A Report Prepared For

Chevron U.S.A. Products Company
Site Assessment and Remediation Group
20500 Richmond Beach Drive N.W.
Seattle, Washington 98177

GROUNDWATER MONITORING RESULTS
JULY THROUGH SEPTEMBER 1993
CHEVRON U.S.A. PRODUCTS COMPANY
FACILITY NO. 60094511
617 N.W. RICHMOND BEACH
SEATTLE, WASHINGTON

AGI Project No. 15,582.044

by:

Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

APPLIED GEOTECHNOLOGY INC.
300 120th Avenue N.E.
Building 4, Suite 215
Bellevue, Washington 98005
206/453-8383

August 31, 1993

Independent Action Report Update

Site Name: Chevron SS # 9-4511

Inc. #: 1491 Date of Report: 8-31-93

County: King Date Report Rec'd: 9-23-93

Reviewed by: B. Amoah-Forson

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

High levels of Benzene 2070 ppb and TPH-G 47,000 ppb exist in MW-9

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1.0 INTRODUCTION

This report summarizes the results of Applied Geotechnology Inc.'s (AGI) groundwater monitoring activities during the third quarter of 1993 at Chevron U.S.A. Products Company (Chevron) Facility No. 60094511 in Seattle, Washington. Figure 1 is a Vicinity Map and Figure 2 is a Site Plan.

The site is currently an active service station. The groundwater monitoring tasks consist of measuring water levels and collecting groundwater samples from selected monitoring wells. The groundwater samples were analyzed for the chemistry parameters described below. Our work was conducted under Chevron Contract No. CB6C930522NWX.

1.1 PURPOSE

The intent of groundwater monitoring is to document the water level elevations and water quality conditions beneath the site. This report summarizes the information collected during the third quarter of 1993.

1.2 SCOPE OF WORK

Our work was completed in general accordance with Chevron Specification NW-101692SEP, dated November 3, 1992, and direction from the Chevron project manager. The scope of work for the monitoring consisted of:

- Collecting water level measurements, and purging and sampling groundwater in the selected monitoring wells (Wells MW1, MW2, MW4, MW5, MW6, MW7, MW8, MW9, MW10, and MW11).
- Documenting site conditions at the time of our monitoring visit.
- Submitting the groundwater samples for selected quantitative chemistry analyses.
- Disposing of the purge water.
- Preparing this report summarizing the results of the monitoring event.

2.0 METHODS

2.1 GROUNDWATER LEVEL MEASUREMENTS

Prior to purging each monitoring well, the depth to water below the top of the monitoring well casing was measured. Each measurement was to the nearest 0.01 foot using a SINCO water level indicator or an interface probe. The portions of the instrument probe and wire that would contact the well casing were decontaminated prior to use in each monitoring well. The decontamination procedure consisted of an n-propyl alcohol rinse, followed by a deionized water rinse, followed by a second n-propyl alcohol rinse. The instrument was then allowed to air dry.

2.2 MONITORING WELL PURGING AND SAMPLING PROCEDURES

Each monitoring well was purged prior to sampling. The purging consisted of bailing at least three well volumes of water from the monitoring well. A clean, unused disposable bailer and new polyethylene cord were used in each monitoring well. Purge water generated was transported to Chevron's Point Wells Distribution Center at Richmond Beach, Washington.

The water samples from the monitoring wells were placed in precleaned containers provided by the analytical laboratory. A chain-of-custody seal was affixed to the sample lid, and the container and seal were both labeled with the project name, Chevron facility number, sample number, date and time the sample was collected, and the sampler's initials. The samples were placed in a chilled ice chest for transport to the analytical laboratory. Chain-of-custody forms were used to document the sample handling.

Copies of the field records and analytical laboratory reports are included in Appendices A and B, respectively.

2.3 SAMPLE ANALYSES

Columbia Analytical Services of Bothell, Washington completed the sample analyses. Ten samples were analyzed for total petroleum hydrocarbons (TPH) and seven samples were analyzed for benzene, ethylbenzene, toluene, and xylenes (BETX). The TPH analyses were conducted in accordance with Washington State Department of Ecology Method WTPH-G and WTPH-418.1. The BETX analyses were completed by Environmental Protection Agency (EPA) Method 8020. Laboratory-prepared trip blanks were included and are reported as trip blanks or method blanks in the laboratory report.

3.0 RESULTS

3.1 GROUNDWATER ELEVATIONS

Groundwater elevations in each monitoring well were calculated by subtracting the measured depth to water in the well from the elevation at the top of the casing. Top of casing elevations were supplied by Chevron. The August 4, 1993 water level measurements and the top of casing elevations provided to us indicate groundwater was generally migrating toward the east and west at the time of our site monitoring.

Figure 3 shows the groundwater elevations and contours for the August 4, 1993 measurements. Table 1 summarizes the groundwater elevation data.

3.2 ANALYTICAL CHEMISTRY

The analytical chemistry results from the August 4, 1993 sampling show volatile organic compounds are present in samples collected from wells MW1, MW2, MW4, MW5, MW6, MW7, MW8, MW9, MW10, and MW11, and petroleum hydrocarbon compounds are present in samples collected from MW1, MW2, MW4, MW5, MW6, MW7, MW9, MW10, and MW11. Table 2 summarizes the chemistry results for the groundwater sample analyses.

4.0 LIMITATIONS

This report has been prepared for exclusive use by Chevron U.S.A. Products Company for this project only. The analyses included in this report are based on conditions encountered at the time of our field observations, information provided by Chevron U.S.A. Products Company, and our experience and judgement. Information in this report is limited only to the area described and does not apply to other areas of the site. AGI cannot be responsible for interpretation by others of the data contained herein.

Our work has been performed in a manner consistent with the scope of work described in your Specification NW-101692SEP. No other warranty, express or implied, is made.

DISTRIBUTION

2 Copies

Chevron U.S.A. Products Company
Site Assessment and Remediation Group
20500 Richmond Beach Drive N.W.
Seattle, Washington 98177

Attention: Mr. Timothy D. Johnson

PPB/GLL/jlh

TABLES

Table 1
Historical Groundwater Elevation Data
Chevron U.S.A. Products Company Facility 60094511
Seattle, Washington

Well No.	Date Measured	Casing Rim Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	Apparent Liquid Hydrocarbon Thickness
MW-1	05/22/92	98.13	--	93.18 [a]	--
	06/23/92	98.13	--	93.13 [b]	--
	07/20/92	98.13	--	93.38 [c]	--
	02/23/93	98.13	4.75	93.38	0.00
	05/14/93	98.13	4.11	94.02	0.00
	08/04/93	98.13	4.65	93.48	0.00
MW-2	05/22/92	97.53	--	91.53	--
	06/23/92	97.53	--	92.36	--
	07/20/92	97.53	--	91.82	--
	02/23/93	97.53	NM	NM	NM
	05/14/93	97.53	NM	NM	NM
	08/04/93	97.53	6.39	91.14	0.00
MW-4	05/22/92	97.99	--	91.33 [d]	--
	06/23/92	97.99	--	90.68 [e]	--
	07/20/92	97.99	--	90.65 [f]	--
	02/23/93	97.99	6.95	91.08 [g]	0.05
	05/14/93	97.99	6.27	91.72	0.00
	08/04/93	97.99	7.18	90.81	0.00
MW-5	05/22/92	97.90	--	91.69	--
	06/23/92	97.90	--	91.48	--
	07/20/92	97.90	--	91.64	--
	02/23/93	97.90	6.18	91.72	0.00
	05/14/93	97.90	6.00	91.90	0.00
	08/04/93	97.90	6.99	90.91	0.00
MW-6	05/22/92	97.51	--	93.06	--
	06/23/92	97.51	--	93.12	--
	07/20/92	97.51	--	93.41	--
	02/23/93	97.51	3.70	93.81	0.00
	05/14/93	97.51	4.62	92.89	0.00
	08/04/93	97.51	3.99	93.52	0.00
MW-7	05/22/92	97.87	--	93.05	--
	06/23/92	97.87	--	93.02	--
	07/20/92	97.87	--	93.09	--
	02/23/93	97.87	4.20	93.67	0.00
	05/14/93	97.87	4.35	93.52	0.00
	08/04/93	97.87	4.38	93.49	0.00

Table 1
Historical Groundwater Elevation Data
Chevron U.S.A. Products Company Facility 60094511
Seattle, Washington

Well No.	Date Measured	Casing Rim Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	Apparent Liquid Hydrocarbon Thickness
MW-8	05/22/92	98.24	--	90.81	--
	06/23/92	98.24	--	90.03	--
	07/20/92	98.24	--	89.84	--
	02/23/93	98.24	8.00	90.24	0.00
	05/14/93	98.24	6.85	91.39	0.00
	08/04/93	98.24	8.19	90.05	0.00
MW-9	05/22/92	97.72	--	90.06	--
	06/23/92	97.72	--	89.25	--
	07/20/92	97.72	--	89.06	--
	02/23/93	97.72	8.10	89.62	0.00
	05/14/93	97.72	7.43	90.29	0.00
	08/04/93	97.72	8.31	89.41	0.00
MW-10	05/22/92	97.78	--	90.07	--
	06/23/92	97.78	--	89.37	--
	07/20/92	97.78	--	88.99	--
	02/23/93	97.78	8.30	89.48	0.00
	05/14/93	97.78	7.50	90.28	0.00
	08/04/93	97.78	8.39	89.39	0.00
MW-11	05/22/92	97.16	--	92.01	--
	06/23/92	97.16	--	91.90	--
	07/20/92	97.16	--	92.07	--
	02/23/93	97.16	4.72	92.44	0.00
	05/14/93	97.16	4.50	92.66	0.00
	08/04/93	97.16	4.94	92.22	0.00

Note:

Reference: Well elevation based on March 20, 1991, vertical control survey; measuring points are north side of PVC well casing.

a) 93.19 = relative elevation of phase-separated hydrocarbons.
b) 93.16 = relative elevation of phase-separated hydrocarbons.
c) 93.40 = relative elevation of phase-separated hydrocarbons.
d) 91.43 = relative elevation of phase-separated hydrocarbons.
e) 90.57 = relative elevation of phase-separated hydrocarbons.
f) 90.73 = relative elevation of phase-separated hydrocarbons.
g) Groundwater elevation is corrected using: depth to water (measured) minus (product thickness multiplied by 0.80') = depth to water in absence of product.

-- Not known or not provided.

Table 2
Historical Groundwater Analytical Results
Chevron U.S.A. Products Company Facility 60094511
Seattle, Washington

Sample I.D.	Date Sampled	Test Methods							
		BETX – EPA 5030/8020				TPH [a]	TPH – 3510/8015 M		EPA 418.1
		Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Gasoline (µg/L)	Diesel (µg/L)	Other [b] (µg/L)	TPH–IR [c] (µg/L)
MW–1	01/03/91	24	67	64	580	202,000	ND	56,000	166,000
	05/15/91	NA	NA	NA	NA	NA	NA	NA	NA
	05/22/92	NA	NA	NA	NA	NA	NA	NA	NA
	02/23/93	26	51	15	410	6,800	ND	NA	77,000
	05/14/93	10.2	4	2	286	6,770	NA	NA	110,000
	08/04/93	17.2	16	17	221	6,780	NA	NA	280,000
MW–2	01/03/91	240	2,080	4,400	16,400	44,400	ND	4,190	7,000
	05/15/91	401	1,370	2,510	8,660	47,000	ND	ND	9,000
	05/22/92	280	500	260	4,100	33,000	NA	NA	NA
	02/23/93	NS	NS	NS	NS	NS	NS	NS	NS
	05/14/93	NS	NS	NS	NS	NS	NS	NS	NS
	08/04/93	49.8	145	28	739	4,790	NA	NA	900
MW–4	01/03/91	NA	NA	NA	NA	46,700	ND	ND	NA
	05/15/91	535	293	59	1,340	11,000	ND	ND	22,000
	05/22/92	NA	NA	NA	NA	NA	NA	NA	NA
	02/23/93	NS	NS	NS	NS	NS	NS	NS	NS
	05/14/93	89.8	63	9	1,020	25,000	NA	NA	290,000
	08/04/93	147	152	22	2,090	17,800	NA	NA	1,400,000
MW–5	01/03/91	1,100	1,990	1,740	13,300	35,000	ND	5,520	6,000
	05/15/91	787	1,540	309	6,020	25,000	ND	ND	7,000
	05/22/92	600	1,300	86	5,400	38,000	NA	NA	NA
	02/23/93	183	368	35	1,810	8,870	NA	NA	2,100
	05/14/93	45.6	3	2	981	5,690	NA	NA	2,700
	08/04/93	559	1,120	75	3,260	17,900	NA	NA	3,500

Table 2
Historical Groundwater Analytical Results
Chevron U.S.A. Products Company Facility 60094511
Seattle, Washington

Sample I.D.	Date Sampled	Test Methods							
		BETX – EPA 5030/8020				TPH [a]	TPH – 3510/8015 M		EPA 418.1
		Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Gasoline (µg/L)	Diesel (µg/L)	Other [b] (µg/L)	TPH-IR [c] (µg/L)
MW-6	01/03/91	439	35	73	1,970	7,040	ND	1,500	ND
	05/15/91	498	417	27	1,340	8,000	ND	ND	2,000
	05/22/92	580	570	30	1,700	15,000	NA	NA	NA
	02/23/93	202	134	7	177	2,570	NA	NA	ND
	05/14/93	230	177	9	128	2,040	NA	NA	900
	08/04/93	240	238	8	103	2,400	NA	NA	800
MW-7	01/03/91	4	ND	ND	1	ND	370	2,240	ND
	05/15/91	1	ND	ND	ND	ND	ND	ND	ND
	05/22/92	1	ND	ND	ND	ND	NA	NA	NA
	02/23/93	NA	NA	NA	NA	NA	NA	NA	ND
	05/14/93	NA	NA	NA	NA	NA	NA	NA	600
	08/04/93	ND	ND	ND	1	90	NA	NA	1,200
MW-8	01/03/91	ND	ND	ND	ND	ND	ND	2,900	ND
	05/15/91	ND	ND	ND	ND	ND	ND	ND	ND
	05/22/92	ND	ND	ND	ND	ND	NA	NA	NA
	02/23/93	NA	NA	NA	NA	NA	NA	NA	ND
	05/14/93	NA	NA	NA	NA	NA	NA	NA	ND
	08/04/93	ND	ND	ND	1	ND	NA	NA	ND
MW-9	01/03/91	3,350	2,170	134	6,480	21,500	ND	ND	5,000
	05/15/91	1,740	1,920	100	5,350	34,000	ND	ND	9,000
	05/22/92	2,300	2,700	120	5,600	61,000	NA	NA	NA
	02/23/93	1,750	1,980	72	4,100	34,000	NA	NA	NA
	05/14/93	1,360	737	85	4,300	34,000	NA	NA	NA
	08/04/93	2,070	2,700	120	6,900	47,000	NA	NA	NA

Table 2
Historical Groundwater Analytical Results
Chevron U.S.A. Products Company Facility 60094511
Seattle, Washington

Sample I.D.	Date Sampled	Test Methods							
		BETX – EPA 5030/8020				TPH [a]	TPH – 3510/8015 M		EPA 418.1
		Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Gasoline (µg/L)	Diesel (µg/L)	Other [b] (µg/L)	TPH-IR [c] (µg/L)
MW-10	01/03/91	17	40	2	60	140	ND	ND	ND
	05/15/91	96	118	12	454	2,000	ND	ND	ND
	05/22/92	83	250	6	190	3,000	NA	NA	NA
	02/23/93	5.9	20	ND	21	265	NA	NA	NA
	05/14/93	7.6	11	ND	9	110	NA	NA	NA
	08/04/93	18.3	30	2	35	620	NA	NA	NA
MW-11	01/03/91	353	331	30	1,520	10,100	ND	ND	ND
	05/15/91	513	355	15	679	8,000	ND	ND	2,000
	05/22/92	330	140	7	200	5,200	NA	NA	NA
	02/23/93	212	102	7	169	3,850	NA	NA	NA
	05/14/93	124	51	4	61	1,760	NA	NA	NA
	08/04/93	58.9	25	1	28	980	NA	NA	NA
Laboratory Detection Limit [d]		0.5	1	1	1	50	250	600	500
State Cleanup Levels [e]		5	30	40	20	1,000	1,000	1,000	5

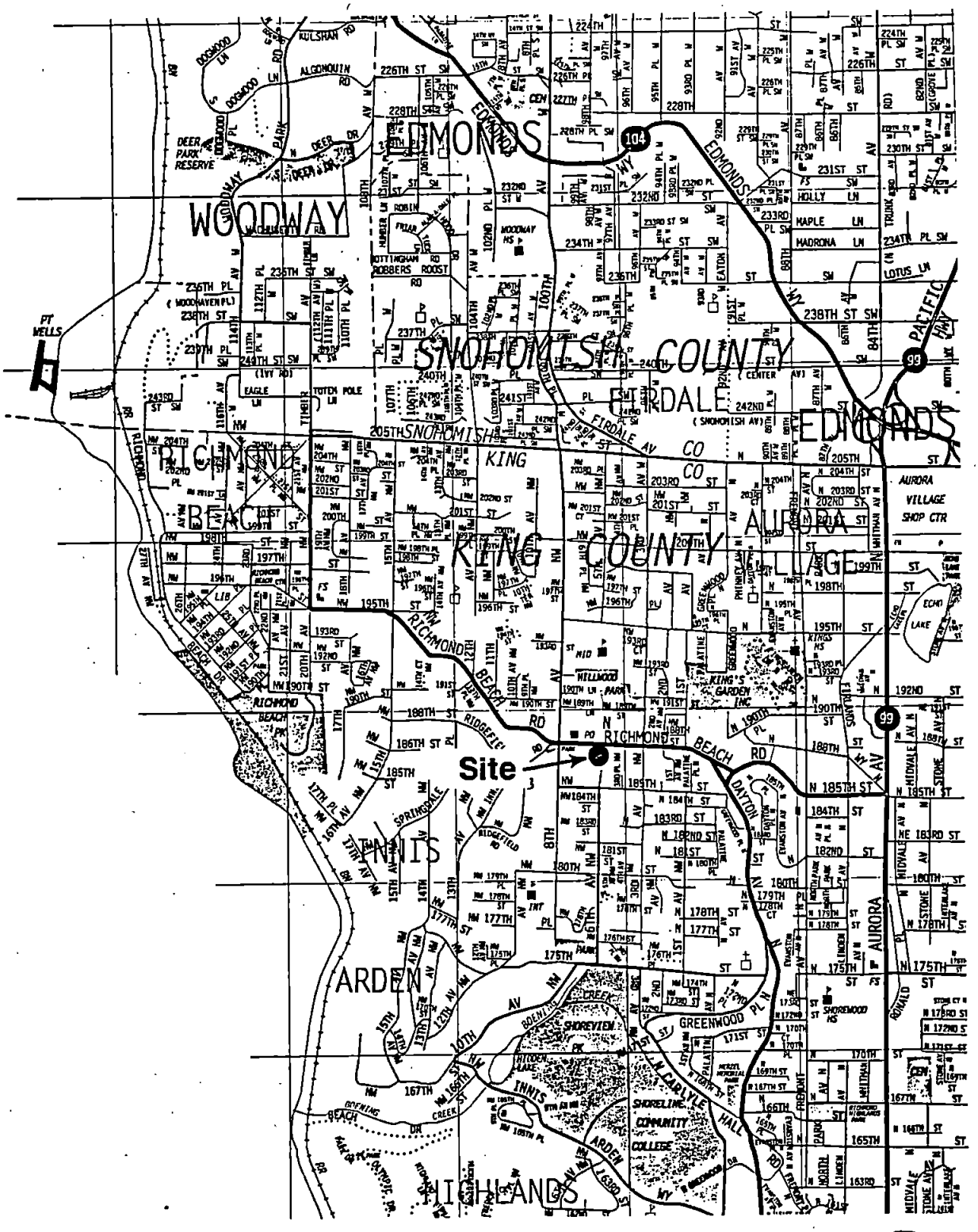
Notes:

a) Total petroleum hydrocarbons as gasoline. Methods 3010/8015 Modified for samples collected 1/3/91. Method WTPH-G for samples collected on or after 5/15/91.
b) Total petroleum hydrocarbons quantified using hydraulic oil as a standard.
c) Total petroleum hydrocarbons recoverable prior to 1993. Analyses on or after February 23, 1993 by WTPH-418.1.
d) Detection limit as of August 4, 1993.
e) Method A suggested cleanup level for groundwater promulgated under Chapter 173-340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.

NA – Not analyzed. ND – Not detected. NS – Not sampled.
µg/L – Micrograms per liter is approximately equivalent to parts per billion depending on density of water sample.

FIGURES

541914



Reference: Thomas Guide to King, Pierce and Snohomish County, 1992 Edition

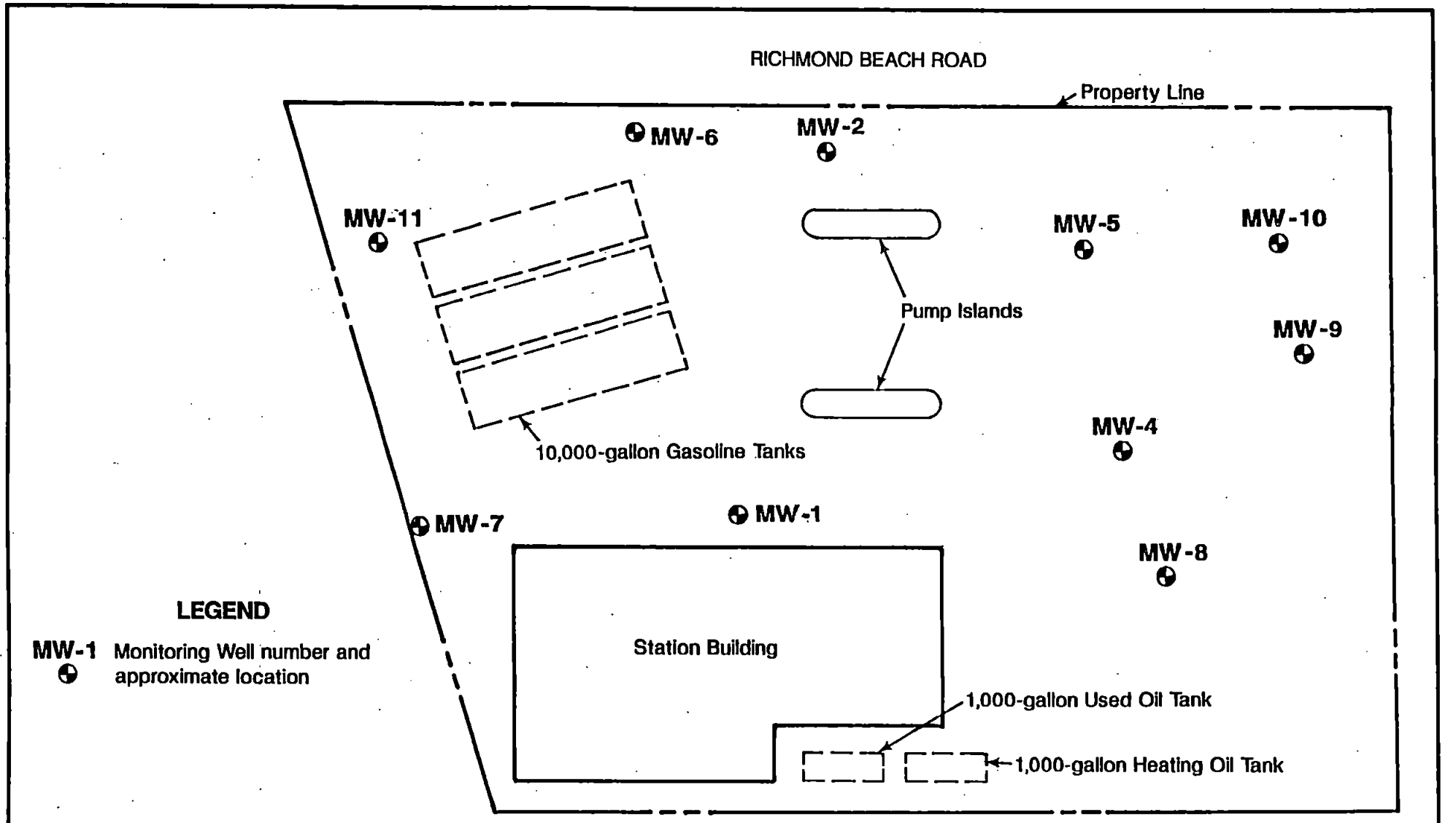
Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Vicinity Map

Chevron/Facility No. 60094511
Seattle, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,582.044	KM	PPB	8-31-93		



Reference: EMCON Northwest, Inc., Site Map, 6/92.

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

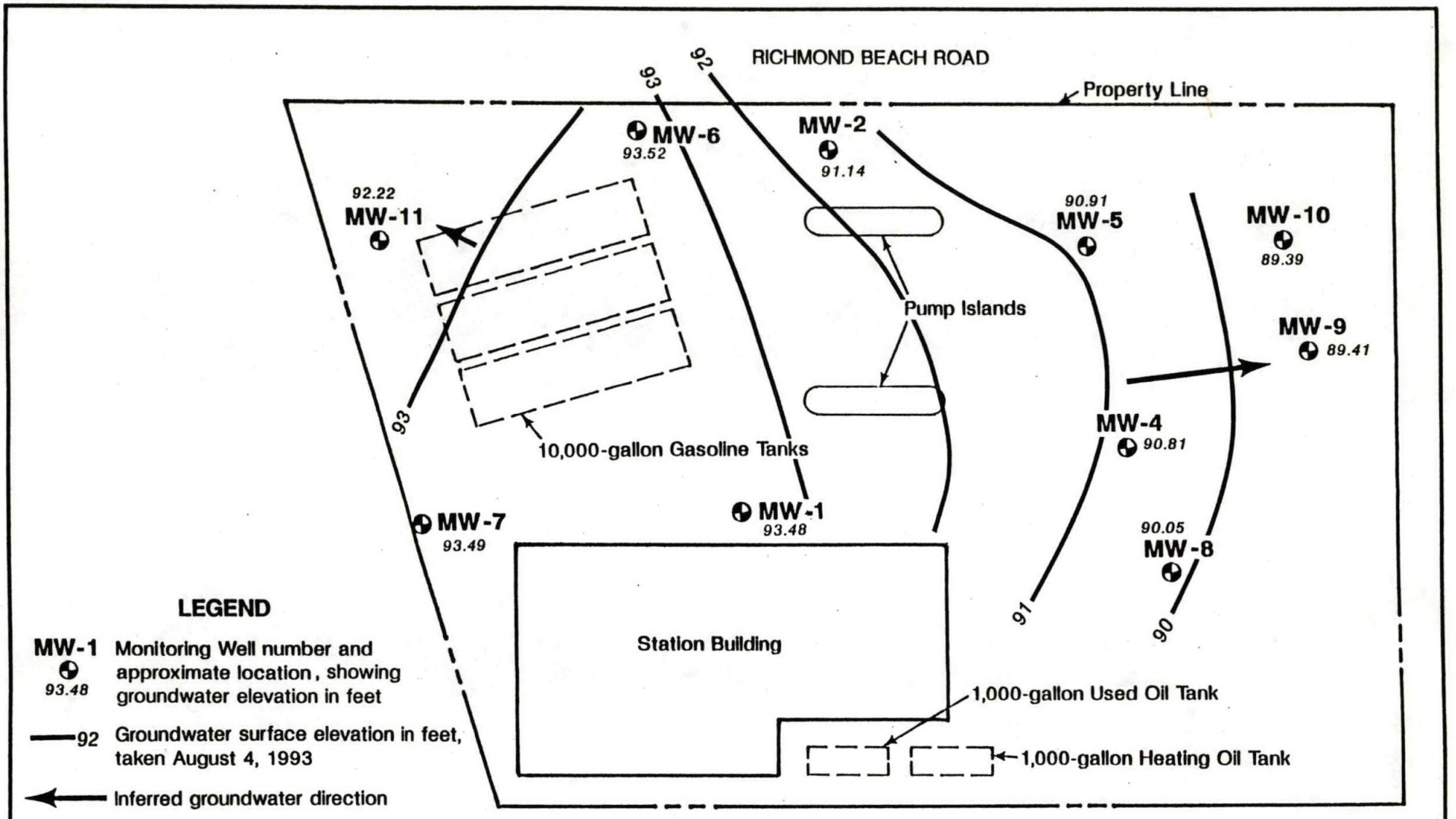
Site Plan

Chevron/Facility No. 60094511
Seattle, Washington

FIGURE **2**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,582.044	KM		8-31-93		

541914



Reference: EMCON Northwest, Inc., Site Map, 8/92.

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Groundwater Elevation and Contour Map

Chevron/Facility No. 60094511
Seattle, Washington

FIGURE 3

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,582.044	KM		8-31-93		

541914

APPENDIX A

Field Sampling Records

Groundwater Monitoring and Sampling Record

Facility Number: 6009 4511
Street Address: RICHMOND BEACH
City, State: ~~LYNNWOOD~~ WA SEATTLE
Sampling Personnel: J AMBROSE

Monitor Well Number	MW8	MW4	MW9	MW10
General Data				
Well Accessible (Y/N)	Y	Y	Y	Y
Well Diameter	4"	2"	4"	4"
Depth to bottom of Well (ft)	11.90	12.20	17.11	13.33
Height of Water Column in Well (ft)	3.71	5.02	8.8	4.94
Liquid Hydrocarbon or Sheen (Y/N)	N	Y	Y	Y
Depth to Water (hold/cut)	8.19	7.18	8.31	8.39
Depth to Hydrocarbon (hold/cut)	~~8.19~~	—	—	—
Measurement Date and Time	8/4 0920	8/4 0945	8/4 1010	8/4 1035
Well Purging Data				
Purging Technique	BAILER	—	—	—
Gallons Purged	7 GAL	3 GAL	9 GAL	9 GAL
Casing Volumes Purged *	3	3	2	3
Well Sampling Data				
Sample ID on C.O.C.	MW8	MW4	MW9	MW10
Sampling Date	8/4	—	—	—
Sampling Time	0935	1000	1025	1050
Sampling Technique	BAILER	—	—	—
Sample Preservation	HCL	—	—	—
Observations				
Sheen (Y/N)	N	Y	Y	Y
Odor (Y/N)	N	Y	Y	Y

Comments

NOTE: All measurements should be referenced from top of casing at surveyed measuring point, unless otherwise documented on this form.

* In general, three casing volumes should be removed or the well should be allowed to recover to at least 60% of the pre-purge static before sampling.

Groundwater Monitoring and Sampling Record

Facility Number: 6094511

Street Address: RICH. BEACH

City, State: [illegible] WA SEATTLE

Sampling Personnel: J. AMBROSE

Monitor Well Number	MW5	MW2	MW6	MW11
General Data				
Well Accessible (Y/N)	Y	Y	Y	Y
Well Diameter	2"	4"	2"	4"
Depth to bottom of Well (ft)	11.55	19.39	11.82	11.20
Height of Water Column in Well (ft)	4.56	13.00	7.83	6.26
Liquid Hydrocarbon or Sheen (Y/N)	N	N	N	N
Depth to Water (hold/cut)	6.99	6.39	3.99	4.94
Depth to Hydrocarbon (hold/cut)				
Measurement Date and Time	8/4 1100	8/4 1120	8/4 1145	8/4 1210
Well Purging Data				
Purging Technique	BAILER	—	—	—
Gallons Purged	3 GAL	10 DRY	4 GAL	12 GAL
Casing Volumes Purged *	3	1.0	3	3
Well Sampling Data				
Sample ID on C.O.C.	MW5	MW2	MW6	MW11
Sampling Date	8/4	8/4	—	—
Sampling Time	1115	1130	1200	1229
Sampling Technique	BAILER	—	—	—
Sample Preservation	HCL	—	—	—
Observations				
Sheen (Y/N)	N	N	N	N
Odor (Y/N)	Y	Y	N	N

Comments

NOTE: All measurements should be referenced from top of casing at surveyed measuring point, unless otherwise documented on this form.

* In general, three casing volumes should be removed or the well should be allowed to recover to at least 60% of the pre-purge staticbefore sampling.

Groundwater Monitoring and Sampling Record

Facility Number: 6209 4511 — Sampling Personnel: J. AMBROSE
Street Address: ROOSEVELT DCN.
City, State: ~~LYNNWOOD WA.~~ SEATTLE

Monitor Well Number	MW1	MW7		
General Data				
Well Accessible (Y/N)	Y	Y		
Well Diameter	4"	2"		
Depth to bottom of Well (ft)	11.69	16.40		
Height of Water Column in Well (ft)	7.04	12.02		
Liquid Hydrocarbon or Sheen (Y/N)	Y	N		
Depth to Water (hold/cut)	4.65	4.38		
Depth to Hydrocarbon (hold/cut)				
Measurement Date and Time	8/4 1235	8/4 1305		
Well Purging Data				
Purging Technique	BAILER	—		
Gallons Purged	14 GAL	6 GAL		
Casing Volumes Purged *	3	3		
Well Sampling Data				
Sample ID on C.O.C.	MW1	MW7		
Sampling Date	8/4	—		
Sampling Time	1255	1315		
Sampling Technique	BAILER	—		
Sample Preservation	HCL	—		
Observations				
Sheen (Y/N)	Y	N		
Odor (Y/N)	Y	N		

Comments

NOTE: All measurements should be referenced from top of casing at surveyed measuring point, unless otherwise documented on this form.

* In general, three casing volumes should be removed or the well should be allowed to recover to at least 60% of the pre-purge staticbefore sampling.

APPENDIX B

Laboratory Analytical Reports, Laboratory QC,
and Chain of Custody

Columbia Analytical Services, Inc.

August 23, 1993 Service Request No.: B930388

Peter Barry
Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Re: **Chevron #60094511 - Seattle**

Dear Peter:

Attached are the results of the samples submitted to our laboratory on August 5, 1993. Preliminary results were transmitted via facsimile on August 20, 1993. For your reference, these analyses have been assigned our service request number B930388.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results only apply to samples analyzed.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Colin B. Elliott
Laboratory Manager

CBE/kk

18912 North Creek Parkway, Suite 118 • Bothell, WA 98011 • 206/486-6983 • Fax 206/486-7695

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Work Order No.:**	B930388

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name:		MW-1	MW-7	MW-6
Lab Code:		B0388-1	B0388-2	B0388-3
Date Analyzed:		08/13/93	08/13/93	08/13/93
Analyte	**MRL**			
Benzene	0.5	17.2	ND	240
Toluene	1	17	ND	8
Ethylbenzene	1	16	ND	238
Total Xylenes	1	221	1	103
TPH as Gasoline	50	6,780	90	2,400

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Ann Ellis Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Work Order No.:**	B930388

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name:		MW-2	MW-5	MW-4
Lab Code:		B0388-4	B0388-5	B0388-6
Date Analyzed:		08/13/93	08/13/93	08/13/93
Analyte	**MRL**			
Benzene	0.5	49.8	559	147
Toluene	1	28	75	22
Ethylbenzene	1	145	1,120	152
Total Xylenes	1	739	3,260	2,090
TPH as Gasoline	50	4,790	17,900	17,800

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Chris Ellwood Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Work Order No.:**	B930388

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name:		MW-8	MW-9	TBLB
Lab Code:		B0388-7	B0388-8	B0388-9
Date Analyzed:		08/13/93	08/13/93	08/13/93
Analyte	**MRL**			
Benzene	0.5	ND	2,070	ND
Toluene	1	ND	120	ND
Ethylbenzene	1	ND	2,700*	ND
Total Xylenes	1	1	6,900*	ND
TPH as Gasoline	50	ND	47,000*	NA**

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Analyte concentration is an estimate because the result was above the instrument calibration range, and because insufficient sample quantity remained for additional analysis.
** Not analyzed.

Approved by Chris Elliott Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Work Order No.:**	B930388

BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name:		MW-11	MW-10	Method Blank
Lab Code:		B0388-10	B0388-11	B0388-MB
Date Analyzed:		08/13/93	08/13/93	08/12/93
Analyte	**MRL**			
Benzene	0.5	58.9	18.3	ND
Toluene	1	1	2	ND
Ethylbenzene	1	25	30	ND
Total Xylenes	1	28	35	ND
TPH as Gasoline	50	980	620	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Chris Elliott Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Date Extracted:**	08/10/93
		Date Analyzed:	08/10/93
		Work Order No.:	B930388

Total Petroleum Hydrocarbons
Washington DOE Method WTPH-418.1 Modified
mg/L (ppm)

Sample Name	Lab Code	MRL	Result
MW-1	B0388-1	0.5	280
MW-7	B0388-2	0.5	1.2
MW-6	B0388-3	0.5	0.8
MW-2	B0388-4	0.5	0.9
MW-5	B0388-5	0.5	3.5
MW-4	B0388-6	0.5	1,400
MW-8	B0388-7	0.5	ND
Method Blank	B0388-MB	0.5	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Chris Elliott Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Date Analyzed:**	08/12,13/93
		Work Order No.:	B930388

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020
Washington DOE Method WTPH-G

Sample Name	Lab Code	Spike Level (µg/L)	Percent Recovery 4-Bromofluorobenzene
MW-1	B0388-1	100	84
MW-7	B0388-2	100	107
MW-6	B0388-3	100	107
MW-6	B0388-3 Dup	100	103
MW-2	B0388-4	100	102
MW-5	B0388-5	100	103
MW-4	B0388-6	100	149*
MW-8	B0388-7	100	105
MW-9	B0388-8	100	97
TBLB	B0388-9	100	104
	CAS Acceptance Criteria		50-130

TPH Total Petroleum Hydrocarbons
* Outside of acceptance limits because of matrix interferences. The chromatogram showed target components that interfered with the analysis.

Approved by Ch. Ellis Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/05/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Date Analyzed:**	08/12,13/93
		Work Order No.:	B930388

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020
Washington DOE Method WTPH-G

Sample Name	Lab Code	Spike Level (µg/L)	Percent Recovery 4-Bromofluorobenzene
MW-11	B0384-10	100	107
MW-10	B0384-11	100	107
Method Blank	B0384-MB	100	106
Laboratory Control Sample	B0384-LCS	100	105
Laboratory Control Sample	B0384-GLCS	100	101
	CAS Acceptance Criteria		59-139

TPH Total Petroleum Hydrocarbons

Approved by C. Elliott Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Date Analyzed:**	08/13/93
		Work Order No.:	B930388

Duplicate Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name: MW-6
Lab Code: B0388-3

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	240	249	244	4
Toluene	1	8	8	8	<1
Ethylbenzene	1	238	241	240	1
Total Xylenes	1	103	112	108	8
TPH as Gasoline	50	2,400	2,490	2,440	4

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Cole Ellis Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Applied Geotechnology, Inc.	**Date Collected:**	08/04/93
Project:	Chevron #60094511	**Date Received:**	08/05/93
Sample Matrix:	Water	**Date Analyzed:**	08/13/93
		Work Order No.:	B930388

Matrix Spike Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/Washington DOE Method WTPH-G
µg/L (ppb)

Sample Name: MW-10
Lab Code: B0388-11

Analyte	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	100	18.3	128	110	51-159
Toluene	100	2	111	109	50-156
Ethylbenzene	100	30	138	108	49-157

TPH Total Petroleum Hydrocarbons
ND None Detected at or above the method reporting limit

Approved by Chris Ellis Date 8/23/93

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Applied Geotechnology, Inc.	**Date Extracted:**	08/10/93
Project:	Chevron #60094511	**Date Analyzed:**	08/10/93
Sample Matrix:	Water	**Work Order No.:**	B930388

Laboratory Control Sample Summary
Total Petroleum Hydrocarbons
Washington DOE Method WTPH-418.1 Modified
mg/L (ppm)

Sample Name: Laboratory Control Sample

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH	20	23.8	119*	83-107

* Outside of acceptance limits. Insufficient sample quantity remained for additional analysis. All other Method QC was acceptable, therefore, it is assumed the method is in control.

Approved by Chris Ellis Date 8/23/93

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Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 8/4/93 Page 1 of 2

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PROJECT INFORMATION

Project Manager: P. BARRY
Project Name: CHEV #8
Project Number: 60094511
Site Location: ~~[illegible]~~
Sampled By: JMA

Laboratory Number: ~~9308-036~~ 8/5/93 ~~8h~~ B93-388

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)

Disposal Method:

Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☐AGI Std. ☐Special

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER: TPH-D	NUMBER OF CONTAINERS
MW 1	8/4	1255	H2O	1		X							X																						X	3
MW 7	|	1315	|	2		X							X																						X	3
MW 6	|	1200	|	3		X							X																						X	3
MW 2	|	1130	|	4		X							X																						X	3
MW 5	|	1115	|	5		X							X																						X	3
MW 4	|	1000	|	6		X							X																						X	3
MW 8	|	0935	|	7		X							X																						X	3
MW 9	|	1025	|	8		X							X																							2

LAB INFORMATION

Lab Name: COLUMBIA
Lab Address: BOTHELL WA
Via: COURIER
Turn Around Time: ☒ Standard ☐24 hr. ☐48 hr. ☐72 hr. ☐1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: DON'T CHARGE FOR TRIP BLANK
LAB RELEASE. 5119500

SAMPLE RECEIPT

Total Number of Containers:	23
Chain of Custody Seals: Y/N/NA	Y
Intact?: Y/N/NA	Y
Received in Good Condition/Cold:	Y/Y

	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:	[signature]	[signature]	
Time:	0950	1400	
Printed Name:	J. AMBROSE	STINA KENSLER	
Date:	8/5	8/5/93	
Company:	AGI	ATI-WA	

	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature:	[signature]	[signature]	
Time:	1025		
Printed Name:	STINA KENSLER	DAVID SEARS	
Date:	8/5/93	8/05	
Company:	ATI-WA	CAS	

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 8/4/93 Page 1 of 1

13

PROJECT INFORMATION

Project Manager: P. BARRY
Project Name: CHEV #8
Project Number: 60094511
Site Location: SEATTLE Sampled By: JMS

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method: _____
Disposed by: _____ Disposal Date: _____

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☐AGI Std. ☐Special

Laboratory Number: ~~9308-036~~ 8151938

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-ID State:	TPH-G State: WA.	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	PESTS/PCB's: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	METALS: Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER	NUMBER OF CONTAINERS
TBLB	8/4	—	W	9									X																						1
MW11	"	1229	"	10		X							X																						2
MW10	"	1050	"	11		X							X																						2

LAB INFORMATION

Lab Name: ATT
Lab Address: RENTON WA
Via: COURIER

SAMPLE RECEIPT

Total Number of Containers: 5
Chain of Custody Seals: Y/N/NA: Y
Intact?: Y/N/NA: Y
Received in Good Condition/Cold: Y/Y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: SEE PG 1 OF 1

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 0950	Signature: Time: 1100	Signature: Time:
Printed Name: J. AMBROSE Date: 8/5/93	Printed Name: STINA KENSLER Date: 8/5/93	Printed Name: Date:
Company: AGI	Company: ATT-WA	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Time: 1005	Signature: Time:	Signature: Time:
Printed Name: STINA KENSLER Date:	Printed Name: Date: 8/5/93	Printed Name: Date:
Company: ATT-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 4/92