PREREPLACEMENT SITE ASSESSMENT
ARCO SERVICE STATION NO. 6162
ISSAQUAH, WASHINGTON

PROJECT NO. WA0273.001

October 27, 1993

Prepared for

ARCO Products Company
2000 Alameda de las Pulgas
San Mateo, California 94402

Prepared by

Geraghty & Miller, Inc.
Environmental Services
8330 154th Avenue Northeast
Redmond, Washington 98052-3864
(206) 869-6321

Independent Action Report Update

Site Name: ARCO 6162

Inc. #: 4705 Date of Report: 10-27-93

County: King Date Report Rec'd: 10-29-93

Reviewed by: W. Moon

Comments (please include: free prod., tank info., media, contaminant migration, GW conc. trends, PCS treated/fate?):

Prereplacement assessment. 4 borings. GW at 5.5' to 6' bgs. GW cont in one boring at GW interface

PREREPLACEMENT SITE ASSESSMENT
ARCO SERVICE STATION NO. 6162
ISSAQUAH, WASHINGTON

October 27, 1993

Geraghty & Miller, Inc. is submitting this report to ARCO Products Company for work performed at ARCO Service Station No. 6162 in Issaquah, Washington. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

GERAGHTY & MILLER, INC.

Amr M. Amr
Scientist/Project Manager

Michael H. Pottinger
Office Program Manager, Hydrocarbon Services

Mary J. Gearhart
Principal Scientist and Associate/ Project Officer

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PREREPLACEMENT SITE ASSESSMENT
ARCO SERVICE STATION NO. 6162
ISSAQUAH, WASHINGTON

INTRODUCTION

At the request of ARCO Products Company (ARCO), Geraghty & Miller, Inc. (Geraghty & Miller) conducted a site assessment and collected soil samples prior to the replacement of underground storage tanks (USTs) at ARCO Service Station No. 6162 (the site) located at 1403 NW Sammamish Road, in Issaquah, Washington (Figure 1). Washington Administrative Code (WAC) 173-360-610 requires that a site assessment be conducted for a UST system change-in-service and for reporting a release of hydrocarbons (Ecology 1992). The scope of work for the project was developed based on discussions with ARCO.

BACKGROUND

Pertinent background information concerning the site is summarized below:

- The site is an active service station that currently has three steel underground storage tanks (USTs) containing regular and unleaded gasoline.

- The existing steel USTs will be removed and replaced with four fiberglass USTs. The new USTs will be installed in same location as the steel USTs.

- Environmental subsurface investigations have not been performed at the site to date.

OBJECTIVES

The objective of the site assessment at this site were to accomplish the following:

- Investigate the subsurface soil and groundwater conditions in the vicinity of the UST complex.

SITE DESCRIPTION

ARCO Service Station No. 6162 is located on the southwest corner of NW Sammamish Road and State Route 900 in Issaquah, Washington (Figure 1). The site is bounded to the south by a restaurant, to the west by a parking lot and day care center, to the north by NW Sammamish Road, and to the east by State Route 900. Lake Sammamish is situated approximately ½ mile to the north-northwest. Site improvements include a service station building, and two pump islands covered by a single canopy (Figure 2). The ground surface of the site is covered with asphalt and concrete pavement. Site topography is relatively flat.

METHODOLOGY

In August 1993, Geraghty & Miller observed the drilling of four soil borings (B1, B2, B3, and B4) in the vicinity of the existing USTs for the purposes of logging soils, and collecting soil samples for laboratory analysis. All four borings were drilled to a maximum depth of 16½ feet below land surface (bls). Drilling and soil sampling methods are summarized in Appendix A.

Five soil samples were collected during the field activities and submitted to North Creek Analytical, Inc. (NCAI) for chemical analysis (Table 1). Four samples were collected directly from the split-spoon sampler during drilling. Sample STOCK-1 was collected from the stockpiled drill cuttings to characterize those soils for disposal.

The four split-spoon samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using U.S. Environmental Protection Agency (USEPA) Method 8020, total petroleum hydrocarbons (TPH) as gasoline using Washington State Method WTPH-G, and total lead using USEPA Method 7420. Sample STOCK-1 was analyzed for hydrocarbon identification (HCID) using Oregon State Method TPH-HCID.

SUBSURFACE CONDITIONS

The soils encountered in the boreholes generally consisted of native, interbedded sands, silts, and clays (Appendix B). The interbeds range in thickness from 2 to 6 feet, and appear to be laterally discontinuous.

Groundwater was encountered during drilling at depths ranging from 5½ to 6 feet bls. The direction of groundwater flow at the site is not known; however, based on local topography, it is reasonable to assume that groundwater flows to the north-northwest.

ANALYTICAL RESULTS

The soil analytical results (Appendix C) were compared to Washington State Model Toxics Control Act (MTCA) Method A cleanup levels for soil (Table 1). MTCA Method A cleanup levels are presented only as a reference and are not necessarily appropriate as specific cleanup action levels for this site.

Residual hydrocarbons were detected at concentrations above the MTCA Method A cleanup levels only in soil sample B2(5.5). HCID analysis of the stockpile sample did not detect TPH at or above the laboratory reporting limits. Total lead was detected only in samples B3(5.5) and B4(5.5). The concentration of total lead in those samples was below the MTCA Method A cleanup level.

Upon receipt of the analytical results, Geraghty & Miller contacted ARCO regarding the detection of residual hydrocarbons at concentrations above the MTCA Method A cleanup levels. At ARCO's request, Geraghty & Miller contacted the Washington State Department of Ecology (Ecology) to report a hydrocarbon release at the site (Moon, pers. comm. 1993).

SUMMARY

The findings of the site assessment activities are summarized below:

- Four soil borings were drilled in the vicinity of the UST complex.
- The on-site soils generally consist of native, interbedded sands, silts and clays.
- Groundwater was encountered during drilling at depths ranging from 5½ to 6 feet bls.
- Residual hydrocarbons were detected at concentrations above the MTCA Method A cleanup levels only in soil sample B2(5.5).
- Ecology was notified of the hydrocarbon release at the site on September 9, 1993.

REFERENCES

Ecology, 1992. Washington State Department of Ecology Underground Storage Tank Program, Guidance for Site Checks and Site Assessments for Underground Storage Tanks, Revised October 1992.

Moon, Wally. 1993. Washington State Department of Ecology. Personal communication with Amr M. Amr, Geraghty & Miller, Inc., September 9, 1993.

TABLE

TABLE 1 SUMMARY OF ANALYTICAL DATA FOR SOIL SAMPLES COLLECTED IN AUGUST 1993
ARCO SERVICE STATION NO. 6162, ISSAQUAH, WASHINGTON
PROJECT NO. WA0273001

Sample Identification	Collection Date	Sample Depth (feet bls)	TPH as Gasoline (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl Benzene (mg/kg)	Total Xylenes (mg/kg)	Total Lead (mg/kg)	HCID as Gasoline (mg/kg)	HCID as Diesel (mg/kg)	HCID as Heavy Oil (mg/kg)
B1 (4)	30-Aug-93	4	9.5	0.13	0.13	0.050 U	0.23	10 U	NA	NA	NA
B2 (5.5)	30-Aug-93	5.5	4000	10	62	52	330	10 U	NA	NA	NA
B3 (5.5)	30-Aug-93	5.5	23	0.070	0.050 U	0.72	2.4	28	NA	NA	NA
B-4 (5.5)	30-Aug-93	5.5	17	0.18	0.21	0.24	1.5	41	NA	NA	NA
STOCK-1	30-Aug-93	NA	NA	NA	NA	NA	NA	NA	20 U	50 U	100 U
MTCA Method A Cleanup Level (1):			100	0.5	40	20	20	250	NA	NA	NA

(1) Washington State Department of Ecology, Cleanup Standards Amendments to Model Toxics Control Act Regulation, adopted January 28,1991, effective February 28, 1991
bls Below land surface
TPH Total petroleum hydrocarbons
U Not detected at given laboratory reporting limit
NA Not analyzed
mg/kg Milligrams per kilogram

Analyses performed by North Creek Analytical of Bothell, Washington, using the following methods:
TPH: Washington State Method for analysis of gasoline in soils (WTPH-G)
BTEX: USEPA Method 8020
Total Lead: USEPA Method 7420
HCID: Oregon State Method for identification of hydrocarbons as gasoline, diesel and heavy oil (OR TPH-HCID)

G:\ARCO\6162\WA27301\PRESOILWQ1

FIGURES

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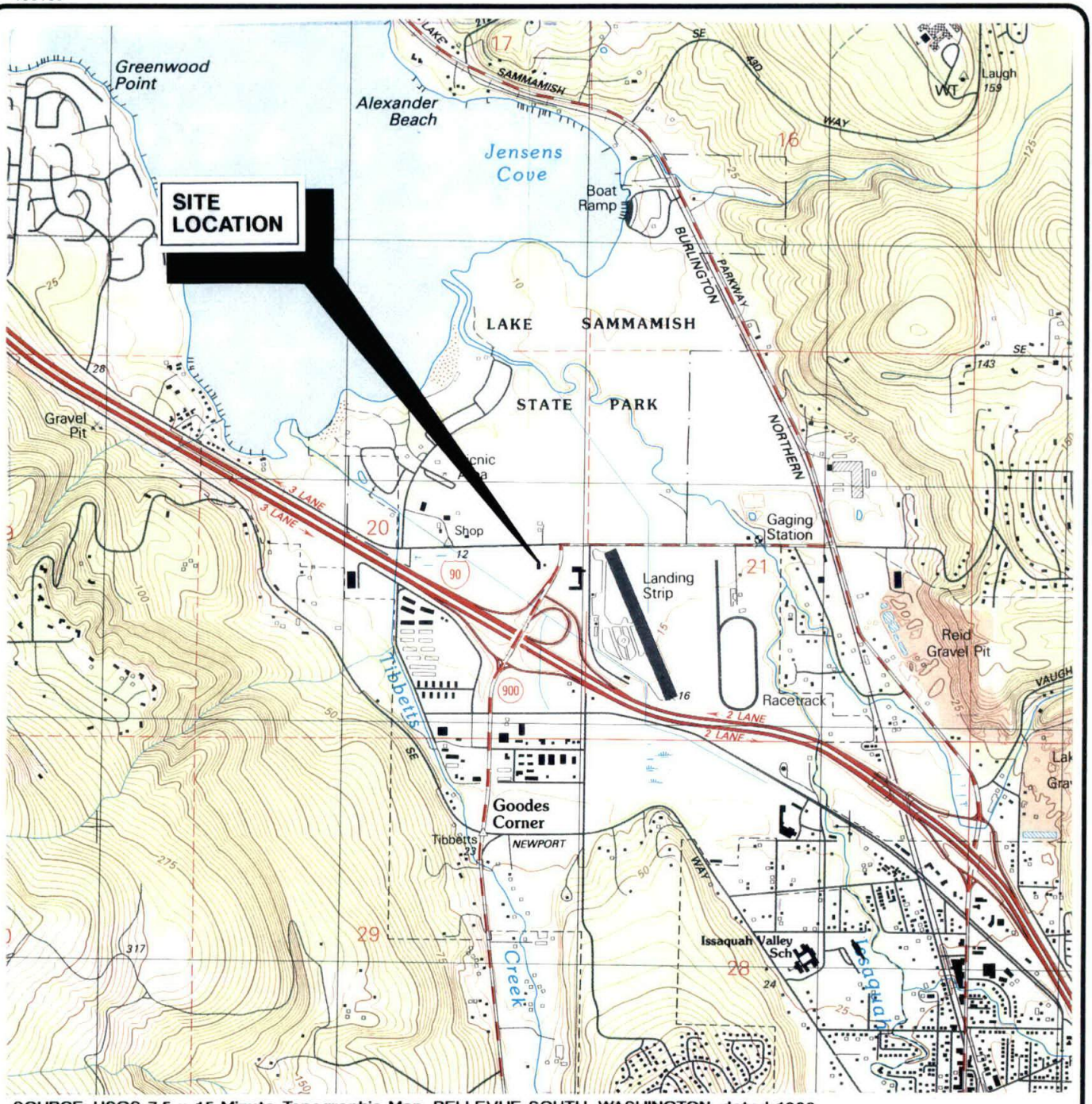


SOURCE: USGS 7.5 x 15 Minute Topographic Map, BELLEVUE SOUTH, WASHINGTON, dated 1983.

0 .5 1 MILE

0 2000 4000 6000 FEET

QUADRANGLE LOCATION

N

DRAFTER: SAC | APPROVED: AMA | CHECKED: | DRAWING: | FILE NO.: | PRJCT NO.: WA0273.001 | DWG DATE: SEPT 1993

GERAGHTY & MILLER, INC.
Environmental Services

SITE LOCATION MAP

ARCO Products Company
Service Station #6162
1403 NW Lake Sammamish Road
Issaquah, Washington

FIGURE
1

NW Lake Sammamish Road

DRIVEWAY

DRIVEWAY

TELEPHONE VAULT

WATER METER

PLANTER

PLANTER

PLANTER

PLANTER

CANOPY

CONCRETE PAD

BUILDING

PLANTER

PUMP ISLAND

B4

B2

B1

B3

PLANTER

PLANTER

State Route 900

N

0 10 20 40

Approximate Scale In Feet

LEGEND

- Property Boundary
- Approximate Location Underground Storage Tanks
- Catch Basin
- B1 Soil Boring Location

DRAFTER: SAC | APPROVED: AMA | CHECKED: AMA | DRAWING: | FILE NO.: | PRJCT NO.: WA0273.001 | DWG DATE: 9-14-93

GERAGHTY & MILLER, INC.
Environmental Services

SITE PLAN

ARCO Products Company
Service Station #6162
1403 NW Lake Sammamish Road
Issaquah, Washington

FIGURE
2

APPPENDIX A

DRILLING AND SOIL SAMPLING METHODS

DRILLING AND SOIL SAMPLING METHODS

Prior to initiating the drilling, on-site underground utilities were located. As an additional precaution, the uppermost 4 feet of soil in each boring was dug by hand to verify that no near-surface underground utilities were present.

The soil borings were drilled with a IR-T3W drill rig using a hollow-stem auger. During advancement of the boreholes, soil samples were obtained at approximate 5-foot intervals for purposes of describing the encountered soils and collecting soil samples for laboratory analysis. The soil samples were obtained by driving an 18-inch long, 2.5-inch inside diameter, split-spoon sampler lined with brass sample tubes into undisturbed sediments with a 140-pound hammer free-falling 30 inches. The number of hammer blows required to drive the sampler every 6 inches was recorded on field logs for the sole purpose of determining relative density of the subsurface soils. The blow-counts should not be construed as appropriate for determining soil parameters to be used in structural design or construction.

The soils collected in the upper two brass sample tubes at each sampling interval were described in the field by a Geraghty & Miller geologist and placed in a sealed plastic bag for field analysis of volatile organic compounds (VOCs) using a Thermo-Environmental Instruments, Inc. Model 580s OVM™ (organic vapor meter) with a lamp energy of 10.6 electron volts. The results of the VOC screening were used to help determine which soil samples would be sent to the laboratory for chemical analysis. The soils collected inside the bottom brass tubes were retained for laboratory analysis.

As each soil sample was retained for laboratory analysis, the ends of the brass sample tube were covered with Teflon™ tape, capped with plastic covers, and sealed with self-bonding, adhesiveless tape. The sealed sample was labeled, placed in a water-tight bag, and stored in a portable cooler with ice. A chain-of-custody record was prepared and accompanied the soil samples to the laboratory to document sample identities, requested analyses, sample handling, and receipt by the laboratory.

The auger flights and other reusable drilling equipment were decontaminated between each borehole with a steam cleaner. All reusable sampling equipment was decontaminated after each use by washing with laboratory-grade, nonphosphate detergent solution, then rinsing it with potable water and deionized water.

APPENDIX B

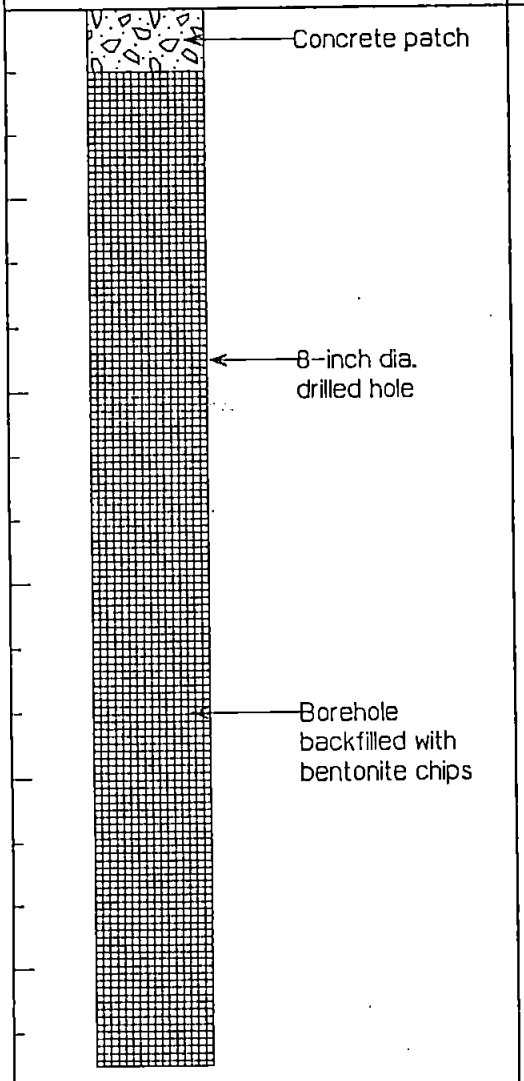
SOIL BORING LOGS

PROJECT NAME: ARCO STATION NO. 6162
PROJECT NO: WA0273.001

LOG OF B1
Page 1 of 1

CLIENT NAME: ARCO PRODUCTS COMPANY
PROJECT LOCATION: ISSAQUAH, WASHINGTON
DATE STARTED: 30-AUG-93
DATE COMPLETED: 30-AUG-93
LOGGED BY: A. AMR
CHECKED BY: J. SADLER

SURFACE ELEV: NA
DATUM: NA
DRILL COMPANY: CASCADE DRILLING, INC.
DRILLER: MIKE COLBERT
DRILL METHOD: HOLLOW-STEM AUGER
SAMPLING METHOD: SPLIT SPOON (140-lb. hammer)



DEPTH (feet)	BLOWS PER SIX IN.	MATERIALS DESCRIPTION
		ASPHALT (4-Inches).
3	4 3 4	SILTY CLAY (CL) – Dark gray to black, moist, clay with few silt, trace fine-grained sand, (moderate hydrocarbon odor, PID = 32 ppm). Hand dug to 3 feet below land surface (bls).
6	2 1 2	SILTY SAND (SM) – Light gray, wet, loose, fine-grained sand, little silt, (hydrocarbon odor, PID = 4 ppm). Groundwater encountered at 5.5 feet bls during drilling.
9	2 3 4	SILTY CLAY (CL) – Gray, moist, stiff, clay with few silt, plastic, root fragments, (no hydrocarbon odor, PID = 0 ppm). CLAYEY SAND (SC) – Gray, wet, loose, fine-grained sand, little clay, (no hydrocarbon odor).
12		
15	1 2 1	As above, fine- to medium-grained sand layer (3-inches). SILTY CLAY (CL) – Gray to brown, wet, soft, clay, few silt, root fragments, (no hydrocarbon odor).
18		Borehole terminated at 16.5 feet bls. Groundwater encountered during drilling at 5.5 feet bls. Note: Blow counts taken below 4 feet bls using a 2.5-inch diameter split-spoon sampler driven with a 140-pound hammer falling 30 inches. Blow counts recorded for evaluating relative soil density only and are not appropriate for construction or structural design purposes.
21		

PROJECT NAME: ARCO STATION NO. 6162
PROJECT NO: WA0273.001

CLIENT NAME: ARCO PRODUCTS COMPANY
PROJECT LOCATION: ISSAQUAH, WASHINGTON
DATE STARTED: 30-AUG-93
DATE COMPLETED: 30-AUG-93
LOGGED BY: A. AMR
CHECKED BY: J. SADLER

SURFACE ELEV: NA
DATUM: NA
DRILL COMPANY: CASCADE DRILLING, INC.
DRILLER: MIKE COLBERT
DRILL METHOD: HOLLOW-STEM AUGER
SAMPLING METHOD: SPLIT SPOON (140-lb. hammer)

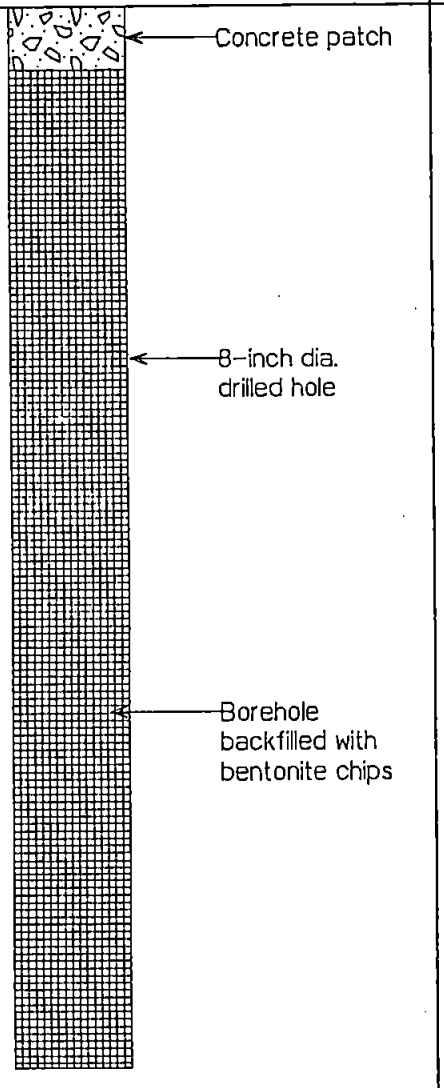
WELL CONSTRUCTION	DEPTH (feet)	BLOWS PER SIX IN.	SAMPLES AND GRAPHIC LOG	MATERIALS DESCRIPTION
Concrete patch				ASPHALT (4-Inches).
				SAND with Gravel (SW) - Gray to brown, moist, fine- to coarse-grained sand, fine to coarse gravel, cobbles and bricks, (Fill).
	3			WELL-GRADED SAND (SW) - Gray, moist, fine- to medium-grained sand, few silt, (strong hydrocarbon odor). Hand dug to 4 feet below land surface (bls).
8-inch dia. drilled hole		3 1		SILTY SAND (SM) - Gray, wet, loose, fine-grained sand, little silt, (hydrocarbon odor, PID = 1588 ppm).
	6	2	▽	Groundwater encountered at 6 feet bls during drilling.
	9			SILTY CLAY (CL) - Dark gray to green, wet, soft, clay, little silt, plastic, (moderate hydrocarbon odor, PID = 700 ppm).
		2 1		
Borehole backfilled with bentonite chips		2		
	12			SILTY SAND (SM) - Gray, wet, loose, fine- to medium-grained sand, little silt, (slight hydrocarbon odor).
	15	1		
		2		
		1		CLAYEY SILT (ML) - Brown, wet, soft, silt, little clay, organic-rich, (no hydrocarbon odor).
				Borehole terminated at 16.5 feet bls. Groundwater encountered during drilling at 6 feet bls.
	18			Note: Blow counts taken below 4 feet bls using a 2.5-inch diameter split-spoon sampler driven with a 140-pound hammer falling 30 inches. Blow counts recorded for evaluating relative soil density only and are not appropriate for construction or structural design purposes.
	21			

PROJECT NAME: ARCO STATION NO. 6162
PROJECT NO: WA0273.001

LOG OF B3
Page 1 of 1

CLIENT NAME: ARCO PRODUCTS COMPANY
PROJECT LOCATION: ISSAQUAH, WASHINGTON
DATE STARTED: 30-AUG-93
DATE COMPLETED: 30-AUG-93
LOGGED BY: A. AMR
CHECKED BY: J. SADLER

SURFACE ELEV: NA
DATUM: NA
DRILL COMPANY: CASCADE DRILLING, INC.
DRILLER: MIKE COLBERT
DRILL METHOD: HOLLOW-STEM AUGER
SAMPLING METHOD: SPLIT SPOON (140-lb. hammer)



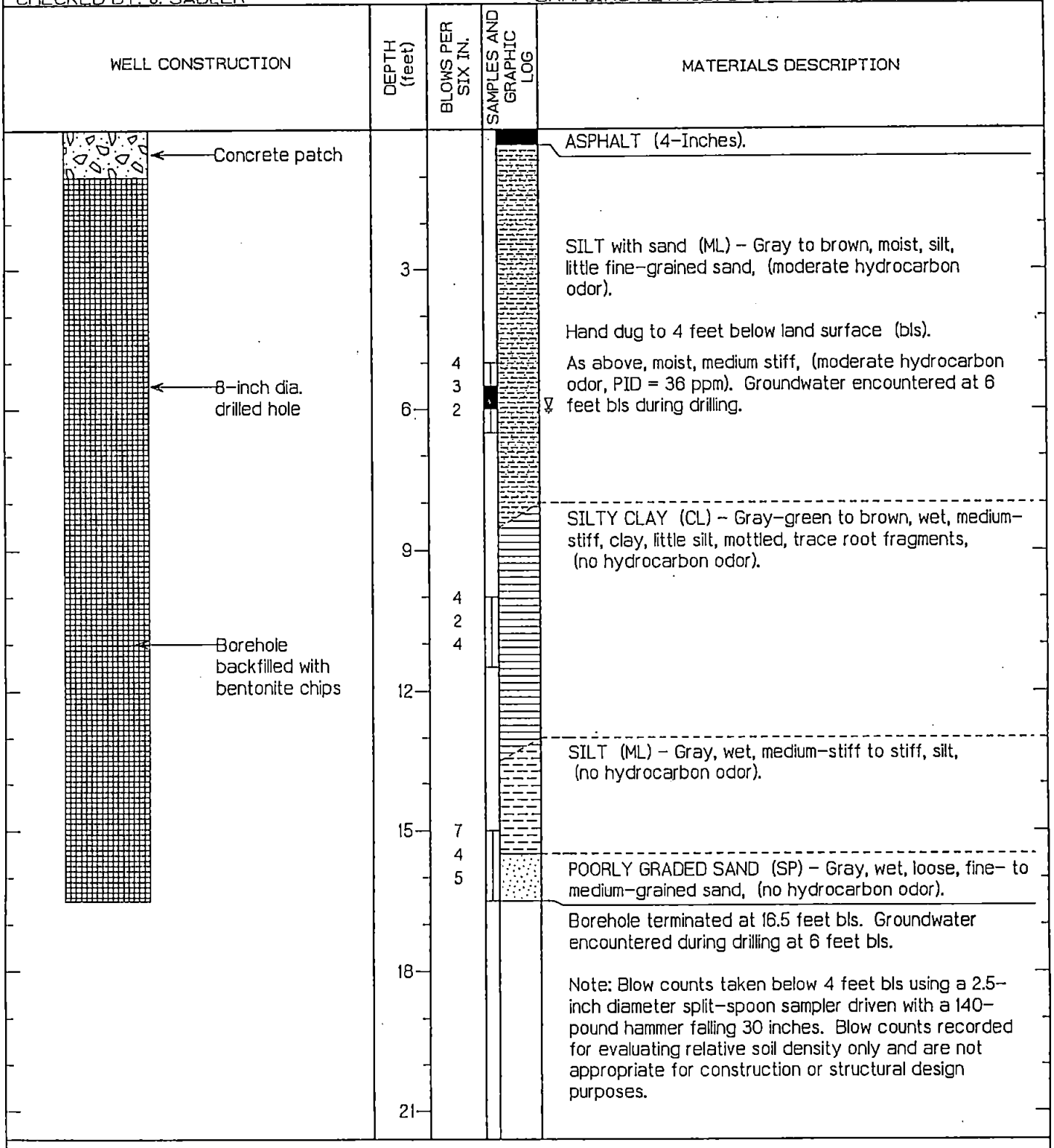
DEPTH (feet)	BLOWS PER SIX IN.	SAMPLES AND GRAPHIC LOG	MATERIALS DESCRIPTION
			ASPHALT (4-Inches).
			SAND with Gravel (SW) - Gray to brown, moist, fine- to coarse-grained sand, fine to coarse gravel, rounded, with cobbles (6-inch diameter).
3			Hand dug to 4 feet below land surface (bls).
	3		SILTY CLAY (CL) - Brown, moist, clay, few silt, (moderate hydrocarbon odor, PID = 1 ppm).
	2		
6	2	▽	WELL-GRADED SAND (SW) - Gray, wet, loose, fine- to medium-grained sand, trace fine gravel, trace silt, (no hydrocarbon odor, PID = 3 ppm). Groundwater encountered during drilling at 6 feet bls.
			SILTY SAND (SM) - Gray, wet, loose, fine-grained few sand, silt, (no hydrocarbon odor, PID = 0 ppm).
9			
	3		
	4		
	2		SILT (ML) - Gray, wet, medium stiff, silt, trace fine-grained sand, mottled brown, root fragments, (no hydrocarbon odor, PID = 0 ppm)
12			
15	2		
	4		As above, brown, organic-rich, (no hydrocarbon odor, PID = 0 ppm).
	3		
			Borehole terminated at 16.5 feet bls. Groundwater encountered during drilling at 6 feet bls.
18			Note: Blow counts taken below 4 feet bls using a 2.5-inch diameter split-spoon sampler driven with a 140-pound hammer falling 30 inches. Blow counts recorded for evaluating relative soil density only and are not appropriate for construction or structural design purposes.
21			

PROJECT NAME: ARCO STATION NO. 6162
PROJECT NO: WA0273.001

LOG OF B4
Page 1 of 1

CLIENT NAME: ARCO PRODUCTS COMPANY
PROJECT LOCATION: ISSAQUAH, WASHINGTON
DATE STARTED: 30-AUG-93
DATE COMPLETED: 30-AUG-93
LOGGED BY: A. AMR
CHECKED BY: J. SADLER

SURFACE ELEV: NA
DATUM: NA
DRILL COMPANY: CASCADE DRILLING, INC.
DRILLER: MIKE COLBERT
DRILL METHOD: HOLLOW-STEM AUGER
SAMPLING METHOD: SPLIT SPOON (140-lb. hammer)



APPENDIX C

LABORATORY ANALYTICAL REPORT AND

CHAIN-OF-CUSTODY DOCUMENTATION

NORTH CREEK ANALYTICAL

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

Geraghty & Miller	Client Project ID:	ARCO Issaquah, #6162-93-1	
8330 154th Avenue NE	Sample Matrix:	Soil	
Redmond, WA 98052			Received: Aug 31, 1993
Attention: Amr M. Amr	First Sample #:	308-1116	Reported: Sep 7, 1993

TOTAL SOLIDS & MOISTURE CONTENT REPORT

Sample Number	Sample Description	Total Solids %	Moisture Content %
308-1116	B-1 (4)	75	25
308-1117	B-2 (5.5)	82	18
308-1118	B-3 (5.5)	83	17
308-1119	B-4 (5.5)	88	12
308-1120	STOCK-1	76	24

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 to the samples analyzed in accordance with the chain of custody document.
This analytical report must be reproduced in its entirety.

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
for Project Manager

NORTH CREEK ANALYTICAL

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

Geraghty & Miller	Client Project ID:	ARCO Issaquah, #6162-93-1	Sampled: Aug 30, 1993
8330 154th Avenue NE	Sample Matrix:	Soil	Received: Aug 31, 1993
Redmond, WA 98052	Analysis Method:	OR TPH-HCID	Extracted: Sep 3, 1993
Attention: Amr M. Amr	First Sample #:	308-1120	Analyzed: Sep 3, 1993
			Reported: Sep 7, 1993

HYDROCARBON IDENTIFICATION

Sample Number	Sample Description	HCID as Gasoline C6 - C10 mg/kg (ppm)	GRO Surrogate Recovery %	HCID as Diesel C10 - C28 mg/kg (ppm)	DRO Surrogate Recovery %	HCID Heavy Oil >C28 mg/kg (ppm)
308-1120	STOCK-1	<20	78	<50	78	<100
BLK090393	Method Blank	<20	77	<50	95	<100

Oregon TPH-HCID is a qualitative procedure which is used identify petroleum products containing components from C6 to >C28 by Gas Chromatography using a capillary column and a Flame Ionization Detector (FID). While this method is intended to be qualitative, it can be used to eliminate the need for further analysis for those samples which demonstrate TPH levels significantly below the regulatory threshold. Surrogate Recovery control limits are 50 - 150%.

NORTH CREEK ANALYTICAL Inc.

Matthew T. Essig
Project Manager

3081116.G&M <2>

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

Geraghty & Miller	Client Project ID:	ARCO Issaquah, #6162-93-1	Sampled:	Aug 30, 1993
8330 154th Avenue NE	Sample Matrix:	Soil	Received:	Aug 31, 1993
Redmond, WA 98052	Analysis Method:	WTPH-G	Analyzed:	Sep 7, 1993
Attention: Amr M. Amr	First Sample #:	308-1116	Reported:	Sep 7, 1993

TOTAL PETROLEUM HYDROCARBONS-GASOLINE RANGE

Sample Number	Sample Description	Sample Result mg/kg (ppm)	Surrogate Recovery %
308-1116	B-1 (4)	9.5	82
308-1117	B-2 (5.5)	4,000	S-3
308-1118	B-3 (5.5)	23	90
308-1119	B-4 (5.5)	17	94
BLK090793	Method Blank	N.D.	90

Reporting Limits	1.0

4-Bromofluorobenzene surrogate recovery control limits are 50 - 150 %.
Volatile Total Petroleum 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.

Matthew T. Essig
Project Manager

Please Note:
S-3 = Due to coelution with hydrocarbon contamination present in the sample, the Surrogate Recovery for this analysis is >150% and cannot be accurately quantified.

NORTH CREEK ANALYTICAL
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Phone (206) 481-9200 · FAX (206) 485-2992

Geraghty & Miller	Client Project ID:	ARCO Issaquah, #6162-93-1	Sampled:	Aug 30, 1993
8330 154th Avenue NE	Sample Matrix:	Soil	Received:	Aug 31, 1993
Redmond, WA 98052	Analysis Method:	EPA 8020	Analyzed:	Sep 7, 1993
Attention: Amr M. Amr	First Sample #:	308-1116	Reported:	Sep 7, 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 %
308-1116	B-1 (4)	0.13	0.13	N.D.	0.23	84
308-1117	B-2 (5.5)	10	62	52	330	S-2
308-1118	B-3 (5.5)	0.070	N.D.	0.72	2.4	88
308-1119	B-4 (5.5)	0.18	0.21	0.24	1.5	92
BLK090793	Method Blank	N.D.	N.D.	N.D.	N.D.	96

Reporting Limits:	**0.050**	**0.050**	**0.050**	**0.10**	

4-Bromofluorobenzene surrogate recovery control limits are 79 - 165 %.
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.

Matthew T. Essig
Project Manager

Please Note:
The Reporting Limit for Ethyl Benzene in #308-1116 = 0.080 mg/kg.
S-2 = The Surrogate Recovery for this sample is not available due to coelution with other organic compounds present in the sample.

NORTH CREEK ANALYTICAL

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Phone (206) 481-9200 · FAX (206) 485-2992

Geraghty & Miller	Client Project ID:	ARCO Issaquah, #6162-93-1	Sampled:	Aug 30, 1993
8330 154th Avenue NE	Sample Matrix:	Soil	Received:	Aug 31, 1993
Redmond, WA 98052	Analysis Method:	EPA 7420	Digested:	Sep 7, 1993
Attention: Amr M. Amr	First Sample #:	308-1116	Analyzed:	Sep 7, 1993
			Reported:	Sep 7, 1993

METALS ANALYSIS FOR: TOTAL LEAD

Sample Number	Sample Description	Reporting Limit mg/kg (ppm)	Sample Result mg/kg (ppm)
308-1116	B-1 (4)	10	N.D.
308-1117	B-2 (5.5)	10	N.D.
308-1118	B-3 (5.5)	10	28
308-1119	B-4 (5.5)	10	41
BLK090793	Method Blank	10	N.D.

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.

Matthew T. Essig
Project Manager

NORTH CREEK ANALYTICAL

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

Geraghty & Miller	Client Project ID: ARCO Issaquah, #6162-93-1	Analyst: T. Fitzgibbon
8330 154th Avenue NE	Sample Matrix: Soil	
Redmond, WA 98052	Units: mg/kg (ppm)	
Attention: Amr M. Amr		Digested: Sep 7, 1993
		Reported: Sep 7, 1993

METALS QUALITY CONTROL DATA REPORT

ANALYTE	Lead
EPA Method:	7420
Date Analyzed:	Sep 7, 1993

ACCURACY ASSESSMENT

LCS Spike Conc. Added:	50
LCS Spike Result:	54
LCS Spike % Recovery:	108
Upper Control Limit:	125
Lower Control Limit:	68
Matrix Spike Sample #:	309-0049
Matrix Spike % Recovery:	98

PRECISION ASSESSMENT

Sample #:	309-0049
Original:	12
Duplicate:	N.D.
Relative % Difference:	RPD values are not reported at sample concentration levels < 10 X the Reporting Limit.

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Lab Control Sample % Recovery: $\frac{\text{Conc. of L.C.S.}}{\text{L.C.S. Spike Conc. Added}} \times 100$

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 6162-93-1

Chain of Custody

ARCO Facility no. 6162	City (Facility) Issaquah	Project manager (Consultant) Amr M. Amr	Laboratory name NCA
ARCO engineer Kyle Christie	Telephone no. (ARCO) 415-571-2468	Telephone no. (Consultant) 206-869-6321	Fax no. (Consultant) 206-869-6369
Consultant name Geraghty & Miller, Inc	Address (Consultant) 8330 154th Ave NE, Redmond WA 98052		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	TPH-HCID OREGON
B1(4)	1116	1	X			X		8/30/93	9:00	X		X								X	
B2(5.5)	1117	1	X			X			11:10	X		X								X	
B3(5.5)	1118	1	X			X			10:10	X		X								X	
B4(5.5)	1119	1	X			X			12:20	X		X								X	
STOCK-1	1120	2	X			X			13:30	Hold 8/31/93											X

Special detection Limit/reporting

Special QA/QC

Method of shipment: LAB COURIER

Remarks: 5-DAY TURNAROUND ON SAMPLE STOCK-1 FOR OREGON TPH-HCID

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample:

Temperature received:

	Date	Time		Date	Time
Relinquished by sampler	8/31/93	8:00	Received by		
Relinquished by			Received by		
Relinquished by			Received by laboratory		

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPC-3292 (2-91)