



June 1, 1993
Project 0556-012.20

Mr. Frank Fossati
Shell Oil Company
511 North Brookhurst Street
P.O. Box 4848
Anaheim, California 92803

Re: Additional Site Characterization and Semiannual Groundwater Sampling Report
Former Shell Station 37089
3315 172nd Street Northeast
Arlington, Washington 98223
WIC 246-0434-0307

Dear Mr. Fossati:

EMCON Northwest, Inc., is pleased to submit this letter report describing the additional site characterization and semiannual groundwater sampling event conducted on March 10 and April 1, 1993, respectively at the former Shell service station referenced above (Figure 1).

Well Installation

On March 10, 1993, a monitoring well (MW-6) was installed by Cascade Drilling Inc., of Woodinville, Washington, with a hollow-stem auger drilling rig. MW-6 was drilled south of the pump islands and north of the convenience store to a depth of 15.5 feet below ground surface. Soil samples were collected at 5-foot intervals. A soil sample was also collected from the water-bearing zone in the soil boring and submitted for sieve analysis to Pacific Testing Laboratories of Bothell, Washington. Sieve analysis results were used to evaluate the grain-size distribution of the soils in the water-bearing zone. The sieve analysis report is presented in Appendix A. Soil samples and drill cuttings were also classified in the field according to the Unified Soil Classification System by an EMCON geologist.

The monitoring well was constructed with 4-inch diameter, flush-threaded Schedule 40 PVC well casing and screen. The screen slot size was 0.010 inch. MW-6 was screened from approximately 5.0 to 15.5 feet below ground surface. A 4-inch diameter slip cap was secured to the bottom of the well with two stainless steel screws.

The annular space between the borehole and the well casing was backfilled with 10-20 Colorado silica sand to approximately 2 feet above the well screen. A hydrated bentonite seal and 12-inch-diameter traffic-rated well cover set in concrete composed the well seal. The boring log and well construction details are included in Appendix B.



Following installation, EMCON personnel developed MW-6 and surveyed the five on-site monitoring wells. Approximately 40 gallons of purge water were bailed from the well and stored on-site in a 55-gallon drum until disposal arrangements were made. Survey elevations were to the nearest 0.01 foot relative to the project (site) datum on March 16, 1993. The horizontal position of the new monitoring well was measured to the nearest 0.1 foot relative to a fixed on-site reference.

Soil samples were collected, properly labelled, and placed into an iced cooler. The samples were delivered under standard chain-of-custody protocol to North Creek Analytical of Bothell, Washington, for quantitative chemical analyses. The samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 5030/8020 and total petroleum hydrocarbons (TPH) as gasoline by Washington Department of Ecology (WDOE) Method WTPH-G.

The reported concentrations of BTEX and TPH as gasoline for the sample collected at 7.5 feet below ground surface from MW-6 exceeded the Model Toxics Control Act (MTCA)¹ Method A cleanup levels for soil. Soil samples collected from MW-6 at 2.5 feet below ground surface did not contain BTEX or TPH as gasoline above the MTCA Method A cleanup levels. Soil sample analytical results are summarized on Table 1. A copy of the laboratory report is included in Appendix C.

Groundwater Sampling

EMCON personnel collected groundwater samples from five monitoring wells on April 1, 1993 (Figure 2). Prior to sample collection, depth-to-water readings were measured with an electronic well sounding tape. The depth-to-water readings were used to calculate the volume of water standing in the well casing (pore volume). A minimum of three pore volumes were removed from each well prior to collection of samples.

Field measurements of pH, specific conductance, and temperature were recorded during well purging. Measurements were collected following the removal of each pore volume and recorded. Following stabilization of the field parameters (less than ten percent change between pore volumes), dissolved oxygen measurements were obtained and a sample was collected. The dissolved oxygen measurements were disregarded due equipment problems.

¹ Chapter 173-340 WAC, *The Model Toxics Control Act Cleanup Regulation; Method A Cleanup Levels*. Amended February 1991.

Mr. Frank Fossati
June 1, 1993
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Each sample was properly labelled and placed into an iced cooler. The samples were delivered under standard chain-of-custody protocol to North Creek Analytical of Bothell, Washington, for quantitative chemical analyses. The samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 5030/8020, total petroleum hydrocarbons (TPH) as gasoline by WDOE Method WTPH-G, and total lead by EPA Method 7421.


Groundwater analytical results are summarized in Table 2. Benzene concentrations and groundwater elevation data are shown on Figure 2. A summary of the groundwater elevations and stabilized groundwater parameters is included as Table 3. The reported concentrations of BTEX and TPH as gasoline for the sample collected from MW-6 exceeded the Model Toxics Control Act (MTCA) Method A cleanup levels for groundwater. Groundwater samples collected from MW-1, MW-3, MW-4, and MW-5 did not contain BTEX or TPH as gasoline above the MTCA Method A cleanup levels. Total lead was not detected in any of the groundwater samples. A copy of the laboratory report and a summary of previous groundwater quality data are included in Appendix B.

The next semiannual groundwater sampling event at this site is scheduled for September 1993. If you have any questions regarding the information presented here, please call.

Sincerely,

EMCON Northwest, Inc.


Lisa A. Rutan
Project Engineer


Patrick Brooks
Project Manager

Attachments: Figure 1 - Site Vicinity Map
Figure 2 - Site Map — Groundwater Data
Table 1 - Soil Sample Chemical Analyses
Table 2 - Groundwater Sample Chemical Analyses
Table 3 - Groundwater Depth and Parameters
Appendix A - Sieve Analysis
Appendix B - Boring Logs
Appendix C - Laboratory Reports and Groundwater Quality Summary Table

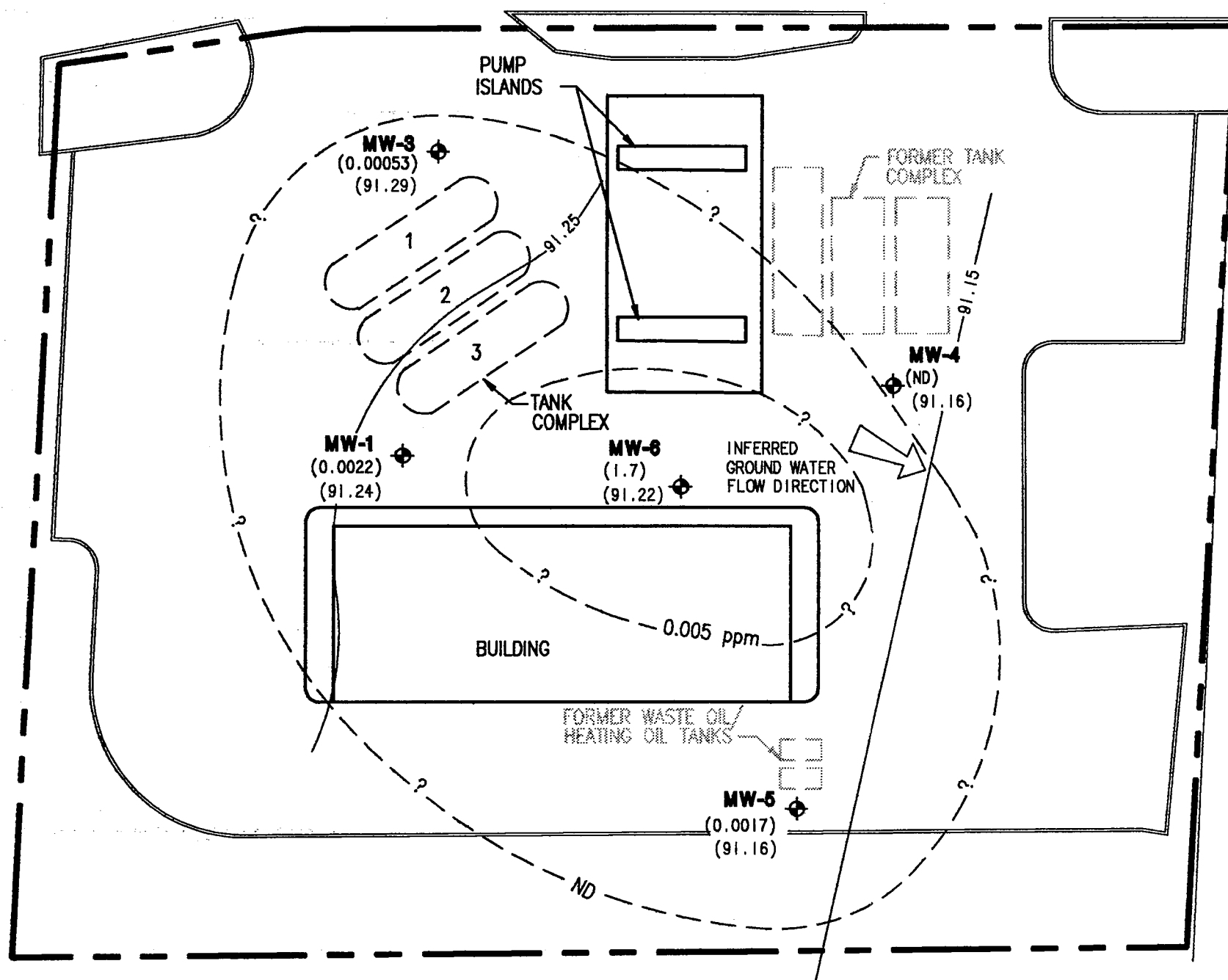
cc/att: Lynn Chun, Texaco Refining and Marketing, Inc.
Mark Wells, Texaco Environmental Services

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

172ND STREET NE



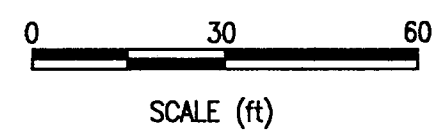
LEGEND

- MW-1 Monitoring Well
- WM Water Meter
- CB Catch Basin
- FH Fire Hydrant
- Area Light

- 91.15 — Relative Groundwater Elevation (feet)
- (91.16) Measured Groundwater Elevation (feet) April 1, 1993
- 0.005 ppm — Approximate Benzene Concentration Contour
- (0.0017) Measured Benzene Concentration in Groundwater (ppm) April 1, 1993
- ND Not Detected
- ? Uncertain

NOTE:

1. Tank 1 capacity 10,000 gallons super unleaded.
2. Tank 2 capacity 10,000 gallons regular.
3. Tank 3 capacity 10,000 gallons unleaded.



DATE 4-93
 DWN. MLP
 REV.
 APPR. PB
 PROJECT NO.
 0556-021.20

Figure 2
 FORMER SHELL SERVICE STATION
 3315 172ND STREET NE
 ARLINGTON, WASHINGTON
SITE MAP - GROUNDWATER DATA

Table 1

**Shell Oil Company
Soil Sample Chemical Analyses
3315 172nd Street Northeast, Arlington, Washington
WIC 246-0434-0307**

Sample Date	Sample ID	Sample Location	Sample Depth (feet)	BTEX Compounds ^a (ppm)				TPH as Gasoline ^b (ppm)	PID ^c (ppm)
				Benzene	Toluene	Ethylbenzene	Total Xylenes		
MTCA ^d Method A Cleanup Levels				0.5	40	20	20	100	—
03/10/93	MW-6-2.5	MW-6	2.5	0.11	1.5	0.74	5.2	59	860
03/10/93	MW-6-7.5	MW-6	7.5	6.8	140	71	450	5,000	5,569

NOTE: ND Not detected.
 — Not analyzed.
 dup Duplicate sample.
 Shading indicates values that exceeds MTCA Method A cleanup levels.

^a Results for analyses of soil samples for BTEX were obtained using EPA Method 5030/8020 (Purge and Trap) and reported as mg/kg (ppm).
^b Results for analyses of soil samples for total petroleum hydrocarbons as gasoline were obtained using Washington State Department of Ecology Method WTPH-G and reported as mg/kg (ppm).
^c Photoionization detector (PID) readings were obtained in the field at the time of collection and reported in ppm.
^d Chapter 173-340 WAC, "The Model Toxics Control Act Cleanup Regulations, Method A Cleanup Limits." Amended February 1991. Caution on misusing Method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

Table 2

Shell Oil Company
Soil Sample Chemical Analyses
3315 172nd Street Northeast, Arlington, Washington
WIC 246-0434-0307

Sample Location	Sample Date	Sample ID	BTEX Compounds ^a (ppm)				TPH as Gasoline ^b (ppm)	Dissolved Oxygen ^c (mg/l)	Total Lead ^d (ppm)
			Benzene	Toluene	Ethyl-benzene	Total Xylenes			
MTCA ^e Method A Cleanup Levels			0.005	0.040	0.0330	0.020	1	—	0.005
MW-1	04/01/93	MW-1-0493	0.0022	0.00057	ND	0.017	0.13	—	ND
MW-3	04/01/93	MW-3-0493	0.00053	0.0025	ND	0.0032	ND	—	ND
MW-4	04/01/93	MW-4-0493	ND	ND	ND	ND	ND	—	ND
MW-5	04/01/93	MW-5-0493	0.0017	ND	ND	ND	ND	—	ND
MW-6	04/01/93	MW-6-0493	1.7	4.6	0.58	4.3	30	—	ND
MW-6(dup)	04/01/93	MW-2-0493	1.6	4.4	0.55	4.0	29	—	—
Field Blank	04/01/93	FB-0493	ND	ND	ND	ND	0.12	—	—
Trip Blank	04/01/93	TB-0493	ND	ND	ND	ND	0.15	—	—

NOTE: ND Not detected.
 — Not analyzed.
 dup Duplicate sample.

Shading indicates values that exceeds MTCA Method A cleanup levels.

^a Results for analyses of groundwater samples for BTEX were obtained using EPA Method 5030/8020 (Purge and Trap) and reported as mg/l (ppm).

^b Results for analyses of groundwater samples for total petroleum hydrocarbons as gasoline were obtained using Washington State Department of Ecology Method WTPH-G and reported as mg/l (ppm).

^c Dissolved oxygen measurements obtained with a Corning Checkmate Meter.

^d Results for analyses of groundwater samples for total lead were obtained using EPA Method 7421 and reported as mg/l (ppm).

^e Chapter 173-340 WAC, "The Model Toxics Control Act Cleanup Regulations, Method A Cleanup Limits." Amended February 1991. Caution on misusing Method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

Table 3

**Shell Oil Company
Groundwater Depth and Parameters
3315 172nd Street Northeast Arlington, Washington
WIC 246-0434-0307**

Sample Location	Sample Date	Measured Depth to Elevation (ft)	Groundwater Elevation (ft)	pH	Specific Conductance (μ mhos/cm)	Temperature ($^{\circ}$ C)
MW-1	04/01/93	8.30	91.24	5.94	138	11.0
MW-3	04/01/93	6.70	91.29	5.98	120	11.0
MW-4	04/01/93	7.90	91.22	6.00	110	11.5
MW-5	04/01/93	8.76	91.16	5.91	125	13.0
MW-6	04/01/93	8.30	91.22	6.15	149	12.0

NOTE: Specific conductance measured at 25 $^{\circ}$ C.

APPENDIX A
SIEVE ANALYSIS

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0666 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8436 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
10726 Silverdale Way N.W. #105 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 698-6648

March 16, 1993
Certificate. No. 9303.6870

Page 1 of 5

Mr. Mike Staton
EMCON N.W.
18912 North Creek Parkway, Suite 210
Bothell, WA 98011

Subject: Shell - Arlington/Kenmore

Dear Mr. Staton:

As requested and agreed, Pacific Testing Laboratories analyzed the material supplied by the client for sieve analysis. Material testing was performed in accordance to ASTM standards. Test results conform to applicable specifications unless otherwise noted. Please refer to Table 1 for test results.

Table 1. Test Results

SAMPLE ID	% GRVL	% SAND	% FINES	SAMPLE DESCRIPTION
4275/01	16.8	76.9	6.3	GRY/BRWN SND W/GRVL & SILT
4276/01	22.7	75.7	1.6	GRY SND & GRVL

This report is provided for the information of the client only. Reproduction and transmittal of this report, or any section of this report, to a third party is prohibited without permission from Pacific Testing Laboratories.

If you have any questions, please contact us at (206) 451-8436 or 485-4244.

Reviewed by: William B. Throne, Assistant Manager, Eastside Division

Sincerely,


Jeffrey S. Moefer, Manager
Eastside Division

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 6

Date: 3-15-93
 Certificate No.: 9303-6870
 Client: EMCON

Sample Data

Location of Sample: SHELL / ARLINGTON
 Sample Description: GRY/BRWN SND W/GRVL & SILT
 USCS Class: SP-SM
 AASHTO Class: SP-SM
 Liquid limit: NP
 Plasticity index: NP

Notes

Remarks: SAMPLE 4275/01 M:19.7% 0556-012.20/1115/MW6-12
 Tested by, date: ML, 3-15-93
 Checked by, date: JSM, 3-15-93 WJ
 LR No.:

Fig. No.: 1

Mechanical Analysis Data

	Initial	After wash
Dry sample and tare=	758.76	730.04
Tare =	0.00	0.00
Dry sample weight =	758.76	730.04
Minus #200 from wash=	3.8 %	
Tare for cumulative weight retained=	0	

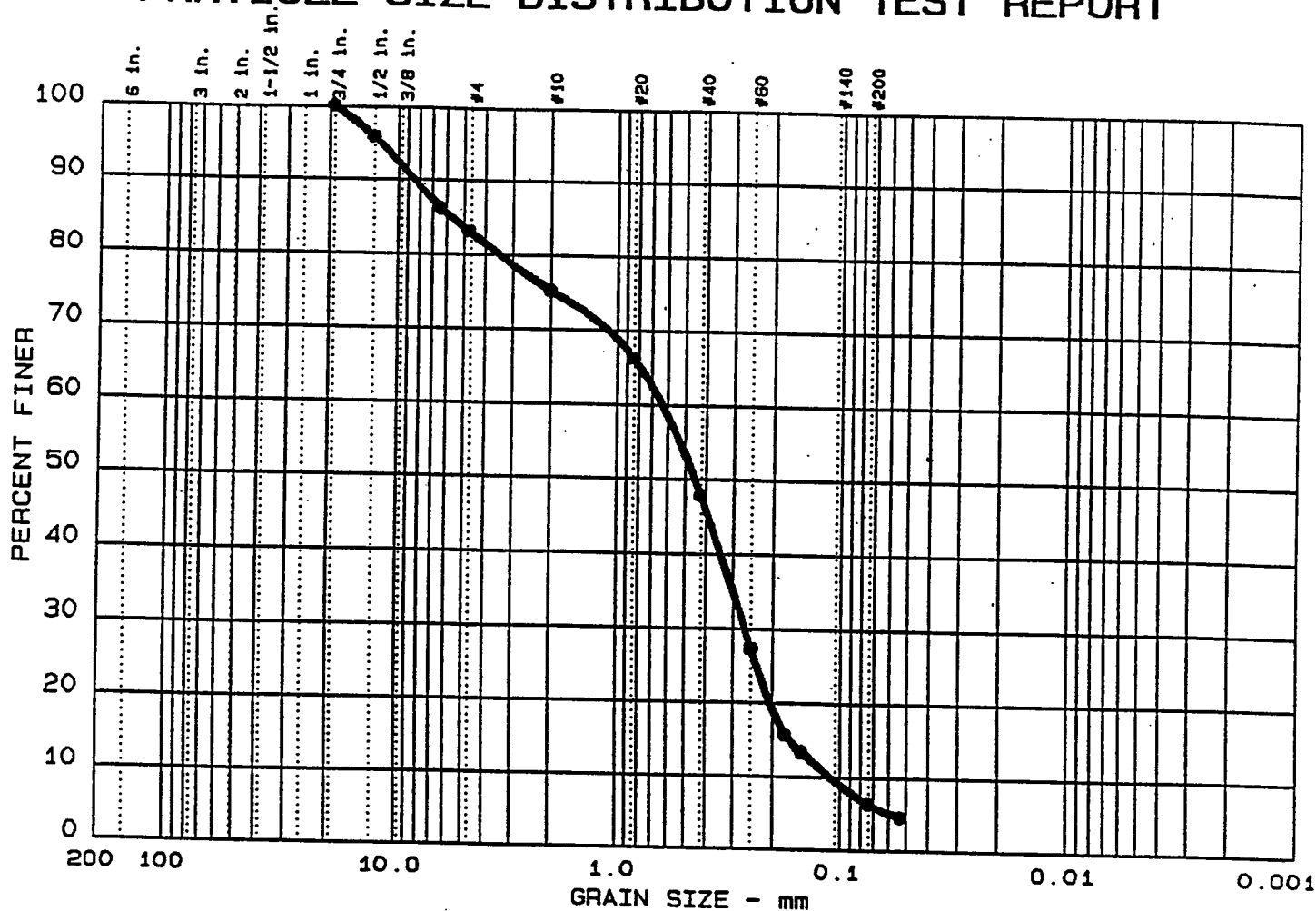
Sieve	Cumul. Wt. retained	Percent finer
.75 inches	0.00	100.0
0.5 inches	31.45	95.9
0.25 inches	104.93	86.2
# 4	127.51	83.2
# 10	188.13	75.2
# 20	256.10	66.2
# 40	395.90	47.8
# 60	551.50	27.3
# 80	639.70	15.7
# 100	657.50	13.3
# 200	710.70	6.3
# 270	724.10	4.6

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 16.8 % SAND = 76.9
 % FINES = 6.3

D85= 5.62 D60= 0.624 D50= 0.447
 D30= 0.2661 D15= 0.16982 D10= 0.10965

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
● 6	0.0	16.8	76.9	6.3		SP-SM

SIEVE inches size	PERCENT FINER	
	●	
0.75	100.0	
0.5	95.9	
0.25	86.2	
✕ GRAIN SIZE		
D ₆₀	0.62	
D ₃₀	0.27	
D ₁₀	0.11	
✕ COEFFICIENTS		
C _c	1.04	
C _u	5.7	

SIEVE Number size	PERCENT FINER	
	●	
4	83.2	
10	75.2	
20	66.2	
40	47.8	
60	27.3	
80	15.7	
100	13.3	
200	6.3	
270	4.6	

Sample information:
 ● SHELL / ARLINGTON
 GRY/BRAWN SND W/GRVL & SILT

Tested by: ML
 Date: 3-15-93
 Checked by: JSM *WXT*
 Date: 3-15-93
 SAMPLE 4275/01 M: 19.7%

**PACIFIC TESTING
 LABORATORIES**

Certificate No.: 9303-6870 LR No.:
 Client: EMCON
 0556-012.20/1115/MW6-12
 Date: 3-15-93 Fig. No. 1

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 7

Date: 3-15-93
 Certificate No.: 9303-6870
 Client: EMCON

Sample Data

Location of Sample: SHELL / KENMORE
 Sample Description: GREY SND & GRVL
 USCS Class: SP
 AASHTO Class: Liquid limit: NP
Plasticity index: NP

Notes

Remarks: SAMPLE 4276/01 M:13.9% 0556-005.20/0930/MW3-19
 Tested by, date: ML, 3-15-93
 Checked by, date: JSM, 3-15-93
 LR No.: Fig. No.: 1

Mechanical Analysis Data

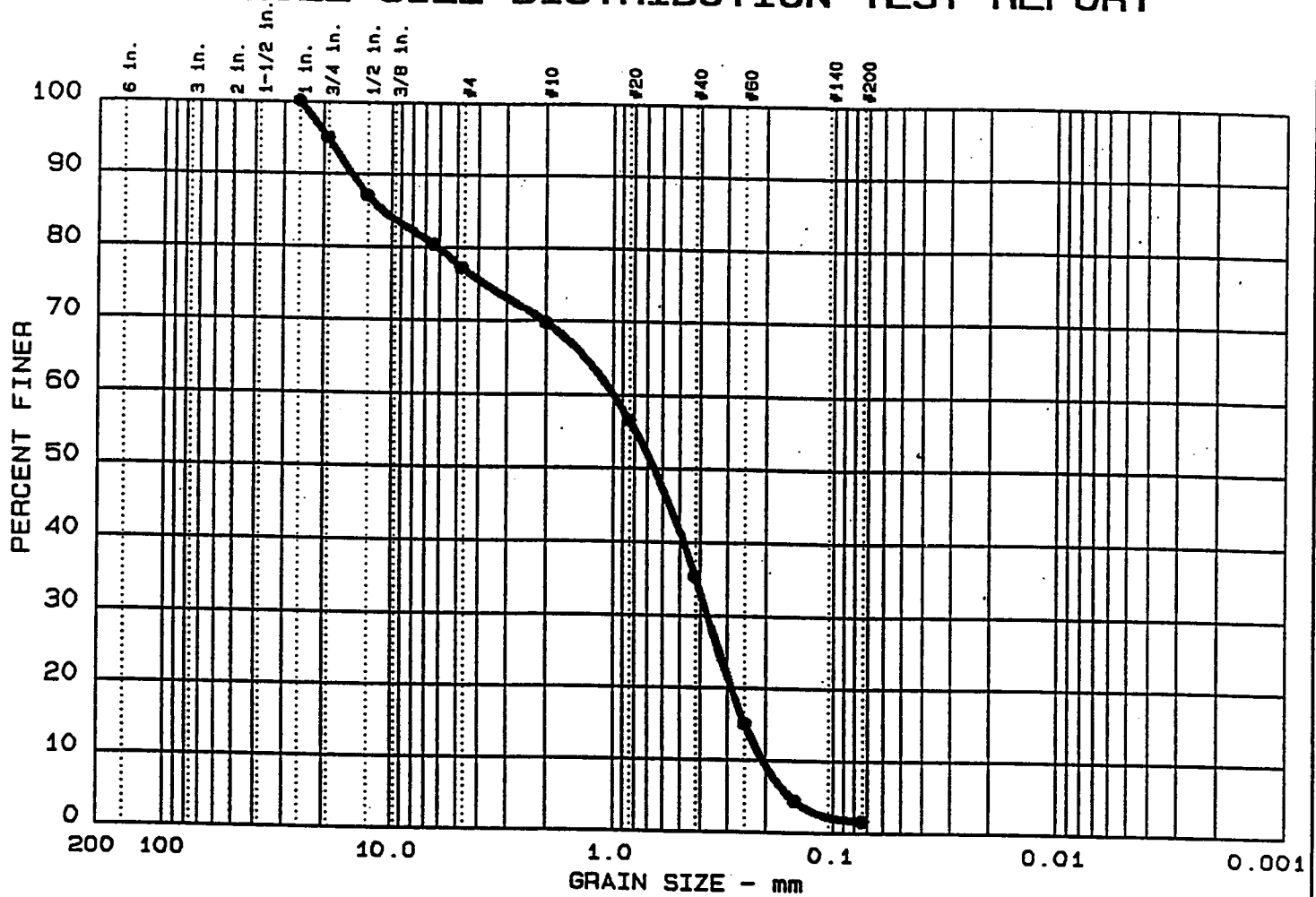
	Initial	After wash
Dry sample and tare=	655.51	647.57
Tare =	0.00	0.00
Dry sample weight =	655.51	647.57
Minus #200 from wash=	1.2 %	
Tare for cumulative weight retained=	0	
Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.5 inches	32.72	95.0
0.25 inches	84.58	87.1
# 4	128.44	80.4
# 10	149.06	77.3
# 20	198.00	69.8
# 40	284.80	56.6
# 60	424.10	35.3
# 100	556.90	15.0
# 200	626.70	4.4
	645.00	1.6

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 22.7 % SAND = 75.7
 % FINES = 1.6

D85= 10.84 D60= 0.989 D50= 0.646
 D30= 0.3673 D15= 0.24831 D10= 0.20654
 Cc = 0.6607 Cu = 4.7863

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
● 7	0.0	22.7	75.7		1.6	SP

SIEVE inches size	PERCENT FINER	
	●	
1	100.0	
0.75	95.0	
0.5	87.1	
0.25	80.4	
 		
GRAIN SIZE		
D ₆₀	0.99	
D ₃₀	0.37	
D ₁₀	0.21	
 		
COEFFICIENTS		
C _c	0.66	
C _u	4.8	

SIEVE number size	PERCENT FINER	
	●	
4	77.3	
10	69.8	
20	56.6	
40	35.3	
60	15.0	
100	4.4	
200	1.6	

Sample information:
 ● SHELL / KENMORE
 GREY SND & GRVL

Tested by: ML
 Date: 3-15-93
 Checked by: JSM *WJX*
 Date: 3-15-93
 SAMPLE 4276/01 M: 13.9%

APPENDIX B
BORING LOGS

LOG OF EXPLORATORY BORING

PROJECT NAME **Shell, Arlington**
 LOCATION **3315 172nd St. NE, Arlington, WA**
 DRILLED BY **Cascade Drilling**
 DRILL METHOD **H.S. Auger**
 LOGGED BY **John Bertrand**

BORING NO. **MW- 6**
 PAGE **1 OF 2**
 REFERENCE ELEV.
 TOTAL DEPTH **15.50'**
 DATE COMPLETED **03/10/93**

SAMPLING METHOD AND NUMBER	PID (in ppm)	BLOWS PER 6-INCHES	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-LOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
				0				0 to 0.5 foot: CONCRETE.
*SS	860	6-7-11		5				0.5 to 7.75 feet: SILTY SAND (SM), yellow brown, fine to coarse, trace fine gravel, little fines, medium dense, damp, hydrocarbon-like odor. (FILL)
*SS	5569	14-14-15		10				7.75 to 15.5 feet: SILTY SAND (SM), brown, fine to coarse, trace fine gravel, little fines, medium dense, moist to wet, hydrocarbon-like odor. (ALLUVIUM) @ 8.0 feet: groundwater encountered.
SS	1019	17-16-13		15				Total depth drilled = 15.5 feet. Total depth sampled = 15.5 feet.
				20				See Page 2 for Well Completion Details.

REMARKS

(1) SS = 2-inch O.D. split spoon sampler driven with a 140 pound hammer. (2) PID = Model 580B photoionization detector results in parts per million. (3) * = Sample submitted for analyses.



LOG OF EXPLORATORY BORING

PROJECT NAME **Shell, Arlington**
 LOCATION **3315 172nd St. NE, Arlington, WA**
 DRILLED BY **Cascade Drilling**
 DRILL METHOD **H.S. Auger**
 LOGGED BY **John Bertrand**

BORING NO. **MW- 6**
 PAGE **2 OF 2**
 REFERENCE ELEV.
 TOTAL DEPTH **15.50'**
 DATE COMPLETED **03/10/93**

SAMPLING METHOD AND NUMBER	PID (in ppm)	BLOWS PER 6-INCHES	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
				25				<p>WELL COMPLETION DETAILS: 0 to 5.0 feet: 4-inch-diameter, flush threaded schedule 40 PVC blank riser pipe. 5.0 to 15.5 feet: 4-inch-diameter, flush threaded schedule 40 PVC well screen with 0.010-inch machined slots and a 4-inch-diameter schedule 40 PVC end cap.</p> <p>0 to 1.5 feet: Concrete. 1.5 to 3.0 feet: Bentonite chips hydrated with potable water. 3.0 to 15.5 feet: 10 - 20 Colorado silica sand.</p>
				30				
				35				
				40				

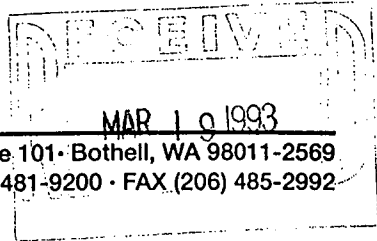
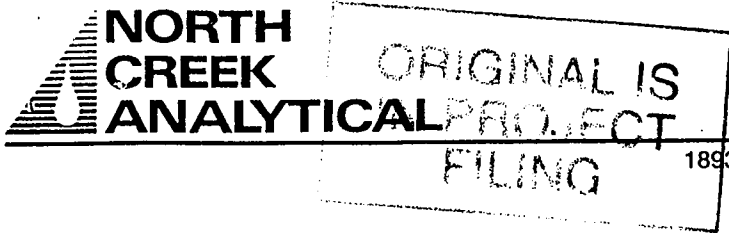
REMARKS

(1) SS = 2-inch O.D. split spoon sampler driven with a 140 pound hammer. (2) PID = Model 580B photoionization detector results in parts per million. (3) * = Sample submitted for analyses.



APPENDIX C

**LABORATORY REPORTS AND GROUNDWATER QUALITY
SUMMARY TABLE**



18939 120th Avenue N.E., Suite 101 - Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Mike Noll	Client Project ID: Shell, #0556-012.20 Matrix: Soil Analysis for: Moisture Content First Sample #: 303-0307	Received: Mar 10, 1993 Reported: Mar 17, 1993
----------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------	--------------------------------------------------

LABORATORY ANALYSIS FOR: Moisture Content

Sample Number	Sample Description	Total Solids %	Moisture Content %
303-0307	MW-6-2.5	90	10
303-0308	MW-6-7.5	83	17

The enclosed analytical results for soils, sediments and sludges have been converted to a DRY WEIGHT reporting basis. To attain the wet weight "as received" equivalent, multiply the dry weight result by the decimal fraction of percent Total Solids. The results in this report apply only to the samples analyzed, as indicated on the custody document. This analytical report is to be reproduced only in its entirety.

NORTH CREEK ANALYTICAL inc

Tod Becherer
Project Manager

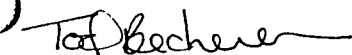
EMCON Northwest	Client Project ID: Shell, #0556-012.20	Sampled: Mar 10, 1993
18912 N. Creek Parkway, #100	Matrix Descript: Soil	Received: Mar 10, 1993
Bothell, WA 98011	Analysis Method: WTPH-G	Analyzed: Mar 12, 1993
Attention: Mike Noll	First Sample #: 303-0307	Reported: Mar 17, 1993

TOTAL PETROLEUM FUEL HYDROCARBONS (WTPH-G)

Sample Number	Sample Description	Volatile Hydrocarbons mg/kg (ppm)	Surrogate Recovery %
303-0307	MW-6-2.5	59	130
303-0308	MW-6-7.5	5,000	144
BLK031293	Method Blank	N.D.	77

Reporting Limits:	1.0
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4-Bromofluorobenzene Surrogate Recovery Control Limits are 50 - 150 %.
 Volatile Hydrocarbons are quantitated as Gasoline Range Organics (toluene - dodecane).
 Analytes reported as N.D. were not detected above the stated Reporting Limit. The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL inc


 Tod Becherer
 Project Manager

EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Mike Noll	Client Project ID: Shell, #0556-012.20 Matrix Descript: Soil Analysis Method: EPA 5030/8020 First Sample #: 303-0307	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Analyzed: Mar 12, 1993 Reported: Mar 17, 1993
----------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------

BTEX DISTINCTION

Sample Number	Sample Description	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)	Surrogate Recovery %
303-0307	MW-6-2.5	0.11	1.5	0.74	5.2	109
303-0308	MW-6-7.5	6.8	140	71	450	118
BLK031293	Method Blank	N.D.	N.D.	N.D.	N.D.	92

Reporting Limits:	0.050	0.050	0.050	0.10
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4-Bromofluorobenzene surrogate recovery control limits are 73 - 128 %.
Analytes reported as N.D. were not detected above the stated Reporting Limit.
The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL inc



Tod Becherer
Project Manager

EMCON Northwest
 18912 N. Creek Parkway, #100
 Bothell, WA 98011
 Attention: Mike Noll

Client Project ID: Shell, #0556-012.20
 EPA Method: WTPH-G
 Sample Matrix: Soil
 Units: mg/kg (ppm)

Analyst: R. Lister
 K. Wilke
 F. Shino
 Analyzed: Mar 12, 1993
 Reported: Mar 17, 1993

HYDROCARBON QUALITY CONTROL DATA REPORT

ACCURACY ASSESSMENT Laboratory Control Sample

Gasoline

Spike Conc.
 Added: 5.0

Spike
 Result: 5.2

%
 Recovery: 105

Upper Control
 Limit %: 120

Lower Control
 Limit %: 80

PRECISION ASSESSMENT Sample Duplicate

Volatile
 Hydrocarbons

Sample
 Number: 303-0297

Original
 Result: N.D.

Duplicate
 Result: N.D.

Relative % Difference Relative Percent Difference values are not reported at sample concentration levels less than 10 times the Detection Limit.

Maximum
 RPD: 50

NORTH CREEK ANALYTICAL inc


 Tod Becherer
 Project Manager

% Recovery:	$\frac{\text{Spike Result}}{\text{Spike Concentration Added}} \times 100$
Relative % Difference:	$\frac{\text{Original Result} - \text{Duplicate Result}}{(\text{Original Result} + \text{Duplicate Result}) / 2} \times 100$

EMCON Northwest
 18912 N. Creek Parkway, #100
 Bothell, WA 98011
 Attention: Mike Noll

Client Project ID: Shell, #0556-012.20
 EPA Method: 5030/8020
 Sample Matrix: Soil
 Units: mg/kg (ppm)
 QC Sample #: 303-0298

Analyst: R. Lister
 K. Wilke
 F. Shino
 Analyzed: Mar 12, 1993
 Reported: Mar 17, 1993

MATRIX SPIKE QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Result:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.50	0.50	0.50	1.50
Spike Result:	0.46	0.45	0.46	1.37
Spike % Recovery:	92%	90%	92%	91%
Spike Dup. Result:	0.46	0.44	0.46	1.37
Spike Duplicate % Recovery:	92%	88%	92%	91%
Upper Control Limit %:	105	106	116	114
Lower Control Limit %:	61	68	74	65
Relative % Difference:	0%	2%	0%	0%
Maximum RPD:	11	7.9	16	11

NORTH CREEK ANALYTICAL inc



Tod Becherer
 Project Manager

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



SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD

Serial No: _____

Date 3-10-93

Page 1 of 1

Handwritten initials/signature

Site Address: 3315 172ND ST NE ARLINGTON

Analysis Required

LAB: North Creek Analytical

WIC#: 246-0434-0307

Shell Engineer: Frank Fossati
 Phone No: 714-520-3362
 Fax #: 520-3313

Consultant Name & Address: EMCON Northwest, Inc.
 18912 North Creek Parkway, #100, Bothell WA 98011

Consultant Contact: Mike Noll
 Phone No: 206-485-5000
 Fax #: 486-9766

Comments: Project No 0556-012.20

Sampled by: *J Bertrand*
 Printed Name: J BERTRAND

CHECK ONE (1) BOX ONLY	CT/DT	TURN AROUND TIME
G W Monitoring <input checked="" type="checkbox"/>	4461	24 hours <input type="checkbox"/>
Site Investigation <input type="checkbox"/>	4441	48 hours <input type="checkbox"/>
Soil Classify/Disposal <input type="checkbox"/>	4442	15 days <input checked="" type="checkbox"/> (Normal)
Water Classify/Disposal <input type="checkbox"/>	4443	Other <input type="checkbox"/>
Soil/Air Rem. or Sys O & M <input type="checkbox"/>	4452	NOTE Notify Lab as soon as Possible of 24/48 hrs TAT
Water Rem. or Sys O & M <input type="checkbox"/>	4453	
Other <input type="checkbox"/>		

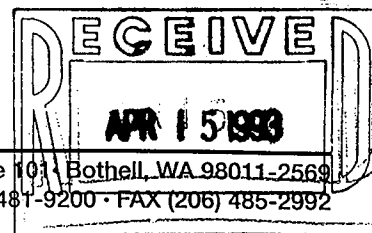
TPH (EPA 8015 Mod Gas)	TPH (EPA 8015 Mod Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	Fats/Oils/Grease SM5520F	Total Lead	Asbestos	Container Size	Preparation Used	Composite Y/N
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UST AGENCY: DOE

Sample ID	Date Time	Sludge	Soil	Water	Air	No of conts	TPH (EPA 8015 Mod Gas)	TPH (EPA 8015 Mod Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	Fats/Oils/Grease SM5520F	Total Lead	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS	
MW-6-25	3-10 1045		X			1						X								SOIL 3030307	POSS HIGH PID
MW-6-75	3-10 1100		X			1						X								SOIL 3030308	POSS HIGH PID

Relinquished By (signature) <i>J Bertrand</i>	Printed Name J BERTRAND	Date 3-10-93	Time 1530	Received (signature) <i>Dana Heinz</i>	Printed Name DANA HEINZ	Date 3/10/93	Time 15:50
Relinquished By (signature)	Printed Name	Date	Time	Received (signature)	Printed Name	Date	Time
Relinquished By (signature)	Printed Name	Date	Time	Received (signature)	Printed Name	Date	Time

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



18939 120th Avenue N.E., Suite 101 Bothell, WA 98011-2569
Phone (206) 481-9200 • FAX (206) 485-2992

EMCON Northwest	Client Project ID: Shell, Holly Corner, # 246-0434-030	Sampled: Apr 1, 1993
18912 N. Creek Parkway, #100	Analysis Method: EPA 7421	Received: Apr 1, 1993
Bothell, WA 98011	Analysis for: Lead	Digested: Apr 7, 1993
Attention: Pat Brooks	First Sample #: 304-0083	Analyzed: Apr 8, 1993
	Matrix: Water	Reported: Apr 14, 1993

METALS ANALYSIS FOR: Lead

Sample Number	Sample Description	Reporting Limit mg/L (ppm)	Sample Result mg/L (ppm)
304-0083	MW-1-0493	0.0020	N.D.
304-0085	MW-3-0493	0.0020	N.D.
304-0086	MW-4-0493	0.0020	N.D.
304-0087	MW-5-0493	0.0020	N.D.
304-0088	MW-6-0493	0.0020	0.0045
BLK040793	Method Blank	0.0020	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL inc

Matthew T. Essig
Matthew T. Essig
Project Manager



18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011-2569
 Phone (206) 481-9200 • FAX (206) 485-2992

EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Pat Brooks	Client Project ID: Shell, Holly Corner, # 246-0434-030 EPA Method: 5030/8020 Sample Matrix: Water Units: mg/L (ppm) QC Sample #: 304-0089	Analyst: R. Lister K. Wilke F. Shino Analyzed: Apr 5, 1993 Reported: Apr 14, 1993
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MATRIX SPIKE QUALITY CONTROL DATA REPORT

ANALYTE	Ethyl Benzene Xylenes			
	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Result:	N.D.	0.00087	N.D.	0.0014
Spike Conc. Added:	0.0050	0.0050	0.0050	0.0150
Spike Result:	0.0054	0.0061	0.0054	0.0171
Spike % Recovery:	108%	105%	108%	105%
Spike Dup. Result:	0.0055	0.0060	0.0054	0.0161
Spike Duplicate % Recovery:	110%	103%	108%	98%
Upper Control Limit %:	123	118	126	114
Lower Control Limit %:	87	89	88	92
Relative % Difference:	2%	2%	0%	6%
Maximum RPD:	8.3	7.9	8.0	12

NORTH CREEK ANALYTICAL inc

Matthew T. Essig
 Matthew T. Essig
 Project Manager

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



18939 120th Avenue N.E., Suite 101 - Bothell, WA 98011-2569
 Phone (206) 481-9200 · FAX (206) 485-2992

EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Pat Brooks	Client Project ID: Shell, Holly Corner, # 246-0434-030 EPA Method: WTPH-G Sample Matrix: Water Units: mg/L (ppm)	Analyst: R. Lister K. Wilke F. Shino Analyzed: Apr 5, 1993 Reported: Apr 14, 1993
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HYDROCARBON QUALITY CONTROL DATA REPORT

ACCURACY ASSESSMENT Laboratory Control Sample

Gasoline

PRECISION ASSESSMENT Sample Duplicate

Volatile
Hydrocarbons

Spike Conc.
Added: 0.10

Spike
Result: 0.099

%
Recovery: 99

Upper Control
Limit %: 120

Lower Control
Limit %: 80

Sample
Number: 304-0284

Original
Result: 13

Duplicate
Result: 12

Relative
% Difference: 8.0

Maximum
RPD: 20

NORTH CREEK ANALYTICAL inc

Matthew T. Essig
Matthew T. Essig
Project Manager

% Recovery:	$\frac{\text{Spike Result}}{\text{Spike Concentration Added}} \times 100$
Relative % Difference:	$\frac{\text{Original Result} - \text{Duplicate Result}}{(\text{Original Result} + \text{Duplicate Result}) / 2} \times 100$

EMCON Northwest
 18912 N. Creek Parkway, #100
 Bothell, WA 98011
 Attention: Pat Brooks

Client Project ID: Shell, Holly Corner, # 246-0434-030
 Sample Matrix : Water
 Units: mg/L

Analyst: K. Ackerlund

Digested: Apr 7, 1993
 Reported: Apr 14, 1993

METALS QUALITY CONTROL DATA REPORT

ANALYTE

Lead

EPA Method: 7421
 Date Analyzed: 4/8/93

ACCURACY ASSESSMENT

LCS Spike
 Conc. Added: 0.025

LCS Spike
 Result: 0.025

LCS Spike
 % Recovery: 100

Upper Control
 Limit: 114

Lower Control
 Limit: 82

Matrix Spike
 Sample #: 304-0083

Matrix Spike
 % Recovery: 92

PRECISION ASSESSMENT

Sample #: 304-0083

Original: N.D.

Duplicate: N.D.

Relative %
 Difference: RPD values are not reported at sample concentrations < 10 X the Reporting Limit.

NORTH CREEK ANALYTICAL inc

Matthew T. Essig
 Matthew T. Essig
 Project Manager

Lab Control Sample	Conc. of L.C.S.	x 100
% Recovery:	L.C.S. Spike Conc. Added	
Relative % Difference:	Original Result - Duplicate Result	x 100
	(Original Result + Duplicate Result) / 2	

EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Pat Brooks	Client Project ID: Shell, Holly Corner, # 246-0434-030 Matrix Descript: Water Analysis Method: WTPH-G First Sample #: 304-0083	Sampled: Apr 1, 1993 Received: Apr 1, 1993 Analyzed: Apr 5, 1993 Reported: Apr 14, 1993
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TOTAL PETROLEUM FUEL HYDROCARBONS (WTPH-G)

Sample Number	Sample Description	Volatile Hydrocarbons mg/L (ppm)	Surrogate Recovery %
304-0083	MW-1-0493	0.13	107
304-0084	MW-2-0493	29	110
304-0085	MW-3-0493	N.D.	97
304-0086	MW-4-0493	N.D.	103
304-0087	MW-5-0493	N.D.	104
304-0088	MW-6-0493	30	113
304-0089	TB-0493	0.15 G3	98
304-0090	FB-0493	0.12 G3	97
BLK040593	Method Blank	N.D.	94

Reporting Limits:	0.050
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4-Bromofluorobenzene Surrogate Recovery Control Limits are 50 - 150 %.
Volatile Hydrocarbons are quantitated as Gasoline Range Organics (toluene - dodecane).
Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL inc


Matthew T. Essig
Project Manager

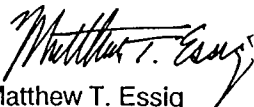
EMCON Northwest 18912 N. Creek Parkway, #100 Bothell, WA 98011 Attention: Pat Brooks	Client Project ID: Shell, Holly Corner, # 246-0434-030 Matrix Descript: Water Analysis Method: EPA 5030/8020 First Sample #: 304-0083	Sampled: Apr 1, 1993 Received: Apr 1, 1993 Analyzed: Apr 5, 1993 Reported: Apr 14, 1993
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BTEX DISTINCTION

Sample Number	Sample Description	Benzene mg/L (ppm)	Toluene mg/L (ppm)	Ethyl Benzene mg/L (ppm)	Xylenes mg/L (ppm)	Surrogate Recovery %
304-0083	MW-1-0493	0.0022	0.00057	N.D.	0.017	100
304-0084	MW-2-0493	1.6	4.4	0.55	4.0	106
304-0085	MW-3-0493	0.00053	0.0025	N.D.	0.0032	98
304-0086	MW-4-0493	N.D.	N.D.	N.D.	N.D.	98
304-0087	MW-5-0493	0.0017	N.D.	N.D.	N.D.	99
304-0088	MW-6-0493	1.7	4.6	0.58	4.3	101
304-0089	TB-0493	N.D.	N.D.	N.D.	N.D.	98
304-0090	FB-0493	N.D.	N.D.	N.D.	N.D.	98
BLK040593	Method Blank	N.D.	N.D.	N.D.	N.D.	95

Reporting Limits:	0.00050	0.00050	0.00050	0.0010
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4-Bromofluorobenzene surrogate recovery control limits are 74 - 130 %.
 Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL inc


Matthew T. Essig
 Project Manager

EMCON Northwest	Client Project ID: Shell, Holly Corner, # 246-0434-030	Sampled: Apr 1, 1993
18912 N. Creek Parkway, #100	Analysis Method: EPA 7421	Received: Apr 1, 1993
Bothell, WA 98011	Analysis for: Lead	Digested: Apr 7, 1993
Attention: Pat Brooks	First Sample #: 304-0083	Analyzed: Apr 8, 1993
	Matrix: Water	Reported: Apr 14, 1993

METALS ANALYSIS FOR: Lead

Sample Number	Sample Description	Reporting Limit $\mu\text{g/L}$ (ppb)	Sample Result $\mu\text{g/L}$ (ppb)
304-0083	MW-1-0493	2.0	N.D.
304-0085	MW-3-0493	2.0	N.D.
304-0086	MW-4-0493	2.0	N.D.
304-0087	MW-5-0493	2.0	N.D.
304-0088	MW-6-0493	2.0	4.5
BLK040793	Method Blank	2.0	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.

NORTH CREEK ANALYTICAL inc

Matthew T. Essig
 Matthew T. Essig
 Project Manager



SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
 Serial No: _____

Date: 4/1/93
 Page 1 of 1

Site Address: 3315 172nd St. NE
Arlington, WA

WIC#: 246-0434-0307

Shell Engineer: Frank Fossati Phone No.: 714-520-3362
 Fax #: 520-3313

Consultant Name & Address: EMCON Northwest, Inc.
18912 North Creek Parkway, #100, Bothell, WA 98011

Consultant Contact: Pat Brooks Phone No.: 206-485-5000
 Fax #: 486-9766

Comments: Project No. 0556-012.20

Sampled by: Holly Corner

Printed Name: Holly Corner

Sample ID	Date	Sludge	Soil	Water	Air	No. of conls.
MW-1-0493	4/1/93			X		3
MW-2-0493	↓			X		2
MW-3-0493				X		3
MW-4-0493				X		3
MW-5-0493				X		3
MW-6-0493				X		4
TB-0493				X		1
FB-0493				X		2

Analysis Required											
TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	SM5520F (EMCON FOG)	Total Lead	Asbestos	Container Size	Preparation Used	Composite Y/N
					X		X				
					X		X				
					X		X				
					X		X				
					X		X				
					X		X				
					X		X				

LAB: North Creek Analytical

CHECK ONE (1) BOX ONLY	CT/DT	TURN AROUND TIME
G.W. Monitoring <input checked="" type="checkbox"/>	4461	24 hours <input type="checkbox"/>
Site Investigation <input type="checkbox"/>	4441	48 hours <input type="checkbox"/>
Soil Classify/Disposal <input type="checkbox"/>	4442	15 days <input checked="" type="checkbox"/> (Normal)
Water Classify/Disposal <input type="checkbox"/>	4443	Other <input type="checkbox"/>
Soil/Air Rem. or Sys. O & M <input type="checkbox"/>	4452	
Water Rem. or Sys. O & M <input type="checkbox"/>	4453	
Other <input type="checkbox"/>		

NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.

UST AGENCY: _____

MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
	<u>* do not analyze for Pb.</u>

Relinquished By (signature): <u>Holly Corner</u>	Printed Name: <u>Holly Corner</u>	Date: <u>4/1/93</u> Time: <u>1745</u>	Received (signature): <u>Trace Collier</u>	Printed Name: <u>Trace Collier NCA</u>	Date: <u>4/1/93</u> Time: <u>1745</u>
Relinquished By (signature):	Printed Name:	Date: Time:	Received (signature):	Printed Name:	Date: Time:
Relinquished By (signature):	Printed Name:	Date: Time:	Received (signature):	Printed Name:	Date: Time:

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