1R - 156

REPORTS

DATE:

1996

GPM GAS CORPORATION
4044 PENBROOK
ODESSA, TX 79762

April 25, 1996

Mr. William Olson - Hydrogeologist
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
2040 South Pacheco
State Land Office Building
Santa Fe, New Mexico 87505

RE: FIRST QUARTER 1996 SAMPLING EVENT
MONUMENT BOOSTER STATION
LEA COUNTY, NEW MEXICO

Dear Mr. Olson:

GPM Gas Corporation (GPM) has completed the first quarter 1996 groundwater sampling and monitoring operations at the above-referenced site in accordance with the requirements specified in your letters dated August 24, 1995 and October 25, 1995. Sampling and monitoring activities were conducted by Geoscience Consultants, Ltd. (GCL).

PROCEDURES

Prior to sampling, the monitoring wells at the Monument Booster Station (MW-1 through MW-7) were gauged for depth to groundwater on January 18, 1996 using an electronic water level indicator. Immediately prior to collecting groundwater samples, each monitoring well was purged of a minimum of three well casing volumes of development water using clean, decontaminated PVC bailers. A total of approximately 123 gallons of water was purged from monitoring wells MW-1D, MW-2, MW-3, MW-4, MW-6, and MW-7. Groundwater samples were obtained using a new, decontaminated, disposable bailer for each well after purging. Groundwater parameters, including conductivity, temperature, and dissolved oxygen were measured after purging, and prior to obtaining groundwater samples.

The water samples were transferred into air-tight, septum-sealed, 40-ml glass VOA sample vials with zero head space for analysis of total benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8020. Samples were submitted to Trace Analysis, Inc. of Lubbock, Texas for laboratory analysis. Three duplicate samples for MW-2, MW-6, and MW-7 were sent to Trace Analysis, Inc. and Inchcape Testing Services in Richardson, Texas for BTEX analysis. Additional groundwater samples were collected from monitoring wells MW-1D, MW-6, and MW-7 and sent to Trace Analysis, Inc. for analysis of nitrate (NO_3), sulfate (SO_4), total aerobic heterotrophic plate count (HPC), and total hydrocarbon utilizing bacteria (HUB), to assess the efficacy of intrinsic bioremedial activity currently taking place. Chain-of-custody (COC) forms documenting sample identification numbers, collection times, and delivery times to the laboratory were completed for each set of samples. The water samples were placed in an ice-filled cooler immediately after collection and shipped to the laboratories.

GROUNDWATER GRADIENT

Based on the gauging measurements conducted on January 18, 1996, the water table elevation has not fluctuated significantly since the previous measurement obtained in November 1995. Depth to groundwater occurs at approximately 22 to 29 feet below ground surface across the site. The direction of flow is to the southeast with a hydraulic gradient of approximately 0.006 ft/ft, which is consistent with determinations made from previous gauging events.

Groundwater elevations for the current and previous monitoring events are summarized in Table 1 (Attachment A). A map that depicts the elevation of the potentiometric surface (groundwater table) and direction of groundwater flow is illustrated in Figure 1 (Attachment B).

Approximately 2.18 feet and 0.75 feet of free product (crude oil) was observed in monitoring wells MW-1 and MW-5, respectively, during sampling activities on January 18, 1996.

ANALYTICAL RESULTS

Groundwater sample analytical results for the current and previous sampling events are presented in Tables 2, 3, and 4. The WQCC standards are presented in Table 2 and 3 for comparison. Constituents with concentrations above the WQCC standards are highlighted in boldface type. The laboratory reports and COC documentation are included in Attachment C. The most recent total dissolved BTEX concentrations are depicted graphically on Figure 2.

BTEX concentrations have remained consistent compared to the previous groundwater sampling data in most monitoring wells. The groundwater samples obtained from monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 during the latest sampling event had dissolved BTEX concentrations near or below the laboratory detection limit of 0.001 mg/l (Table 2) and below New Mexico Water Quality Control Commission (WQCC) standards. A benzene concentration of 1.130 mg/l in MW-7 exceeded the WQCC standards of 0.010 mg/l.

Due to suspected cross-contamination of samples from MW-2 and MW-4 from the submersible well purging pump during the November 15, 1995 sampling event, the wells were purged by using clean, decontaminated PVC bailers during the current sampling event. After hand bailing, samples were obtained using a new, decontaminated, disposable bailer for each well after purging. To further evaluate QA/QC between the laboratories and field sampling methods, three duplicate samples for MW-2, MW-6, and MW-7 were sent to Trace Analysis, Inc. and Inchcape Testing Services in Richardson, Texas for BTEX analysis. The BTEX results for the duplicate samples are summarized in Table 3. Based on the results of the duplicate analyses and different purging methodology (hand bailing versus submersible pump), GPM concludes that the elevated BTEX concentrations observed in MW-2 and MW-4 during the November 15, 1995 sampling event reflect cross-contamination from the submersible pump. Based on the current results and laboratory trends, BTEX concentrations inthose wells should have been close to or below the method detection limits during the previous (November 1995) sampling event.

The results for dissolved oxygen (DO), nitrate (NO_3), sulfate (SO_4), total aerobic heterotrophic plate count (HPC), total hydrocarbon utilizing bacteria (HUB) are summarized in Table 4. While intrinsic bioremediation is occurring, additional monitoring and sampling data will be required to evaluate its effectiveness in limiting the migration or elimination of the dissolved hydrocarbon plume.

Product Recovery

To date, approximately 14 gallons of free product have been removed from monitoring well MW-1 using a combination of gravity siphoning and hand bailing. GPM has elected to implement a more aggressive remediation system utilizing a pneumatic product recovery system that will recover free product (crude oil) from monitoring wells MW-1 and MW-5. Our consultant, GCL, is in the process of designing and procuring the necessary equipment for this system. We anticipate that the system will be installed in late February or early March 1996. Results of the system recovery operations will be documented in the next quarterly monitoring and sampling report (Second Quarter 1996).

CONCLUSIONS

- Benzene was the only constituent that exceeded the New Mexico Water Quality Control Commission standards (NMWQCC) of 0.010 mg/l, in MW-7.
- Approximately 2.18 feet and 0.75 of free product (crude oil) was observed in monitoring wells MW-1 and MW-5, respectively, during sampling activities. GPM plans to install a pneumatic product recovery system to recover free product from monitoring wells MW-1 and MW-5 prior to the next sampling event.
- According to the analytical and groundwater gradient data, the hydrocarbon-impacted groundwater has not migrated off site, and remains well within the boundaries of the facility.

GPM will conduct second quarter sampling and monitoring operations in May 1996. If you have any questions regarding this project please call me at 915-368-1142.

Sincerely,

Scott Seeby

Environmental Engineer
New Mexico Region

Attachments

cc: Tony Canfield, Oil Center, NM
Jerry Sexton, OCD-Hobbs, NM
Gilbert J. Van Deventer, GCL-Midland,TX

ATTACHMENTS

ATTACHMENT A

TABLES

Table 1
Summary of Groundwater Elevations
Monument Booster Station

Well	Date	Relative Ground Surface Elevations (feet)*	Relative Top of Casing Elevation (feet)*	Depth to Groundwater Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase-Separated Hydrocarbon Thickness (feet)
MW-1	05-16-95	3588.85	3591.15	28.05	3565.17	2.52
	11-21-95	3588.85	3591.15	27.03	3565.65	1.86
	01-18-96	3588.85	3591.15	27.62	3565.32	2.18
MW-1D	05-16-95	3589.06	3591.31	26.04	3565.27	0.00
	11-21-95	3589.06	3591.31	25.54	3565.77	0.00
	01-18-96	3589.06	3591.31	25.89	3565.42	0.00
MW-2	05-16-95	3594.13	3596.30	29.28	3567.02	0.00
	11-21-95	3594.13	3596.30	29.09	3567.21	0.00
	01-18-96	3594.13	3596.30	29.15	3567.15	0.00
MW-3	05-16-95	3581.46	3583.86	22.72	3561.14	0.00
	11-21-95	3581.46	3583.86	22.12	3561.74	0.00
	01-18-96	3581.46	3583.86	22.25	3561.61	0.00
MW-4	05-16-95	3586.10	3588.77	26.45	3562.32	0.00
	11-21-95	3586.10	3588.77	25.79	3562.98	0.00
	01-18-96	3586.10	3588.77	25.90	3562.87	0.00
MW-5	05-16-95	3589.62	3592.16	28.10	3564.06	0.00
	11-21-95	3589.62	3592.16	28.24	3564.54	0.76
	01-18-96	3589.62	3592.16	28.45	3564.33	0.75
MW-6	11-21-95	3586.15	3587.93	24.71	3563.22	0.00
	01-18-96	3586.15	3587.93	24.11	3563.82	0.00
MW-7	11-21-95	3588.06	3589.40	25.16	3564.24	0.00
	01-18-96	3588.06	3589.40	25.48	3563.92	0.00

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, New Mexico. The monitor well casings were marked on the north side to provide consistent reference points for future gauging operations.
** Correction Equation for Phase-Separated Hydrocarbons: Corrected Relative Groundwater Elevation = Top of Casing Elevation - [Depth to Groundwater Below Top of Casing - (SG) (PSH Thickness)]
Specific Gravity (SG) ≈ 0.82 for crude oil.
PSH indicates phase separated hydrocarbons (crude oil).

Table 2
Summary of Dissolved BTEX Results
Monument Booster Station

Constituent	Date	Monitoring Well Numbers								NMWQCC Standards (mg/l)
		MW-1 (mg/l)	MW-1D (mg/l)	MW-2 (mg/l)	MW-3 (mg/l)	MW-4 (mg/l)	MW-5 (mg/l)	MW-6 (mg/l)	MW-7 (mg/l)	
Benzene	05-16-95	NA	**0.018**	<0.001	<0.001	<0.001	**0.265**	---	---	0.010
	11-15-95	NA	0.003	**0.044***	<0.001	**0.045***	NA	0.003	**0.465**	
	01-18-96	NA	0.004	<0.001	<0.001	0.003	NA	0.002	**1.130**	
Toluene	05-16-95	NA	0.006	<0.001	<0.001	<0.001	0.009	---	---	0.75
	11-15-95	NA	<0.001	0.002*	<0.001	0.002*	NA	<0.001	<0.001	
	01-18-96	NA	<0.001	<0.001	0.001	<0.001	NA	<0.001	0.003	
Ethylbenzene	05-16-95	NA	0.015	<0.001	<0.001	<0.001	0.261	---	---	0.75
	11-15-95	NA	0.002	0.006*	<0.001	0.006*	NA	0.001	0.205	
	01-18-96	NA	0.003	<0.001	<0.001	<0.001	NA	<0.001	0.476	
Xylenes (Total)	05-16-95	NA	0.016	<0.001	<0.001	<0.001	0.050	---	---	0.62
	11-15-95	NA	0.001	0.009*	<0.001	0.010*	NA	0.003	0.163	
	01-18-96	NA	0.009	<0.001	<0.001	<0.001	NA	<0.001	0.365	

Analyses performed by Trace Analysis, Inc., Lubbock, Texas.
All samples analyzed for BTEX using EPA Method 8020 except for samples obtained on May 17, 1995 (analyzed using EPA Method 8240).
New Mexico Water Quality Control Commission (NMWQCC) Standards are listed as specified in Regulation 3-103.
Values in **boldface** type indicate concentrations exceed NMWQCC groundwater standards.
NA indicates monitoring well was not analyzed (due to presence of free phase floating product).
* Indicates BTEX cross-contamination suspected on samples obtained from monitoring wells MW-2 and MW-4 for the November 15, 1995 sampling event.
--- Indicates monitoring well was installed after this sampling date.

Table 3
Summary of BTEX Results For Duplicate and Rinsate Samples
Monument Booster Stations
Samples Obtained on January 18, 1996

Constituent	Laboratory	Monitoring Well Numbers			WQCC Standards (mg/l)
		MW-2 (mg/l)	MW-6 (mg/l)	MW-7 (mg/l)	
Benzene	Trace[1]	<0.001	0.002	1.130	0.010
	Trace[2]	NA	NA	1.050	
	Inchcape[2]	<0.001	0.001	1.040	
Toluene	Trace[1]	<0.001	<0.001	0.003	0.75
	Trace[2]	NA	NA	0.003	
	Inchcape[2]	<0.001	<0.001	<0.01	
Ethylbenzene	Trace[1]	<0.001	<0.001	0.476	0.75
	Trace[2]	NA	NA	0.431	
	Inchcape[2]	<0.001	<0.001	0.459	
Xylenes (Total)	Trace[1]	<0.001	<0.001	0.365	0.62
	Trace[2]	NA	NA	0.353	
	Inchcape[2]	<0.001	<0.001	0.355	

All samples analyzed for BTEX using EPA Method 8020.
1 Original field sample results (Trace Analysis, Inc.).
2 Duplicate field sample results (Trace Analysis, Inc. and Inchcape Testing Services).
NA Not analyzed.
New Mexico Water Quality Control Commission (WQCC) Standards are listed as specified in Section 3-103.
Values in **boldface** type indicate concentrations exceed WQCC groundwater standards.

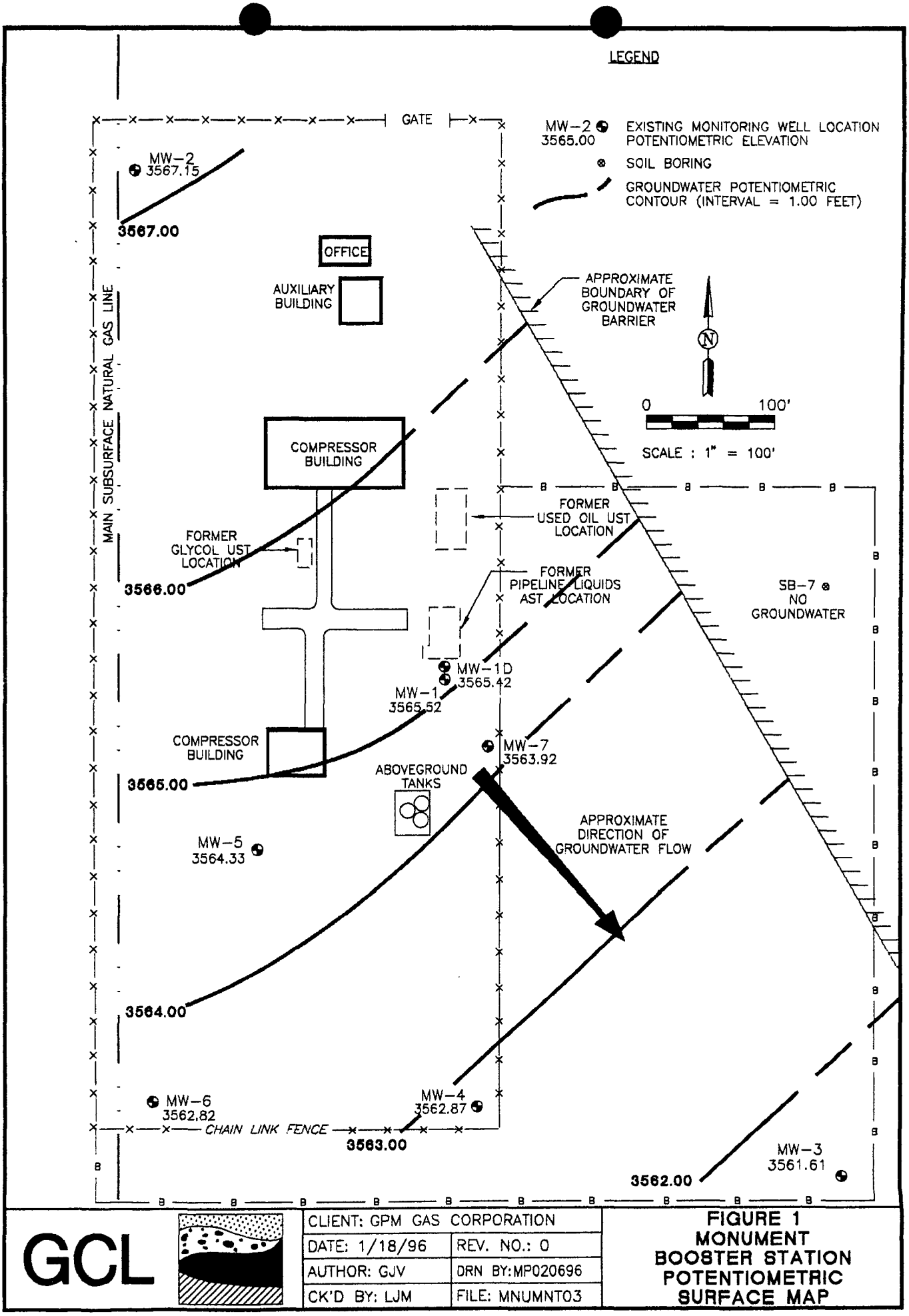
Table 4
Summary of Groundwater Analytical Results for Bacterial Activity
Monument Booster Station

Constituent	Date	Monitoring Well Numbers						
		MW-1D (cfu/ml)	MW-2 (cfu/ml)	MW-3 (cfu/ml)	MW-4 (cfu/ml)	MW-5 (cfu/ml)	MW-6 (cfu/ml)	MW-7 (cfu/ml)
Total Aerobic Bacterial Populations	05-16-95	900,000	34,000	NA	NA	1,550,000	---	---
	11-15-95	35,000	NA	NA	NA	NA	41,000	44,000
	01-18-96	1,020,000	NA	NA	NA	NA	11,900	63,300
Total Hydrocarbon Degraders	05-16-95	61,000	28,000	NA	NA	24,500	---	---
	11-15-95	3,000	NA	NA	NA	NA	1,100	990
	01-18-96	481,000	NA	NA	NA	NA	852,000	38,400
Dissolved Oxygen (DO)	05-16-95	1.05	6.48	6.85	4.85	1.10	---	---
	11-15-95	1.26	6.13	1.29	1.30	NA	5.4	1.60
	01-18-96	4.8	6.2	4.9	4.0	NA	4.1	4.8
Nitrate (NO_3)	05-16-95	1.37	7.42	5.62	3.69	0.56	---	---
	11-15-95	<0.01	NA	NA	NA	NA	0.06	0.03
	01-18-96	0.6	NA	NA	NA	NA	<0.05	<0.05
Sulfate (SO_4)	05-16-95	174	509	115	136	67	---	---
	11-15-95	119	NA	NA	NA	NA	233	418
	01-18-96	168	NA	NA	NA	NA	93	180

Total Aerobic Bacterial Populations equivalent to Total Aerobic Heterotrophic Plate Count.
Total Hydrocarbon Degraders equivalent to Total Hydrocarbon Utilizing Bacteria.
Analyses performed by Trace Analysis, Inc. with assistance from the Biological Sciences Department of Texas Tech University using modified standard plate count methods (Appendix D).
Units reported in colony forming units per milliliter (cfu/ml).
NA indicates sample was not analyzed for this constituent.
--- indicates monitoring well was installed after this sampling date.

ATTACHMENT B

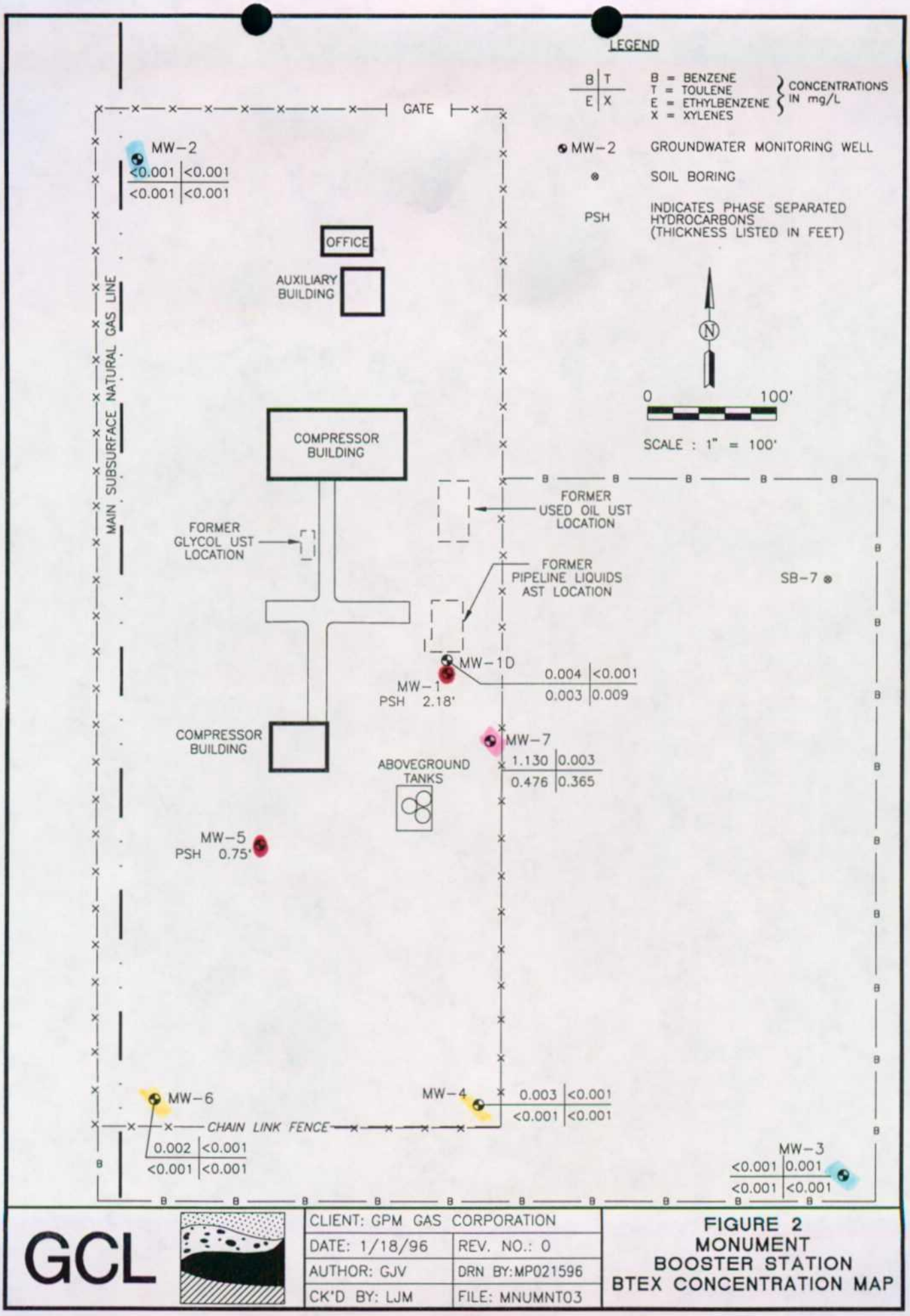
FIGURES



GCL

CLIENT: GPM GAS CORPORATION	
DATE: 1/18/96	REV. NO.: 0
AUTHOR: GJV	DRN BY:MP020696
CK'D BY: LJM	FILE: MNUMNT03

FIGURE 1
MONUMENT BOOSTER STATION
POTENTIOMETRIC SURFACE MAP



GCL

CLIENT: GPM GAS CORPORATION	
DATE: 1/18/96	REV. NO.: 0
AUTHOR: GJV	DRN BY:MP021596
CK'D BY: LJM	FILE: MNUMNT03

FIGURE 2
MONUMENT
BOOSTER STATION
BTEX CONCENTRATION MAP

ATTACHMENT C

LABORATORY ANALYTICAL REPORTS

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
GCL ENVIRONMENTAL
Attention: Annette Montoya
505 Marquette NW, Suit 1100
Albuquerque, NM 87102

January 22, 1996
Receiving Date: 01/19/96
Sample Type: Water
Charge Code No: 3100-008
Project Location: NA
COC #9847

Prep Date: 01/19/96
Analysis Date: 01/19/96
Sampling Date: 01/18/96
Sample Condition: I & C
Sample Received by: ML
Project Name: Monument Booster

TA#	FIELD CODE	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL-BENZENE (ug/L)	M,P,O XYLENE (ug/L)	TOTAL BTEX (ug/L)
T47114	9601180945 MW-2	<1	<1	<1	<1	<1
T47115	9601181100 MW-4	3	<1	<1	<1	3
T47116	9601181130 MW-6	2	<1	<1	<1	2
T47117	9601181200 MW-1d	4	<1	3	9	16
T47118	9601181240 MW-3	<1	1	<1	<1	1
T47119	9601181300 MW-7	1,130	3	476	365	1,974
T47120	9601181430 MW-7d	1,050	3	431	353	1,837
QC	Quality Control	98	95	97	320	
Reporting Limit		1	1	1	1	
RPD		2	3	2	1	
% Extraction Accuracy		97	92	97	107	
% Instrument Accuracy		98	96	98	107	

METHODS: EPA SW 846-5030, 8020.
BTEX SPIKE AND QC: 100 ug/L BTEX.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

1-22-96
Date

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
GCL ENVIRONMENTAL
Attention: Annette Montoya
505 Marquette NW, Suite 1100
Albuquerque, NM 87102

January 31, 1996
Receiving Date: 01/19/96
Sample Type: Water
Charge Code No: 3100-008
Project Location: NA
COC# 9847

Prep Date: 01/22/96
Analysis Date: 01/22/96
Sampling Date: 01/18/96
Sample Condition: I & C
Sample Received by: ML
Project Name: Monument Booster

TA#	FIELD CODE	SULFATE (mg/L)	(NO3-NO2)-N (mg/L)
T47116	9601181130 MW - 6	93	<0.5
T47117	9601181200 MW - 1d	168	0.6
T47119	9601181300 MW - 7	180	<0.5
QC	Quality Control	8	1.01
RPD		3	0
% Extraction Accuracy		101	99
% Instrument Accuracy		85	101
REPORTING LIMIT		1.0	0.5

METHODS: EPA 375.4, 353.3.
SULFATE SPIKE AND QC: 10 mg/L SULFATE.
(NO3-NO2)-N SPIKE: 1.33 mg/L (NO3-NO2)-N.
(NO3-NO2)-N QC: 1.0 mg/L (NO3-NO2)-N.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

1-31-96
DATE

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
GCL ENVIRONMENTAL
Attention: Annette Montoya
505 Marquette NW, Suite 1100
Albuquerque, NM 87102

March 14, 1996
Receiving Date: 01/19/96
Sample Type: Water
Charge Code No: 3100-008
Project Location: NA
COC# 9847

Prep Date: 02/02,23/96
Analysis Date: 02/02,23/96
Sampling Date: 01/18/96
Sample Condition: I & C
Sample Received by: ML
Project Name: Monument Booster

TA#	FIELD CODE		HPC (CFU/ml)	HUB (CFU/ml)
T47116	9601181130	MW-6	8.52 x 10E4	1.19 x 10E4
T47117	9601181200	MW-1d	4.81 x 10E5	1.02 x 10E6
T47119	9601181300	MW-7	3.84 x 10E5	6.3 x 10E5

BS

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

3-28-96

DATE

add HPC/HUB, SO4, NO3 to MW 6, 10, + (Dirk) Ship 3 extra VOH regular UPS to NDRC

per Gil V. Deventer ML 1-19-96

in Richardson 1089 E Collins 75081

Faxed all except HPC/HUB 1-31

GCL Environmental Science and Engineering
A BDM International Company

☑ Albuquerque
505 Marquette NW, Ste. 1100
Albuquerque, NM 87102
(505) 842-0001
FAX: (505) 842-0595

☐ Mid Atlantic Region
4221 Forbes Blvd., Ste. 240
Lanham, MD 20706-4325
(301) 459-9677
FAX: (301) 459-3064

☐ NASA-WSTF
PO Drawer MM
Las Cruces, NM 88004
(505) 524-5353
FAX: (505) 524-5315

No 9847

Chain of Custody

Date 1/18/96 Page 1 Of 1

Lab Name TRACE ANALYSIS
Address 6701 ABERDEENE AVENUE
LUBBOCK, TEXAS 79424
Telephone (806) 794-1296

Samplers (SIGNATURES) D Nee

Analysis Request

Sample Number	Matrix	Location	Halogenated Volatiles 601/8010	Aromatic Volatiles 602/8020 (BTEX)	Phenols, Sub Phenols 604 8040	Pesticides/PCB 608 8080	Polynuclear Aromatic Hydrocarbons 610 8310	Volatile Compounds GC MS 624/8240	Base Neu/Acid Compounds GC/MS 625/8270	Total Organic Carbon (TOC) 415 9060	Total Organic Halides (TOX) 9020	Petroleum Hydrocarbons 418.1	TPH BTEX Modified 8015	TCLP Vol., Semi-Vol. Herbicides, Pesticides	TCLP Metals	RCRA Metals(8)	Priority Pollutant Metals (13)	CAM Metals (18) TTLC STLC	~~Flash Point~~ HPC/HUB	~~Corrosivity~~ SO4	~~Reactivity~~ NO3	Oil & Grease	Cyanide Total/Amenable	Chemical Oxygen Demand (COD)					Number of Containers
7114 9601180945	H2O	MW-2		2																									2
5 9601181100	H2O	MW-4		2																									2
6 9601181130	H2O	MW-6		2															✓	✓	✓								2 (8)
7 9601181200	H2O	MW-10		2															✓	✓	✓								2 (5)
8 9601181240	H2O	MW-3		2																									2
9 9601181300	H2O	MW-7		2															✓	✓	✓								2 (5)
20 9601181430	H2O	MW-7d		2																									2

Project Information
Project Monument Booster
Project Director Lou Mazzulo
Charge Code No. 3100-008
Shipping ID. No. 0253147590
Via: FEDEX

Sample Receipt
Total No. of Containers 26
Chain of Custody Seals
Rec'd Good Condition/Cold
Conforms to Record N
Lab No.

	1.	2.	3.
Relinquished By (Signature)	D Nee	Gil Van Deventer	
(Time)	1340	1730	
(Printed Name)	DAVID NEE	Gil Van Deventer	
(Date)	1/18/96	1-18-96	
(Company)	GCL	GCL	

	1.	2.	3. Received By (Laboratory)
Received By (Signature)	Gil Van Deventer		M Lopez
(Time)	1342		11:00
(Printed Name)	Gil Van Deventer		M Lopez
(Date)	1-18-96		1-19-96
(Company)/(Laboratory)	GCL		Trace Analysis

Special Instructions/Comments: Please fax results to GCL Midland 915 6820028

Invoice EPM direct (Attn: Tony Canfield)

[illegible] 19A0

on: White, Canary-Laboratory; Pink, GCL

[illegible] SO4/NO3