GROUNDWATER MONITORING REPORT:
JULY - SEPTEMBER 1993

CHEVRON SERVICE STATION
NO. 60093883
1602 TERRACE HEIGHTS.
YAKIMA, WASHINGTON

OCTOBER 7, 1993

Prepared for:

Chevron U.S.A. Products Company
Site Assessment and Remediation Group
2410 Camino Ramon
San Ramon, California 94583

Prepared by:

Groundwater Technology, Inc.
19033 West Valley Hwy, Suite D-104
Kent, Washington 98032

Steve Hartman
Staff Geologist

Mark E. Nichols
Project Manager/Hydrogeologist

GROUNDWATER TECHNOLOGY, INC.

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1602 TERRACE HEIGHTS.
YAKIMA, WASHINGTON

1.0 INTRODUCTION

1.1 Purpose

The results of routine groundwater monitoring and sampling for the Chevron service station #60093883 are presented in this report. The site is located at 1602 Terrace Heights, Yakima, Washington. The site location map and site plan are shown in Figures 1 and 2, respectively. The objectives of the monitoring and sampling activities are to evaluate groundwater quality and to monitor movement of petroleum compounds that may be present on site. Groundwater Technology conducted site work and prepared this report in accordance with Chevron U.S.A. Products Company specifications NW-101692SEP for routine groundwater monitoring. The field work activities discussed in this report were performed on September 3, 1993.

1.2 Scope of Work

The work steps completed during this reporting period are listed below.

- Measured total well depth, depth to groundwater, thickness of separate-phase hydrocarbons (if present), and calculated groundwater elevations relative to an assumed site datum.
- Obtained groundwater samples from selected monitoring wells (MW-1 and MW-2) during the site visit for chemical analysis. Monitoring well MW-4 was dry, and therefore was not sampled as planned.
- Treated and disposed on-site water generated during well purging. Prior to discharge to soil, the groundwater collected during purging was treated by filtering the water through two canisters of granular activated carbon connected in series.

2.0 METHODS

2.1 Groundwater Measurements

Groundwater measurements were obtained using an Oil Recovery Systems, Inc. Interface Probe™. The probe and measuring tape were cleaned using Alconox and distilled water prior to use at each well. Water level measurements were used to calculate groundwater elevations relative to the site datum. Water level measurements were made from the top of casing of each well and are accurate to approximately 0.01 feet.

2.2 *Sampling Protocol*

Those monitoring wells selected for sampling, which contained less than 0.02 feet of separate-phase hydrocarbons, were purged by bailing approximately three (3) well volumes, or until dry, prior to sampling. Each well was purged using a clean, unused disposable bailer or by pumping using a diaphragm-pump and clean, dedicated suction-tubing.

Wells which recharged slowly were allowed to recover to within 60 percent of the static water level, prior to sample collection, or for two hours, whichever came first.

The wells were sampled in order of least to most contaminated, if data were available to determine the order. Each well was sampled within 24 hours of purging.

The samples were decanted into properly prepared, laboratory-supplied containers and stored for shipment to the laboratory in cooled containers. A chain-of-custody form was filled-out and accompanied the samples to the laboratory. A laboratory-supplied, travel blank was sent with each sample set. Copies of field forms used to record monitoring and sampling data are included in Appendix A.

2.3 *Sample Analyses*

Per Chevron specifications, samples collected from this site were analyzed by EPA or Washington State methods as follows:

- Volatile aromatic hydrocarbons, benzene, toluene, ethylbenzene, and xylenes (BTEX), by EPA Method 8020.
- Total petroleum hydrocarbons-as-gasoline (TPH-G) by EPA Method 8015, modified.

3.0 RESULTS

3.1 Groundwater Measurements

The depth to groundwater at the site ranged from approximately 13.9 to 14.6 feet below grade level. The apparent groundwater flow direction was undetermined. Historically, the groundwater flow direction has been southeasterly. Groundwater elevations are shown in Figure 3. Groundwater elevations and measurements for this reporting period and previous monitoring or sampling dates are summarized in Table 1.

3.2 Analytical Findings

Benzene was detected in the water sample from monitoring well MW-1 with a reported concentration of 4.7 ppb. Total petroleum hydrocarbons-as-gasoline were not detected in any of the monitored wells. Phase-separated hydrocarbons were not detected in the monitored wells during this site visit. Monitoring well MW-4 was not sampled because it was dry.

Model Toxics Control Act, Compliance Cleanup Levels - Method A [MTCA-CCLs (a)] and analytical results for this sampling event are summarized in Table 2. The laboratory method detection limits for this sampling event are also shown in Table 2. Benzene and TPH-G concentrations are illustrated in Figure 4. Laboratory analysis reports are included in Appendix B.

TABLES

Table 1
WELL CASING AND GROUNDWATER ELEVATIONS
CHEVRON SERVICE STATION #60093883
1602 TERRACE HEIGHTS ROAD, YAKIMA, WASHINGTON

WELL I.D.	DATE	TOC	DTW (feet)	SPT (feet)	WTE (feet)
MW-1	05/14/92	95.53	13.81		81.52
	06/19/92	95.53	13.46		82.07
	06/26/92	95.53	13.54		81.99
	07/28/92	95.53	13.57		81.96
	09/01/92	95.53	13.66		81.87
	11/23/92	95.53	14.89		80.64
	03/23/93	95.53	14.55		80.98
	06/25/93	95.53	13.85		81.68
	09/03/93	95.53	13.87		81.66
MW-2	05/14/92	96.06	14.51		81.55
	06/19/92	96.06	14.17		81.89
	06/26/92	96.06	14.24		81.82
	07/28/92	96.06	14.28		81.78
	09/01/92	96.06	14.38		81.68
	11/23/92	96.06	15.56		80.50
	03/23/93	96.06	15.22		80.84
	06/25/93	96.06	14.55		81.51
	09/03/93	96.06	14.58		81.48
MW-3	05/14/92	95.44	13.82		81.62
	06/19/92	95.44	13.45		81.99
	06/26/92	95.44	13.52		81.92
ABANDONED	07/13/92	95.44	--		--
MW-4	05/14/92	94.92	13.34		81.58
	06/19/92	94.92	12.94		81.98
	06/26/92	94.92	13.02		81.90
	07/28/92	94.92	13.06		81.86
	09/01/92	94.92	13.16		81.76
	11/23/92	94.92	DRY		--
	03/23/93	94.92	DRY		--
	06/25/93	94.92	13.35		81.57
	09/03/93	94.92	DRY		--

TOC = Top of casing and groundwater elevations expressed as feet above a relative site datum of 100 feet.
DTW = Depth to water
SPT = Separate – Phase hydrocarbon thickness
WTE = Water table elevation
-- = Not sampled, not analyzed or not tested

YAKIMA-W.WK1

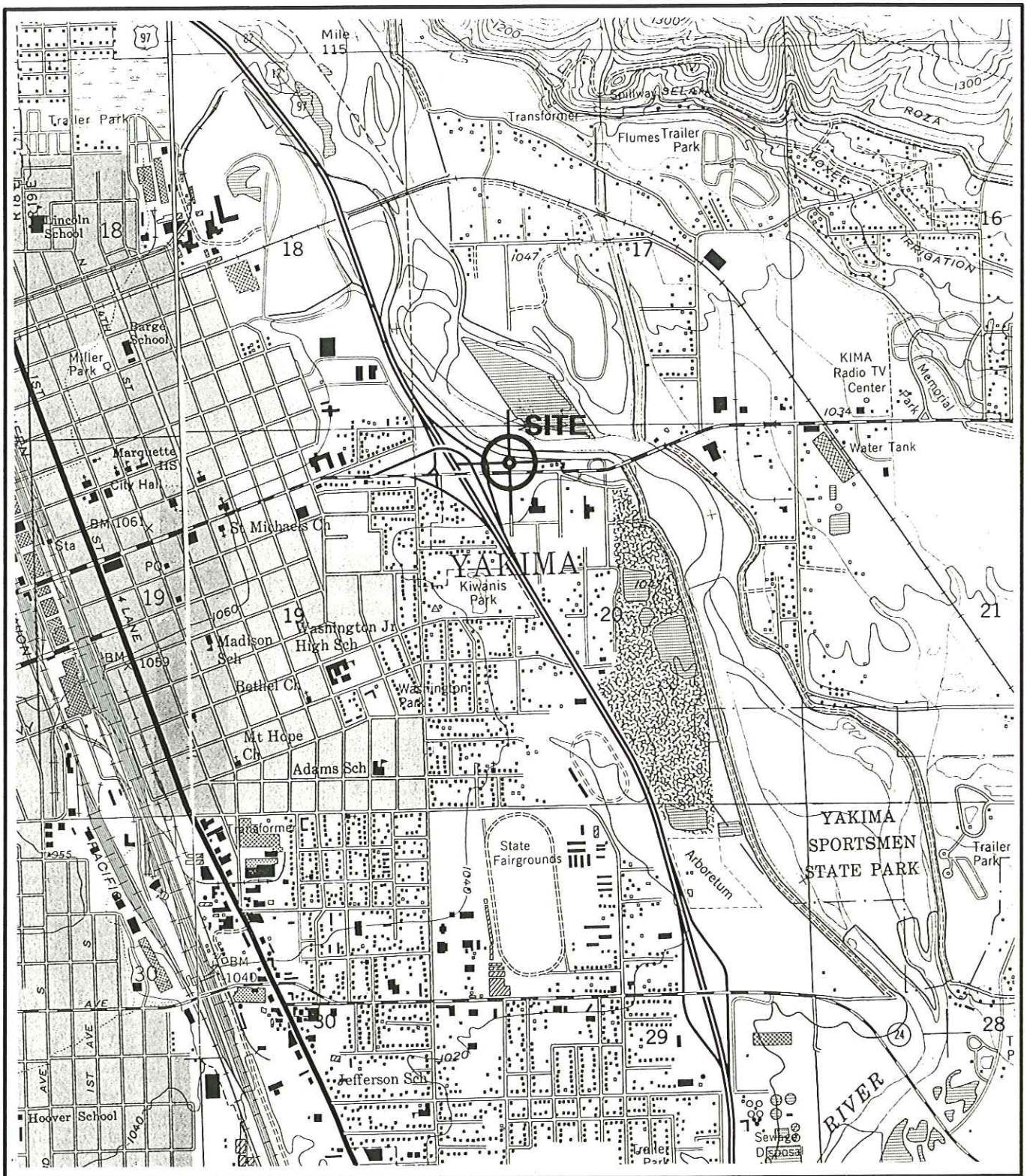
Table 2
GROUNDWATER CHEMICAL ANALYSES RESULTS
CHEVRON SERVICE STATION #60093883
1602 TERRACE HEIGHTS ROAD, YAKIMA, WASHINGTON

WELL I.D.	DATE	BENZENE (ppb)	TOLUENE (ppb)	ETHYL-BENZENE (ppb)	XYLENES (ppb)	TPH-G (ppb)	TPH-D (ppb)	TPH 418.1 (ppm)	TOTAL LEAD (ppb)
MTCA-CCLs(a)		5	40	30	20	1000	1000	1000	5
MW-1	04/27/89	ND	ND	ND	ND	--	--	--	--
	05/14/92	ND	ND	ND	ND	ND	ND	ND	ND
	09/01/92	ND	ND	ND	ND	ND	ND	ND	ND
	11/23/92	ND	ND	ND	ND	ND	ND	ND	ND
	03/24/93	ND	ND	ND	ND	ND	--	--	--
	06/25/93	ND	ND	ND	ND	ND	--	--	--
	09/03/93	4.7	11	2	12	ND	--	--	--
MW-2	04/27/89	ND	ND	ND	ND	ND	--	--	--
	05/14/92	ND	ND	ND	ND	ND	ND	ND	ND
	09/01/92	ND	ND	ND	ND	ND	ND	ND	ND
	11/23/92	ND	ND	ND	ND	ND	ND	--	ND
	03/24/93	ND	ND	ND	ND	ND	--	--	--
	06/25/93	ND	ND	ND	ND	ND	--	--	--
	09/03/93	ND	1	ND	1	ND	--	--	--
MW-3	04/27/89	ND	ND	ND	ND	--	--	--	--
	03/05/92	ND	ND	ND	ND	8000	100000	5	3.7
	05/14/92	ND	ND	ND	ND	2000	12000	92	ND
ABANDONED	07/13/92	--	--	--	--	--	--	--	--
MW-4	05/14/92	ND	ND	ND	ND	4000	56000	12	ND
	09/01/92	ND	ND	ND	ND	ND	ND	4.4	ND
	11/23/92	--	--	--	--	--	--	--	--
(Dry)	03/24/93	--	--	--	--	--	--	--	--
(No recovery)	06/25/93	--	--	--	--	--	--	--	--
(Dry)	09/03/93	--	--	--	--	--	--	--	--

ppm = Parts per million
ppb = Parts per billion
TPH-G = Total petroleum hydrocarbons as gasoline (ppb)
TPH-D = Total petroleum hydrocarbons as diesel (ppb)
ND = Not detected at or above the quantification limit
-- = Not sampled, not analyzed
MTCA-CCLs(a) = Model Toxic Control Act, Compliance Control Levels, Method A
Note: See laboratory reports for minimum quantification limits

YAKIMA-C.WK1

FIGURES



GROUNDWATER TECHNOLOGY

19033 W. VALLEY HWY
KENT, WASHINGTON
(206) 251-5441

N

SCALE: 0 FEET 2000

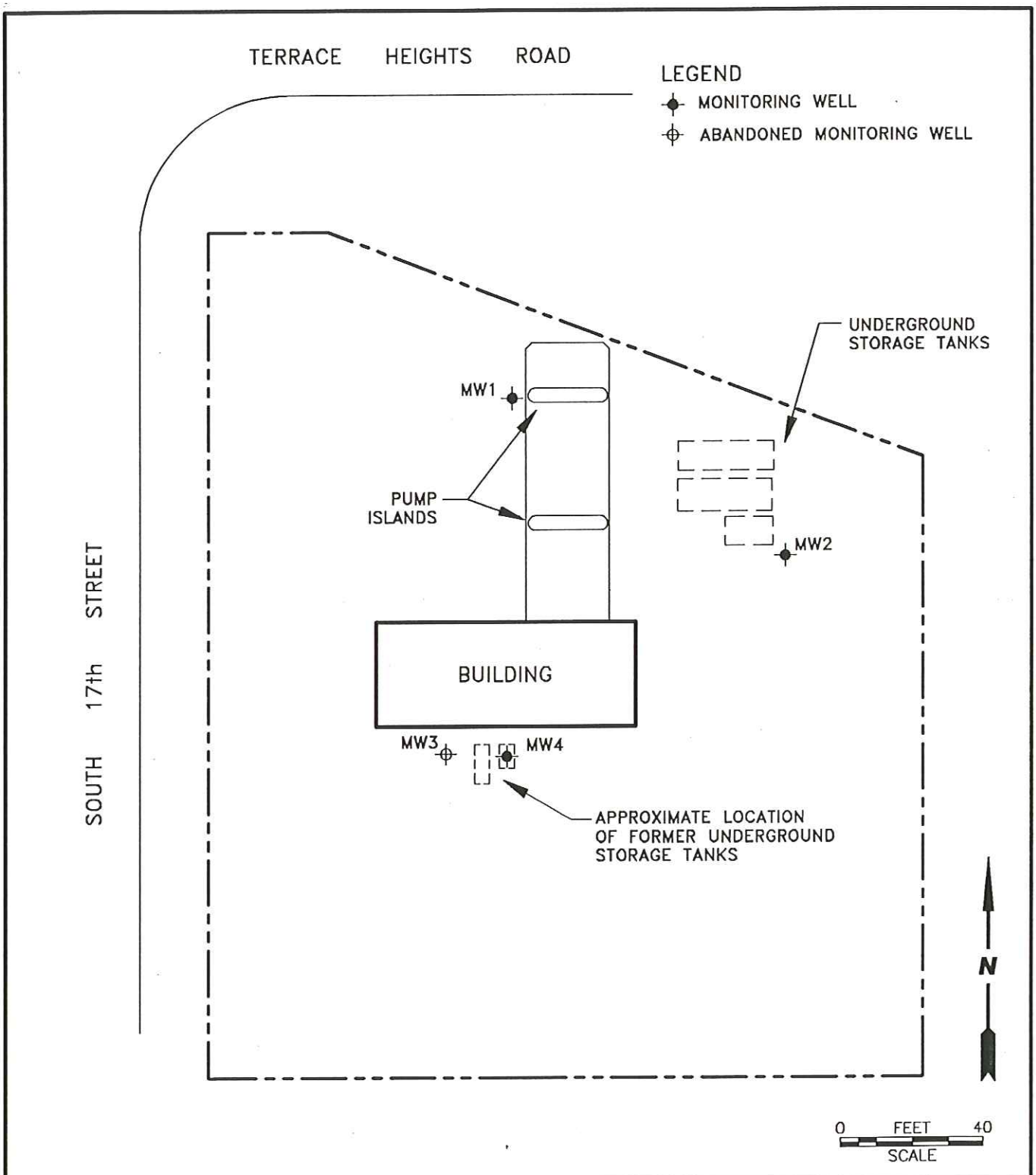
SITE LOCATION MAP

CLIENT:
CHEVRON U.S.A. PRODUCTS CO.
SERVICE STATION NO. 60093883

DATE: 5/5/93

LOCATION:
1602 TERRACE HEIGHTS ROAD
YAKIMA, WASHINGTON

FIGURE: 1

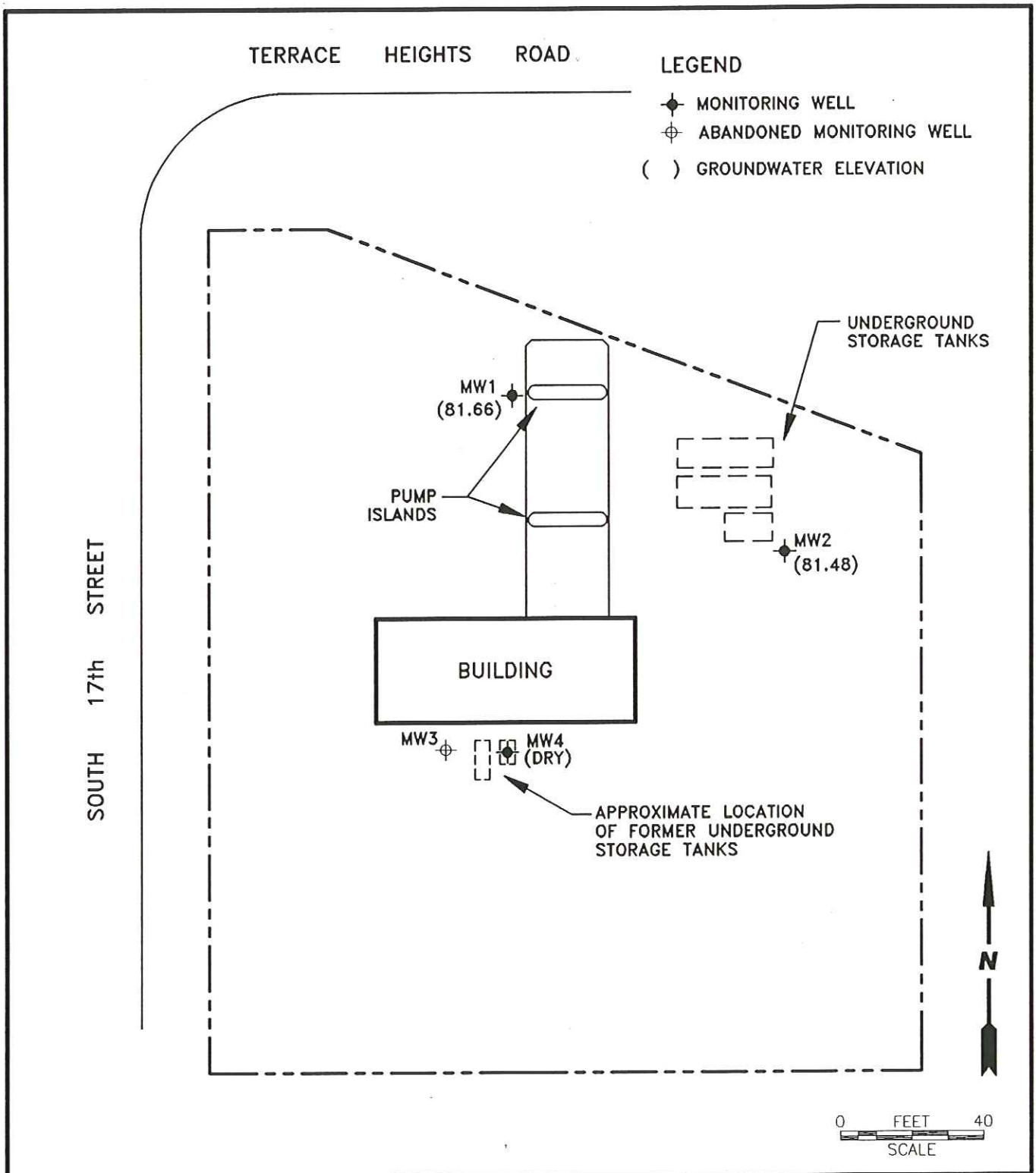


GROUNDWATER TECHNOLOGY
19033 W. VALLEY HWY
KENT, WASHINGTON
(206) 251-5441

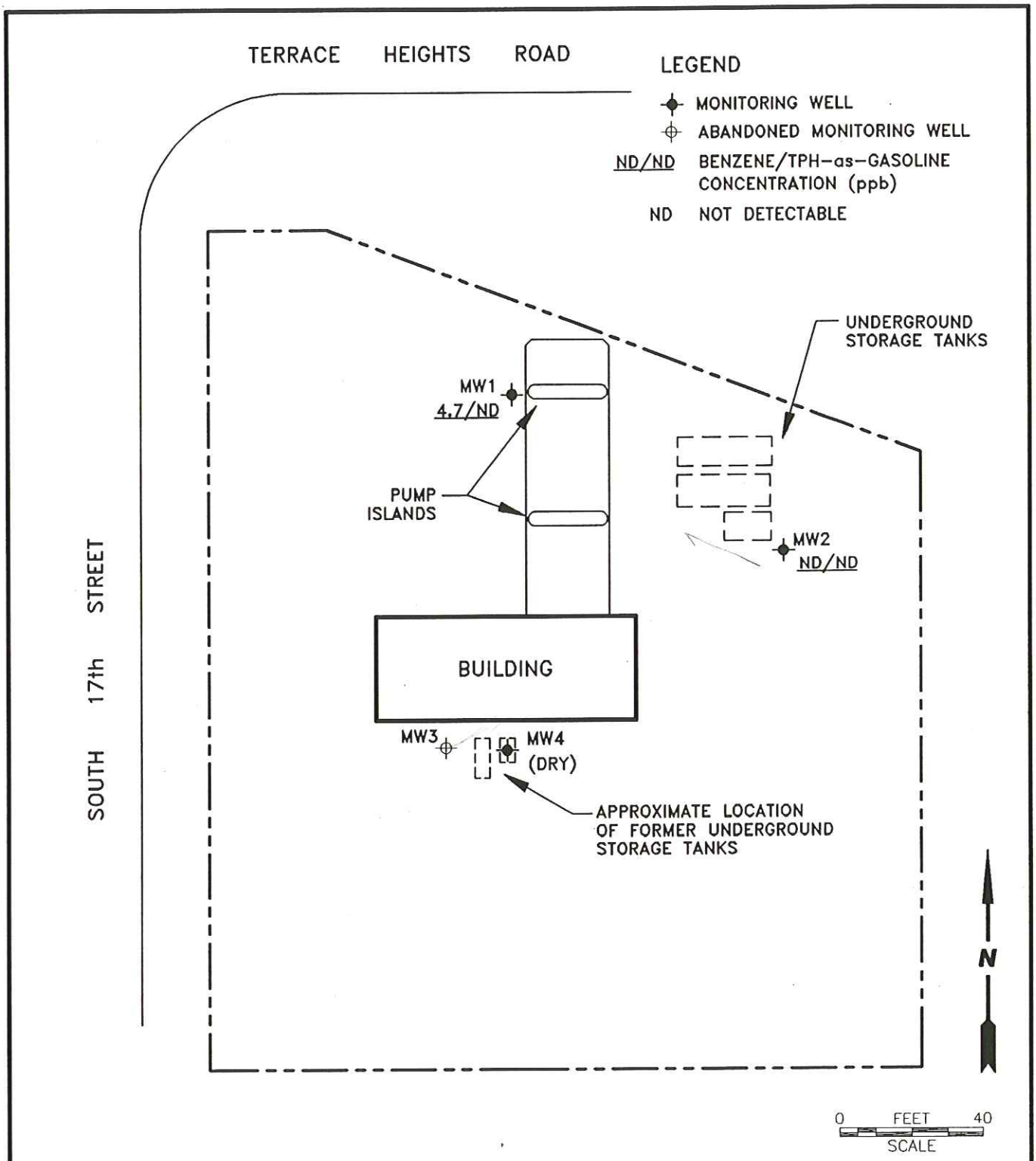
SITE PLAN

CLIENT:	LOCATION:	REV. NO.:	DATE:
CHEVRON U.S.A. PRODUCTS Co. SERVICE STATION No. 60093883	1602 TERRACE HEIGHTS ROAD YAKIMA, WASHINGTON	1	1/18/93

PM	PE/RG	DESIGNED	DETAILED	ACAD FILE:	PROJECT NO.:	FIGURE:
		SH	CSY	SP593	020603835	2



GROUNDWATER TECHNOLOGY 19033 W. VALLEY HWY KENT, WASHINGTON (206) 251-5441				GROUNDWATER ELEVATION (9/3/93)		
CLIENT: CHEVRON U.S.A. PRODUCTS Co. SERVICE STATION No. 60093883				LOCATION: 1602 TERRACE HEIGHTS ROAD YAKIMA, WASHINGTON	REV. NO.: 1	DATE: 10/6/93
PM	PE/RG	DESIGNED SH	DETAILED CY	ACAD FILE: SP893	PROJECT NO.: 020603835	FIGURE: 3



GROUNDWATER TECHNOLOGY 19033 W. VALLEY HWY KENT, WASHINGTON (206) 251-5441				BENZENE AND TPH-as-GASOLINE CONCENTRATION MAP (9/3/93)		
CLIENT: CHEVRON U.S.A. PRODUCTS Co. SERVICE STATION No. 60093883				LOCATION: 1602 TERRACE HEIGHTS ROAD YAKIMA, WASHINGTON	REV. NO.: 1	DATE: 10/7/93
PM	PE/RG	DESIGNED SH	DETAILED CY	ACAD FILE: SP893	PROJECT NO.: 020603835	FIGURE: 4

APPENDIX A

FIELD MONITORING AND SAMPLING DATA

JDE# 020603835	GROUNDWATER MONITORING AND SAMPLING DATA
Address:	CHEVRON SITE NO. 6009-3883
1602 Terrace Heights	
Yakima, WA	
Sampling Personnel:	

MONITORING WELL #	MW-1 ✓	MW-2 ✓	MW-4 ✓	MW-3							
General Data	4"	4"									
Time											
DTB	23.65	20.65									
DTP											
DTW	13.87	14.58	DIV								
WC	9.78	6.07									
Purge Data											
Method	DP	DP		Pump Broke							
Gal. Purged	18	12									
# Casing Vol.	3	3									
Sampling Data											
Date	9-3-93	9-3-93									
Time	10:00	10:15									
Technique	DB	DB									
Preservation	HCl	HCl									
Other	ICE	ICE									
Observation											
Sheen (y/n)	N	N									
Odor (y/n)	N	N									
Well Condition											
(good/poor)	G	G	G								
Locked (y/n)	Y	Y	Y								
Labs:											
BTEX, TPHG	X	X	X								
TPHD			X								
418.1			X								
GAUGE ONLY				X							

NOTES/ABBREV.:
DTW = DEPTH TO WATER
DTP = DEPTH TO PRODUCT
DTB = DEPTH TO BOTTOM
WC = WATER COLUMN (DTB-DTW)
DB = DISPOSABLE BAILER
DP = DIAGPHRAM PUMP

COMMENTS:
MW 3 Not exsist #2 Needs Cover
Contractor on site Bldg. Down, SI. SAMPLED Apparent Dirty
SAUVE EXCAVATion, A&F Contractors on site
fence around SI 2-n 6' holes Dug Tray w/ A&F paid Excavation
Dirty soil will take place

APPENDIX B

LABORATORY ANALYSIS TEST RESULTS
LABORATORY QA/QC
CHAIN-OF-CUSTODY

Analytical Technologies, Inc.
560 Naches Avenue, S.W., Suite 101, Renton, WA 98055 (206) 228-8335
Karen L. Mixon, Laboratory Manager

ATI I.D. # 9309-075

September 21, 1993

Groundwater Technology, Inc.
19033 West Valley Highway
Suite D-104
Kent WA 98032

Attention : Mark Nichols

Project Number : 020603835

Project Name : Chevron-Yakima

Dear Mr. Nichols:

On September 4, 1993, Analytical Technologies, Inc. (ATI), received three samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Please note that this report has a summary report for the fuels analyses. If you have any questions, please call.

Sincerely,

Donna M. McKinney
Senior Project Manager

DM/hal/ff

Enclosure

Analytical Technologies, Inc.

ATI I.D. # 9309-075

SAMPLE CROSS REFERENCE SHEET

CLIENT : GROUNDWATER TECHNOLOGY, INC.
PROJECT # : 020603835
PROJECT NAME : CHEVRON-YAKIMA

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9309-075-1	MW-1	09/03/93	WATER
9309-075-2	MW-2	09/03/93	WATER
9309-075-3	TB-LB	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

ATI I.D. # 9309-075

ANALYTICAL SCHEDULE

CLIENT : GROUNDWATER TECHNOLOGY, INC.
PROJECT # : 020603835
PROJECT NAME : CHEVRON-YAKIMA

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-G	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

Analytical**Technologies,**Inc. ATI Reference: 9309-075

Analytical Summary Report

Client: Groundwater Technology, Inc. **Project: Chevron-Yakima**

Analysis: WA DOE WTPH-G/8020(BETX) **Matrix: WATER** **Units: ug/L**

ATI Sample #:	0	1	2	3
Client ID:	Method Blank	MW-1	MW-2	TB-LB
Date Sampled:	N/A	09/03/93	09/03/93	N/A
Date Extracted:	N/A	N/A	N/A	N/A
Date Analyzed:	09/07/93	09/07/93	09/07/93	09/07/93
Benzene	<0.5	4.7	<0.5	<0.5
Ethylbenzene	<0.5	2.0	<0.5	<0.5
Toluene	<0.5	11	1.0	<0.5
Total Xylenes	<0.5	12	1.0	<0.5
Gasoline (Toluene to Dodecane)	<100	<100	<100	<100
Surrogate Recoveries (%)				
Bromofluorobenzene	103	103	106	106
Trifluorotoluene	105	102	100	98

Surrogate Limits: (BFB:76-120 TFT:50-150)

Analytical Technologies, Inc. ATI Reference: 9309-075

Quality Control Summary Report

Client: Groundwater Technology, Inc. **Project: Chevron-Yakima**

Analysis: WA DOE WTPH-G/8020(BETX) **Matrix: WATER** **Units: ug/L** **Matrix Spike/Matrix Spike Duplicate**

Extracted: N/A **Analyzed: 09/07/93** **Sample ID: 9309-075-3**

Compound	Sample Result	Duplicate Result	RPD	Spike Added	Spike Result	Spike %Rec	Spike Dup. Result	Spike Dup. %Rec	Spike Dup. RPD	Limits %Rec	Limits RPD
GASOLINE	<100	<100	NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20

Quality Control Surrogate Recoveries (%)

Compound	Sample	Sample Dup.	Spike Dup.	Limits
TRIFLUOROTOLUENE	98	102	N/A	50-150

Analysis: WA DOE WTPH-G/8020(BETX) **Matrix: WATER** **Units: ug/L** **Matrix Spike/Matrix Spike Duplicate**

Extracted: N/A **Analyzed: 09/07/93** **Sample ID: 9309-035-1**

Compound	Sample Result	Duplicate Result	RPD	Spike Added	Spike Result	Spike %Rec	Spike Dup. Result	Spike Dup. %Rec	Spike Dup. RPD	Limits %Rec	Limits RPD
BENZENE	<0.500	N/A	N/A	20.0	19.6	98	19.5	98	1	77-112	20
TOLUENE	<0.500	N/A	N/A	20.0	19.8	99	19.6	98	1	72-113	20
TOTAL XYLENES	<0.500	N/A	N/A	40.0	39.5	99	39.2	98	1	80-110	20
GASOLINE	<100	<100	NC	1000	1050	105	1020	102	3	58-127	20

Quality Control Surrogate Recoveries (%)

Compound	Sample	Spike	Spike Dup.	Limits
BROMOFLUOROBENZENE	104	104	104	76-120
TRIFLUOROTOLUENE	102	109	107	50-150

Analysis: WA DOE WTPH-G/8020(BETX) **Matrix: WATER** **Units: ug/L** **Blank Spike/Blank Spike Duplicate**

Extracted: N/A **Analyzed: 09/07/93** **Sample ID: Blank**

Compound	Sample Result	Duplicate Result	RPD	Spike Added	Spike Result	Spike %Rec	Spike Dup. Result	Spike Dup. %Rec	Spike Dup. RPD	Limits %Rec	Limits RPD
BENZENE	<0.500	N/A	N/A	20.0	20.3	102	N/A	N/A	N/A	80-111	20
TOLUENE	<0.500	N/A	N/A	20.0	20.3	102	N/A	N/A	N/A	78-111	20
TOTAL XYLENES	<0.500	N/A	N/A	40.0	40.5	101	N/A	N/A	N/A	80-114	20
GASOLINE	<100	N/A	N/A	1000	1040	104	N/A	N/A	N/A	75-120	20

Quality Control Surrogate Recoveries (%)

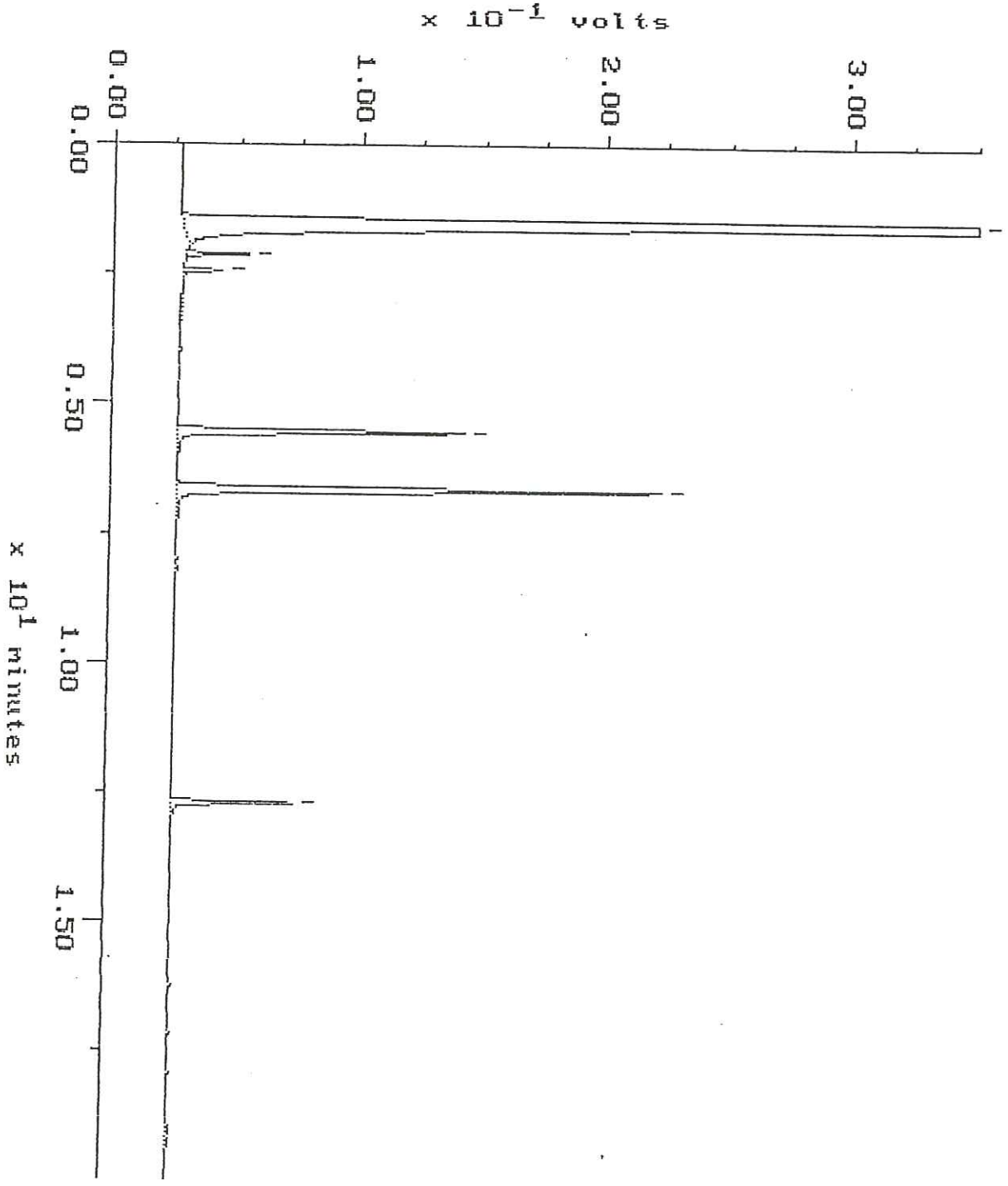
Compound	Sample	Spike	Spike Dup.	Limits
BROMOFLUOROBENZENE	103	102	N/A	76-120
TRIFLUOROTOLUENE	105	110	N/A	50-150

Blank

WA DOE WTPH-G

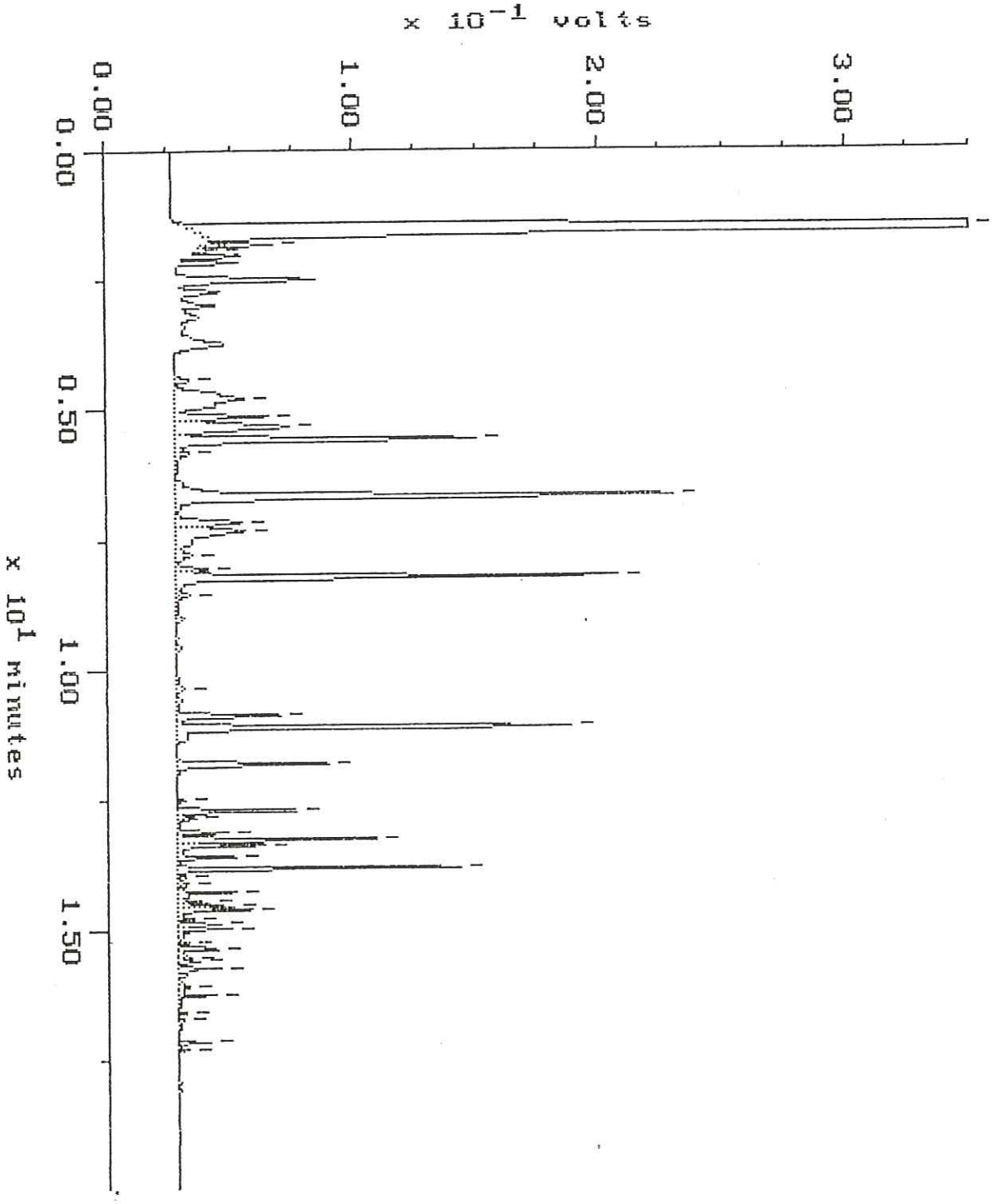
Sample: WRB 9-07 Channel: FID
Acquired: 07-SEP-93 9:45 Method: F:\BRO2\MAXDATA\PICARD\090793PC
Comments: ATI FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY.

Filename: R9079P03
Operator: ATI



Continuing Calibration

Sample: STD-C G Channel: FID Filename: R9079P01
Acquired: 07-SEP-93 8:18 Method: F:\BRO2\MAXDATA\PICARD\090793PC Operator: ATI
Comments: ATI FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY.



Chevron U.S.A. Inc.
20500 Richmond Beach Drive N.W.
Seattle, WA 98177
FAX (206)546-0531

Chevron Facility Number: 6009-3883
Facility Address: 1602 Terrace Hts., Yakima, WA
Consultant Project Number: 020603835
Consultant Name: GROUNDWATER TECHNOLOGY, INC.
Address: 19033 W. Valley Hwy, Suite D-104, Kent, WA 98032
Project Contact (Name): MARK E. NICHOLS
(Phone) 206 251 5441 (Fax Number) 206 251 8452

Chevron Contact (Name): Ken Baki
(Phone): (510) 842-9018
Laboratory Name: ANALYTICAL TECHNOLOGIES, INC.
Laboratory Release Number: 7165990
Samples Collected by (Name): Gene Jones
Collection Date: 9-3-93
Signature: Gene Jones

9309-075

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	TPH-G/BTEX (8015 mod./8020)	BTEX (8020)	TPH-HCID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	TPH-IR (418.1)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Total and/or Dissolved LEAD State:	Remarks
MW-1		2	W	G	10:00	Y	Y	✓												
MW-2		2	W	G	10:15	Y	Y	✓												
~~MW-3~~		~~4~~	W	G		Y	Y	✓				✓		✓						Dry Well
TB-LB		2	W				Y	✓												

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Gene Jones	GTI	9-3-93/12:00		ATL-WA	9/4/93 1105
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Fed-X					
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
(10 Days)
As Contracted