TRIANGLE WORKS

3008 NORTHWEST 71ST STREET

SEATTLE, WASHINGTON 98117

ATTENTION: MR. R.G. SATTERWHITE

RESULTS OF SOIL CONTAMINATION TESTING AT

5615 24TH AVENUE NORTHWEST, SEATTLE, WASHINGTON

PACIFIC TESTING LABORATORIES

3220 17TH AVENUE WEST

SEATTLE, WASHINGTON 98119

JULY 3, 1990

CERTIFICATE NO. 9006-7130

Prepared by: Robert Allen Bartlett
Robert A. Bartlett, Manager
Chemistry Department

Reviewed by: Michael E Dodson
Michael E. Dodson, Operations Manager

Approved by:
Frank T. Jarnot, P.E., Chief Engineer

CONTAMINATION TESTING OF SOILS AT 5615 24TH AVENUE NORTHWEST, SEATTLE, WASHINGTON

SYNOPSIS

On June 18 and 19, 1990, representatives of the Chemistry, Geotechnical, and Drilling Departments of Pacific Testing Laboratories traveled to 5615 24th Avenue N.W., Seattle, Washington. As agreed, six soil sampling holes were auger drilled and soil samples taken at five foot intervals. In the laboratory, soils from surface and bottom depth of each hole were analyzed to detect contamination by petroleum products. Analytical results revealed petroleum product contamination in three of the boreholes. Contamination locations range from the surface to depths of approximately 10 feet in depth.

INTRODUCTION

The site under investigation is located at 5615 24th Avenue Northwest, Seattle, Washington. Property legal description is as follows:

Lot 10-11 Block 50 QTR N.W. Sect 11 TWN 25 RNG 3 Folio C 00639 Subarea 120-000 Plat Gilman Park ADD BLKS 050-94

Established in 1948 as Chuck's Ballard Service Station, the site possessed five underground storage tanks for gasoline, diesel and waste oil. All underground storage tanks were removed by 1987. The site also contained a concrete lined waste oil sump within the shop area which currenlty holds approximately 50 gallons of waste oil and sludge.

The purpose of the investigation was to determine the present environmental status of the property with respect to petroleum product contamination by examination of the soils on site.

FIELD INVESTIGATION

On June 18 and 19, 1990, Pacific Testing Laboratories mobilized a truck-mounted drilling rig (B-75) with 3- 5/8 inch diameter hollow stem auger to the site. Borehole locations around the site are shown on the site map provided in Appendix A. Soil boring was accomplished in accordance with ASTM D-1586.

Standard split spoon samples were obtained at approximately five foot intervals using a two inch O.D. split spoon sampler driven by a 140 pound hammer with a thirty inch free-fall.

Sampling data was recorded in accordance with ASTM D-1586. Sampler decontamination between borehole locations and samples was performed using detergent and water.

A total of six boreholes were provided each to a depth of 15 feet. Groundwater was encountered at approximately 11-13 feet. Soils consisted mainly of well to poorly graded sands and sandy silts with traces of clays.

Borehole log sheets indicating soils classification, depth to water, blow counts and field observations for each test boring are provided in Appendix C.

ANALYTICAL METHODS

Soil samples collected during the field investigation were placed in precleaned I-Chem bottles stored at a temperature of 4°C ± 2°C until the performance of the chemical analysis.

The soil samples from the top (approximately five foot depth) and bottom (approximately fifteen foot depth) of each hole were analyzed for petroleum product contamination. The analytical methods followed for each determination are shown in Table 1.

Table 1. Soil and Groundwater Samples: Chemical Analysis Parameters and Analytical Methods

Chemical Analysis Parameter	Sample Medium	Analytical Methods
Total Petroleum Hydrocarbons	Soil	EPA 418.1
Benzene, toluene, xylenes (BTX)	Soil	EPA 3810

ANALYTICAL RESULTS

The samples were analyzed on June 19 and 20, 1990 for total petroleum hydrocarbons (TPH) by EPA Method 418.1 using a Perkin Elmer 1600 Series FTIR (S/N 135991) and benzene, toluene and xylenes (BTX) content by EPA Method 3810 using a Hewlett-Packard 5890A Gas Chromatograph (S/N 2429 A 03040). Results of these analyses, in parts per million, are presented in Table 1 of Appendix B.

CONCLUSIONS

Three of the borehole locations produced soils which were contaminated with petroleum products in excess of the state and federal regulations. The Washington State Department of Ecology guidelines regulate total petroleum hydrocarbons in soil at 200 ppm, benzene at 0.5 ppm, toluene at 16 ppm, and total xylenes at 2 ppm.

Boreholes BH-2, BH-5, and BH-6 revealed the presence of gasoline, diesel, and heavier oils extending from the surface to groundwater level (approximatley 13 feet).

The observed physical characteristics of the soils on site indicate the potential for mobility of the contamination is high due to the permeable nature of the soils and relatively shallow depth to groundwater.

Due to over 40 years of operation as a service station, and the character of the soils, the probability that petroleum products have migrated over a considerable extent of the site is anticipated.

RECOMMENDATIONS

The following recommendations are advanced by Pacific Testing Laboratories based on field investigation and laboratory results.

1. Clean out waste oil sump within the building and barrel the waste for removal by a certified waste handler.

2. Excavation to remove the concrete waste oil sump liner and immediately adjacent soils.

3. Sump excavation may reveal the extent of contamination in the soils surrounding this area of the site. The extent of contamination in this area can be determined by removal of additional soil samples as excavation proceeds.

4. In the Phase II investigation, Pacific Testing Laboratories would address the determination of the extent of contaminated soils and act as consultant to Triangle Works in:

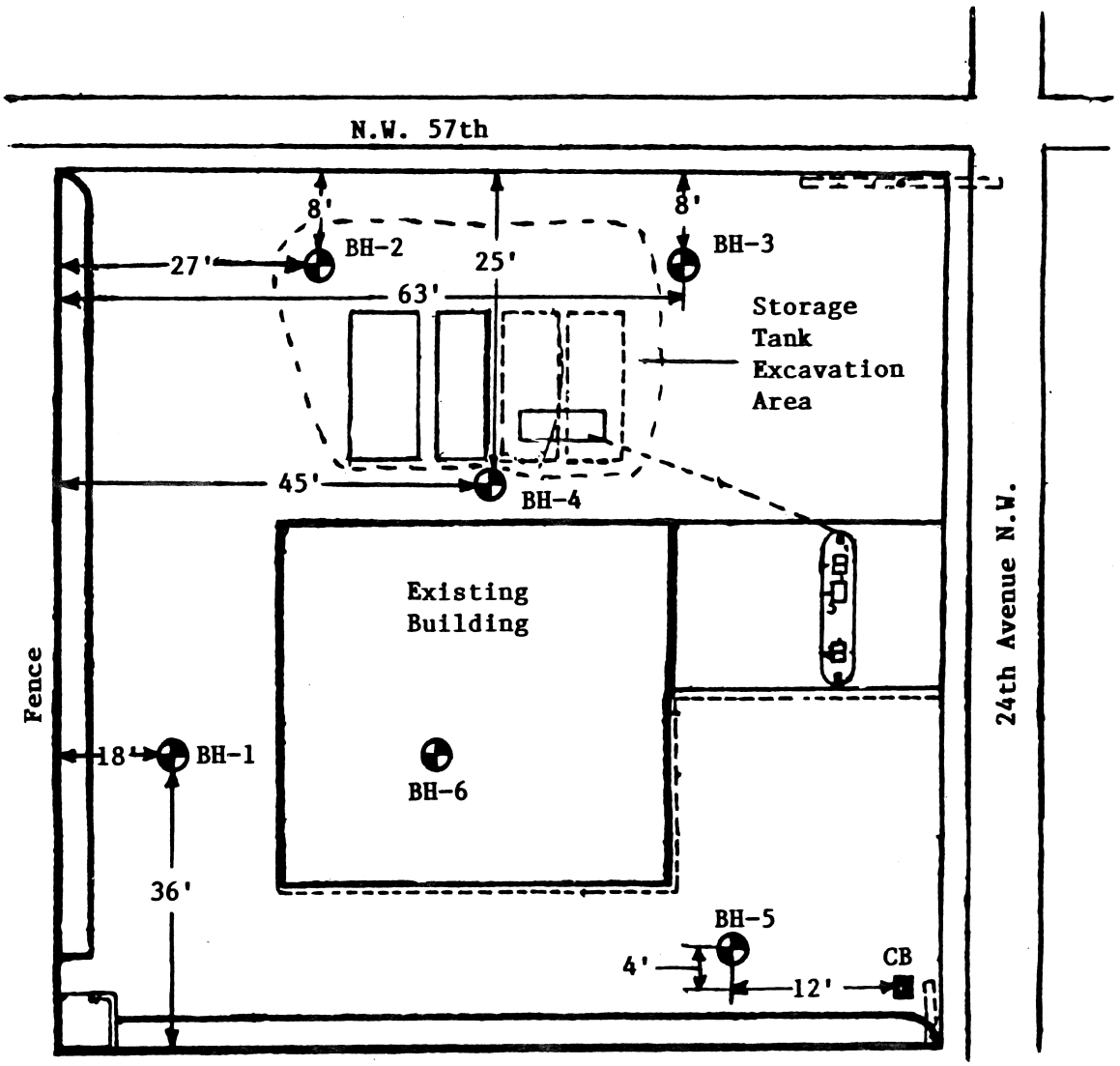
    a. Understanding the clean-up levels for contaminants as mandated by state and Federal agencies at your site.

b. Selection of a suitable waste disposal firm or firm which specializes in remediation technologies applicable to your site.

c. Inspection and documentation of the clean-up process including laboratory analysis of excavated soils.

Pacific Testing Laboratories can perform this Phase II investigation at your request.

END OF REPORT TEXT



Not to Scale

PACIFIC TESTING LABORATORIES 3220 17th AVE. W. SEATTLE, WA. 98119 206-282-0666	WILLIAM RAPP Site and Borehole Plan N.W. 57th and 24th Ave. N.W.	PROJECT NO. 9006-7130 DATE June 19, 1990 DRAWN RS ENGR./GEOL. FTJ APPROVED

APPENDIX B

ANALYTICAL RESULTS

Certificate No. 9006-7130

Table 1. Analytical Results for Soil Samples (ppm)

Sample No.	Depth	%Water	Total Petroleum Hydrocarbons	Benzene	Toluene	Xylenes Ortho-	Meta-	Para-
1A	2.6-4	16.12	<50	<0.05	<7.5	<0.5	<0.5	<0.5
1C	12-13	8.43	113.3	<0.05	<7.5	<0.5	<0.5	<0.5
2B	8-9	15.37	102.3	1.97	<7.5	1.82	20.45	20.45
2BB	10	13.87	2018.9	>2.5	11.8	42.39	61.83	61.83
2D	17.6	9.22	<50	<0.05	<7.5	<0.5	<0.5	<0.5
3A	3-4	32.16	<50	<0.05	<7.5	<0.5	<0.5	<0.5
3C	12-14	7.82	56.6	<0.05	<7.5	<0.5	<0.5	<0.5
4A	3-4	15.0	<50	<0.05	<7.5	<0.5	<0.5	<0.5
4C	12-14	8.49	<50	<0.05	<7.5	<0.5	<0.5	<0.5
5A	3-4	13.63	245.4	<0.05	<7.5	1.42	2.42	2.42
5B	8-9	9.83	2308.9	>2.5	18.04	4.39	5.51	5.51
5C	12-14	11.87	<50	<0.05	<7.5	<0.5	<0.5	<0.5
6A	3-4	11.75	3477.1	<0.05	<7.5	<0.5	<1.0	<1.0
6B	8-9	18.30	2634.6	0.116	<7.5	1.86	<1.0	<1.0
6C	12-14	11.53	<50	<0.05	<7.5	<0.5	<1.0	<1.0

PACIFIC TESTING LABORATORIES

APPENDIX C

BOREHOLE LOGS

LOG OF TEST BORING

BORING BH-1

PROJECT: Soil Contamination Investigation
LOCATION: NW 57th & 24th Ave. NW
DRILL METHOD: Augar
GROUND WATER DEPTH: 14 feet
ENGINEER: Rick Safford
CAVING: N/A

Cert. No.: 9006-7130
START: 2.5
FINISH: 06-18-90
BORING NO: BH-1
ELEVATION: 0+00
SCALE: 1.0 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0	0/0 0/0 0/0	SW	Well graded sand, some silt, med. grained, moist.	Top 2" were asphalt.
2.5	24/6 44/6 10/6	SM	Silty sand, some clay, trace gravel gray, moist, well graded, non-plastic, non-dilatent, med dense.	Homogenous Drilling, smooth/easy.
5				
7.5	24/6 60/6 0/6	SP	Poorly graded sand, trace silt, trace gravel, gray, moist, med size, very dense.	Homogenous, Drilling, @ 5' smooth-slow.
10				
12.5	50/6 0/0 0/0	SP	Poorly graded sand, trace silt, trace gravel, gray, moist, med size, very dense.	Homogenous.
Water Checked Augar				

No indication of contamination at this time.

Figure Number 1

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING BH-2

PROJECT: Soil Contamination Investigation
LOCATION: NW 57th & 24th Ave. NW
DRILL METHOD: Augar
GROUND WATER DEPTH: 11 feet
ENGINEER: Rick Safford
CAVING: N/A

Cert. No.: 9006-7130
START: 2.5
FINISH: 06-18-90
BORING NO: BH-2
ELEVATION: 0+00
SCALE: 1.0 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0	0/0 0/0 0/0	SW	Well graded sand, some silt, med. grained, moist, brown, fill material.	
2.5	02/6 05/6 11/6	SW	Well graded sand, some silt, med. grained, moist, brown, fill material.	Drilling, smooth/easy.
7.5	01/6 01/6 01/6	SW	Well graded sand, some silt, trace gravel, well graded, wet, fine to coarse grained, loose.	Homogenous, trace gas odor
12.5	50/4 0/0 0/0	SM	Sandy silt, some clay, trace gravel tan, dry, fine grained, non-plastic non-dilatent, very dense.	Homogenous. Water level 11 feet.
15				

Water Checked
Augar
Boring continues

Contaminated cuttings were barrled, hole was backfilled with bentonite.

Figure Number 3

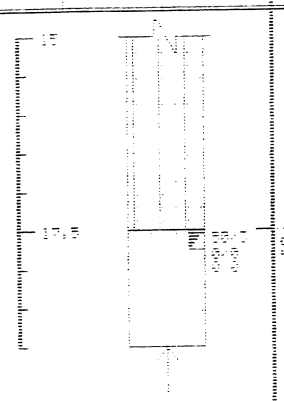
PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING BH-2

PROJECT: Soil Contamination Investigation
LOCATION:NW 57th & 24th Ave. NW
DRILL METHOD:Augar
GROUND WATER DEPTH: 11 feet
ENGINEER: Rick Safford
CAVING:N/A

Cert. No.:9006-7130
START:2.5
FINISH:06-18-90
BORING NO:BH-2
ELEVATION:0+00
SCALE:1.0 feet per inch

ELEV. / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
17.5		SP	Poorly graded sand, some silt, gray, moist, friable, very dense.	Laminations of silt. BOH=19 feet.

Contaminated cuttings were barrled, hole was backfilled with bentonite.

Figure Number 4

LOG OF TEST BORING

BORING BH-3

PROJECT: Soil Contamination Investigation
LOCATION:NW 57th & 24th Ave. NW
DRILL METHOD:Augar
GROUND WATER DEPTH: 12 feet
ENGINEER: Rick Safford
CAVING:N/A

Cert. No.:9006-7130
START:2.5
FINISH:06-18-90
BORING NO:BH-3
ELEVATION:0+00
SCALE:1.0 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0	3/6 3/6 3/6	SW	Well graded sand,some silt, trace gravel, well graded, wet, fine to coarse grained, loose, brown.	
2.5	81/6 81/6 82/6	CL	Silty clay, trace of sand, red and tan motled, plastic, wet, tough, fat, soft, organics.	Drilling, smooth/easy.
7.5	81/6 86/6 78/6	CL	Silty clay, some sand, red-gray-tan laminated, wet, tough, plastic, very stiff.	Laminated.
10				
12.5	50/6 50/6 0/0	SM	Sandy silt, some clay, trace gravel tan,moist,fine grained, non-plastic non-dilatent, very dense, friable.	Drilling, slow smooth. Water at 12'.

Water Checked Augar

No indication of contamination at this time.

Figure Number 4

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING BH-4

PROJECT: Soil Contamination Investigation
LOCATION:NW 57th & 24th Ave. NW
DRILL METHOD:Augar
GROUND WATER DEPTH: N/A
ENGINEER: Rick Safford
CAVING:N/A

Cert. No.:9006-7130
START:2.5
FINISH:06-18-90
BORING NO:BH-4
ELEVATION:0+00
SCALE:1.0 feet per inch

ELEV. / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0	6/6 8/6 8/6	SW	Well graded sand,some silt, trace gravel, well graded, wet, fine to coarse grained, loose, brown.	2 inches of asphalt.
2.5	22/6 30/6 37/6	ML	Silt and sand, dark brown, organic, low plasticity, wet, med stiff.	Drilling, smooth/fast, Bedded.
5				
7.5	28/6 50/1 0/0	SW	Well graded sand,some silt, trace gravel, well graded, moist, fine to coarse grained, tan, very dense.	Homogenous.
10				
12.5	20/6 8/6 9/6	SM	Silty sand, trace gravel, tan, moist,fine grained, non-plastic non-dilatent, very dense, friable.	No water encountered.

Water Checked Augar

No indication of contamination at this time.

Figure Number 5

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING BH-5

PROJECT: Soil Contamination Investigation
LOCATION:NW 57th & 24th Ave. NW
DRILL METHOD:Augar
GROUND WATER DEPTH: 13 feet
ENGINEER: Rick Safford
CAVING:N/A

Cert. No.:9006-7130
START:2.5
FINISH:06-18-90
BORING NO:BH-5
ELEVATION:0+00
SCALE:1.0 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0		SW	Well graded sand,some silt, trace gravel, well graded, moist, fine to coarse grained, brown, loose.	2 inches of asphalt.
2.5		ML	Sandy silt, some clay, trace of gravel, gray-tan-red mottled, moist, med plasticity, fine grained, loose	Drilling smooth/easy.
5				
7.5		SP	Poorly graded sand, some silt, trace clay, med-fine grained, moist gray, very dense.	Trace of petroleum odor, Drill slow @7'
10				
12.5		SP	Poorly graded sand, some silt, trace clay, med-fine grained, moist tan, very dense.	No oder, Water level at 13 feet.
Water Checked Augar				

Contaminated soil was barreled and hole was backfilled with bentonite.

Figure Number 6

PACIFIC TESTING LABORATORIES