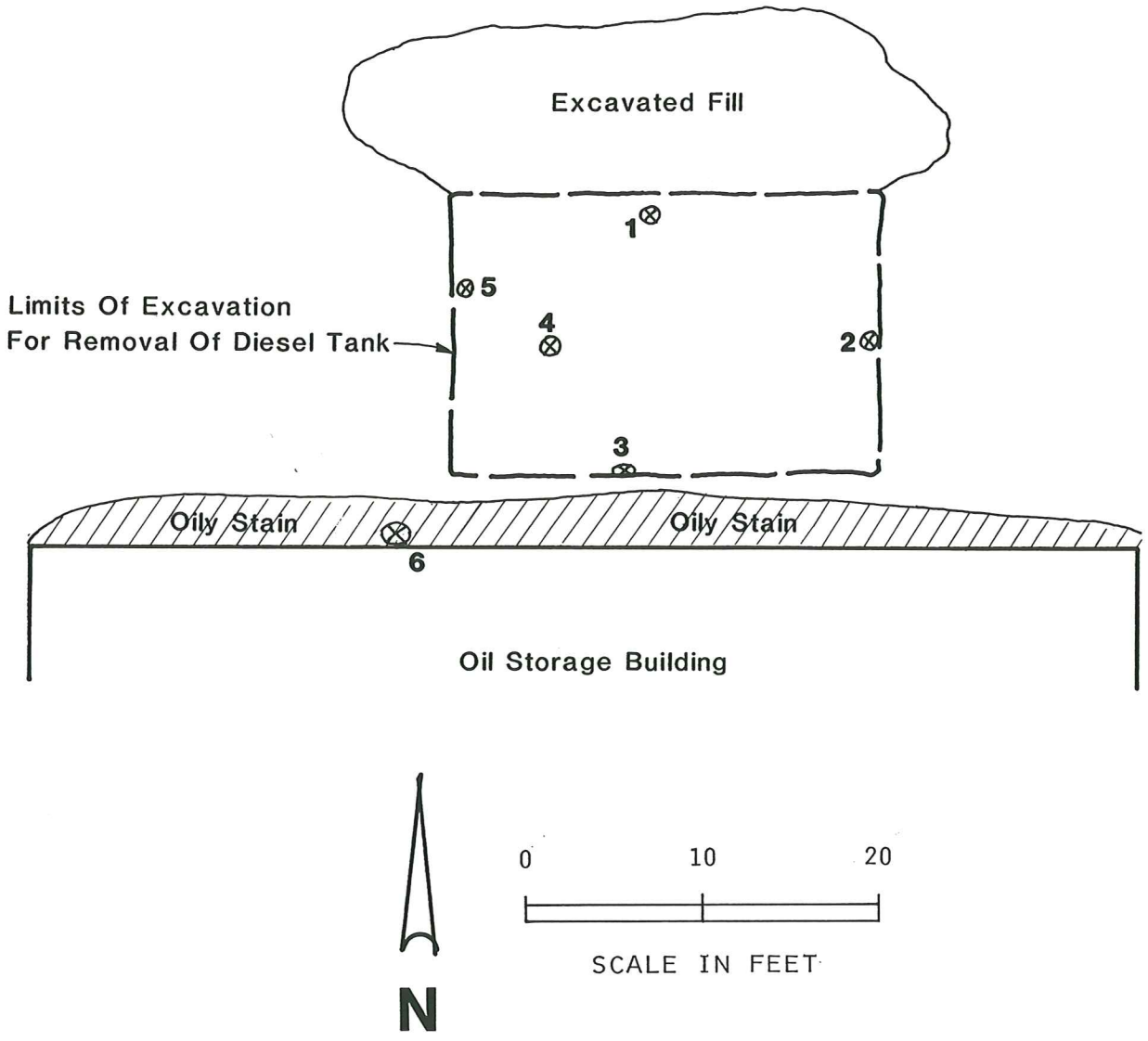
JF:JAM:gm

TABLE 1
SUMMARY OF FIELD SCREENING AND SUBSURFACE SOIL CHEMISTRY

Sample Number	Sample Depth	Date Collected	Sample Location
1	3.0	05/19/89	North wall, diesel storage tank excavation
2	3.4	05/19/89	East wall, diesel storage tank excavation
3	1.0	05/19/89	South wall, diesel storage tank excavation
4	9.0	05/19/89	Base of diesel storaqge tank excavation
5	2.5	05/19/89	West wall, diesel storage tank excavtaion
6	1.5	05/19/89	Near oil storage building

	Field Screening									
Sample Number	Headspace Vapors (1)	Sheen Test	TPH (2) (ppm)	Fuel Hydrocarbons (ppm) (3)			BETX (ppb) (4)			
				Gasoline	Diesel 1	Diesel 2	B	E	T	X
1	<100	None	11	--	--	--	<1	<1	<1	<1
2	<100	Slight	83	--	--	--	<1	<1	<1	<1
3	<100	Slight	7920	--	--	--	<1	<1	<1	4
4	<100	Moderate	98	<10	<10	<10	--	--	--	--
5	<100	Slight	13	<10	<10	<10	--	--	--	--
6	<100	Moderate	9200	--	--	--	<1	<1	2	3

Notes:
(1) Headspace vapor field screening was conducted using a Bacharach TLV Sniffer Calibrated to hexane (ppm).
(2) Total Petroleum Hydrocarbons analyzed using EPA Method 418.1
(3) Fuel Hydrocarbons analyzed using EPA Method 8015 (modified)
(4) BETX analyzed by EPA Method 8020. B=Benzene, E=Ethylbenzene, T=Toluene, X=Total Xylenes
ppm = parts per million
ppb = parts per billion
"--" indicates "not tested"



EXPLANATION:

1⊗ SOIL SAMPLE LOCATION AND NUMBER

GeoEngineers	**SITE PLAN**
	FIGURE 1

161-181-4 CSL:KKT 6-14-89

May 30, 1989

Julia Fowler, Project Manager
GeoEngineers, Inc.
2405-140th Avenue N.E., Suite 105
Bellevue, WA 98005

Dear Julia:

Enclosed are the results of the analyses of soil samples submitted on May 22, 1989 from Project 0161-181-4.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this material, or if you just want to discuss any aspect of your projects, please do not hesitate to contact me.

Sincerely,

James K. Farr, Ph.D.

JKF/jkf

Enclosures

enviros

Corporation Scientists & Engineers (206) 455-2962 fax 451-8546
600 Skyline Tower 10900 NE 4th Street Bellevue, Washington 98004
Analytical Laboratory: 225 112th Avenue NE (206) 453-8174

Date of Report: May 30, 1989
Date Submitted: May 22, 1989
Project: 0161-181-4

RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS BY IR (EPA METHOD 418.1)

Sample #	Total Petroleum Hydrocarbons (ppm)
#1 soil	11.3
#2 soil	83.4
#3 soil	7,920
#4 soil	97.8
#5 soil	12.9
#6 soil	9,200
Quality Assurance	
Method Blank	<5.0

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RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR BTX AND ETHYLBENZENE METHOD 8020
Results Reported as ng/g (ppb)

Sample #	Benzene	Toluene	Et-Benzene	Xylene *m,p*	Xylene *o*
#1 soil	<1	<1	<1	<1	<1
#2 soil	<1	<1	<1	<1	<1
#3 soil	<1	<1	<1	1	3
#6 soil	<1	2	<1	<1	3
Quality Assurance					
Method Blank	<1	<1	<1	<1	<1
#1 (Duplicate)	<1	<1	<1	<1	<1
#1 (Matrix Spike) Spiked @10 ppb Percent Recovery	78%	78%	78%	72%	84%

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RESULTS OF ANALYSES OF SAMPLES FOR GASOLINE, DIESEL #1 AND DIESEL #2 BY GC/FID

Sample #	Gasoline (ppm)	Diesel #1 (ppm)	Diesel #2 (ppm)
#4 soil	<10	<10	<10
#5 soil	<10	<10	<10
Quality Assurance			
Method Blank	<10	<10	<10
#5 (Duplicate)	<10	<10	<10
#5 (Matrix Spike) Spiked @100 ppm Percent Recovery	130%	a	110%

a - The analyte indicated was not added to the matrix spike sample.

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GEOENGINE .S INC.
2405 - 140th AVE. N.E., SUITE 105
BELLEVUE, WASHINGTON 98005
206-746-5200

CHAIN OF CUSTODY RECORD

PROJECT LOC. Bingen, WA
PROJECT NAME Unocal
GEI FILE NO. 161-181-4

SAMPLED BY Charles S. Lindsay DATE 5/19/89

	SAMPLE No.	DATE SAMPLED	TIME SAMPLED	DEPTH OF SAMPLE	TYPE OF SAMPLE	FIELD FILTERED	PRESERVATIVE ADDED TO SAMPLE	ANALYSES TO BE CONDUCTED	NO. OF SAMPLE CONTAINERS	COMMENTS
E-371	1	5/19/89	1210	3.0'	Soil	No	—	418.1 /8020	1	
372	2	"	1220	3.4'	"	"	—	"	1	
373	3	"	1235	1.0'	"	"	—	"	1	
374	4	"	1240	9.0'	"	"	—	418.1/8015	1	
375	5	"	1255	2.5'	"	"	—	418.1/8015	1	
376	6	"	1345	1.5'	"	"	—	418.1/8020	1	

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME
NAME Charles S. Lindsay FIRM GeoEngineers			NAME Bob Walter FIRM [illegible]		
NAME FIRM			NAME FIRM		

ADDITIONAL COMMENTS:

Please analyze Samples 4 and 5 for modified 8015 (gas/diesel) and 418.1.
~~[illegible]~~ Julia Fowler