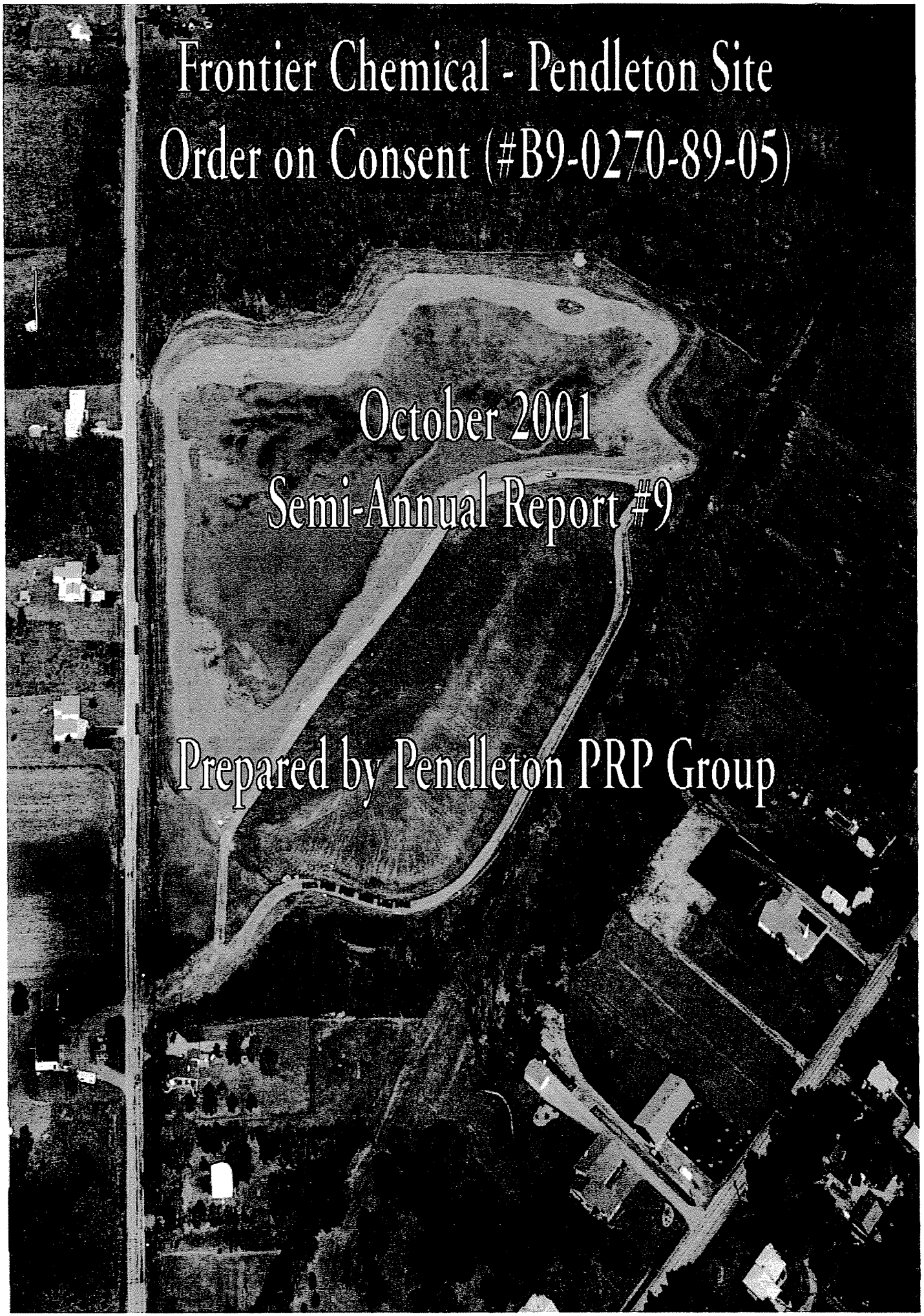


Frontier Chemical - Pendleton Site
Order on Consent (#B9-0270-89-05)

October 2001
Semi-Annual Report #9

Prepared by Pendleton PRP Group

January 7, 2002

VIA AIRBORNE EXPRESS

Mr. Daniel King P. E.
Division of Environmental Remediation
New York State Department of Environmental Conversation
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: Frontier Chemical - Pendleton Site, Pendleton, New York
Order on Consent (#B9-0270-89-05)
October 2001, Semi-Annual Report #9
Post Closure Operation, Maintenance, and Monitoring Activities,

Dear Mr. King:

In accordance with the approved Pendleton O & M Manual, enclosed are three copies of the Semi-Annual Report on the Post-Closure Operation, Maintenance, and Monitoring of the Closure Components for the Frontier Chemical-Pendleton Site by the Pendleton PRP Group.

The submittal of this report was delayed to allow the Pendleton PRP Group to respond primarily to NYSDEC comments dated May 30, 2001 relating to hydraulic containment. The letter requested that the Pendleton PRP Group collect groundwater samples from specific piezometers, analyze the samples for specific parameters and include the analytical results and a summary report in the subsequent semi-annual report. We regret that completion of this report has been delayed by including the requested information.

If you have any questions regarding the above submittals, please contact me by telephone at 423-336-4057, by facsimile at 423-336-4166 or by e-mail at jmburns@olin.com.

Sincerely,

Pendleton PRP Group

John M. Burns

John M. Burns
Chairman, Technical Committee

Distribution

Daniel King, P. E. (3 copies)
Division of Environmental Remediation
NYSDEC
270 Michigan Avenue
Buffalo, New York 14203-2999

G. Anders Carlson, Ph.D., (2 Copies)
Director
Bureau of Environmental Exposure Investigation
New York State Department of Health
2 University Place, Room 205
Albany, New York 12203-3399

Mr. James Devald (1 copy)
Niagara County Health Department
Environmental Services Division
5460 Upper Mountain Road
Lockport, New York 14094

Pendleton PRP Technical Committee

David Cook, Esq.
Nixon, Hargrave, Devans & Doyle
900 Clinton Square
P.O. Box 1051
Rochester, NY 14604

Mark Piazza
Elf ATOChem
2000 Market Street
Philadelphia, PA 19103

Dave Moreira
Waste Management
Closed Sites Department
4 Liberty Lane West
Hampton, New Jersey 03842

Bill Snyder
Honeywell, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

John Graubman
Law Offices of Ted Hadzi-Antich
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Dennis P. Harkowitz, Esq.
Jaeckle, Fleishman & Mugel
Fleet Bank Building
Twelve Fountain Plaza
Buffalo, NY 14202-2292

Tracy Goad Walter, Esq.
Legal Department
The Dow Chemical Company
2030 Dow Center
Midland, MI 48674

Table of Contents
Semi-Annual Report #9
October 2001

Attachments

Introduction

This ninth semi-annual report is submitted on behalf of the Frontier Chemical - Pendleton Site PRP Group (PRP Group) for the Frontier Chemical - Pendleton Site located in Pendleton, New York. This report summarizes the activities performed since March 2001 for Post-Closure Operation, Maintenance, and Monitoring of the Closure Components at the subject site.

Background

The Frontier Chemical-Pendleton Site is located on Town Line Road in the Town of Pendleton, Niagara County, New York. The total site comprises approximately 22 acres of the 75-acre Frontier Chemical property. Prior to remediation activities, Quarry Lake, a flooded quarry that resulted from the excavation of clay for use in clay brick and tile manufacturing at an on-site facility, occupied 15 acres of the 22-acre site. The remaining 7 acres, identified as the former Process Area, were utilized by Frontier Chemical Waste Process, Inc. (Frontier) when the site was operated as an industrial waste treatment facility from 1958 to 1974. Plating wastes, pickle liquors and other liquid acid wastes from plating and metal finishing industries were treated at the site, with residuals from the waste treatment process being discharged into Quarry Lake. Much of the former Process Area was filled and graded following termination of waste treatment operations.

The site remediation project with remedial designed by O'Brien & Gere Engineers, Inc. and remedial action by Sevenson Environmental Services, Inc. included the following major components:

1. Dewatering Quarry Lake to allow drying and consolidation of sediments;
2. Excavation and relocation of sediments from Quarry Lake after dewatering operations to within the limits of the capped area;
3. Excavation and relocation of surface soils, fill or debris to within the limits of the capped area;
4. Capping of consolidated sediments, previously dredged materials, and surface soils with a low-permeability cap;
5. Installation, in conjunction with a cap, of a low-permeability barrier to ground water flow;
6. Construction of a ground water collection trench along the eastern shore of Quarry Lake and the southern portion of the capped area;
7. Reconstruction of the berm around Quarry Lake and installation of a new outlet structure;
8. Construction of a ground water pumping station consisting of a wet well and dry vault;
9. Installation of a ground water pre-treatment system within the dry vault;
10. Conveyance of collected and pre-treated ground water to the local Publicly Owned Treatment Works (POTW);
11. Creation of new wetlands at the site;
12. Construction of a surface water swale adjacent to the cap access road to direct surface water away from the capped area;
13. Installation of piezometers inside and outside the capped area and a standpipe within the ground water collection trench; and
14. Installation of a chain link fence around the capped area and pump station to limit access.

Discussion

Post-closure operation, maintenance, and monitoring of the closure components of the Frontier Chemical-Pendleton Site are the responsibility of the Pendleton PRP Group. Operation, maintenance, and monitoring activities performed by the Pendleton PRP Group during this reporting period includes the following five elements:

1. Routine inspection and maintenance of constructed features, including the capped area, ground water collection and conveyance system, surface water runoff facilities, constructed wetlands, access road, perimeter and containment berms, and outlet weir,

   The semi-annual site was performed on October 8, 2001. A copy of the inspection report is included in Attachment D.

   A water elevation chart is included in Attachment A. This water level chart depicts the lake elevation starting in April 1996 until present.

2. Operation and maintenance of the ground water pre-treatment system, as described in the Pre-Treatment System Operations Plan, O'Brien & Gere, 1997.

   Included in Attachment B are the operation and maintenance activities performed during this reporting period. The activities include monthly submittals to the Niagara Country Sewer District #1 detailing analytical and discharge flow data. The first semi-annual submittal to the Niagara County Sewer District occurred on November 8, 2001.

   Operation, Maintenance, and Monitoring Activities for the site during this reporting period are summarized in Table B-3.

3. Regarding performance of a ground water monitoring program, the report "Frontier Chemical - Pendleton Site, Semi-Annual Ground Water Monitoring Report" dated October 2001 is included in Attachment C.

   The main purpose of the groundwater monitoring program is to monitor on-site and off-site groundwater condition and to verify that an inward hydraulic gradient is occurring within the capped area and to evaluate the operation, maintenance, and monitoring activities and identify proposed changes to the O&M Manual or site procedures and policies which would provide a safer and/or more cost-effective operation.

4. Recordkeeping

   Records for site operation and maintenance activities are maintained at the site and the Olin Corporation Charleston Plant. These records include daily and weekly logs and charts. Glynn Geotechnical provides assistance to the site caretaker and updates O&M documentation.

   O'Brien & Gere Engineers provide ground water level measurement, sampling, monitoring, and analytical field and office support. The PRP representative maintains

analytical results and reports submitted to NCSD #1 and NYSDEC at the Olin's Charleston Plant. These records are available for your review and inspection.

Conclusions

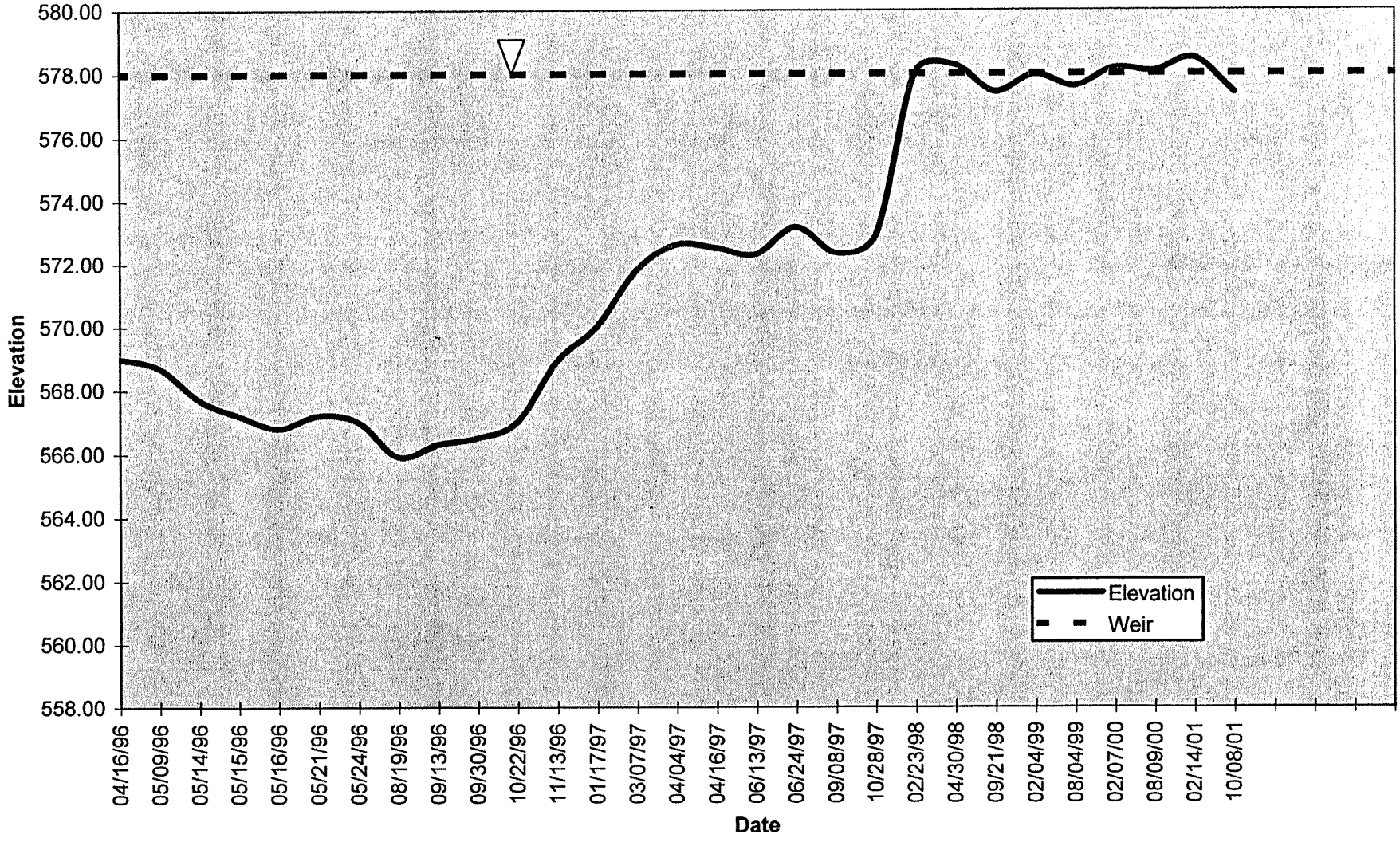
The work performed during this reporting period, April 2001 through October 2001 were reviewed and found to be in accordance with the approved O&M Manual for the Site.

Attachment A – Quarry Lake Level – October 8, 2001
Quarry Lake Level Plot versus Time

TABLE A-1
Quarry Lake Level

Date	Elevation
4/16/96	569.00
5/9/96	568.70
5/14/96	567.70
5/15/96	567.20
5/16/96	566.80
5/21/96	567.20
5/24/96	567.00
8/19/96	565.92
9/13/96	566.30
9/30/96	566.50
10/22/96	567.00
11/13/96	568.90
1/17/97	570.00
3/7/97	571.80
4/4/97	572.60
4/16/97	572.50
6/13/97	572.30
6/24/97	573.15
9/8/97	572.34
10/28/97	572.88
2/23/98	578.00
4/30/98	578.26
9/21/98	577.42
2/4/99	577.97
8/4/99	577.60
2/7/00	578.16
8/9/00	578.07
2/14/01	578.47
10/8/01	577.39

Quarry Lake Water Level



ATTACHMENT B –Niagara County Sewer District #1 Submittals and Operation, Maintenance and Monitoring Activities

B-1 Niagara County Sewer District #1 Submittals
B-2 Operation, Maintenance and Monitoring Activities

B-1 Niagara County Sewer District #1 Submittals

TABLE B-1

Niagara County Sewer District #1 Submittals	
Semi-Annual Submittal Date	**Sampling Date**
November 8, 2001	October 5, 2001

B-2 Operation, Maintenance and Monitoring Activities

FRONTIER CHEMICAL PENDLETON PRP GROUP
C/O OLIN CORPORATION
1186 LOWER RIVER ROAD
CHARLESTON, TN 37310

November 8, 2001

VIA AIRBORNE EXPRESS

Mr. Frank Nerone
Chief Operator
Niagara County Sewer District #1
7346 Liberty Drive
Niagara Falls, NY 14304

Subject: Analytical Sampling Results (10/5/2001 Semi-Annual Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the October 5, 2001, sampling event for discharge of collected groundwater from the pre-treatment system at the Pendleton Site. Analytical results for this sampling event are compared against the Permit (#00-11) requirements on the attached Analytical Summary and Daily Flow sheets.

A review of the analytical and flow data shows that all permit parameters are significantly below the permit discharge requirements.

This data is being provided for your review and concurrence that all permit parameters are well within their limits. If, following review of the enclosed information, you are not in agreement with the above stated conclusion, please contact me at 423-336-4057 as soon as possible so we may discuss any future monitoring requirements.

Sincerely,

John M. Burns

John M. Burns
For the Frontier Chemical - Pendleton Site PRP Group

Enclosures: as stated

David Cook, Esq.
Nixon, Hargrave, Devans & Doyle
900 Clinton Square
P.O. Box 1051
Rochester, NY 14604

Dave Moreira
Waste Management – Closed Sites
Department
4 Liberty Lane West
Hampton, New Jersey 03842

David Paley
Honeywell
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103

Colleen K. Sanson, Esq.
Law Offices of Ted Hadzi-Antich
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Dennis P. Harkowitz. Esq.
Jaecekle, Fleishman & Mugel
Fleet Bank Building
Twelve Fountain Plaza
Buffalo, NY 14202-2292

Tracy Goad Walter. Esq.
Legal Department
The Dow Chemical Company
2030 Dow Center
Midland, MI 48674

October 2000 Analytical Summary for WS 001
Permit # 98-11
Groundwater Discharge Point: D 002

500,048 Gallons Discharged Prior To 10/5/2001
41,893 Gallons Since Last Report
179.8 Average Daily Flow Based on 233 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	10/5/2001 Sample Results GPD
Discharge Rate (1)	662		
624 Analytes	ug/L	ug/L	ug/L
Toluene	10.0	1.0	< 1.0
1,2-Dichloroethane	10.0	1.0	< 1.0
4-Methyl-2-Pentanone	10.0	5.0	< 5.0
Vinyl Chloride	10.0	2.0	< 2.0
Methylene Chloride	10.0	2.8	< 2.8
trans-1,2-Dichloroethene	10.0	1.0	< 1.0
1,1,1-Trichloroethane	10.0	1.0	< 1.0
Trichloroethene	10.0	1.0	< 1.0
Benzene	10.0	1.0	< 1.0
Chloromethane		2.0	3.0
Bromomethane		2.0	< 2.0
Chloroethane		2.0	< 2.0
Chloroform		1.0	< 1.0
Carbon Tetrachloride		1.0	< 1.0
1,1-Dichloroethene		1.0	< 1.0
Trichlorofluoromethane		2.0	< 2.0
1,1-Dichloroethane		1.0	< 1.0
1,2-Dichloropropane		1.0	< 1.0
Bromodichloromethane		1.0	< 1.0
2-Chloroethylvinyl ether		2.0	< 2.0
cis-1,3-Dichloropropene		1.0	< 1.0
trans-1,3-Dichloropropene		1.0	< 1.0
1,1,2-Trichloroethane		1.0	< 1.0
Tetrachloroethene		1.2	< 1.2
Dibromochloromethane		1.0	2.8
Chlorobenzene		1.0	< 1.0
Ethylbenezene		1.0	< 1.0
Bromoform		1.0	< 1.0
1,1,2,2-Tetrachloroethane		1.0	< 1.0
1,3-Dichlorobenzene		1.0	< 1.0
1,4-Dichlorobezene		1.0	< 1.0
1,2-Dichlorobenzene		1.0	< 1.0
Sum of 624 Analytes		100.0	45.8
608 Pesticides (2)	ug/L	ug/L	ug/L
alpha BHC	10.0		
beta BHC	20.0		
delta BHC	10.0		
gamme BHC	10.0		
Heptachlor	8.0		
Aldrin	8.0		
Heptachlor Epoxide	9.0		
4,4-DDE	20.0		
Methoxychlor	18.0		
Metals	mg/L		mg/L
Antimony	0.1	0.011	< 0.011
Boron	4.00	0.012	0.359
Chromium	5.33	0.005	< 0.005
Cyanide(T)	2.0	0.005	< 0.005
Other	mg/L	mg/L	mg/L
Total Phenolics	NA	0.005	< 0.005
TSS	300	4.000	8.400

Legend:
(1) Permit limit @ 662 GPD with maximum daily discharged @ 2500 GPD
(2) Discontinued per April 14, 1997 Letter from F. Narrone to PRP Group.
(B) Detected in blank
NA Not applicable

DAILY FLOW DATA - PENDLETON SITE
MARCH 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
3/1/2001	456732	303.0	Average Flow
3/2/2001		288.7	Average Flow
3/3/2001		288.7	Average Flow
3/4/2001	457598	288.7	
3/5/2001	457912	314.0	
3/6/2001	458221	309.0	
3/7/2001	458532	311.0	
3/8/2001	458840	308.0	
3/9/2001		337.0	
3/10/2001		337.0	
3/11/2001	459851	337.0	
3/12/2001	460164	313.0	
3/13/2001	460725	561.0	
3/14/2001	461237	512.0	
3/15/2001	461754	517.0	Average Flow
3/16/2001		424.0	Average Flow
3/17/2001		424.0	
3/18/2001	463026	424.0	
3/19/2001	463397	371.0	
3/20/2001	463926	529.0	
3/21/2001	464233	307.0	Average Flow
3/22/2001		260.0	Average Flow
3/23/2001	464753	260.0	Average Flow
3/24/2001			GAC #1 Leak Tank Recirculating
3/25/2001			GAC #1 Leak Tank Recirculating
3/26/2001			GAC #1 Leak Tank Recirculating
3/27/2001			GAC #1 Leak Tank Recirculating
3/28/2001			GAC #1 Leak Tank Recirculating
3/29/2001	490452		GAC #1 Leak Tank Recirculating
3/30/2001		802.0	
3/31/2001	492057	802.5	

AVERAGE DAILY FLOW IN GALLONS 320.3

[redacted] = DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
APRIL 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
4/1/2001	492861	804.0	
4/2/2001	493066	205.0	
4/3/2001	493224	158.0	
4/4/2001	493434	210.0	
4/5/2001		206.0	Average Flow, GAC # 1 repaired/on line
4/6/2001		206.0	Average Flow
4/7/2001		206.0	Average Flow
4/8/2001	494258	206.0	Average Flow
4/9/2001	494511	253.0	
4/10/2001	494763	252.0	
4/11/2001	494946	183.0	
4/12/2001	495207	261.0	
4/13/2001		189.7	Average Flow
4/14/2001		189.7	Average Flow
4/15/2001	495776	189.7	Average Flow
4/16/2001	495980	204.0	
4/17/2001	496240	260.0	
4/18/2001	496503	263.0	
4/19/2001	496797	294.0	
4/20/2001		155.3	Average Flow
4/21/2001		155.3	Average Flow
4/22/2001	497263	155.3	Average Flow
4/23/2001	497474	211.0	
4/24/2001	497631	157.0	Site Inspection
4/25/2001	497838	207.0	
4/26/2001	497989	151.0	
4/27/2001		189.3	Average Flow
4/28/2001		189.3	Average Flow
4/29/2001	498557	189.3	Average Flow
4/30/2001	498708	151.0	

AVERAGE DAILY FLOW IN GALLONS 221.7

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons

TOTAL GALLONS 0.0

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
MAY 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
5/1/2001	498914	206.0	
5/2/2001	499117	203.0	
5/3/2001	499322	205.0	
5/4/2001		172.7	Average Flow
5/5/2001		172.7	Average Flow
5/6/2001	499840	172.7	Average Flow
5/7/2001	500040	200.0	
5/8/2001	500194	154.0	
5/9/2001	500451	257.0	
5/10/2001	500605	154.0	
5/11/2001		224.7	Average Flow
5/12/2001		224.7	Average Flow
5/13/2001	501279	224.7	Average Flow
5/14/2001	501489	210.0	
5/15/2001	501745	256.0	
5/16/2001	501902	157.0	
5/17/2001		190.0	Average Flow
5/18/2001		190.0	Average Flow
5/19/2001		190.0	Average Flow & Site Inspection
5/20/2001	502662	190.0	Average Flow
5/21/2001	503023	361.0	
5/22/2001	503652	629.0	
5/23/2001	504402	750.0	
5/24/2001	504918	516.0	
5/25/2001		380.5	
5/26/2001		380.5	Average Flow
5/27/2001		380.5	Average Flow
5/28/2001	506440	380.5	Average Flow
5/29/2001	507071	631.0	
5/30/2001	507335	264.0	
5/31/2001	507541	206.0	

AVERAGE DAILY FLOW IN GALLONS 284.9

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
JUNE 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
6/1/2001	507953	412.0	
6/2/2001		222.0	Average Flow
6/3/2001	508397	222.0	Average Flow
6/4/2001	508554	157.0	
6/5/2001	508758	204.0	
6/6/2001	508962	188.3	
6/7/2001	509212	250.0	
6/8/2001		204.3	Average Flow
6/9/2001		204.3	Average Flow
6/10/2001	509825	204.3	Average Flow
6/11/2001	510030	205.0	
6/12/2001		227.5	
6/13/2001	510485	227.5	
6/14/2001	510662	177.0	
6/15/2001		184.0	Average Flow
6/16/2001		184.0	Average Flow
6/17/2001	511214	184.0	Average Flow
6/18/2001	511420	206.0	
6/19/2001	511575	155.0	
6/20/2001	511725	150.0	
6/21/2001	511885	160.0	
6/22/2001		149.3	Average Flow
6/23/2001		149.3	Average Flow
6/24/2001	512333	149.3	Average Flow
6/25/2001	512539	206.0	
6/26/2001	512689	150.0	
6/27/2001	512885	196.0	
6/28/2001	513032	147.0	
6/29/2001		177.5	Average Flow
6/30/2001	513387	177.5	Average Flow

AVERAGE DAILY FLOW IN GALLONS 188.1

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
JULY 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
7/1/2001	513538	151.0	
7/2/2001	513736	222.0	
7/3/2001		180.0	Average Flow
7/4/2001		180.0	Average Flow
7/5/2001		180.0	Average Flow
7/6/2001	514456	180.0	Average Flow
7/7/2001		150.0	Average Flow
7/8/2001	514756	150.0	Average Flow
7/9/2001	514907	151.0	
7/10/2001	515061	154.0	
7/11/2001	515234	173.0	
7/12/2001	515438	204.0	
7/13/2001		149.0	Average Flow
7/14/2001		149.0	Average Flow
7/15/2001	515885	149.0	Average Flow
7/16/2001	516038	153.0	
7/17/2001	516141	103.0	
7/18/2001	516238	97.0	
7/19/2001	516286	48.0	
7/20/2001		130.0	Average Flow
7/21/2001		130.0	Average Flow
7/22/2001	516676	130.0	Average Flow
7/23/2001	516776	100.0	
7/24/2001	516876	100.0	
7/25/2001	516974	98.0	
7/26/2001	517059	85.0	
7/27/2001		109.3	Average Flow
7/28/2001		109.3	Average Flow & Site Inspection
7/29/2001	517387	109.3	Average Flow
7/30/2001	517485	98.0	
7/31/2001	517582	97.0	

AVERAGE DAILY FLOW IN GALLONS 136.1

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
AUGUST 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
8/1/2001	517679	97.0	
8/2/2001	517776	97.0	
8/3/2001		121.5	Average Flow
8/4/2001	518019	121.5	Average Flow
8/5/2001	518068	49.0	
8/6/2001	518162	94.0	
8/7/2001	518260	98.0	
8/8/2001	518356	96.0	
8/9/2001	518503	147.0	
8/10/2001		82.0	Average Flow
8/11/2001		82.0	Average Flow
8/12/2001	518749	82.0	Average Flow
8/13/2001		100.0	Average Flow
8/14/2001		100.0	Average Flow
8/15/2001	519049	100.0	Average Flow
8/16/2001	519146	97.0	
8/17/2001		84.0	Average Flow
8/18/2001		84.0	Average Flow
8/19/2001	519398	84.0	Average Flow
8/20/2001	519498	100.0	
8/21/2001	519596	98.0	
8/22/2001	519693	97.0	
8/23/2001	519791	98.0	
8/24/2001		99.0	Average Flow
8/25/2001	519989	99.0	Average Flow
8/26/2001	520086	97.0	
8/27/2001		82.3	Average Flow
8/28/2001		82.3	Average Flow
8/29/2001	520333	82.3	Average Flow & Site Inspection
8/30/2001		97.5	
8/31/2001	520528	97.5	

AVERAGE DAILY FLOW IN GALLONS 95.0

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

DAILY FLOW DATA - PENDLETON SITE
SEPTEMBER 2001

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
9/1/2001		82.3	Average Flow
9/2/2001		82.3	Average Flow
9/3/2001	520775	82,3	Average Flow
9/4/2001	520873	98.0	
9/5/2001	520947	74.0	
9/6/2001	520996	49.0	
9/7/2001	521143	147.0	
9/8/2001	521240	97.0	
9/9/2001	521289	49.0	
9/10/2001	521339	50.0	
9/11/2001	521441	102.0	
9/12/2001	521539	98.0	
9/13/2001	521588	49.0	
9/14/2001	521687	99.0	
9/15/2001		49.0	Average Flow
9/16/2001	521785	49.0	Average Flow
9/17/2001	521885	100.0	
9/18/2001	521983	98.0	
9/19/2001	522032	49.0	
9/20/2001	522229	197.0	
9/21/2001		49.0	Average Flow
9/22/2001	522327	49.0	Average Flow
9/23/2001		127.5	Average Flow
9/24/2001	522582	127.5	Average Flow
9/25/2001	522898	316.0	Average Flow
9/26/2001	523157	259.0	
9/27/2001		143.8	Average Flow
9/28/2001		143.8	Average Flow
9/29/2001		143.8	Average Flow & Site Inspection
9/30/2001	523732	143.8	Average Flow

AVERAGE DAILY FLOW IN GALLONS 104.1

= DRY VAULT GROUNDWATER RELIEF

		gallons
		gallons
		gallons
		gallons
TOTAL GALLONS	0.0	

avg =flow between data points divided by days of missing data

WASTE STREAM TECHNOLOGY, INC.

302 Grote Street
Buffalo, NY 14207
(716) 876-5290

Analytical Data Report

Report Date : 10/19/01
Group Number : 2019-085

Prepared For :
Mr. John Burns
Olin Corporation
P.O. Box 248
1186 Lower River Road NW
Charleston, TN 37310

Site : Pendleton TW 707

Analytical Parameters	Analytical Services Number of Samples	Turnaround Time
Total Metals	1	Standard
Cyanide	1	Standard
Phenol	1	Standard
Total Suspended Solids	1	Standard
624	2	Standard

Report Released By : Daniel W. Vollmer

Daniel W. Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977

Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207
(716) 876-5290

Analytical Data Report

Group Number: 2019-085
Site: Pendleton TW 707

Field and Laboratory Information

WST ID	Client ID	Matrix	Date Sampled	Date Received	Time
WS87574	TW 707 100501	Aqueous	10/05/01	10/05/01	10:55
WS87575	Trip Blank	Aqueous	10/05/01	10/05/01	10:55

METHODOLOGIES

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

ORGANIC DATA QUALIFIERS

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimated value. This flag is used to qualify the following: when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed; a compound is detected in the sample but the result is less than the method quantitation limit but greater than the statistically calculated laboratory method detection limit; the result for a compound is estimated due to the analysis of a sample beyond the USEPA defined holding time; the result for a compound is estimated due to a quality control sample result that is outside the laboratory quality control recovery limits.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as the sample.

E - This flag identifies all compounds whose concentrations exceed the calibration range of the GC/MS instrument of that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

G - Matrix spike recovery is greater than the expected upper limit of analytical performance.

L - Matrix spike recovery is less than the expected lower limit of analytical performance.

 # - Indicates that a surrogate recovery was found to be outside the expected limits of analytical performance.

$ - Indicates that the surrogate compound was diluted out. The sample had to be diluted to obtain analytical results and a recovery could not be calculated.

(%) - Indicates that the compound is a surrogate and that the value reported for this compound is in percent recovery. The quality control recovery limits are indicated in the detection limit or QC limits column.

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Units: mg/L
Matrix: Aqueous

WST ID: WS87574
Client ID: TW 707 100501
Digestion Date: 10/11/01

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by ICP	0.011	Not detected	10/11/01	EPA 200.7
Boron by ICP	0.012	0.359	10/11/01	EPA 200.7
Chromium by ICP	0.005	Not detected	10/11/01	EPA 200.7

Waste Stream Technology, Inc.

Cyanide in Water

EPA 335.2

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS87574	TW 707 100501	0.005	Not detected	10/10/01

Waste Stream Technology, Inc.

Total Recoverable Phenol

EPA 420.1

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS87574	TW 707 100501	0.005	Not detected	10/11/01

Waste Stream Technology, Inc.

Total Suspended Solids

EPA 160.2

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS87574	TW 707 100501	4.0	8.4	10/09/01

Waste Stream Technology, Inc.

Volatile Organics in Water

EPA 624

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Units: µg/L
Matrix: Aqueous

WST ID: WS87574
Client ID: TW 707 100501
Extraction Date: NA
Date Analyzed: 10/16/01

Compound	Detection Limit	Result	QC Limits (%)	Qualifier
chloromethane	2.0	3.0		
vinyl chloride	2.0	Not detected		U
bromomethane	2.0	Not detected		U
chloroethane	2.0	Not detected		U
trichlorofluoromethane	2.0	Not detected		U
1,1-dichloroethene	1.0	Not detected		U
methylene chloride	2.8	Not detected		U
trans-1,2-dichloroethene	1.0	Not detected		U
1,1-dichloroethane	1.0	Not detected		U
chloroform	1.0	Not detected		U
1,1,1-trichloroethane	1.0	Not detected		U
carbon tetrachloride	1.0	Not detected		U
benzene	1.0	Not detected		U
1,2-dichloroethane	1.0	Not detected		U
trichloroethene	1.0	Not detected		U
1,2-dichloropropane	1.0	Not detected		U
bromodichloromethane	1.0	Not detected		U
2-chloroethylvinyl ether	2.0	Not detected		U
cis-1,3-dichloropropene	1.0	Not detected		U
toluene	1.0	Not detected		U
trans-1,3-dichloropropene	1.0	Not detected		U
1,1,2-trichloroethane	1.0	Not detected		U
tetrachloroethene	1.0	Not detected		U
dibromochloromethane	1.0	2.8		
chlorobenzene	1.0	Not detected		U
ethylbenzene	1.0	Not detected		U
bromoform	1.0	Not detected		U
1,1,2,2-tetrachloroethane	1.0	Not detected		U
1,3-dichlorobenzene	1.0	Not detected		U
1,4-dichlorobenzene	1.0	Not detected		U
1,2-dichlorobenzene	1.0	Not detected		U
4-methyl-2-pentanone	5.0	Not detected		U
1,2-Dichloroethane-d4 (%)		101	76-119	
Toluene-d8 (%)		96	82-117	
Bromofluorobenzene (%)		97	80-117	
Dilution Factor	**1**			

Waste Stream Technology, Inc.

Volatile Organics in Water

EPA 624

Site: Pendleton TW 707
Date Sampled: 10/05/01
Date Received: 10/05/01

Group Number: 2019-085
Units: µg/L
Matrix: Aqueous

WST ID: WS87575
Client ID: Trip Blank
Extraction Date: NA
Date Analyzed: 10/16/01

Compound	Detection Limit	Result	QC Limits (%)	Qualifier
chloromethane	2.0	Not detected		U
vinyl chloride	2.0	Not detected		U
bromomethane	2.0	Not detected		U
chloroethane	2.0	Not detected		U
trichlorofluoromethane	2.0	Not detected		U
1,1-dichloroethene	1.0	Not detected		U
methylene chloride	2.8	Not detected		U
trans-1,2-dichloroethene	1.0	Not detected		U
1,1-dichloroethane	1.0	Not detected		U
chloroform	1.0	Not detected		U
1,1,1-trichloroethane	1.0	Not detected		U
carbon tetrachloride	1.0	Not detected		U
benzene	1.0	Not detected		U
1,2-dichloroethane	1.0	Not detected		U
trichloroethene	1.0	Not detected		U
1,2-dichloropropane	1.0	Not detected		U
bromodichloromethane	1.0	Not detected		U
2-chloroethylvinyl ether	2.0	Not detected		U
cis-1,3-dichloropropene	1.0	Not detected		U
toluene	1.0	Not detected		U
trans-1,3-dichloropropene	1.0	Not detected		U
1,1,2-trichloroethane	1.0	Not detected		U
tetrachloroethene	1.0	Not detected		U
dibromochloromethane	1.0	Not detected		U
chlorobenzene	1.0	Not detected		U
ethylbenzene	1.0	Not detected		U
bromoform	1.0	Not detected		U
1,1,2,2-tetrachloroethane	1.0	Not detected		U
1,3-dichlorobenzene	1.0	Not detected		U
1,4-dichlorobenzene	1.0	Not detected		U
1,2-dichlorobenzene	1.0	Not detected		U
4-methyl-2-pentanone	5.0	Not detected		U
1,2-Dichloroethane-d4 (%)		102	76-119	
Toluene-d8 (%)		96	82-117	
Bromofluorobenzene (%)		100	80-117	
Dilution Factor	1			

CHAIN OF COUSTODY

WASTE STREAM TECHNOLOGY
Waste Stream Technology Inc.
302 Grote Street, Buffalo, NY 14207
(716) 876-5290 • FAX (716) 876-2412

OFFICE USE ONLY
GROUP # 2019-055
DUE DATE

PAGE ____ OF ____

ARE SPECIAL DETECTION LIMITS REQUIRED:
YES NO
If yes please attach requirements.

TURN AROUND TIME:

QUOTATION NUMBER:

Is a QC Package required:
YES NO
If yes please attach requirements

REPORT TO: [illegible]

CONTACT

PH. # ( )

FAX # ( )

BILL TO:

PO# Pendleton TW 707

PROJECT DESCRIPTION

SAMPLER SIGNATURE [illegible signature]

DW DRINKING WATER
GW GROUND WATER
SW SURFACE WATER
WW WASTE WATER
O OIL
SL SLUDGE
SO SOIL
S SOLID
W WIPE
OTHER

ANALYSES TO BE PERFORMED

	SAMPLE I.D.	DATE SAMPLED	TIME OF SAMPLING	SAMPLE TYPE	TOTAL NO. OF CONTAINERS	Phenols - H_2SO_4	T.Metals - HNO_3	T-CN - NaOH	TSS - 3°C	VOC - HCl	VOC - HCl					TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	TW 707 100501	10/5/01	915 AM	Comp	1	1										500 mL	1158757
2	" "	10/5/01	915 AM	Comp	1		1									~~Garnet~~ 250 mL	
3	" "	10/5/01	915 AM	Comp	1			1								~~250 mL~~ 500 mL	
4	" "	10/5/01	915 AM	Comp	1				1							250 mL	
5	" "	10/5/01	915 AM	Grab	1					1						40 mL	
6	" "	10/5/01	915 AM	Grab	1						1					40 mL	1158758
7	Trip Blank																
8	(TB)																
9																	
10																	

REMARKS:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
	/ /		[illegible signature]	10/5/01	10:55
[illegible signature]	10/5/01	10:55	[illegible signature]	10/5/01	10:55

B-2 Operation, Maintenance, and Monitoring Activities

Table B-2

Operation, Maintenance, and Monitoring Activities		
Date	**Event**	**Action Taken**
March 30, 2001	• GAC #1 Tank Leak	• By-Passed Tank
April 24, 2001	• GAC #1 Tank Leak	• Repaired Tank
June 28, 2001	• Grass needs cutting • Varmint holes in cap between P-3 and P-4	• Scheduled grass cutting • Repaired varmint holes
August 30, 2001	• Varmint holes in cap between P-3 and P-4	• Repaired varmint holes
October 5, 2001	• Varmint holes in cap between P-3 and P-4	• Repaired varmint holes
October 8, 2001	• Varmint holes in cap between P-3 and P-4	• Repaired varmint holes

ATTACHMENT C – Groundwater Data

C-1 Frontier Chemical – Pendleton Site
Semi-Annual Ground Water Monitoring Report
O'Brien & Gere
October 2001

C-2 Frontier Chemical – Pendleton Site
Town of Pendleton, Niagara County, NY Water Samples
Volume 1 of 6
O'Brien & Gere
October 8, 9, 10, 11 and 18

C-1 Frontier Chemical – Pendleton Site
Semi-Annual Ground Water Monitoring Report
O'Brien & Gere
October 2001

C-2 Frontier Chemical – Pendleton Site
Town of Pendleton, Niagara County, NY Water Samples
Volume 1 of 6
O'Brien & Gere
October 8,9,10, 11 and 18, 2001

REPORT

Frontier Chemical - Pendleton Site Semi-Annual Ground Water Monitoring Report

Pendleton Site PRP Group

October 2001

5829/29820

REPORT

Frontier Chemical - Pendleton Site Semi-Annual Ground Water Monitoring Report

Pendleton Site PRP Group

James R. Heckathorne, P.E.
Vice President

October 2001

O'BRIEN & GERE ENGINEERS, INC.

5000 Brittonfield Parkway
Syracuse, New York 13221

Contents

List of Tables

List of Figures

List of Appendices

List of Attachments

1. Introduction

This Semi-Annual Ground Water Monitoring Report is for the Frontier Chemical - Pendleton Site (Site), located on Town Line Road in the Town of Pendleton, Niagara County, New York. This report is prepared based on the New York State Department of Environmental Conservation (NYSDEC)-approved Operation & Maintenance (O&M) Manual (O'Brien & Gere Engineers, 1997) for the Site, which addresses, among other items, long-term ground water monitoring at the Site.

In addition to the ground water samples collected as part of the long-term ground water monitoring covered by the O&M Manual, additional ground water samples were collected from six piezometers (P-1 through P-6). These additional samples were collected at the request of the NYSDEC in a letter dated May 30, 2001 to the Frontier Pendleton Technical Committee (Attachment A). The piezometers were sampled to evaluate potential migration of Site-related constituents from the capped area in general, and specifically in the area of the cap where inward hydraulic gradients are not readily observed.

This Semi-Annual Ground Water Monitoring Report presents a discussion of the following:

- Piezometer/monitoring well inspection
- Hydraulic evaluation of the capped area and collection trench
- Evaluation of ground water chemistry in the intermediate and deep ground water zones.
- Evaluation of ground water chemistry collected from piezometers within the capped area and those outside the capped area.

These items are described in the following sections.

1.1. Piezometer/monitoring well inspection

The piezometer/monitoring well inspection was conducted on October 8, 2001, and included the piezometers (P-1 through P-8), standpipe (SP-1), and ground water monitoring wells (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, URS-9D, 88-12C, 88-12D, URS-14I, and URS-14D) identified as the Site monitoring network in the O&M Manual for the Site.

Results of the inspection indicated that each piezometer and monitoring well was in an acceptable condition for collecting water elevation

measurements and ground water samples. Similar maintenance issues to those identified in previous inspection reports were noted at the Site:

- Piezometer P-6 was angled +/-15 degrees from vertical.
- Monitoring Well 85-7R lacks concrete at the base of the casing.
- Monitoring Well URS-5D was found to have a broken hinge.
- Monitoring Well URS-7D has a broken and shifted concrete base.
- Monitoring Well URS-9I has a shifted casing and a broken outer cap, and some settling was apparent, and there was sediment in the bottom of the well.

October 2001 inspection forms are included in Appendix A.

1.2. Hydraulic evaluation of capped area and collection trench

In accordance with the O&M Manual, a complete round of static ground water elevations was collected from the piezometers (P-1 through P-8), standpipe (SP-1), and ground water monitoring wells (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, URS-9D, 88-12C, 88-12D, URS-14I, and URS-14D). The ground water elevation measurements were collected on October 8, 2001. Glynn Geotechnical Engineering, Inc. measured the surface water elevation of Quarry Lake on October 8, 2001. The ground water elevations measured in the piezometers and standpipe, and in the monitoring wells, are summarized on Tables 1 and 2, respectively. Quarry Lake elevations are summarized on Table 3. As shown on Table 3, the October 8, 2001 surface water elevation of Quarry Lake was recorded at 577.39 ft, which is above the outlet weir elevation of 577.2 ft.

The water level measurements collected on October 8, 2001 are illustrated on Figure 1. These measurements are the eleventh round collected since remedial construction was substantially completed in August 1996. The water elevation data was used to evaluate the following:

- Whether an inward hydraulic gradient exists at the site by comparing water level measurements within the capped area (P-2, P-3, P-4, P-6, and P-7) to those measured outside the capped area (P-1, P-5, P-8, SP-1, and Quarry Lake)

- The ground water flow potential inside the capped area

- Whether the ground water collection trench is effectively controlling ground water migration away from the capped area.

The data indicates that an inward hydraulic gradient exists at the site, except in the eastern portion of the capped area, where the data indicates a slight outward hydraulic gradient. Figures 2, 3, and 4 illustrate the ground water elevation trend at piezometers P-1 and P-2, P-5 and P-6, and P-7 and P-8, respectively. The ground water elevation in piezometer

P-2, located inside the capped area, is higher than the ground water elevation in piezometer P-1, installed outside the capped area. An inward hydraulic gradient exists in the northern and southern portions of the capped area, as the ground water elevations inside the capped area (P-6 and P-7) are lower than the ground water elevations outside the capped area (P-5 and P-8, respectively). The ground water elevation in piezometer P-3, installed within the center of the capped area, is higher than ground water elevations measured in piezometers P-1, P-5, and P-8, installed outside the capped area.

Although the data indicates an outward hydraulic gradient within the eastern portion of the capped area, the ground water elevations collected in the piezometers installed within the capped area (P-2, P-3, P-4, P-6, and P-7) are lower than originally measured in June 1997. The slight fluctuations in water elevations in the piezometers located within the capped area (P-2, P-3, P-4, P-6, and P-7) may be attributed to differences in: barometric pressure during sampling events; the movement of water within the capped area; and/or the low permeability of the materials. The fluctuations in water elevations in the piezometers located outside the capped area (P-1, P-5, and P-8) may be attributed to seasonal variations.

The contrasting fluctuations of ground water levels within and outside the capped area demonstrate that ground water within the capped area has been isolated. In addition, the ground water elevation in the standpipe (SP-1) in the ground water collection trench is lower than the water surface elevation of Quarry Lake, indicating that Quarry Lake is isolated from the capped area.

Ground water elevations of piezometers installed within the capped area along the northern (P-7), western (P-4), eastern (P-2), and southern (P-6) portions of the Site are higher than the invert elevations (bottom) of the ground water collection trench. The invert elevations of the ground water collection trench vary from 568.80 ft to 563.37 ft. This information indicates that the overall hydraulic gradient is to the west towards the ground water collection trench. In summary, the data indicates that the ground water collection trench is effectively removing ground water from within the capped area.

As discussed in the March 1998 monitoring report (O'Brien & Gere Engineers, 1998), based on an average daily flow rate to the ground water collection trench of 170 gallons/day and a hydraulic conductivity adjacent to the ground water collection trench of 3.3×10^{-6} cm/sec, it is estimated that approximately 110 years will be required to dewater the containment area. However, the amount of water present within the capped area and the time to dewater beneath the capped area has minimal impact on the effectiveness of the containment, since hydraulic isolation within the capped area has been established and ground water beneath the capped area is migrating towards the ground water collection trench.

1.3. Ground water sampling and chemistry

Between October 8 and 18, 2001, the ninth round of post-closure ground water samples was collected in accordance with the protocols presented in the O&M Manual. Ground water samples were obtained from the ten ground water monitoring wells identified for sampling in the O&M Manual (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, URS-9D, 88-12C, 88-12D, URS-14I, and URS-14D). In addition to the sampling of the monitoring wells, six piezometers (P-1, P-2, P-3, P-4, P-5, and P-6) were sampled at the request of the NYSDEC.

Following sample collection, the ground water samples were submitted to O'Brien & Gere Laboratories, Inc., for analysis of the parameters shown in Table 1-1.

Table 1-1. *Ground water analytical methods.*

Parameter	Method
VOCs [1,2]	USEPA Method 8260B
Inorganics [1,2]	USEPA Methods 6010B/7470A/7841
Cyanide [1,2]	USEPA Method 9010B/9014
SVOCs [2]	USEPA Methods
Pesticides/PCBs [2]	USEPA Method 8081/8082

Notes: [1] Parameters analyzed from monitoring wells
[2] Parameters analyzed from piezometers

Source: O'Brien & Gere Engineers, Inc.

Ground water sampling logs and chain of custody forms are included in Appendix B.

In accordance with the O&M Manual and as approved by the NYSDEC, sampling and analysis for target compound list (TCL) semi-volatile organic compounds (SVOCs) and polychlorinated biphenyls (PCBs)/pesticides were discontinued for the monitoring wells during the second through fifth years of monitoring. In accordance with the O&M Manual, sampling is to be continued semi-annually for TCL volatile organic compounds (VOCs) and target analyte list (TAL) metals during the second through fifth years of monitoring. In accordance with the NYSDEC-approved O&M Manual, the required sampling frequency will be re-evaluated after the fifth year of monitoring. As indicated in Table 1-1 above, the ground water samples collected from the piezometers were analyzed for TCL VOCs, TCL SVOCs, TCL PCB and pesticides, and TAL metals plus cyanide, as requested by NYSDEC.

Purge water generated during sampling of the monitoring wells and piezometers was contained, passed through a 25-micron bag filter, and

discharged to manhole MH-3. The water in manhole MH-3 was conveyed through the pre-treatment system prior to discharge to the Niagara County Sewer District (NCSD) interceptor system at manhole MH-16.

The laboratory analytical data was validated by Data Validation Services of North Creek, New York. The validation was performed in accordance with guidance from the most current editions of the United States Environmental Protection Agency (USEPA) Contract Laboratory Procedures (CLP) National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA Standard Operating Procedures (SOPs) HW-2 and HW-6. Results of the validation indicated that the samples were processed and analyzed in compliance with protocol requirements, and with adherence to quality criteria. All of the analytical results are useable, although minor qualifications are needed for some of the results. A copy of the data validation report is included in Appendix C.

Monitoring well analytical summary

Results of the ground water analyses (TCL VOCs and TAL Metals plus cyanide) from the monitoring wells, along with a comparison of the results with New York State Class GA standards, are summarized on Table 4. The New York State Class GA standards presented on Table 4 have been revised to reflect revisions to the New York State water quality standards (NYSDEC, 1999). In general, the October 2001 ground water chemistry is similar to previous sampling events.

Detected inorganic constituents that exceeded New York State Class GA standards from the ten monitoring wells sampled included iron at four locations (88-12C, URS-5D, URS-9D, and URS-9I) and sodium at ten locations (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, URS-9D, 88-12C, 88-12D, URS-14I, and URS-14D). Concentrations of iron are similar to historical data, except for the iron concentration in well URS-5D. However, detected concentrations of iron at URS-5D are similar to previously detected concentrations of iron in background well URS-14I. In addition, concentrations of sodium exceeded New York State Class GA standards in background wells URS-14I and URS-14D at similar concentrations as detected in the monitoring wells. It is likely that the elevated concentrations of sodium and iron are naturally occurring and are not related to previous site activities.

VOCs were not detected in the Site monitoring wells above the New York State Class GA standards.

Piezometer analytical summary

Results of the ground water analyses for TCL VOCs, TCL SVOCs, TCL PCB/Pesticides, and TAL Metals plus cyanide from the piezometers, along with a comparison of the results with New York State Class GA standards, are summarized on Tables 5, 6, 7, and 8, respectively.

As indicated on Table 5, VOCs detected in the piezometers that exceeded New York State Class GA Standards are summarized as follows:

- 1,1,1-trichloroethane (1,1,1-TCA) in P-4 and P-6
- 1,1-dichloroethane (1,1-DCA) in P-3, P-4, and P-6
- 1,1-dichloroethene (1,1-DCE) in P-4 and P-6
- 1,2-dichloroethane (1,2-DCA) in P-3, P-4, and P-6
- benzene in P-3 and P-4
- chloroform in P-3 and P-6
- 1,2-dichloroethene (1,2-DCE) in P-4 and P-6
- methylene chloride in P-6
- toluene in P-3 and P-6
- trichloroethene (TCE) in P-3, P-4, and P-6
- vinyl chloride in P-3 and P-4
- cis-1,2-dichloroethene (cis-1,2-DCE) in P-3, P-4, and P-6

The twelve VOCs identified above were detected in piezometers located within the capped area. VOCs were not detected above the New York State Class GA standards from piezometers located outside of the capped area.

As indicated on Table 6, SVOC constituents detected in the piezometers that exceeded New York State Class GA standards included 2-methylphenol, bis(2-chloroethoxy)methane, bis(2-chloroethyl)ether, and phenol in P-3 and 4-chloroaniline in P-6. Piezometers P-3 and P-6 are located within the capped area. SVOCs were not detected above New York State Class GA standards from piezometers located outside of the capped area.

As indicated on Table 7, PCBs and pesticides were not detected in the piezometer samples within or outside of the capped area.

As indicated on Table 8, inorganic constituents detected in the piezometers that exceeded New York State Class GA standards included iron at five locations (P-1, P-2, P-4, P-5, and P-6), sodium at all six locations, chromium at five locations (P-1, P-3, P-4, P-5, and P-6), manganese at three locations (P-2, P-4, and P-6), and arsenic at P-3. Similar to the monitoring wells, it is likely that the detected concentrations of iron, sodium, and manganese in the piezometers are related to naturally occurring concentrations of these constituents and not attributed to site-related activities. This is likely because upgradient wells URS-14I and URS-14D show similar concentrations of these constituents. While detected in one piezometer (P-3) located within the capped area, arsenic was not detected in piezometers outside of the capped area. Chromium was the only inorganic constituent detected outside of the capped area (P-1 and P-5) at concentrations above New York State Class GA standards.

As indicated in Section 1.2, inward hydraulic gradients have consistently been observed in the northeastern and southern portions of the capped area. However, inward gradients have not been readily observable in the vicinity of piezometers P-1 and P-2 along the eastern portion of the capped area. Although inward hydraulic gradients have not been observed in the vicinity of piezometers P-1 and P-2, evaluation of the

October 2001 analytical data from P-1 and P-2 indicates that VOCs, SVOCs, PCBs, pesticides were not detected at concentrations exceeding the New York State Class GA standards. Migration of these constituents via ground water in the vicinity of P-1 and P-2 is not supported by the analytical data. The concentration of chromium detected in P-1 is not likely due to migration of chromium from beneath the cap. If chromium is migrating from beneath the cap in the vicinity of P-1 and P-2, it would be expected that the concentration would be higher in P-2 (within the capped area) than the concentration at P-1 (outside the capped area). The concentration of chromium in P-2 is, however, lower than in P-1. In addition, the chromium concentration in P-5 (outside the capped area) is greater than in P-6 (within the capped area) even though inward hydraulic gradients have consistently been observed in the vicinity of these piezometers.

Statistical analysis

As specified in the O&M Manual, statistical analyses of the ground water chemistry data have been completed. A preliminary exploratory data analysis, using univariate statistics in SAS®, was performed for seventeen analytes that have been detected a total of nine or more times in various monitoring wells since the initial post-construction sampling event in June 1997. Based on the results of the preliminary exploratory data analysis, concentrations for sixteen analytes (at $\alpha = 0.10$) do not appear to be normally distributed. Arsenic appears to be normally distributed.

The October 2001 data represents the results of the ninth baseline data collection effort. A t-test analysis was conducted based on the data collected from the post-construction sampling events, between June 1997 and October 2001, to evaluate whether downgradient concentrations exceed upgradient concentrations, based on a comparison of downgradient wells with the appropriate upgradient wells, URS-14I or URS-14D. Based on the results of the t-test, Table 1-2 presents a summary of locations where constituent concentrations in downgradient wells exceeded concentrations at the appropriate upgradient comparison well, at a confidence level (α) equal to 0.05.

Table 1-2. *Results of the t-test analysis.*

Monitoring Well	Analytes with Higher Concentrations than in Upgradient Wells
85-5R	Calcium, Magnesium, Sodium
URS-5D	Calcium, Manganese, Nickel, Sodium
85-7R	Calcium, Magnesium, Sodium
URS-7D	Calcium, Magnesium, Manganese, Potassium, Sodium
URS-9I	Calcium, Magnesium
88-12C	Calcium, Magnesium, Arsenic
88-12D	Calcium, Magnesium, Manganese, Potassium, Sodium

Source: O'Brien & Gere Engineers, Inc.

It should be noted that there are currently no New York State Class GA standards for calcium, magnesium, or potassium. Concentrations of arsenic and manganese have not been detected above the New York State Class GA standards during the post-construction sampling. Currently, nickel has not been detected above the New York State Class GA standard, however since construction of the cap, nickel has been detected above the New York State Class GA standard twice in downgradient well URS-5D and once in the upgradient well URS-14I. In addition, it is likely that elevated concentrations of calcium, magnesium, manganese, potassium, and sodium are naturally occurring and are not related to previous site activities.

Results of the t-test analysis indicate that barium concentrations are greater in upgradient well URS-14I than in corresponding downgradient wells URS-9I and 88-12C, and greater in upgradient well URS-14D than in corresponding downgradient wells 88-12D and URS-9D, at a confidence level of α=0.05. T-test analysis results also indicate that sodium concentrations are greater in upgradient well URS-14I than in corresponding downgradient wells URS-9I and 88-12C, at a confidence level of α=0.05. Concentrations of barium in URS-9I, URS-9D, 88-12C, 88-12D, URS-14I, and URS-14D are below the New York State Class GA standard.

T-test analysis results indicate that calcium concentrations are greater in upgradient well URS-14D than in corresponding downgradient well URS-9D, at a confidence level of α=0.05. In addition, t-test analysis results indicate that zinc concentrations are greater in upgradient well URS-14I than in corresponding downgradient well 85-7R, at a confidence level of α=0.05.

Although carbon disulfide was detected in some of the samples and was detected in the trip blanks at levels above typical laboratory contamination, it is not considered valid data. Many samples show evidence of sulfur dioxide, based on a review of the analytical spectrum

by the data validator, which may be related to the detection of carbon disulfide. There are currently no New York State standards for carbon disulfide. In addition, carbon disulfide has been detected in the background wells.

2. Conclusions

Based on the data contained in this semi-annual report, the following conclusions are presented:

- The isolation of ground water within the capped area has been established and is being maintained by current operation and maintenance activities.

- The ground water elevation data indicates that ground water within the capped area is migrating to the west toward the ground water collection trench.

- The ground water elevation data indicates that the ground water collection trench is effectively removing shallow ground water from within the capped area.

- The October 2001 ground water chemistry collected from the monitoring wells is similar to previous sampling events.

- Results of the t-test analysis indicate that concentrations of arsenic (88-12C), calcium (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, 88-12C, and 88-12D), magnesium (85-5R, 85-7R, URS-7D, URS-9I, 88-12C, and 88-12D), manganese (URS-5D, URS-7D, and 88-12D), nickel (URS-9D), potassium (88-12D), and sodium (URS-5D, 85-7R, URS-7D, and 88-12D) exceed upgradient concentrations, based on a comparison of downgradient wells with the appropriate upgradient wells, URS-14I or URS-14D. There are currently no New York State Class GA standards for calcium, magnesium, or potassium. Concentrations of arsenic and manganese have not been detected above the New York State Class GA standards during the post-construction sampling. Nickel has been detected above New York State Class GA standards in both upgradient and downgradient wells since cap construction. It is likely that elevated concentrations of calcium, magnesium, manganese, potassium, and sodium are naturally occurring and are not related to previous site activities.

- Results of the t-test analysis indicated that several inorganic constituents were detected at higher concentrations in upgradient wells than in downgradient wells.

- Iron was detected in four monitoring wells at concentrations above New York State Class GA standards. Concentrations of iron have previously been detected in the background wells at similar concentrations. In addition, results of the t-test analysis indicate that concentrations of iron are not statistically higher downgradient than upgradient at the Site, indicating that the capped area is not impacting ground water.

- Sodium was detected in ten monitoring wells at concentrations above New York State Class GA standards. It is likely that sodium is naturally occurring and is not related to previous site activities.

- Although carbon disulfide was detected in some of the samples at levels above typical laboratory contamination, many samples show evidence of sulfur dioxide, based on a review of the analytical spectrum by the data validator, which may be related to the detection of carbon disulfide. There are currently no New York State standards for carbon disulfide. In addition, carbon disulfide was detected in the background wells.

- Samples analyzed from the piezometers indicated that inorganics, VOCs, and SVOCs were detected at concentrations that exceeded New York State Class GA standards. However, other than chromium at P-1 and P-5, these constituents were detected from piezometers within the capped area. It is not unexpected to encounter detectable concentrations of these constituents within the capped area.

- Review of the ground water elevations data on Figure 1 indicate that inward hydraulic gradients were observed between piezometers within the capped area and piezometers outside of the capped area, with the exception of the vicinity of P-1 and P-2. P-1, which is located outside of the capped area, and P-2 located within the capped area did not contain concentrations of VOCs, SVOCs, PCBs, pesticides, or inorganics (other than chromium (P-1), iron (P-1 and P-2), manganese (P-2), and sodium (P-1 and P-2)) that exceeded New York State Class GA standards. Not withstanding the absence of inward hydraulic gradients, potential contaminant migration in the P-1/P-2 area is not of concern given the analytical data for P-1 and P-2.

- Since VOCs are more readily transported in ground water compared with SVOCs, PCBs, and inorganics, the absence of VOCs detected at concentrations above the New York State Class GA standards in the monitoring wells and piezometers surrounding the capped area provides further evidence that contaminants are not migrating from beneath the cap.

References

New York State Department of Environmental Conservation, 1999. Title 6, Chapter X, Subchapter A, Article 2, Part 703.5, Table 1, Water Quality Standards Surface Waters and Groundwater, Effective August 4, 1999.

O'Brien & Gere Engineers, 1997. Operation and Maintenance Manual, Frontier Chemical - Pendleton Site, Town of Pendleton, Niagara County, New York, Pendleton Site PRP Group, March 1997.

O'Brien & Gere Engineers, 1998. Frontier Chemical - Pendleton Site, Semi-Annual Ground Water Monitoring Report, Pendleton Site PRP Group, March 1998.

Table 1

Frontier Chemical - Pendleton Site

Piezometer Ground Water Elevation Summary Table

Piezometer		Location	Top of Riser Elev. (ft)	Top of Cover Elev. (ft)	Depth (ft below riser)	Screened Elev. (ft)	Ground water elevation (ft)										
							6/24/97	9/30/97	2/23/98	4/28/98	9/17/98	2/3/99	8/11/99	2/7/00	8/9/00	2/12/01	10/8/01
P-1	(O)	Eastern portion	583.21	583.30	16.4	576.8 - 566.8	579.54	577.09	579.25	579.60	575.62	572.97	575.83	573.76	576.66	577.24	574.27
P-2	(I)	of capped area	582.90	583.20	15.7	577.2 - 567.2	579.60	579.24	578.20	578.37	578.76	576.96	578.27	575.59	577.60	577.24	577.36
P-3	(I)	Center of capped area	606.33	606.64	39.7	586.6 - 566.6	580.36	580.38	580.06	579.94	579.80	579.96	579.38	579.29	578.95	577.24	578.64
P-4	(I)	Adjacent to	582.31	583.85	15.6	576.7 - 566.7	577.15	577.43	576.70	575.11	575.96	574.58	575.56	573.96	575.11	573.90	576.51
SP-1	(T)	Quarry Lake	579.86	580.07	15.0	bop = 564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<564.9	<565.20
P-5	(O)	Southern portion	583.05	583.55	15.5	577.6 - 567.6	576.87	577.25	578.57	579.31	576.13	574.70	576.48	578.16	579.02	578.70	577.88
P-6	(I)	of capped area	584.45	584.60	16.2	578.3 - 568.3	578.77	579.17	578.14	578.20	578.63	577.94	578.28	577.74	577.78	577.12	577.49
P-7	(I)	Northern portion	580.97	582.00	15.9	575.0 - 565.0	578.33	578.62	576.45	576.17	577.15	574.43	575.55	573.02	574.97	573.21	576.04
P-8	(O)	of capped area	582.83	583.00	17.3	575.5 - 565.5	577.76	578.87	578.75	579.61	576.90	574.72	576.15	576.12	578.26	577.43	576.15

Notes:

1. Elevation based on USGS Datum.
2. bop = bottom of pipe.
3. O = piezometer located outside of capped area.
4. I = piezometer located inside capped area.
5. T = standpipe located within the ground water collection trench.
6. The top of riser of piezometer P-4 was modified on 4/28/98 from 583.68 ft to 582.31 ft to allow clearance for the installation of a locking expansion plug beneath the flush-mounted cover.
7. The top of riser of piezometer P-7 was modified on 4/28/98 from 581.84 ft to 580.97 ft to allow clearance for the installation of a locking expansion plug beneath the flush-mounted cover.

Table 2

Frontier Chemical - Pendleton Site

Monitoring Well Ground Water Elevation Summary Table

Monitoring Well	Location	Top of Riser Elev. (ft)	Ground Elev. (ft)	Depth (ft below riser)	Screened Elev. (ft)	Ground water elevation (ft)										
						6/24/97	9/30/97	2/23/98	4/28/98	9/17/98	2/3/99	8/11/99	2/7/00	8/9/00	2/12/01	10/8/01
URS-14I	Upgradient well nest	581.14	580.84	31.0	550.1 - 555.1	577.15	578.77	580.24	580.14	574.76	577.35	575.42	577.68	577.74	579.58	573.49
URS-14D	in church parking lot	580.71	580.85	41.5	539.2 - 544.2	575.50	574.28	575.87	576.05	573.94	572.89	571.92	571.87	573.05	574.41	571.96
URS-9I	Southern well nest	581.68	579.90	46.0	535.6 - 540.6	575.38	574.22	575.69	575.91	573.76	572.67	571.82	571.78	572.98	574.17	571.95
URS-9D	along Town Line Road	580.80	579.00	46.5	534.3 - 539.3	575.36	574.21	575.68	575.89	573.64	572.66	571.24	571.66	572.94	574.15	571.91
85-5R	Middle well nest	580.84	578.70	40.0	540.9 - 542.9	574.70	573.97	575.39	575.70	574.98	572.78	571.92	571.10	572.95	573.76	571.78
URS-5D	along Town Line Road	580.60	578.00	49.9	530.8 - 535.8	574.73	574.02	575.42	575.74	573.80	572.12	571.97	571.39	572.89	573.80	571.98
85-7R	North well nest	577.90	576.60	27.8	550.2 - 552.2	575.09	574.21	575.53	575.87	573.74	572.30	572.04	571.52	573.10	573.95	571.80
URS-7D	along Town Line Road	579.35	576.50	39.9	539.5 - 544.5	575.15	574.35	575.60	575.99	573.75	572.40	571.99	571.57	573.13	574.14	571.80
88-12C	Well nest outside northeast	583.12	583.70	31.3	551.8 - 553.8	576.60	574.03	576.53	577.06	572.79	571.72	571.26	571.12	573.01	574.34	571.55
88-12D	portion of capped area	582.87	583.28	54.5	528.4 - 533.4	575.72	574.54	576.17	576.33	574.00	572.97	572.36	572.33	573.53	574.74	572.72

Notes:

1. Elevation based on USGS Datum.

Table 3
Frontier Chemical - Pendleton Site
Quarry Lake Surface Water Elevation Summary Table

Date	Quarry Lake Surface Water Elevation (ft) (1)
9/8/97	572.3
2/23/98	578.0
4/30/98	578.26
9/21/98	577.42
2/4/99	577.97
8/4/99	577.60
2/7/00	578.16 (2)
8/10/00	578.07
2/14/01	578.47
10/8/01	577.39

Notes:
1. Elevation based on USGS Datum.
2. Ice surface elevation.

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	85-5R	85-5R	85-5R	85-5R	85-5R	85-5R
	Sample Date		08/01/90	02/01/91	10/01/92	06/25/97	02/24/98	09/18/98
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	2 J	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	5 U	5 U	0.5 U	NA	NA	NA
2-Butanone (MEK)		NC	10 U	10 U	0.5 U	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)		NC	2 J	10 U	0.5 U	5 U	5 U	5 U
Acetone		NC	R	10 U	0.5 U	10 U	10 UJ	10 UJ
Benzene		1	[15]	5 U	0.5 U	0.5 U	0.34 J	0.5 U
Bromodichloromethane		NC	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	5 U	5 U	0.5 U	0.74 U	0.11 U	0.5 U
Chlorobenzene		5	NA	NA	NA	0.5 U	0.28 J	0.5 U
Chloroform		7	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	5 U	5 U	0.5 U	0.5 U	0.24 J	0.5 U
Methylene chloride		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene		5	5 U	5 U	0.5 U	0.5 U	0.14 J	0.5 U
Trichloroethene		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	10 U	10 U	0.5 U	1 U	1 U	1 U
Xylene (total)		5	5 U	5 U	0.5 U	0.5 U	0.96	0.5 U
cis-1,2-Dichloroethene		5	NA	NA	NA	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	214	37.8 B	153	100 U	300	100 U
Antimony		3	18 U	[42.4 B]	80 U	10 U	10 U	5 U
Arsenic		25	1 B	1 U	10 U	10 U	10 U	5 U
Barium		1000	73.5 B	23.4 B	15	40	80	50 J
Beryllium		NC	1 U	1 U	1 U	3 U	3 U	3 U
Cadmium		5	1 U	2 U	5 U	1 U	1 U	1 U
Calcium		NC	355000	378000	321000	270000	220000	220000
Chromium		50	7.5 B	4 U	5 U	10 U	30	10
Cobalt		NC	2 U	3 U	5 U	30 U	30 U	25 U
Copper		200	4 U	12 U	11	10 U	10 U	10 U
Cyanide		200	10 U	10 U	2 U	10 UJ	10 U	10 U
Iron		300	[669]	[915]	[419]	140	[2300]	190
Lead		25	1 U	1.2 B	10 U	10 U	10 U	5 U
Magnesium		NC	106000	170000	139000	130000	85000	110000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	85-5R	85-5R	85-5R	85-5R	85-5R	85-5R
	Sample Date		02/04/99	08/13/99	02/08/00	08/11/00	02/13/01	10/11/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	10 U	10 UJ	10 UJ	10 U	10 UJ	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 U	5 U	5 UJ	5 U	5 U	5 U
Acetone		NC	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzene		1	0.5 U	0.1 J	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.83 U	18	0.5 UJ	0.59 U	0.5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 U	2 U	5 U	2 U	2 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	0.5 U	0.17 J	0.1 J	0.11 J	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	100 U	100 U	100 U	100 U	100 U
Antimony		3	5 U	5 U	5 U	5 U	5 U	5 U
Arsenic		25	5 U	5 UJ	5 U	5 U	5 U	5 U
Barium		1000	100 U	60	60	60	40	50
Beryllium		NC	10 U	3 U	3 U	3 U	3 U	0.1 J
Cadmium		5	10 U	1 U	1 U	1 U	1 U	1 U
Calcium		NC	130000	220000	200000	190000	140000	160000
Chromium		50	10 U	10 U	10 U	10 U	10 U	10 J
Cobalt		NC	50 U	25 U	25 U	20 U	25 U	20 U
Copper		200	10 U	10 U	10 U	10 U	10 U	1 J
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10 U
Iron		300	50 U	100	50 U	[420]	50 U	10 J
Lead		25	5 U	5 U	5 U	5 U	5 U	5 U
Magnesium		NC	59000	99000	90000	85000	62000	61000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	85-5R	85-5R	85-5R	85-5R	85-5R	85-5R
	Sample Date		02/04/99	08/13/99	02/08/00	08/11/00	02/13/01	10/11/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	50 U	80	110	130 J	50	50 J
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	50 U	50 U	10 J
Potassium		NC	5000 U	5000	5000 U	5000 U	5000 U	4000 J
Selenium		10	5 UJ	5 UJ	5 UJ	5 U	5 UJ	5 U
Silver		50	10 U	10 U	10 U	10 U	10 U	1 J
Sodium		20000	[52000]	[96000]	[67000]	[69000]	[62000]	[87000]
Thallium		NC	1 U	5 U	2 U	2 U	2 U	2 U
Vanadium		NC	50 U	50 U	50 U	50 U	50 U	2 J
Zinc		NC	10 U	10 J	10	10 U	20	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	85-7R	85-7R	85-7R	85-7R	85-7R	85-7R
	Sample Date		08/01/90	02/01/91	10/01/92	06/24/97	02/24/98	09/18/98
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	5 U	5 U	0.5 U	NA	NA	NA
2-Butanone (MEK)		NC	10 U	10 U	0.5 U	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)		NC	10 U	10 U	0.5 U	5 U	5 U	5 U
Acetone		NC	10 U	R	0.5 U	10 U	10 UJ	10 UJ
Benzene		1	[6]	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	5 U	5 U	0.5 U	1.9 U	0.13 J	0.5 U
Chlorobenzene		5	NA	NA	NA	0.5 U	0.5 U	0.5 U
Chloroform		7	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene		5	5 U	1 J	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	10 U	10 U	0.5 U	1 U	1 U	1 U
Xylene (total)		5	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	NA	NA	NA	0.14 J	0.19 U	0.14 J
Metals								
Aluminum		NC	277	265	249	100 U	100 U	100 U
Antimony		3	[28.3 B]	26 U	80 U	10 U	10 U	5 U
Arsenic		25	1.4 B	1.7 B	10 U	10 U	10 U	5 U
Barium		1000	91 B	143 B	106	100	80	50 J
Beryllium		NC	1 U	1 U	1 U	3 U	3 U	3 U
Cadmium		5	1 U	2 U	5 U	1 U	1 U	1 U
Calcium		NC	354000	298000	389000	350000	350000	420000
Chromium		50	3 U	4 U	5 U	10 U	10 U	10 U
Cobalt		NC	2 U	3 U	5 U	30 U	30 U	25 U
Copper		200	4 U	12 U	8	10 U	10 U	10 U
Cyanide		200	10 U	10 U	2 U	10 UJ	10 U	10 U
Iron		300	[586]	[820]	[435]	190	[310]	270
Lead		25	1 U	2.6 B	10 U	10 U	10 U	5 U
Magnesium		NC	119000	42600	124000	120000	120000	140000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	85-7R	88-12C	88-12C	88-12C	88-12C	88-12C
	Sample Date		10/18/01	08/01/90	02/01/91	10/01/92	06/24/97	02/25/98
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	NA	45.4	37.8	54	10	70
Mercury		0.7	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	NA	14.6 B	13 U	5 U	50 U	50 U
Potassium		NC	NA	2520 B	3200 B	3000	5000 U	5000 U
Selenium		10	NA	2 U	1 U	5 U	10 U	10 U
Silver		50	NA	4 U	3 U	10 U	10 U	10 U
Sodium		20000	NA	[34600]	[41100]	[41300]	[47000 J]	[43000]
Thallium		NC	NA	1 U	2 U	80 U	10 U	13
Vanadium		NC	NA	22.1 B	10 B	5 U	50 U	50 U
Zinc		NC	NA	10.1 B	15.7 B	10 U	20	20

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	88-12C	88-12C	88-12C	88-12C	88-12C	88-12C
	Sample Date		09/17/98	02/04/99	08/11/99	02/07/00	08/10/00	02/12/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	10 U	10 U	10 UJ	10 UJ	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	5 U	5 U	5 UJ	5 UJ	5 U	5 U
Acetone		NC	10 UJ	10 U	10 UJ	10 UJ	10 UJ	10 UJ
Benzene		1	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.5 U	0.5 UJ	0.84	0.5 UJ	0.72 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 U	0.5 UJ	2 U	5 U	2 U
Toluene		5	0.5 U	0.5 U	0.5 UJ	0.19 J	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	1 U	1 U	1 UJ	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	0.5 UJ	0.15 J	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	600	100 U	100 U	100 U	100 U
Antimony		3	5 U	5 U	5 U	5 U	5 U	5 U
Arsenic		25	10	12	11 J	12	12 J	11
Barium		1000	20 U	20 U	20 U	20 U	20 U	20 U
Beryllium		NC	3 U	3 U	3 U	3 U	3 U	3 U
Cadmium		5	1 U	1 U	1 U	1 U	1 U	1 U
Calcium		NC	71000	76000	80000	78000	78000	76000
Chromium		50	10	20	10 U	10 U	10 U	10 U
Cobalt		NC	25 U	25 U	25 U	25 U	20 U	25 U
Copper		200	10 U	10 U	10 U	10 U	10 U	10 U
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10 U
Iron		300	[330]	[1600]	100	200	[590]	80
Lead		25	5 U	5 U	5 U	5 U	5 U	5 U
Magnesium		NC	110000	100000	110000	110000	110000	100000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

File Number: 5829.22038

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

	Sample ID	NYS Class GA Water Quality	88-12C	88-12C	88-12C	88-12C	88-12C	88-12C
	Sample Date	Standards	09/17/98	02/04/99	08/11/99	02/07/00	08/10/00	02/12/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound								
Manganese		300	10	40	20	20	10 J	20
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	50 U	50 U	50 U
Potassium		NC	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Selenium		10	5 U	5 UJ	5 UJ	5 UJ	5 U	5 UJ
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[40000]	[42000]	[50000]	[47000]	[48000]	[43000]
Thallium		NC	1 UJ	1 U	5 U	2 U	2 U	2 U
Vanadium		NC	50 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10 U	20 J	20	10 U	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	88-12C	88-12D	88-12D	88-12D	88-12D	88-12D
	Sample Date		10/11/01	08/29/90	02/26/91	06/24/97	02/25/98	09/17/98
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	NA	NA	2 J	NA	NA	NA
2-Butanone (MEK)		NC	10 UJ	NA	NA	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	NA	NA	5 U	5 U	5 U
Acetone		NC	10 UJ	NA	NA	10 U	10 UJ	10 UJ
Benzene		1	0.5 UJ	1 J	0.9 J	0.5 U	0.13 J	0.13 J
Bromodichloromethane		NC	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 UJ	NA	6	0.63 U	0.13 U	0.56
Chlorobenzene		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 UJ	NA	NA	0.5 U	0.11 J	0.5 U
Methylene chloride		5	2 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Toluene		5	0.5 UJ	R	[13]	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 UJ	NA	[6]	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	1 UJ	NA	NA	1 U	1 U	1 U
Xylene (total)		5	0.5 UJ	NA	NA	0.5 U	0.48 J	0.5 U
cis-1,2-Dichloroethene		5	0.5 UJ	NA	NA	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	50.7 B	172 B	100 U	100 U	100 U
Antimony		3	5 U	NA	[56.1 B]	10 U	10 U	5 U
Arsenic		25	14	NA	1.3 BW	10 U	10 U	5 U
Barium		1000	10 J	2.9 B	7.9 B	20 U	20 U	20 U
Beryllium		NC	3 U	NA	NA	3 U	3 U	3 U
Cadmium		5	1 U	NA	NA	1 U	1 U	1 U
Calcium		NC	70000	464000	623000 E	490000	480000	630000
Chromium		50	10 J	7.6 B	27.8 E	10	30	30
Cobalt		NC	20 U	NA	NA	30 U	30 U	25 U
Copper		200	10 U	NA	NA	10 U	10 U	10 U
Cyanide		200	10 U	NA	NA	10 UJ	10 U	10 U
Iron		300	[540]	168	250	180	[480]	110
Lead		25	5 U	NA	1.8 BW	10 U	10 U	5 U
Magnesium		NC	100000	109000	199000 E	130000	110000	180000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	88-12C	88-12D	88-12D	88-12D	88-12D	88-12D
	Sample Date		10/11/01	08/29/90	02/26/91	06/24/97	02/25/98	09/17/98
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	20 J	33.9	[696]	90	60	40
Mercury		0.7	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U
Nickel		100	1 J	NA	25.5 B	50 U	50 U	50 U
Potassium		NC	2000 J	11.5 B	12000 E	6000	6000	10000
Selenium		10	5 U	[5310]	NA	10 U	10 U	6
Silver		50	10 U	NA	NA	10 U	10 U	10 U
Sodium		20000	[46000]	[66400]	[474000]	[140000 J]	[100000]	[330000]
Thallium		NC	2 U	NA	NA	10 U	10 U	1 UJ
Vanadium		NC	50 U	51.6	2.4 B	50 U	50 U	50 U
Zinc		NC	10 U	7.9 B	NA	10 U	10	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	88-12D	88-12D	88-12D	88-12D	88-12D	88-12D
	Sample Date		02/04/99	08/11/99	02/07/00	08/10/00	02/12/01	10/11/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	10 U	10 UJ	10 UJ	10 U	10 UJ	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 U	5 UJ	5 UJ	5 U	5 U	5 U
Acetone		NC	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzene		1	0.5 U	0.16 J	0.5 U	0.5 U	0.5 U	0.22 J
Bromodichloromethane		NC	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.7 J	0.68 UJ	77	0.5 UJ	2.7 U	0.51 U
Chlorobenzene		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 UJ	2 U	5 U	2 U	2 U
Toluene		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	1 U	1 UJ	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	100 U	100 U	100 U	100 U	100 U
Antimony		3	5 U	5 U	5 U	5 U	5 U	5 U
Arsenic		25	5 U	5 UJ	6	5 U	5 U	6
Barium		1000	20 U	20 U	20 U	20 U	20 U	10 J
Beryllium		NC	3 U	3 U	3 U	3 U	3 U	3 U
Cadmium		5	1 U	1 U	1 U	1 U	1 U	1 U
Calcium		NC	630000	670000	720000	630000	620000	790000
Chromium		50	[90]	10 U	20	10 U	[60]	10
Cobalt		NC	25 U	25 U	25 U	20 U	25 U	20 U
Copper		200	10 U	10 U	10 U	10 U	10 U	10 U
Cyanide		200	10 U	12	10 U	10 U	10 U	10 U
Iron		300	[650]	90	70	50 U	[330]	60
Lead		25	5 U	5 U	5 U	5 U	5 U	5 U
Magnesium		NC	160000	180000	210000	160000	150000	240000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

	Sample ID	NYS Class GA Water Quality	88-12D	88-12D	88-12D	88-12D	88-12D	88-12D
	Sample Date	Standards	02/04/99	08/11/99	02/07/00	08/10/00	02/12/01	10/11/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound								
Manganese		300	50	30	30	20 J	20	30 J
Mercury		0.7	0.2 U	0.2 U	0.2 J	0.2	0.2 U	0.2 U
Nickel		100	70	50 U	50 U	50 U	50 U	20 J
Potassium		NC	9000	9000	11000	9000	9000	19000
Selenium		10	5 UJ	5 UJ	5 UJ	5 U	5 UJ	5 U
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[250000]	[330000]	[450000]	[240000]	[180000]	[690000]
Thallium		NC	1 U	5 U	2 U	2 U	2 U	2 U
Vanadium		NC	50 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10 J	10	10 U	20	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D
	Sample Date		02/01/91	10/01/92	06/24/97	02/25/98	09/17/98	02/05/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1,2,2-Tetrachloroethane		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1-Dichloroethane		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,2-Dichloroethene		5	5 U	0.5 U	NA	NA	NA	NA
2-Butanone (MEK)		NC	10 U	0.5 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	10 U	0.5 U	5 U	5 U	5 U	5 UJ
Acetone		NC	10 U	0.5 U	10 U	10 UJ	10 UJ	10 UJ
Benzene		1	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Bromodichloromethane		NC	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Carbon disulfide		NC	5 U	0.5 U	1.6 U	0.27 U	0.47 J	1.1 J
Chlorobenzene		5	NA	NA	0.5 U	0.5 U	0.5 U	0.5 UJ
Chloroform		7	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Dibromochloromethane		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Ethylbenzene		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Methylene chloride		5	R	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Toluene		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Trichloroethene		5	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Vinyl chloride		2	10 U	0.5 U	1 U	1 U	1 U	1 UJ
Xylene (total)		5	5 U	0.5 U	0.11 J	0.21 J	0.5 U	0.5 UJ
cis-1,2-Dichloroethene		5	NA	NA	0.5 U	0.5 U	0.5 U	0.5 UJ
Metals								
Aluminum		NC	99.8	100 U	100 U	100 U	100 U	100 U
Antimony		3	[32.1 B]	80 U	10 U	10 U	5 U	5 U
Arsenic		25	2 B	10 U	10 U	10 U	5 U	5 U
Barium		1000	25.5 B	23	20	20 U	20 U	40
Beryllium		NC	1 U	1 U	3 U	3 U	3 U	3 U
Cadmium		5	2 U	5 U	1 U	1 U	1 U	1 U
Calcium		NC	255000	292000	210000	250000	310000	280000
Chromium		50	10.3	7	10 U	10 U	10	10 U
Cobalt		NC	3 U	5 U	30 U	30 U	25 U	25 U
Copper		200	12 U	8	10 U	10 U	10 U	10 U
Cyanide		200	12.2 U	8 U	10 UJ	10	10	10 U
Iron		300	[357]	193	50 U	50 U	50 U	80
Lead		25	1.1 B	10 U	10 U	10 U	5 U	5 U
Magnesium		NC	75200	78000	61000	66000	81000	71000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D
	Sample Date		02/01/91	10/01/92	06/24/97	02/25/98	09/17/98	02/05/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	30.8	27	10 U	10 U	10 U	10 U
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	13 U	5 U	50 U	50 U	50 U	50 U
Potassium		NC	4250 B	3700	5000 U	5000 U	5000 U	5000 U
Selenium		10	1 U	5 U	10 U	10 U	5 U	5 UJ
Silver		50	3 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[40700]	[38700]	[52000 J]	[49000]	[50000]	[48000]
Thallium		NC	2 U	80 U	10 U	10 U	1 UJ	1 U
Vanadium		NC	2 U	5 U	50 U	50 U	50 U	50 U
Zinc		NC	26.8	10 U	10 U	10	10	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP
File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D	URS-14I
	Sample Date		08/12/99	02/08/00	08/10/00	02/13/01	10/08/01	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.29 J	0.5 U	5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	NA	5 U
2-Butanone (MEK)		NC	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 U	5 UJ	5 U	5 U	5 U	10 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Carbon disulfide		NC	0.5 U	6.7	0.5 UJ	1.8 U	0.5 U	5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Methylene chloride		5	0.5 U	2 U	5 U	2 U	2 U	5 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	1 U	10 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Metals								
Aluminum		NC	100 U	100 U	100	100 U	100 U	7140
Antimony		3	5 U	5 U	5 U	5 U	5 U	26 U
Arsenic		25	5 UJ	5 U	5 U	5 U	5 U	7.2 B
Barium		1000	30	30	30	20 U	20 J	115 B
Beryllium		NC	3 U	3 U	3 U	3 U	3 U	1.2 B
Cadmium		5	1 U	1 U	1 U	1 U	1 U	2 U
Calcium		NC	360000	310000	320000	260000	320000	73900
Chromium		50	10 U	10 U	20	10	10 J	30.9
Cobalt		NC	25 U	25 U	20 U	25 U	20 U	5.8 B
Copper		200	10 U	10 U	10 U	10 U	10 U	18.5 B
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10 U
Iron		300	50 U	50 U	[340]	110	40 J	[10400]
Lead		25	5 U	5 U	5 U	5 U	5 U	7.5
Magnesium		NC	91000	83000	84000	74000	88000	32800

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14D	URS-14D	URS-14D	URS-14D	URS-14D	URS-14I
	Sample Date		08/12/99	02/08/00	08/10/00	02/13/01	10/08/01	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	10	10 U	20 J	10	10 J	[484]
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	50 U	1 J	30.4 B
Potassium		NC	5000 U	5000 U	5000 U	5000 U	3000 J	17100
Selenium		10	5 UJ	5 UJ	5 U	5 UJ	5 U	1 U
Silver		50	10 U	10 U	10 U	10 U	10 U	3 U
Sodium		20000	[58000]	[47000]	[45000]	[35000]	[41000]	[44700]
Thallium		NC	5 U	2 U	2 U	2 U	2 U	2 U
Vanadium		NC	50 U	50 U	50 U	50 U	50 U	16.1 B
Zinc		NC	10 U	10 U	10 U	10	10 U	52.3

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14I	URS-14I	URS-14I	URS-14I	URS-14I	URS-14I
	Sample Date		10/01/92	06/26/97	02/25/98	09/17/98	02/05/99	08/13/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	0.5 U	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	0.5 U	10 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	0.5 U	5 U	5 U	5 U	5 U	5 U
Acetone		NC	0.5 U	10 U	10 UJ	10 UJ	10 U	10 UJ
Benzene		1	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.5 U	1.8 U	0.5 U	0.5 U	0.5 UJ
Chlorobenzene		5	NA	0.5 U	0.81	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.13 J	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Toluene		5	0.5 U	0.5 U	0.15 J	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	0.5 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	1170	1300	400	100 U	300	100 U
Antimony		3	80 U	10 U	10 U	5 U	5 U	5 U
Arsenic		25	10 U	10 U	10 U	5 U	5	5 UJ
Barium		1000	47	50	40	40 J	40	50
Beryllium		NC	1 U	3 U	3 U	3 U	3 U	3 U
Cadmium		5	5 U	1 U	1	1 U	1 U	1 U
Calcium		NC	35200	28000	21000	23000	26000	30000
Chromium		50	5 U	10 UJ	[160]	10 U	10 U	10 U
Cobalt		NC	5 U	30 U	30 U	25 U	25 U	25 U
Copper		200	8	10 U	10	10 U	10 U	10 U
Cyanide		200	2 U	10 UJ	10 U	10 U	10 U	10 U
Iron		300	[2060]	[1800]	[2300]	50 U	[320]	50 U
Lead		25	10 U	10 U	10 U	5 U	5 U	5 U
Magnesium		NC	22300	21000	17000	21000	23000	25000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14I	URS-14I	URS-14I	URS-14I	URS-14I	URS-14I
	Sample Date		10/01/92	06/26/97	02/25/98	09/17/98	02/05/99	08/13/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	145	70	60	10 U	10 U	10 U
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	5 U	50 U	[170]	50 U	50 U	50 U
Potassium		NC	5500	5000 UJ	25000	8000	6000	6000
Selenium		10	5 U	10 U	10 U	5 U	5 UJ	5 UJ
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[42500]	[58000 J]	[48000]	[48000]	[54000]	[62000]
Thallium		NC	80 U	10 U	6	1 UJ	1 U	5 U
Vanadium		NC	5 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10	30	10 U	10 U	30 J

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14I	URS-14I	URS-14I	URS-14I	URS-5D	URS-5D
	Sample Date		02/09/00	08/11/00	02/14/01	10/09/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	10 U	5 U
2-Butanone (MEK)		NC	10 UJ	10 U	10 UJ	10 UJ	20 U	R
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	5 U	5 U	5 UJ	20 U	10 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ	250	R
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Carbon disulfide		NC	1.2	0.5 UJ	0.58 U	0.5 UJ	10 U	5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 UJ	NA	NA
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Methylene chloride		5	0.17 J	5 U	2 U	2 UJ	10 U	R
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	1 J
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 UJ	20 U	10 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	0.5 J
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 UJ	NA	NA
Metals								
Aluminum		NC	100 U	100 U	200	100 U	104 U	35 U
Antimony		3	5 U	5 U	5 U	5 U	18 U	[31.5 B]
Arsenic		25	6	5 U	5 U	5 J	1.3 B	1 B
Barium		1000	50	60	50	40	224	71.7 B
Beryllium		NC	3 U	3 U	3 U	3 U	1 U	1 U
Cadmium		5	2	1 U	1 U	1 U	1 U	2 U
Calcium		NC	34000	32000	32000	31000	378000	407000
Chromium		50	10	10 U	10 U	10 J	3 B	4 U
Cobalt		NC	25 U	20 U	25 U	20 U	2 U	3 U
Copper		200	10 U	10 U	10 U	0.7 J	4 U	12 U
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10 U
Iron		300	50 U	50 U	220	10 J	188	143
Lead		25	5 U	5 U	5 U	5 U	1 U	1.3 B
Magnesium		NC	29000	26000	25000	25000	33300	2450 B

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-14I	URS-14I	URS-14I	URS-14I	URS-5D	URS-5D
	Sample Date		02/09/00	08/11/00	02/14/01	10/09/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	10 U	250 J	20	20 J	8.8 B	3.5 B
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	10 J	11.4 B	13 U
Potassium		NC	5000 U	5000 U	5000 U	4000 J	22700	16900
Selenium		10	5 UJ	5 U	5 UJ	5 U	2 U	1 U
Silver		50	10 U	10 U	10 U	10 U	4 U	3 U
Sodium		20000	[67000]	[59000]	[56000]	[56000]	[192000]	[194000]
Thallium		NC	2 U	2 U	2 U	2 U	1 U	2 U
Vanadium		NC	50 U	50 U	50 U	1 J	3.8 B	2 U
Zinc		NC	20	10 U	10	10 U	19.9 B	14.7 B

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

	Sample ID	NYS Class GA Water Quality	URS-5D	URS-5D	URS-5D	URS-5D	URS-5D	URS-5D
	Sample Date	Standards	10/01/92	06/25/97	02/24/98	09/18/98	02/04/99	08/13/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound								
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	0.5 U	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	0.5 U	10 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	0.5 U	5 U	5 U	5 U	5 U	5 U
Acetone		NC	0.5 U	10 U	10 UJ	10 UJ	10 U	10 UJ
Benzene		1	1	0.5 U	0.25 J	0.11 J	0.5 U	0.16 J
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.1 U
Chlorobenzene		5	NA	0.5 U	0.31 J	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.32 J	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene		5	0.5 U	0.5 U	0.19 J	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	0.5 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	1.5	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	100 U	100 U	100 U	100 U	100 U
Antimony		3	80 U	10 U	10 U	5 U	5 U	5 U
Arsenic		25	10 U	10 U	10 U	5 U	5 U	5 UJ
Barium		1000	32	20	20 U	20 U	100 U	20
Beryllium		NC	1 U	3 U	3 U	3 U	10 U	3 U
Cadmium		5	5 U	1 U	1 U	1 U	10 U	1 U
Calcium		NC	387000	440000	300000	490000	510000	490000
Chromium		50	5 U	10 U	10 U	10 U	10 U	10 U
Cobalt		NC	5 U	30 U	60	210	850	350
Copper		200	8	10 U	10 U	10 U	10 U	10 U
Cyanide		200	2 U	10 UJ	10 U	10 U	10 U	10 U
Iron		300	25	50 U	120	50 U	50 U	50 U
Lead		25	12	10 U	10 U	5 U	5 U	5 U
Magnesium		NC	570000	100000	24000	87000	76000	93000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-5D	URS-5D	URS-5D	URS-5D	URS-5D	URS-5D
	Sample Date		10/01/92	06/25/97	02/24/98	09/18/98	02/04/99	08/13/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	5 U	50	10	70	70	50
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	5 U	90	50 U	[180]	90	80
Potassium		NC	8500	5000 U	5000 U	5000 U	5000	5000 U
Selenium		10	5 U	10 U	10 U	5 U	5 UJ	5 UJ
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[114000]	[88000 J]	[93000]	[94000]	[120000]	[110000]
Thallium		NC	80 U	10 U	10 U	1 UJ	1 U	5 U
Vanadium		NC	5 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10 U	10	10 U	10 U	10 J

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-5D	URS-5D	URS-5D	URS-5D	URS-7D	URS-7D
	Sample Date		02/08/00	08/11/00	02/13/01	10/11/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	5 U	5 U
2-Butanone (MEK)		NC	10 UJ	10 U	10 UJ	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	5 U	5 U	5 U	10 U	10 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ	120	R
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Carbon disulfide		NC	4.2	0.5 UJ	0.73 U	0.5 U	0.5 J	5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Methylene chloride		5	2 U	5 U	2 U	2 U	5 U	5 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	10 U	10 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Metals								
Aluminum		NC	100 U	300	200	200	167 B	52.5 B
Antimony		3	5 U	5 U	5 U	5 U	[20.5 B]	[36.3 B]
Arsenic		25	5 U	5 U	5 U	5 U	1 U	1 U
Barium		1000	20 U	20	20	20	20.3 B	47.2 B
Beryllium		NC	3 U	3 U	3 U	0.2 J	1 U	1 U
Cadmium		5	1 U	1 U	1 U	1 U	1 U	2 U
Calcium		NC	500000	430000	490000	490000	277000	333000
Chromium		50	10 U	20	30	30	3 U	4 U
Cobalt		NC	59	50	130	80	2 U	3 U
Copper		200	10 U	10 U	10 U	3 J	4 U	12 U
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10 U
Iron		300	50 U	[410]	[1000]	[560]	[387]	283
Lead		25	5 U	5 U	5 U	5 U	1 U	1 U
Magnesium		NC	97000	52000	88000	66000	96200	115000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-5D	URS-5D	URS-5D	URS-5D	URS-7D	URS-7D
	Sample Date		02/08/00	08/11/00	02/13/01	10/11/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	60	20 J	60	50 J	71.2	140
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50	50 U	[170]	90	23.5 B	13 U
Potassium		NC	5000 U	5000 U	5000 U	4000 J	5990	8550
Selenium		10	5 UJ	5 U	5 UJ	5 U	2 U	1 U
Silver		50	10 U	10 U	10 U	10 U	4 U	3 U
Sodium		20000	[120000]	[110000]	[97000]	[120000]	[82700]	[68900]
Thallium		NC	2 U	2 U	2 U	2 U	1 U	2 U
Vanadium		NC	50 U	50 U	50 U	2 J	4.2 B	6.7 B
Zinc		NC	10	90	180	190	5.3 B	12.2 B

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-7D	URS-7D	URS-7D	URS-7D	URS-7D	URS-7D
	Sample Date		10/01/92	06/24/97	02/24/98	09/18/98	02/04/99	08/12/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	0.5 U	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	0.5 U	10 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	0.5 U	5 U	5 U	5 U	5 U	5 U
Acetone		NC	0.5 U	10 U	10 UJ	61	6 J	10 UJ
Benzene		1	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.5 U	0.24 U	0.5 U	1.3 J	3 U
Chlorobenzene		5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	0.5 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	0.37 J	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Metals								
Aluminum		NC	100 U	100 U	100 U	100 U	100 U	100 U
Antimony		3	80 U	10 U	10 U	5 U	5 U	5 U
Arsenic		25	10 U	10 U	10 U	5 U	5 U	5 UJ
Barium		1000	29	30	40	20 U	100 U	30
Beryllium		NC	1 U	3 U	3 U	3 U	10 U	3 U
Cadmium		5	5 U	1 U	1 U	1 U	10 U	1 U
Calcium		NC	403000	360000	300000	480000	400000	470000
Chromium		50	5 U	10 U	10 U	10	10	10 U
Cobalt		NC	5 U	30 U	30 U	25 U	50 U	25 U
Copper		200	8	10 U	10 U	10 U	10 U	10 U
Cyanide		200	2 U	10 UJ	10 U	10 U	10 U	10 U
Iron		300	63	50 U	70	50 U	100	50 U
Lead		25	10 U	10 U	10 U	5 U	5 U	5 U
Magnesium		NC	140000	120000	89000	140000	130000	140000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed. ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-7D	URS-7D	URS-7D	URS-7D	URS-7D	URS-7D
	Sample Date		10/01/92	06/24/97	02/24/98	09/18/98	02/04/99	08/12/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	86	40	30	40	50	50
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	5 U	50 U	50 U	50 U	50 U	50 U
Potassium		NC	8300	5000	5000 U	6000	5000 U	6000
Selenium		10	5 U	10 U	10 U	5 U	5 UJ	5 UJ
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[78900]	[66000 J]	[54000]	[79000]	[74000]	[81000]
Thallium		NC	80 U	10 U	10 U	1 UJ	1 U	5 U
Vanadium		NC	5 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10 U	10 U	10 U	10 U	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-7D	URS-7D	URS-7D	URS-7D	URS-9D	URS-9D
	Sample Date		02/09/00	08/10/00	02/14/01	10/11/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	5 U	5 U
2-Butanone (MEK)		NC	10 UJ	10 U	10 UJ	10 U	10 U	6 J
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	5 U	5 U	5 U	10 U	10 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ	R	R
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	4 J	5 U
Carbon disulfide		NC	5.2	0.5 UJ	0.86 U	0.5 U	5 U	5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	[8]	5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	1 J	5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Methylene chloride		5	2 U	5 U	2 U	2 U	5 U	5 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.6 J	5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	10 U	10 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Metals								
Aluminum		NC	100	100 U	100	50 J	128	64.2 B
Antimony		3	5 U	5 U	5 U	5 U	18 U	[28 B]
Arsenic		25	5 U	5 U	5 U	5 U	1.6 B	1 U
Barium		1000	30	30	20	20	110 B	38.2 B
Beryllium		NC	3 U	3 U	3 U	3 U	1 U	1 U
Cadmium		5	1 U	1 U	1 U	1 U	1 U	2 U
Calcium		NC	420000	480000	450000	520000	56500	146000
Chromium		50	10	20	20	10 J	3 U	4 U
Cobalt		NC	25 U	20 U	25 U	20 U	2 U	3 U
Copper		200	10 U	10 U	10 U	10 U	5.2 B	12 U
Cyanide		200	10 U	10 U	10 U	10 U	10 U	11.1 B
Iron		300	180	170 J	240	100	127	[506]
Lead		25	5 U	5 U	5 U	5 U	1 U	1 U
Magnesium		NC	140000	150000	140000	160000	29900	70200

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-7D	URS-7D	URS-7D	URS-7D	URS-9D	URS-9D
	Sample Date		02/09/00	08/10/00	02/14/01	10/11/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	70	50 J	140	40 J	20.1	25.5
Mercury		0.7	0.2 U	0.3 J	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	2 J	15.3 B	13 U
Potassium		NC	5000 U	5000	5000	7000	9880	4170 B
Selenium		10	5 UJ	5 U	5 UJ	5 U	2 U	1 U
Silver		50	10 U	10 U	10 U	10 U	4 U	3 U
Sodium		20000	[68000]	[78000]	[69000]	[83000]	[27400]	[37000]
Thallium		NC	2 U	2 U	2 U	2 U	1 U	2 U
Vanadium		NC	50 U	50 U	50 U	50 U	10.7 B	2 U
Zinc		NC	10 U	10 U	10 U	10 U	50.5	16.7 B

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9D	URS-9D	URS-9D	URS-9D	URS-9D	URS-9D
	Sample Date		10/01/92	06/24/97	02/23/98	09/18/98	02/03/99	08/12/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.7	0.37 J	0.34 J	0.17 J	0.16 JN	0.15 J
1,2-Dichloroethene		5	1	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	0.5 U	10 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	0.5 U	5 U	5 U	5 U	5 U	5 U
Acetone		NC	0.5 U	10 U	10 UJ	10 U	10 U	10 UJ
Benzene		1	0.5 U	0.5 U	[1.9]	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	0.5 U	0.5 U	0.35 U	0.5 U	0.5 U	0.5 U
Chlorobenzene		5	NA	0.5 U	0.79	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.44 J	0.5 U	0.5 U	0.5 U
Methylene chloride		5	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene		5	0.5 U	0.5 U	0.51	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.6	0.36 J	0.24 J	0.2 J	0.21 J	0.14 J
Vinyl chloride		2	0.5 U	0.26 J	0.44 J	0.11 NJ	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	1.8	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	NA	0.66	0.59	0.33 J	0.35 J	0.29 J
Metals								
Aluminum		NC	100 U	100 U	100 U	100 U	100 U	100 U
Antimony		3	80 U	10 U	10 U	5 U	5 U	5 U
Arsenic		25	10 U	10 U	10 U	5 U	5 U	5 UJ
Barium		1000	23	20 U	20 U	20 U	20 U	20 U
Beryllium		NC	1 U	3 U	3 U	3 U	3 U	3 U
Cadmium		5	5 U	1 U	1 U	1 U	1 U	1 U
Calcium		NC	120000	200000	190000	190000	200000	210000
Chromium		50	5 U	10 U	10 U	10	10 U	10 U
Cobalt		NC	5 U	30 U	30 U	25 U	25 U	25 U
Copper		200	5 U	10 U	10 U	10 U	10 U	10 U
Cyanide		200	2 U	10 UJ	10 U	10 U	10 U	10 U
Iron		300	252	50 U	70	80	70	60
Lead		25	10 U	10 U	10 U	5 U	5 U	5 U
Magnesium		NC	60000	58000	73000	71000	72000	77000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9D	URS-9D	URS-9D	URS-9D	URS-9I	URS-9I
	Sample Date		02/08/00	08/11/00	02/13/01	10/08/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.28 J	0.5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
1,1-Dichloroethane		5	0.14 J	0.14 J	0.12 J	0.15 J	5 U	5 U
1,2-Dichloroethene		5	NA	NA	NA	NA	5 U	5 U
2-Butanone (MEK)		NC	10 UJ	10 U	10 UJ	10 U	10 U	2 J
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	5 U	5 U	5 U	10 U	10 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ	R	R
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Carbon disulfide		NC	16	0.5 UJ	1.2 U	0.5 U	5 U	5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U
Methylene chloride		5	2 U	5 U	2 U	2 U	5 U	5 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.7 J	5 U
Trichloroethene		5	0.5 U	0.5 U	0.13 J	0.5 U	5 U	5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U	10 U	10 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 UJ	5 U	5 U
cis-1,2-Dichloroethene		5	0.25 J	0.23 J	0.2 J	0.21 J	NA	NA
Metals								
Aluminum		NC	100 U	100 U	100 U	100	221	197
Antimony		3	5 U	5 U	5 U	5 U	18 U	26 U
Arsenic		25	5 U	5 U	5 U	5 U	1.7 B	1 U
Barium		1000	20 U	20 U	20 U	10 J	30.1 B	22.8 B
Beryllium		NC	3 U	3 U	3 U	3 U	1 U	1 U
Cadmium		5	1 U	1 U	1 U	1 U	1 U	2 U
Calcium		NC	220000	210000	200000	210000	106000	143000
Chromium		50	10 U	20	30	20	8.6 B	10.1
Cobalt		NC	25 U	20 U	25 U	20 U	2 U	3 U
Copper		200	10 U	10 U	10 U	0.8 J	12.7 B	12 U
Cyanide		200	10 U	10 U	10 U	10 U	10 U	10.5 U
Iron		300	50	220	200	[380]	[1020]	[1170]
Lead		25	5 U	5 U	5 U	5 U	1 U	1 B
Magnesium		NC	78000	75000	70000	85000	54500	71300

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9D	URS-9D	URS-9D	URS-9D	URS-9I	URS-9I
	Sample Date		02/08/00	08/11/00	02/13/01	10/08/01	08/01/90	02/01/91
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	10	10 J	10	20 J	67.5	80
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	50 U	50 U	50 U	10 J	7.6 B	13 U
Potassium		NC	5000 U	5000 U	5000 U	3000 J	3910 B	4250 B
Selenium		10	5 UJ	5 U	5 UJ	5 U	2 U	1 U
Silver		50	10 U	10 U	10 U	0.9 J	4 U	3 U
Sodium		20000	[48000]	[45000]	[38000]	[49000]	[34500]	[54000]
Thallium		NC	2 U	2 U	2 U	2 U	1 U	2 U
Vanadium		NC	50 U	50 U	50 U	1 J	2 U	9.6 B
Zinc		NC	10 U	10 U	10 U	5 J	19.3 B	34.6

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9I	URS-9I	URS-9I	URS-9I	URS-9I	URS-9I
	Sample Date		10/01/92	06/24/97	02/23/98	09/18/98	02/03/99	08/12/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
VOCs								
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,2-Dichloroethene		5	0.5 U	NA	NA	NA	NA	NA
2-Butanone (MEK)		NC	0.5 U	10 U	10 U	10 U	10 U	10 UJ
4-Methyl-2-pentanone (MIBK)		NC	0.5 U	5 U	5 U	5 U	5 U	5 UJ
Acetone		NC	0.5 U	10 U	10 UJ	10 UJ	10 U	10 UJ
Benzene		1	0.5 U	0.12 J	0.29 J	0.5 U	0.5 U	0.5 UJ
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Carbon disulfide		NC	0.5 U	0.5 U	0.16 U	0.13 J	0.5 U	6.3 UJ
Chlorobenzene		5	NA	0.5 U	0.2 J	0.5 U	0.5 U	0.5 UJ
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Ethylbenzene		5	0.5 U	0.5 U	0.14 J	0.5 U	0.5 U	0.5 UJ
Methylene chloride		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 UJ
Toluene		5	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.16 J
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Vinyl chloride		2	0.5 U	1 U	1 U	1 U	1 U	1 UJ
Xylene (total)		5	0.5 U	0.29 J	0.54	0.5 U	0.5 U	0.5 UJ
cis-1,2-Dichloroethene		5	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Metals								
Aluminum		NC	110	100 U	100 U	100 U	200	100 U
Antimony		3	80 U	10 U	10 U	5 U	5 U	5 U
Arsenic		25	10 U	10 U	10 U	5 U	5 U	5 UJ
Barium		1000	14	30	20 U	20 U	20 U	20 U
Beryllium		NC	1 U	3 U	3 U	3 U	3 U	3 U
Cadmium		5	5 U	1 U	1 U	1 U	1 U	1 U
Calcium		NC	123	170000	150000	160000	160000	160000
Chromium		50	5 U	10 U	10 U	10	10	10 U
Cobalt		NC	5 U	30 U	30 U	25 U	25 U	25 U
Copper		200	5 U	10 U	10 U	10 U	10 U	10 U
Cyanide		200	2 U	10 UJ	10 U	10 U	10 U	10 U
Iron		300	[808]	[460]	[440]	290	[590]	240
Lead		25	10 U	10 U	10 U	5 U	5 U	5 U
Magnesium		NC	63500	70000	69000	77000	70000	75000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9I	URS-9I	URS-9I	URS-9I	URS-9I	URS-9I
	Sample Date		10/01/92	06/24/97	02/23/98	09/18/98	02/03/99	08/12/99
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	75	50	30	40	50	40
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	5 U	50 U	50 U	50 U	50 U	50 U
Potassium		NC	2900	5000 U	5000 U	5000 U	5000 U	5000 U
Selenium		10	5 U	10 U	10 U	5 U	5 UJ	5 UJ
Silver		50	10 U	10 U	10 U	10 U	10 U	10 U
Sodium		20000	[52400]	[43000 J]	[45000]	[49000]	[39000]	[54000]
Thallium		NC	80 U	10 U	10	1 UJ	1 U	5 U
Vanadium		NC	5 U	50 U	50 U	50 U	50 U	50 U
Zinc		NC	10 U	10 U	10 U	20	10 U	10 J

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

	Sample ID	NYS Class GA Water Quality	URS-9I	URS-9I	URS-9I	URS-9I
	Sample Date	Standards	02/08/00	08/11/00	02/13/01	10/08/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L
Compound						
VOCs						
1,1,1-Trichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane		5	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene		5	NA	NA	NA	NA
2-Butanone (MEK)		NC	10 UJ	10 U	10 UJ	10 U
4-Methyl-2-pentanone (MIBK)		NC	5 UJ	5 U	5 U	5 U
Acetone		NC	10 UJ	10 UJ	10 UJ	10 UJ
Benzene		1	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane		NC	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide		NC	8.5	0.5 UJ	0.68 U	0.5 U
Chlorobenzene		5	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform		7	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane		5	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene		5	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride		5	2 U	5 U	2 U	2 U
Toluene		5	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride		2	1 U	1 U	1 U	1 U
Xylene (total)		5	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene		5	0.5 U	0.5 U	0.5 U	0.5 U
Metals						
Aluminum		NC	200	100 U	100 U	400
Antimony		3	5 U	5 U	5 U	5 U
Arsenic		25	5 U	5 U	5 U	5 U
Barium		1000	20 U	20 U	20 U	20 J
Beryllium		NC	3 U	3 U	3 U	3 U
Cadmium		5	1 U	1 U	1 U	1 U
Calcium		NC	170000	160000	150000	140000
Chromium		50	10 U	10 U	10 U	10 J
Cobalt		NC	25 U	20 U	25 U	20 U
Copper		200	10 U	10 U	10 U	1 J
Cyanide		200	10 U	10 U	10 U	10 U
Iron		300	[520]	210	[390]	[480]
Lead		25	5 U	5 U	5 U	5 U
Magnesium		NC	76000	75000	69000	70000

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
October 2001

Compound	Sample ID	NYS Class GA Water Quality Standards	URS-9I	URS-9I	URS-9I	URS-9I
	Sample Date		02/08/00	08/11/00	02/13/01	10/08/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L
Manganese		300	50	40 J	40	50 J
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.09 J
Nickel		100	50 U	50 U	50 U	1 J
Potassium		NC	5000 U	5000 U	5000 U	2000 J
Selenium		10	5 UJ	5 U	5 UJ	5 U
Silver		50	10 U	10 U	10 U	10 U
Sodium		20000	[48000]	[48000]	[41000]	[48000]
Thallium		NC	2 U	2 U	2 U	2 U
Vanadium		NC	50 U	50 U	50 U	0.9 J
Zinc		NC	10 U	10 U	10 U	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:56:16
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPR.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 5
Frontier Chemical-Pendleton Site
Piezometers - October 2001
Method 8260 Volatile Organic Compound Data

Compound	Sample ID	NYS Class GA Water Quality Standards	P-1	P-2	P-3	P-4	P-5	P-6
	Sample Date		10/10/01	10/10/01	10/10/01	10/09/01	10/10/01	10/10/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1,1-Trichloroethane		5	0.28 J	0.5 U	250 U	[91]	0.5 U	[35000]
1,1,2,2-Tetrachloroethane		5	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
1,1,2-Trichloroethane		1	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
1,1-Dichloroethane		5	0.5 U	0.39 J	[190 J]	[19]	0.43 J	[1500]
1,1-Dichloroethene		5	0.5 U	0.5 U	250 U	[14]	0.5 U	[10000]
1,2-Dichloroethane		0.6	0.5 U	0.5 U	[4600]	[1.2]	0.34 J	[150 J]
1,2-Dichloropropane		1	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
2-Butanone (MEK)		NC	10 U	10 U	6500	10 U	10 U	5000 U
2-Hexanone		NC	5 U	5 U	2500 U	5 U	5 U	2500 U
4-Methyl-2-pentanone (MIBK)		NC	5 U	5 U	9800	5 U	5 U	2500 U
Acetone		NC	10 UJ	10 UJ	22000 J	10 UJ	10 UJ	5000 UJ
Benzene		1	0.5 U	0.5 U	[800]	[13]	0.12 J	250 U
Bromodichloromethane		NC	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Bromoform		NC	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Bromomethane		5	1 UJ	1 UJ	500 UJ	1 UJ	1 UJ	500 UJ
Carbon disulfide		NC	0.5 U	0.5 U	250 U	0.5 U	0.5 U	500 U
Carbon tetrachloride		5	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Chlorobenzene		5	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Chloroethane		5	1 U	1 U	500 U	1 U	1 U	500 U
Chloroform		7	0.5 U	0.5 U	[210 J]	0.23 J	0.5 U	[350]
Chloromethane		NC	1 U	1 U	500 U	1 U	0.31 J	500 U
Dibromochloromethane		5	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Ethene, 1,2-dichloro-, (E)-		5	0.5 U	0.5 U	250 U	[22]	0.45 J	[57 J]
Ethylbenzene		5	0.5 U	0.5 U	250 U	0.4 J	0.5 U	250 U
Methylene chloride		5	2 U	2 U	1000 U	2 U	2 U	[9900]
Styrene		5	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
Tetrachloroethene		NC	0.78	0.4 J	250 U	1200	1.5	2000
Toluene		5	0.23 J	0.27 J	[1600]	1	0.26 J	[65 J]
Trichloroethene		5	0.57	0.17 J	[260]	[930]	2.1	[15000]
Vinyl chloride		2	1 U	0.38 J	[260 J]	[11]	1 U	500 U
Xylene (total)		5	0.5 U	0.5 U	250 U	0.24 J	0.5 U	250 U
cis-1,2-Dichloroethene		5	0.28 J	0.12 J	[2900]	[880]	4.3	[1900]
cis-1,3-Dichloropropylene		0.4	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U
trans-1,3-Dichloropropene		0.4	0.5 U	0.5 U	250 U	0.5 U	0.5 U	250 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:58:07
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPRC.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 6
Frontier Chemical-Pendleton Site
Piezometers - October 2001
Method 8270 Semivolatile Organic Compound Data

Compound	Sample ID	NYS Class GA Water Quality Standards	P-1	P-2	P-3	P-4	P-5	P-6
	Sample Date		10/10/01	10/10/01	10/10/01	10/09/01	10/10/01	10/10/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,2,4-Trichlorobenzene		5	11 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene		3	11 U	10 U	10 U	10 U	10 U	1.6 J
1,3-Dichlorobenzene		3	11 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene		3	11 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol		1	54 U	50 U	51 U	50 U	50 U	50 U
2,4,6-Trichlorophenol		1	11 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol		1	11 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol		1	11 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol		1	54 U	50 U	51 U	50 U	50 U	50 U
2,4-Dinitrotoluene		5	11 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene		5	11 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene		NC	11 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol		1	11 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene		NC	11 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol		1	11 U	10 U	[7 J]	10 U	10 U	10 U
2-Nitroaniline		5	54 U	50 U	51 U	50 U	50 U	50 U
2-Nitrophenol		1	11 U	10 U	10 U	10 U	10 U	10 U
3,3-Dichlorobenzidine		5	22 U	20 U	20 U	20 U	20 U	20 U
3-Nitroaniline		5	54 U	50 U	51 U	50 U	50 U	50 U
4,6-Dinitro-2-methylphenol		1	54 U	50 U	51 U	50 U	50 U	50 U
4-Bromophenyl phenyl ether		NC	11 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol		1	11 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline		5	11 U	10 U	10 U	10 U	10 U	[24]
4-Chlorophenyl phenyl ether		NC	11 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol		NC	11 U	10 U	20	10 U	10 U	10 U
4-Nitroaniline		5	54 U	50 U	51 U	50 U	50 U	50 U
4-Nitrophenol		1	54 U	50 U	51 U	50 U	50 U	50 U
Acenaphthene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Anthracene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzo(ghi)perylene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]pyrene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Benzoic acid		NC	54 U	50 U	24 J	50 U	50 U	50 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:58:24
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPRC.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 6
Frontier Chemical-Pendleton Site
Piezometers - October 2001
Method 8270 Semivolatile Organic Compound Data

	Sample ID	NYS Class GA Water Quality	P-1	P-2	P-3	P-4	P-5	P-6
	Sample Date	Standards	10/10/01	10/10/01	10/10/01	10/09/01	10/10/01	10/10/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound								
Bis(2-chloroethoxy)methane		5	11 U	10 U	[52]	10 U	10 U	10 U
Bis(2-chloroethyl)ether		1	11 U	10 U	[99]	10 U	10 U	10 U
Bis(2-chloroisopropyl) ether		NC	11 U	10 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate (BEHP)		5	2.4 J	10 U	2.2 J	2.1 J	2.4 J	3.4 J
Butyl benzyl phthalate		NC	11 U	10 U	10 U	10 U	10 U	10 U
Chrysene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Di-n-butyl phthalate		50	11 U	10 U	10 U	10 U	10 U	10 U
Di-n-octyl phthalate		NC	11 U	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran		NC	11 U	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate		NC	11 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate		NC	11 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Fluorene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene		0.04	11 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene		0.5	11 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene		5	11 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane		5	11 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Isophorone		NC	11 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine		NC	11 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodipropylamine		NC	11 U	10 U	10 U	10 U	10 U	10 U
Naphthalene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene		0.4	11 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol		1	54 U	50 U	51 U	50 U	50 U	50 U
Phenanthrene		NC	11 U	10 U	10 U	10 U	10 U	10 U
Phenol		1	11 U	10 U	[300]	10 U	10 U	10 U
Pyrene		NC	11 U	10 U	10 U	10 U	10 U	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:58:24
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPRC.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 7
Frontier Chemical-Pendleton Site
Piezometers - October 2001
Method 8081/8082 Pesticide/PCB Data

	Sample ID	NYS Class GA Water Quality	P-1	P-2	P-3	P-4	P-5	P-6
	Sample Date	Standards	10/10/01	10/10/01	10/10/01	10/09/01	10/10/01	10/10/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Compound								
Aroclor 1016		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1221		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1232		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1242		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1248		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1254		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Aroclor 1260		0.09	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
4,4'-DDD		0.3	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE		0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT		0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
Dieldrin		0.004	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
Endosulfan II		NC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate		NC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin		NC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde		5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin ketone		NC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heptachlor		0.04	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
Heptachlor epoxide		0.03	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
Lindane		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
Methoxychlor		35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
Toxaphene		0.06	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U
a-Chlordane		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
alpha-BHC		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
beta-BHC		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
delta-BHC		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U
gamma-Chlordane		NC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:59:00
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPRC.FXP

File Number: 5829.22038

O'BRIEN & GERE
ENGINEERS, INC.

Table 8
Frontier Chemical-Pendleton Site
Piezometers - October 2001
Method 6010/7470/7841/9010B/9014 Inorganic Compound Data

Compound	Sample ID	NYS Class GA Water Quality Standards	P-1	P-2	P-3	P-4	P-5	P-6
	Sample Date		10/10/01	10/10/01	10/10/01	10/09/01	10/10/01	10/10/01
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum		NC	400	400	100 U	40 J	30 J	100
Antimony		3	5 U	5 U	5 U	1 J	1 J	5 U
Arsenic		25	5 U	4 J	[62]	4 J	5 U	6
Barium		1000	30	20 J	10 J	60	30	10 J
Beryllium		NC	3 U	0.1 J	0.4 J	3 U	3 U	3 U
Cadmium		5	1 U	1 J	1 U	1 U	1 U	2
Calcium		NC	270000	420000	390000	410000	270000	500000
Chromium		50	[60]	20	[90000]	[70]	[110]	[60]
Cobalt		NC	20 U	20 U	20 U	20 U	20 U	3 J
Copper		200	2 J	2 J	10 U	20	2 J	4 J
Cyanide		200	10 U	10 U	130	10 U	10 U	10 U
Iron		300	[1800]	[6400]	50 U	[9000]	[840]	[3400]
Lead		25	5 U	5 U	5 U	5 U	5 U	5 U
Magnesium		NC	190000	320000	310000	370000	81000	440000
Manganese		300	110 J	[640 J]	20 J	[560 J]	160 J	[820 J]
Mercury		0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel		100	20 J	10 J	10 J	90	10 J	20 J
Potassium		NC	3000 J	2000 J	5000	2000 J	2000 J	2000 J
Selenium		10	5 U	5 U	5 U	5 U	5 U	5 U
Silver		50	10 U	10 U	1 J	10 U	10 U	10 U
Sodium		20000	[69000]	[64000]	[380000]	[170000]	[48000]	[110000]
Thallium		NC	2 U	2 U	2 U	2 U	2 U	2 U
Vanadium		NC	1 J	2 J	3 J	1 J	0.6 J	0.6 J
Zinc		NC	10	10 U	10 J	30	10 U	10 U

NOTES: U - not detected, J,B - estimated value, R - unusable, NA - not analyzed, ND - not detected.
E - estimated, N - tentatively identified, NC - no criteria.
[ ] - exceeds standard.

Date Printed: 01/03/02 05:58:44
DBF File: N:\5829\22038\TEMPDATA.DBF
FXP File: N:\5829\22038\TABLEPRC.FXP

File Number: 5829.22038

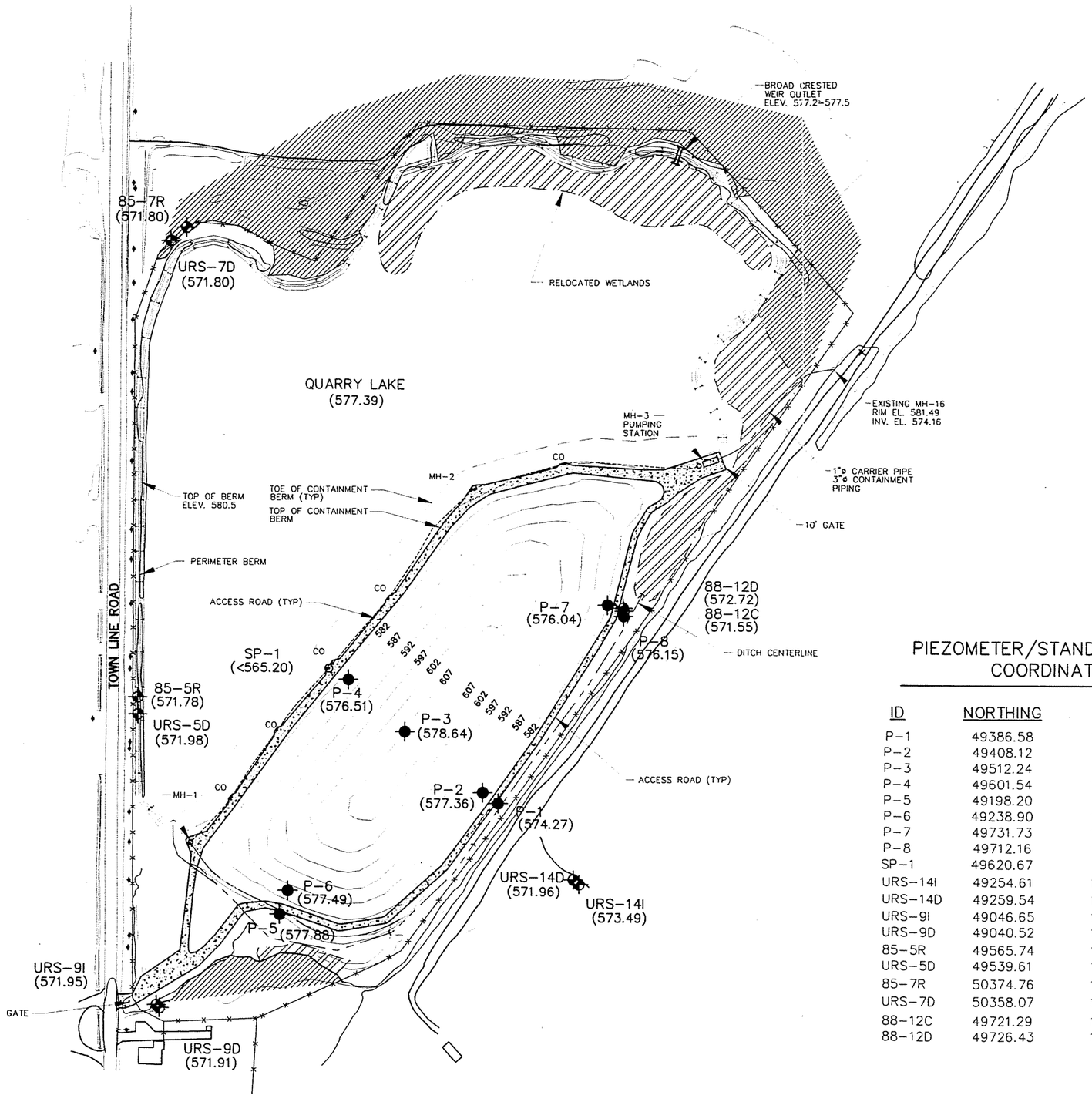


FIGURE 1

LEGEND

- URS-7D — MONITORING WELL
- P-1 — PIEZOMETER
- (577.39) — WATER ELEVATION
- CREATED WETLAND AREA
- EXISTING WETLAND AREA
- 6' HIGH CHAIN LINK FENCE
- 580 — GRADE ELEVATION CONTOUR
- CO — GROUND WATER COLLECTION TRENCH & CLEAN OUT
- STANDPIPE
- UTILITY POLE

PIEZOMETER/STANDPIPE AND MONITORING WELL COORDINATES AND ELEVATIONS

ID	NORTHING	EASTING	RISER	COVER
P-1	49386.58	100656.87	583.21	583.30
P-2	49408.12	100630.30	582.90	583.20
P-3	49512.24	100496.39	606.33	606.64
P-4	49601.54	100399.33	583.68	583.85
P-5	49198.20	100282.65	583.05	583.55
P-6	49238.90	100296.52	584.45	584.60
P-7	49731.73	100842.30	581.84	582.00
P-8	49712.16	100869.82	582.83	583.00
SP-1	49620.67	100365.59	579.86	580.07
URS-14I	49254.61	100794.43	581.14	580.84
URS-14D	49259.54	100789.09	580.71	580.85
URS-9I	49046.65	100075.10	581.68	579.90
URS-9D	49040.52	100076.81	580.80	579.00
85-5R	49565.74	100036.14	580.84	578.70
URS-5D	49539.61	100035.69	580.60	578.00
85-7R	50374.76	100115.55	577.90	576.60
URS-7D	50358.07	100095.40	579.35	576.50
88-12C	49721.29	100870.45	583.12	583.70
88-12D	49726.43	100869.13	582.87	583.28

FRONTIER CHEMICAL
PENDLETON SITE
TOWN OF PENDLETON,
NIAGARA COUNTY, NY

HYDRAULIC POTENTIAL MAP (OCTOBER 8, 2001)

200 0 200

SCALE IN FEET

FILE NO. 5829.27084.001
DATE: MARCH 2001

O'BRIEN & GERE ENGINEERS INC.

FIGURE 2

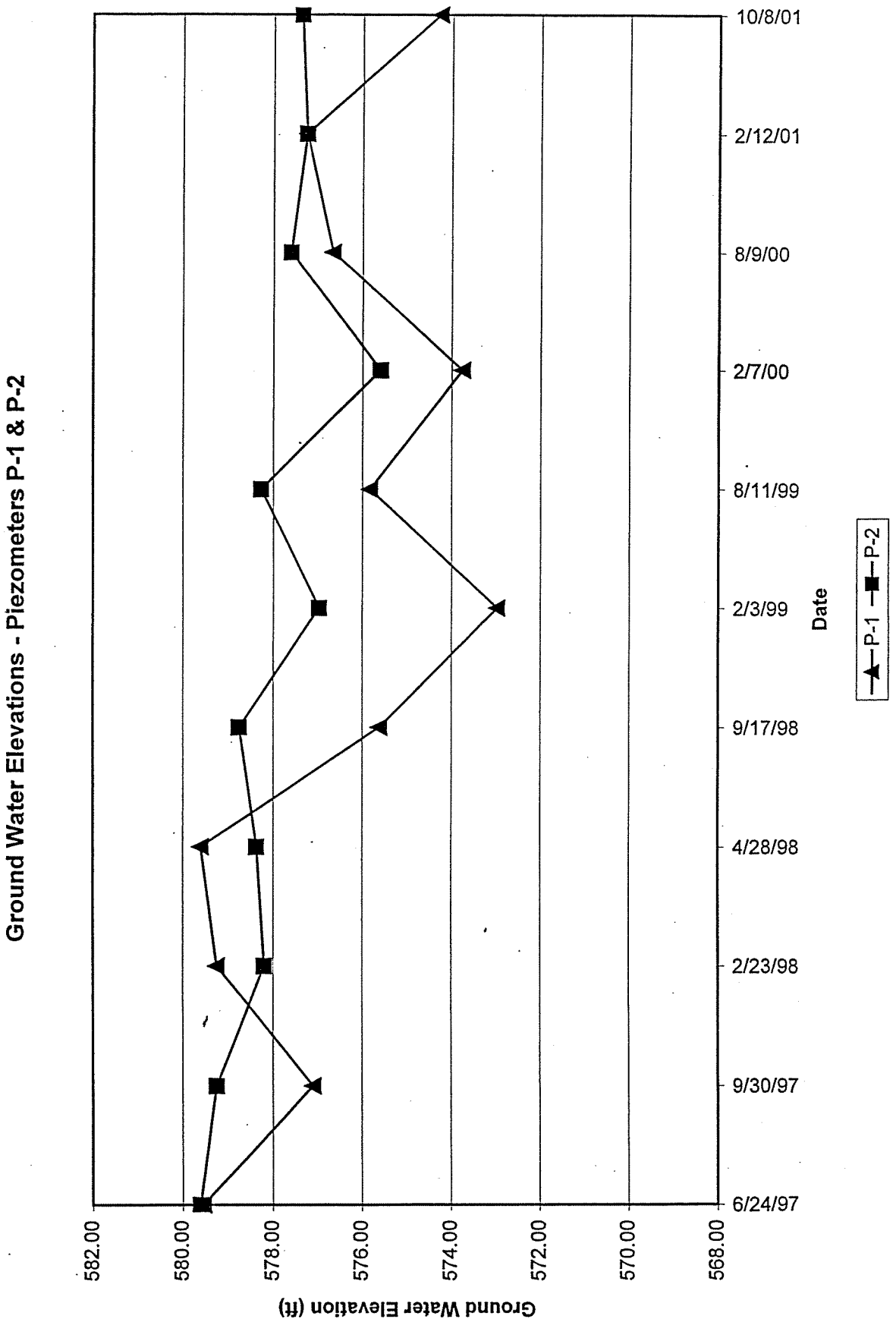

Ground Water Elevations - Piezometers P-1 & P-2
582.00
580.00
578.00
576.00
574.00
572.00
570.00
568.00
Ground Water Elevation (ft)
10/8/01
2/12/01
8/9/00
2/7/00
8/11/99
2/3/99
9/17/98
4/28/98
2/23/98
9/30/97
6/24/97
Date
P-1
P-2

FIGURE 3

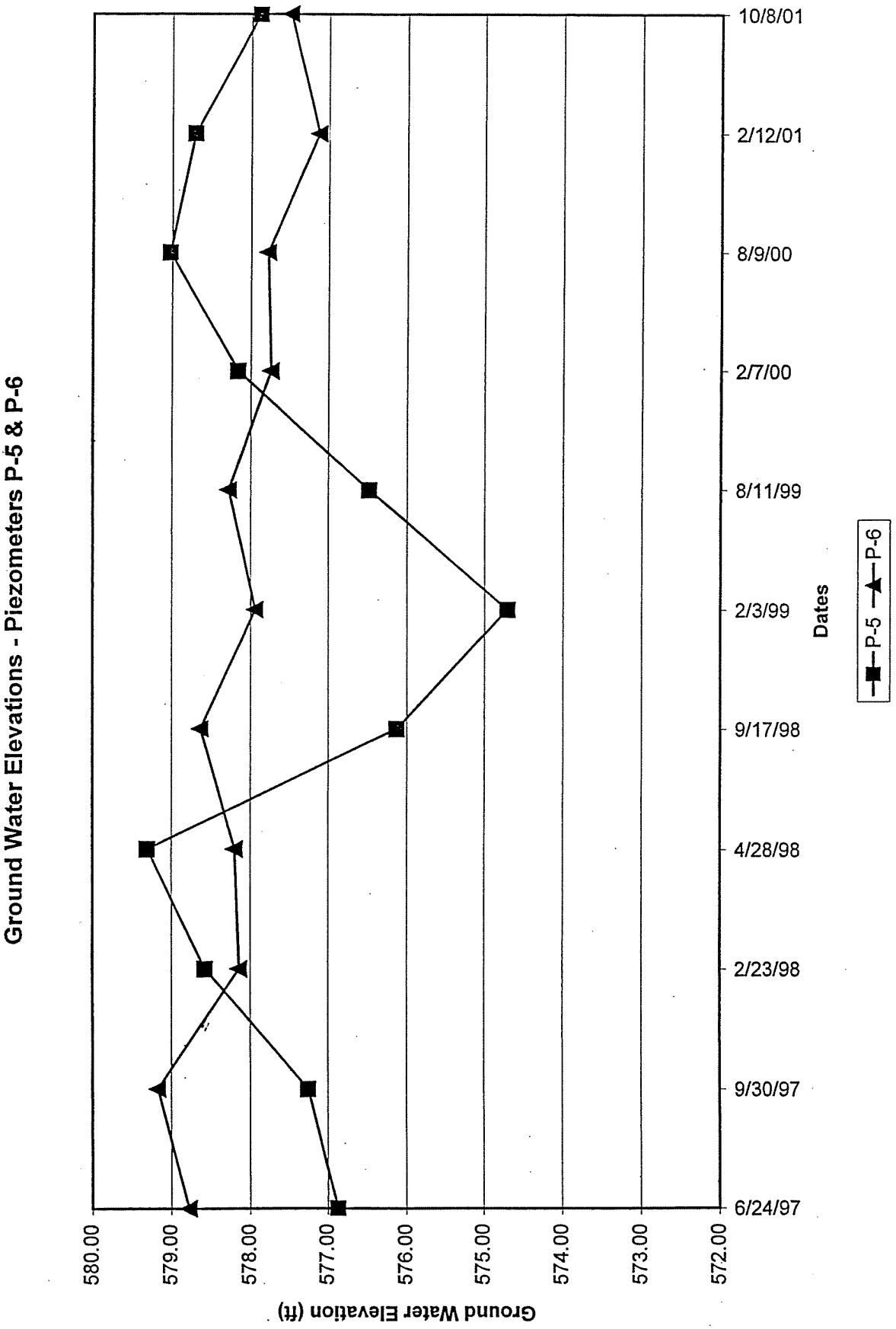
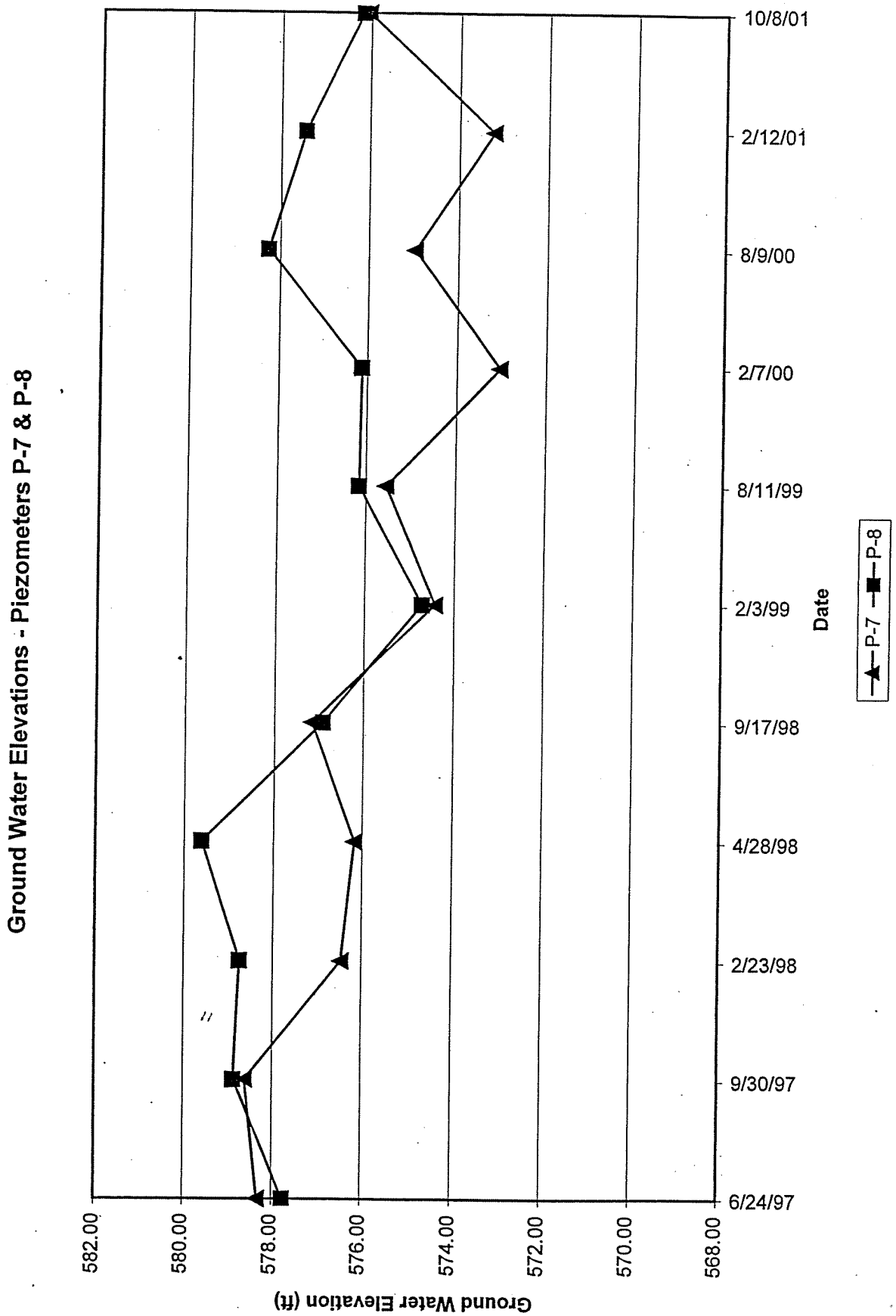

Ground Water Elevations - Piezometers P-5 & P-6
Ground Water Elevation (ft)
580.00
579.00
578.00
577.00
576.00
575.00
574.00
573.00
572.00
Dates
10/8/01
2/12/01
8/9/00
2/7/00
8/11/99
2/3/99
9/17/98
4/28/98
2/23/98
9/30/97
6/24/97
P-5
P-6

FIGURE 4


Ground Water Elevations - Piezometers P-7 & P-8
Ground Water Elevation (ft)
582.00
580.00
578.00
576.00
574.00
572.00
570.00
568.00
Date
10/8/01
2/12/01
8/9/00
2/7/00
8/11/99
2/3/99
9/17/98
4/28/98
2/23/98
9/30/97
6/24/97
P-7
P-8

Appendix A

Piezometer/monitoring well inspection forms

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-1

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	8.94	
Well Depth:	16.42	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	(yes)	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-2

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	(Flush Mounted)
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	5.54	
Well Depth:	15.72	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-3

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	(Flush Mounted)
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	27.69	
Well Depth:	39.78	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	yes	no NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-4

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	(Flush Mounted)
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	7.17	
Well Depth:	16.92	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	yes	no NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-5

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	5.17	
Well Depth:	15.56	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-6

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	6.96	
Well Depth:	16.16	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

Casing angled +/- 15 degrees from vertical

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-7

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	(Flush Mounted)
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	5.80	
Well Depth:	16.64	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	yes	no NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : P-8

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	6.68	
Well Depth:	17.21	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : 85-5R

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	9.06	
Well Depth:	34.03	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : 85-7R

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	6.10	
Well Depth:	27.72	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

No concrete at base of casing.

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : URS-7D

Personnel : TPP/DEC Date :

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	7.55	
Well Depth:	39.81	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

Concrete Box Broken and shifted

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : SP-1

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	~~PVC~~ HDPE	Stainless Steel
Well Diameter	2-inch	~~4-inch~~ 6"
Depth to Ground Water :	Dry	
Well Depth:	14.91	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : URS-9I

Personnel : TPP/DEC Date : 10/8/01

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	PVC	(Stainless Steel)
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	9.73	
Well Depth:	45.74	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	yes	(no)
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	yes	(no)
5. Are soils surrounding the well pad eroded ?	(yes)	no
6. Is the well casing in good condition ?	yes	(no)
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	(yes)	no
10. Does the total sounded depth correspond to the original well completion depth?	yes	(no)
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

(2) Casing has settled, outer cap has broken off.

(4) Some Settling

(10) Some muck has developed in well bottom

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : URS-9D

Personnel : TPP/DEC Date : 10/8/01

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	PVC	(Stainless Steel)
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	~~8.89~~ 8.89	
Well Depth:	50.89	

WELL INTEGRITY

1. Well identification clearly marked ?	(yes)	no
2. Well covers and locks in good condition and secure ?	(yes)	no
3. Is the well stand pipe vertically aligned and secure ?	(yes)	no
4. Is the concrete pad and surface seal in good condition ?	(yes)	no
5. Are soils surrounding the well pad eroded ?	yes	(no)
6. Is the well casing in good condition ?	(yes)	no
7. Is the measuring point on casing well marked ?	(yes)	no
8. Is there standing water in the annular space ?	yes	(no)
9. Is the stand pipe vented at the base to allow drainage ?	(yes)	no
10. Does the total sounded depth correspond to the original well completion depth?	(yes)	no
11. Is the access down the well impeded or blocked? Explain.	yes	(no)

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : URS-14I

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	7.65	
Well Depth:	31.10	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no
2. Well covers and locks in good condition and secure ?	yes	no
3. Is the well stand pipe vertically aligned and secure ?	yes	no
4. Is the concrete pad and surface seal in good condition ?	yes	no
5. Are soils surrounding the well pad eroded ?	yes	no
6. Is the well casing in good condition ?	yes	no
7. Is the measuring point on casing well marked ?	yes	no
8. Is there standing water in the annular space ?	yes	no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no
11. Is the access down the well impeded or blocked? Explain.	yes	no

COMMENTS/RECOMMENDATIONS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical, Pendelton NY Well Identification : URS-14D

Personnel : TPP/DEC Date : 10-8-01

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	8.75	
Well Depth:	41.58	

WELL INTEGRITY

1. Well identification clearly marked ?	yes	no	
2. Well covers and locks in good condition and secure ?	yes	no	
3. Is the well stand pipe vertically aligned and secure ?	yes	no	
4. Is the concrete pad and surface seal in good condition ?	yes	no	
5. Are soils surrounding the well pad eroded ?	yes	no	
6. Is the well casing in good condition ?	yes	no	
7. Is the measuring point on casing well marked ?	yes	no	
8. Is there standing water in the annular space ?	yes	no	
9. Is the stand pipe vented at the base to allow drainage ?	yes	no	NA
10. Does the total sounded depth correspond to the original well completion depth?	yes	no	
11. Is the access down the well impeded or blocked? Explain.	yes	no	

COMMENTS/RECOMMENDATIONS:

Ground water sampling logs

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/9/01	Personnel	DEC/TPP	Weather	
Site Name	Frontier	Evacuation Method	Grundfoss	Well #	P-1
Site Location	Pendleton, NY	Sampling Method	Low Flow	Project #	29820

Well information:

Depth of Well *	16.42	ft.
Depth to Water *	10.95	ft.
Length of Water Column	5.47	ft.

* Measurements taken from

X	Top of Well Casing
	Top of Protective Casing
X	(Other, Specify) TOP PVC

Start Purge Time: 10:00

Elapsed Time	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
0:00	10.97	14.6	7.07	143135	84.2	3.66	14	600
3:00	12.81	16.6	6.8	146418	61.2	1.04	11	110
6:00	12.83	17	6.77	147465	51.0	0.79	7.5	25
9.00	13.09	19.4	6.76	152977	23.8	0.57	4.8	110
12:00	13.15	20.05	6.77	154395	12.7	0.55	3.4	25
15:00	13.41	21.84	6.79	159055	-4.5	0.41	2.2	25
	+ DTW							
	~~15.2~~	~~17.93~~	~~6.89~~					
16:00	13.65	- 10/9/01			Collected			
8:20	13.40	10/10/01				Metals, VOCs		
	14.35					PCB/Pest.		
						~~due to turbidity~~		DSC
							Volume	

End Purge Time: 1145

Water sample:

Time collected: 9:50

Physical appearance at start

Color: Clear

Odor: none

Sheen/Free Product: none

Total volume of purged water removed:

Physical appearance at sampling

Color: Clear

Odor: none

Sheen/Free Product: None

Field Test Results:

Dissolved ferrous iron:

Dissolved total iron:

Dissolved total manganese:

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/9/01	Personnel		Weather	Cloudy 50°
Site Name	Frontier	Evacuation Method	Grunfos	Well #	P-2
Site Location	Pendleton	Sampling Method	Low Flow	Project #	29820

Well information:

Depth of Well *	15.72	ft.
Depth to Water *	5.54	ft.
Length of Water Column	10.18	ft.

* Measurements taken from

	Top of Well Casing
	Top of Protective Casing
x	(Other, Specify) TOP PVC

Start Purge Time: 1155

Elapsed Time	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
0	4.84	13.62	6.65	203196	55	.22	30	180
3:00	6.75	14.88	6.52	209376	-68.8	4.2	25	150
6:00	7.12	16.02	6.52	221628	-74.	4.1	15	250
9:00	7.82	16.78	6.52	220841	-78.0	0.07	5.4	150
12:00	7.88	17.62	6.51	223781	-80.2	0.07	5.6	150
15:00	7.98	17.92	6.50	226733	-80.0	0.09	6.3	165
18:00	8.9	20.31	6.49	2396748	-84.6	.1	5.1	150
21:00	9.2	19.52	6.49	2374520	-84.2	.09	5.4	200
24:	9.1	19.35	6.49	238341	-83.1	.09	2.10	150
	-DRY-							
					~~Collected~~	~~Metals,~~		
1810	9.96					VOCs &		
						PCB/Pest ~~due to~~		
10/10/	9.20	8:40				CN, SVOCs		
	~~11:30~~					~~Collect Volume~~		
						DEC		

End Purge Time: 12:30

Water sample:

Time collected: ~~1150~~ 1035

Total volume of purged water removed:

Physical appearance at start

Color: Clear
Odor: None
Sheen/Free Product: Not

Physical appearance at sampling

Color: Clear
Odor: None
Sheen/Free Product: No

Field Test Results:

Dissolved ferrous iron:
Dissolved total iron:
Dissolved total manganese:

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/9/01	Personnel		Weather	Cloudy 50°
Site Name	Frontier	Evacuation Method	Grundfoss	Well #	P-3
Site Location	Pendleton	Sampling Method	Low Flow	Project #	

Well information:

Depth of Well *	39.78	ft.
Depth to Water *	26.70	ft.
Length of Water Column	13.00	ft.

* Measurements taken from

	Top of Well Casing
	Top of Protective Casing
x	(Other, Specify) Top of PVC

Start Purge Time: 13.15

Elapsed Time	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
~~0:00~~	~~26.70~~	~~24.16~~	~~6.82~~					
0:00	26.70	15.08	7.65	250353	-40.4	0.32	45	210
3:00	29.25	13.45	8.13	250760	2.0	0.05	65	400
6:00	30.53	13.60	8.20	249988	12.3	0.05	45	210
9:00	31.49	14.40	8.22	254672	17.1	0.04	36	135
12:00	32.40	15.40	8.19	261188	22.4	0.04	32	400
15:00	33.62	17.04	8.19	270231	21.6	0.04	40	200
18:00	34.01	18.48	8.14	278461	26.0	0.16	36	135
21:00	34.60	18.34	8.13	278188	24.7	0.08	40	200
24:00	35.06	17.26	8.11	271150	21.1	0.05	56	210
27:00	36.58	21.22	8.05	288220	1.9	0.12	40	150
30:00	37.11	20.26	8.06	286632	0.06	0.06	34	190
33.00	37.95	20.33	8.07	286823	-3.3	0.05	27	180
36.00	38.56	23.00	8.08	307483	0.3	0.12	55	200
1120	-30.81							

End Purge Time: 1355

Water sample:

Time collected: 1145

Total volume of purged water removed:

Physical appearance at start

Color: Flourscent

Odor: None

Sheen/Free Product: Nan

Physical appearance at sampling

Color: Flourescent

Odor: None

Sheen/Free Product: Nan

Field Test Results:

Dissolved ferrous iron:

Dissolved total iron:

Dissolved total manganese:

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/9/01	Personnel	DEC	Weather	Cloudy 50°
Site Name	Frontier	Evacuation Method	Grunfoss	Well #	P-4
Site Location	Pendleton, NY	Sampling Method	low flow	Project #	29820

Well information:

Depth of Well *	16.92	ft.
Depth to Water *	6.52	ft.
Length of Water Column	10.40	ft.

* Measurements taken from

	Top of Well Casing
	Top of Protective Casing
X	(Other, Specify) Top of PVC

Start Purge Time: 14:00

Elapsed Time	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
0:00	6.52	12.83	6.96	332235	-3.3	0.03	8.5	270
3:00	8.56	13.24	6.73	312063	-25.0	0.02	4.0	150
6:00	8.60	14.78	6.67	308986	-32.7	0.02	6.4	110
9:00	8.65	15.82	6.67	308749	-44.2	0.02	4.5	75
12:00	8.68	15.90	6.68	302810	-61.2	0.04	3.6	150
15:00	8.86	16.90	6.65	300607	-62.5	0.04	3.8	100
18.00	8.89	17.19	6.65	298449	-64.5	0.04	3.5	75

End Purge Time: 1437

Water sample:

Time collected: 1450

Total volume of purged water removed: _____

Physical appearance at start

Color: Clear
Odor: None
Sheen/Free Product: None

Physical appearance at sampling

Color: Clear
Odor: None
Sheen/Free Product: None

Field Test Results:

Dissolved ferrous iron: _____
Dissolved total iron: _____
Dissolved total manganese: _____

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/10/01	Personnel	DEC	Weather	Sunny 65°
Site Name	Frontier	Evacuation Method	Grunfoss	Well #	P-5
Site Location	Pendleton	Sampling Method	Low Flow	Project #	29820

Well information:

Depth of Well *	15.56	ft.
Depth to Water *	5.54	ft.
Length of Water Column	10.02	ft.

* Measurements taken from

- [ ] Top of Well Casing
- [ ] Top of Protective Casing
- [x] (Other, Specify) Top of PVC

Start Purge Time: 13:20

Elapsed Time	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
0:00	5.10	17.38	6.47	150665	-36.6	1.51	450	250
3:00	6.12	17.04	6.44	153036	-57.7	1.02	330	100
6:00	6.15	17.39	6.43	155393	-57.9	1.00	220	70
9:00	6.18	18.07	6.43	156302	-58.5	1.01	190	110
12:00	6.37	19.15	6.44	153684	-56.7	1.07	110	110
15:00	6.47	20.04	6.45	150054	-54.1	1.16	75	75
18:00	6.50	21.15	6.44	144990	-45.6	1.25	55	75
21:00	6.52	21.38	6.45	138642	-34.7	1.27	39	60
~~44:15~~	~~7.93~~							

End Purge Time: 1345

Water sample:

Time collected: 1350

Total volume of purged water removed: _____

Physical appearance at start

Color: brown

Odor: none

Sheen/Free Product: None

Physical appearance at sampling

Color: clear

Odor: none

Sheen/Free Product: none

Field Test Results:

Dissolved ferrous iron: _____

Dissolved total iron: _____

Dissolved total manganese: _____

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Low Flow Ground Water Sampling Log

Date	10/10/96	Personnel	DEC, Mike	Weather	Sunny 65°
Site Name	Frontier	Evacuation Method	Grunfoss	Well #	P-6
Site Location	Pendleton	Sampling Method	Low Flow	Project #	29820

Well information:

Depth of Well *	16.16	ft.
Depth to Water *	6.88	ft.
Length of Water Column	9.28	ft.

* Measurements taken from

- [ ] Top of Well Casing
- [ ] Top of Protective Casing
- [x] (Other, Specify) TOP of PVC

Start Purge Time: 14:30

Elapsed Time (min.)	Depth To Water	Temperature	pH	Conductivity	Oxidation Reduction Potential	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Flow Rate (ml/min).
0:00	7.23	17.40	6.48	244484	-43.5	0.62	50	100
3:00	7.36	15.56	6.39	250379	-30.3	0.37	21	120
6:00	7.54	15.82	6.39	251999	-27.9	0.33	15	60
9:00	7.57	16.74	6.41	257993	-28.2	0.25	45	60
12:00	7.65	17.57	6.43	262781	-30.9	0.22	24	90
15:00	7.72	18.22	6.45	267088	-32.2	0.21	32	60
18:00	7.79	18.58	6.45	269575	-32.0	0.21	19	60
21:00	7.90	19.21	6.44	272354	-32.2	0.21	13	50
24:00	7.94	19.58	6.43	274362	-30.4	0.21	12	50
27:00	7.98	19.95	6.43	275600	-30.5	0.20	12	50
30:00	8.04	20.56	6.43	277628	-32.3	0.20	12	60
33:00	8.09	21.03	6.43	279483	-34.1	0.25	14	60
36:00	8.13	21.13	6.44	278587	-34.8	0.24	13	50

End Purge Time: 15:10

Water sample:

Time collected: 1520

Physical appearance at start

Color: Clear

Odor: None

Sheen/Free Product: None

Total volume of purged water removed: _____

Physical appearance at sampling

Color: Clear

Odor: None

Sheen/Free Product: None

Field Test Results:

Dissolved ferrous iron: _____

Dissolved total iron: _____

Dissolved total manganese: _____

Analytical Parameters: VOCs

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

O'Brien & Gere Engineers, Inc. — Standard Ground Water Sampling Log

Date: 10/11/01
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Cloudy 60°
Well #: 85-7R
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	27.72	ft.
Depth to Water *	6.07'	ft.
Length of Water Column	21.65	ft.
Volume of Water in Well	3.53	gal.(s)
3X Volume of Water in Well	11	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: No gal.(s)
Did well go dry? 11

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	∅	57.4	4.92	2080	110
	3	54.3	4.85	2150	600
	7	54.1	4.85	2680	550
	11	53.7	4.94	2700	370

Water Sample:
Time Collected: 1500

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear / Cloudy	Color	Cloudy - lgt brown
Odor	None	Odor	Light sulfur
Turbidity (> 100 NTU)	110	Turbidity (> 100 NTU)	450
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/11/01
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Cloudy 60°
Well #: URS-7D
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	39.81	ft.
Depth to Water *	7.53	ft.
Length of Water Column	32.28	ft.
Volume of Water in Well	5.3	gal.(s)
3X Volume of Water in Well	16	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 12.5 gal.(s)
Did well go dry? Yes

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	58.8	5.52	3240	36
	5	54.6	5.09	3700	29
	10	54.7	5.25	3330	37
	~~16~~ 12	54.4	4.90	3130	280

Water Sample:
Time Collected: 1520

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Clear
Odor	light sulfur	Odor	light sulfur
Turbidity (> 100 NTU)	36	Turbidity (> 100 NTU)	23
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/8/01
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Sunny 60°
Well #: URS-14D
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	41.58	ft.
Depth to Water *	8.75	ft.
Length of Water Column	32.83	ft.
Volume of Water in Well	5.35	gal.(s)
3X Volume of Water in Well	16.0	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: _____ gal.(s)
Did well go dry? _____

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify) _____

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	53.9	7.39	978	19
	5	51.4	6.47	1379	24
	10.5	50.4	5.62	1547	14
	16	50.8	5.65	1561	22

Water Sample:
Time Collected: 1640

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Clear
Odor	None	Odor	Slight
Turbidity (> 100 NTU)	19	Turbidity (> 100 NTU)	22
Sheen/Free Product	None	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/8/01
Site Name: Frontier Chemical
Location: Pendleton, New York
Project No.: 29820
Personnel: BEL, M

Weather: Sunny 60
Well #: MW5 - 9D
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	50.88	ft.
Depth to Water *	8.89	ft.
Length of Water Column	41.99	ft.
Volume of Water in Well	6.84	gal.(s)
3X Volume of Water in Well	20.52	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 20 gal.(s)
Did well go dry? NO

* Measurements taken from: [ ] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	54.7	8.01	1473	5.8
	7	53.4	7.71	1447	8.2
	14	52.1	7.25	1394	10
	20	50.05	7.17	1270	11

Water Sample:
Time Collected: 1450

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Clear
Odor	None	Odor	light sulfur
Turbidity (> 100 NTU)	5.8	Turbidity (> 100 NTU)	11
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH

Notes: Collected MS/MSD

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date 10/11/01
Site Name Frontier Chemical
Location Pendelton, New York
Project No. 29820
Personnel TPP/DEC

Weather Cloudy 60°
Well # 88-12D
Evacuation Method Stainless Steel Bailer
Sampling Method Stainless Steel Bailer

Well Information:

Depth of Well *	51.48	ft.
Depth to Water *	10.43	ft.
Length of Water Column	41.05	ft.
Volume of Water in Well	6.7	gal.(s)
3X Volume of Water in Well	20.	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 9 gal.(s)
Did well go dry? ~~YES~~

* Measurements taken from [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	56.7	5.16	3850	2.9
	6	54.0	5.09	4728	14.0
	9 ~~13~~ 20	~~55~~.0	5.16	11570	80.0

Water Sample:
Time Collected 1215

Physical Appearance at Start		Physical Appearance at Sampling	
Color	CLEAR	Color	clear
Odor	SULFUR	Odor	sulfur
Turbidity (> 100 NTU)	2.9	Turbidity (> 100 NTU)	80
Sheen/Free Product	∅	Sheen/Free Product	∅

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes: X-1 → Blind Dup (Filtered)

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/8/01
Site Name: Frontier Chemical
Location: Pendleton, New York
Project No.: 29820
Personnel: DEC

Weather: Sonny 60°
Well #: URS-9I
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	45.74	ft.
Depth to Water *	9.73	ft.
Length of Water Column	36.01	ft.
Volume of Water in Well	5.87	gal.(s)
3X Volume of Water in Well	17.6	gal.(s)

Water Volume /ft. for:
- x 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 18 gal.(s)
Did well go dry? No

* Measurements taken from: [ ] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	ϕ	58.2	8.20	1175	120
	6	54.6	8.08	1228	700
	12	53.8	7.45	1166	750
	17	51.5	7.36	1081	600

Water Sample:
Time Collected: 1505

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Grey/light Brown
Odor	None	Odor	None
Turbidity (> 100 NTU)	120	Turbidity (> 100 NTU)	600
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCl	
Liter	Plastic	1	Not If < 50	HNO_3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc.

Standard Ground Water Sampling Log

Date: 10/11/09
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Cloudy 60°
Well #: 88-12C
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	31.29	ft.
Depth to Water *	11.43	ft.
Length of Water Column	19.86	ft.
Volume of Water in Well	3.24	gal.(s)
3X Volume of Water in Well	10	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 10 gal.(s)
Did well go dry? No

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	61.4	4.61	1059	ERR <
	3	54.9	4.77	1043	ERR -
	6	54.4	4.54	1101	ERR -
	10	54.0	4.86	1156	ERR

Water Sample:
Time Collected: 1150

Physical Appearance at Start		Physical Appearance at Sampling	
Color	lgt brown	Color	Brown
Odor	none	Odor	None
Turbidity (> 100 NTU)	7100	Turbidity (> 100 NTU)	7100
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

u

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date 10/11/01
Site Name Frontier Chemical
Location Pendelton, New York
Project No. 29820
Personnel TPP/DEC

Weather
Well # 85-5R
Evacuation Method Stainless Steel Bailer
Sampling Method Stainless Steel Bailer

Well Information:

Depth of Well *	38.03	ft.
Depth to Water *	8.92	ft.
Length of Water Column	29.11	ft.
Volume of Water in Well	4.74	gal.(s)
3X Volume of Water in Well	14.2	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling 7 gal.(s)
Did well go dry? YES

* Measurements taken from [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard	7.0	1413 S Standard	
10.0 Standard	10.0		

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	Ø	57.7	7.81	9500.00	70
	5	56.1	8.57	1037.0	950
	7 X Ø	54.8	8.38	1248.6	ERROR - O/L
	14				

Water Sample:
Time Collected 1025

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Cloudy	Color	Cloudy
Odor	Ø	Odor	None
Turbidity (> 100 NTU)	70	Turbidity (> 100 NTU)	80
Sheen/Free Product	Ø	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/11/01
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Cloudy 60°
Well #: URS-5D
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	49.83	ft.
Depth to Water *	8.62	ft.
Length of Water Column	41.21	ft.
Volume of Water in Well	6.7	gal.(s)
3X Volume of Water in Well	20	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 8.5 gal.(s)
Did well go dry? Yes

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	57.5	7.97	2380	19
	6	54.2	8.68	2490	38
	~~8.5~~	54.1	6.20	3770	60
	~~20~~				

Water Sample:
Time Collected: 10:00

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Clear
Odor	None	Odor	None
Turbidity (> 100 NTU)	19	Turbidity (> 100 NTU)	14
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

O'Brien & Gere Engineers, Inc. — **Standard Ground Water Sampling Log**

Date: 10/8/01
Site Name: Frontier Chemical
Location: Pendelton, New York
Project No.: 29820
Personnel: TPP/DEC

Weather: Sunny 60°
Well #: URS-14I
Evacuation Method: Stainless Steel Bailer
Sampling Method: Stainless Steel Bailer

Well Information:

Depth of Well *	31.10	ft.
Depth to Water *	7.65	ft.
Length of Water Column	23.45	ft.
Volume of Water in Well	3.82	gal.(s)
3X Volume of Water in Well	11.5	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: ~~12~~ 8 gal.(s)
Did well go dry? Yes

* Measurements taken from: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard		1413 S Standard	
10.0 Standard			

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity Readings Ntu
initial	0	58.6	8.22	238	34
	4	51.8	7.83	400	500
	8	50.0	7.35	494	~~999~~ 1100
	12				

Water Sample:
Time Collected: 1545 (10/9/01)

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Cloudy
Odor	No	Odor	NO
Turbidity (> 100 NTU)	341	Turbidity (> 100 NTU)	240
Sheen/Free Product	No	Sheen/Free Product	NO

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	3	No	1:1 HCL	
Liter	Plastic	1	Not if < 50 ntu	HNO3	
Pint	Plastic	1	No	NaOH	

Notes:

Appendix C

Data validation report

Data Validation Services

120 Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429
Facsimile 518-251-4428

November 27, 2001

Dave Carnevale
O'Brien & Gere Engineers
5000 Brittonfield Parkway
Syracuse, NY 13221

RE: Validation of Frontier Chemical Site Data Packages
OBG Laboratory report for samples received October 2001

Dear Mr. Carnevale:

Review has been completed for the data package generated by OBG Laboratories which pertains to aqueous samples collected October 9 through October 18, 2001 at the Frontier Chemical Site. Six samples were analysed for full TCL/TAL parameters, and eleven were processed for TCL volatiles and TAL metals/cyanide. Matrix spikes/duplicates, and field and trip blanks were also processed. Methodologies utilized are those of the USEPA SW846.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA SOPs HW-2 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Field Duplicate Correlation (volatiles and metals)
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, sample processing was primarily conducted with compliance to protocol requirements and with adherance to quality criteria, and most reported results are usable with minor qualification. The laboratory summary data package, with recommended qualifiers applied in red ink to the sample result forms is attached to this narrative, and should be reviewed in conjunction with this text.

Volatile Analyses

Only the reanalysis results for URS-14I should be used due to potential contamination in the initial analysis.

Results for URS-14I and 88-12C are qualified estimated due to low recoveries of surrogate standard d8-toluene (70% and 75%, below 83% limit). Matrix effects are indicated.

Due to low calibration standard responses (42%D to 60%D), results for bromomethane in all project samples are qualified estimated, and are possibly biased low.

Due to low responses in the calibration standards (mean RRF of 0.036), results for acetone in all samples are qualified estimated. The level of bias is not expected to be great.

Results for analytes reported initially with the "E" flag are derived from the dilution analysis.

Detections of acetone, methylene chloride, and carbon disulfide, with the exceptions of acetone in P-3 and methylene chloride in P-6, are edited to nondetection due to presence in associated blanks.

Matrix spikes of URS-9D evaluate recoveries of all target analytes. Recoveries and duplicate correlation values were acceptable, with the exception of bromomethane (76% and 67%, below the recommended limit of 78%), cis-1,2-dichoropropene (50% and 49%, below 65% limit), and styrene (26% and 28%, below the recommended limit of 88%). The results for these analytes in the unspiked sample are therefore qualified estimated ("J" qualifier), possibly biased slighty low. Spiked blank recoveries were acceptable.

Field duplicate correlation for 88-12D and X-1 was acceptable.

Processing was compliant, and results are substantiated by the raw data.

Semivolatile Analyses

Detected results for di-n-butylphthalate are edited to nondetection due to presence in associated blanks. Detected concentrations of bis(2-ethylhexyl)phthalate are at levels typical of contamination.

The matrix spikes of batch QC produced acceptable recoveries and duplicate correlations, with the exception of low recoveries for n-nitrosodi-n-propylamine (51% and 56%, below 61%). One spiked blank showed acceptable recoveries, the spiked duplicate showed five slightly low recoveries; reported results for samples are unaffected.

Results for analytes reported initially with the "E" flag are derived from the dilution analysis.

Tentatively Identified Compounds (TICs) with retention times of 16.0' should be considered as contamination (due to presence in the associated blanks), and are rejected as sample components.

Processing was compliant, and results are substantiated by the raw data.

Pesticide/PCB Analyses

Accuracy and precision were determined from spiked blanks, and showed acceptable values. Matrix effect is not evaluated.

Processing was compliant, and results are substantiated by the raw data.

Metals/CN Analyses

Detection of calcium in the equipment blank does not affect sample results, the concentrations of which were greatly in excess of that of the blank.

Matrix spike recoveries for URS-9D were acceptable, and LCS recoveries were within required ranges. With the exception of that for cyanide, duplicate correlations were performed on sample spikes, not the unspiked sample. Values were acceptable.

Field duplicate results for 88-12D and X-1 showed acceptable correlations.

The serial dilution determinations for URS-9D produced acceptable correlations, with the exception of that for manganese (12%D). Results for that element in samples reporting concentrations above 7 ug/L are qualified estimated due to matrix.

Method blanks were reported with reporting limits only down to the CRDL, while samples were reported to the IDL. Qualification of results is not affected.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

CROSS REFERENCE TABLE

Site	Sample Number	Date Collected	Time	Received	Package
URS-9D	T3313D	10/08/2001		10/10/2001	190
URS-9D	T3313MS	10/08/2001		10/10/2001	190
URS-9D	T3313MSD	10/08/2001		10/10/2001	190
URS-9D	T3313	10/08/2001		10/10/2001	190
URS-9I	T3314	10/08/2001		10/10/2001	190
URS-14D	T3315	10/08/2001		10/10/2001	190
P-4	T3316	10/09/2001		10/10/2001	190
URS-14I	T3317	10/09/2001		10/10/2001	190
QC Trip Blank	T3318	10/08/2001		10/10/2001	190
P-1	T3420	10/10/2001		10/11/2001	202
P-2	T3421	10/10/2001		10/11/2001	202
P-3	T3422	10/10/2001		10/11/2001	202
P-5	T3423	10/10/2001		10/11/2001	202
P-6	T3424	10/10/2001		10/11/2001	202
QC Trip Blank	T3425			10/11/2001	202
Grundfos Equip Blank(Equipment Blank)	T3524	10/11/2001		10/12/2001	219
URS-5D	T3525	10/11/2001		10/12/2001	219
85-5R	T3526	10/11/2001		10/12/2001	219
88-12C	T3527	10/11/2001		10/12/2001	219
88-12D	T3528	10/11/2001		10/12/2001	219
85-7R	T3529	10/11/2001		10/12/2001	219
URS-7D	T3530	10/11/2001		10/12/2001	219
Stainless Steel Bailer Equip Blank	T3531	10/11/2001		10/12/2001	219
Blind Dup. X-1	T3532	10/11/2001		10/12/2001	219
QC Trip Blank	T3533	10/11/2001		10/12/2001	219
85-7R - Preserved	T3857	10/18/2001		10/19/2001	279
85-7R - Non-Preserved	T3858	10/18/2001		10/19/2001	279

Attachment A

NYSDEC Correspondence Dated May 30, 2001

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue, Buffalo, New York, 14203-2999
Phone: (716) 851-7220 • **FAX:** (716) 851-7226
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

May 30, 2001

FILE COPY

Mr. John Burns
Chairman
Frontier Pendleton Technical Committee
Olin Corporation
P.O. Box 248
1186 Lower River Road
Charleston, TN 37310

Dear Mr. Burns:

Frontier Pendleton Site # 932043
Operation and Maintenance (O&M)

We have reviewed Semi-Annual Operation & Maintenance Report # 8 submitted by your letter dated May 3, 2001 and offer the following comments for your consideration:

Hydraulic Containment

Ground water monitoring has been continuing on a semi-annual basis since June 1997. The June 1997 data showed that ground water elevations within the containment cell were higher than than outside, indicating that no inward hydraulic gradient existed at the site when monitoring began. Monitoring data collected since that time shows that while an inward hydraulic gradient seems to have been established and is being maintained by the operation of the leachate collection, treatment and pumping facility, there is still no inward hydraulic gradient near the mid-portion of the eastern site border. (Refer to groundwater elevations in piezometers P-1/ outside containment and P-2/inside containment). Due to the absence of an inward hydraulic gradient at the mid-eastern border of the site, there is some concern of migration of contaminants from the containment cell in that area.

In order to better evaluate the effectiveness of the containment, particularly along the eastern site boundary, a comparison of groundwater quality within the containment and immediately outside the containment is necessary. For this purpose, we recommend the following actions:

- In addition to the routine O&M monitoring of groundwater, collect groundwater samples from piezometers P-3, P-1, P-2, P-4, P-5 and P-6 during the next monitoring event.

- Analyze the samples from the above-mentioned piezometers for the parameters as specified for the first year of O&M monitoring, including VOCs, SVOCs, PCBs and Pesticides.

- Include the analytical results and a summary report in the subsequent semi-annual report. Provide detailed evaluation and recommendations, as appropriate.

While the above-outlined sampling of groundwater from the piezometers within the containment cell and in the areas immediately offsite is not routinely required per the approved O&M manual, it is critical that this be undertaken so as to better evaluate the eastern boundary hydraulic containment and potential contaminant migration. In addition, the five-year in-depth evaluation of effectiveness of the remedial actions at the site will take place in 2002. Collection of the groundwater quality data as outlined above is needed prior to 2002 so that needed evaluations can be completed. Currently the only groundwater data for areas within the containment is prior to construction of the landfill in 1996 and therefore insufficient in performing the eastern boundary evaluation.

Other specific comments on the subject report are as following:

Attachment D - Site Maintenance

Table B - 3: GAC # 1 is reported to be leaking. The report must provide details of the actions taken to correct this situation.

Operator's Log: The system check list shows the word "Fail" in items #6 and #7 for pumps #1 and #2. This is confusing as pump #2 was found ok on arrival. Therefore, the word "Fail" against it does not appear applicable. Clarification or revision should be made in future reports.

Groundwater Monitoring

Table I: For other long-term monitoring projects, we have found it very useful to graph data to clearly depict trends, highlight changes and track remedial progress. It is requested that future reports include such a graph of groundwater monitoring data as tabulated in Table I. An example of such graphing is attached for your information.

Should you have any questions on the above, please contact me on (716) 851-7220.

Sincerely,

Abul Barkat, P.E.
Project Manager

AB/tml
Attachment

cc: Mr. Glen May, NYSDEC
Mr. Brian Sadowski, NYSDEC

Attachment D – Site Maintenance Work Items and Field Observation Reports

D-1 Field Observation Reports

March 30, 2001
April 24, 2001
June 28, 2001
August 30, 2001
October 5, 2001
October 8, 2001

Field Observation Reports

- March 30, 2001, Field Observation Report

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Date:	3/30/01

Time In:	10:00am
Time Out:	12:00pm

Weather: Overcast, cloudy, light rain

Precipitation:	Yes

Temperature:	35 deg. f

Reason for Visit: Change out filter bags, by-pass GAC #1

	Reading		Time
Flowmeter Totalization Reading (upon arrival)	464232	Gal	10:00am
Flowmeter Totalization Reading (upon departure)	464232	Gal	11:55am
Flow rate	8.78	GPM	
Pump Hour Meter Readings: Pump #1	495.6	Hours	
Pump Hour Meter Readings: Pump #2	402.3	Hours	
Wet Well Level	3.03	Ft	
Pressure Sensor Reading (Bar Graph)	31.94	PSI	

	Influent Gauge	Effluent Gauge	Differential
BF1	28	24	4
BF2	26	24	2
GAC1	Off-line		
GAC2	22	7	15

Change Filter Bags (Check One)	YES	X	NO		TIME	

Details: Replaced filter bags, by-passed GAC #1, and put both pumps on auto. Maintenance will repair tank on 4/2/01.

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Actions taken to correct problems: By-passed GAC#1 until hole is repaired.

Recommended actions to prevent future problems:

Other relevant information:

SYSTEM CHECK LIST	*Arrival*	*Departure*
#1 Vault Door	ok	ok
#2 Panel Door	ok	ok
#3 Vault Sump High	ok	ok
#4 Containment Pipe Alarm	ok	ok
#5 High Wet Well Alarm	ok	ok
#6 Pump #1 Fail	tripped	ok
#7 Pump # 2 Fail	ok	ok
#8 Bag Filter Differential Pressure High	ok	In alarm
#9 Wet Well Level (Actual Measure Spoken)	3.03	3.03
#10 Flow Rate	0	0
#11 #16; Reserved for future use		
FOR CURRENT STATUS CALL: (716) 743-1335		

Operator Name: Ben Brayley

Operator Signature: Ben Brayley

Field Observation Reports

- April 24, 2001, Field Observation Report

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Date:	4/24/01

Time In:	8:00am
Time Out:	9:00am

Weather: Clear & cool

Precipitation:	No

Temperature:	34 deg. f

Reason for Visit: Monthly Inspection.

	Reading		Time
Flowmeter Totalization Reading (upon arrival)	496949	Gal	8:00am
Flowmeter Totalization Reading (upon departure)	496949	Gal	9:00am
Flow rate	0.0	GPM	
Pump Hour Meter Readings: Pump #1	551.7	Hours	
Pump Hour Meter Readings: Pump #2	407.4	Hours	
Wet Well Level	1.9	Ft	
Pressure Sensor Reading (Bar Graph)	0.0	PSI	

	Influent Gauge	Effluent Gauge	Differential
BF1			
BF2			
GAC1			
GAC2			

Change Filter Bags (Check One)	YES		NO	X	TIME	

Details:

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Actions taken to correct problems:

Recommended actions to prevent future problems:

Other relevant information: GAC 1 tank has been patched & shows no signs of further leakage.

SYSTEM CHECK LIST	*Arrival*	*Departure*
#1 Vault Door	ok	ok
#2 Panel Door	ok	ok
#3 Vault Sump High	ok	ok
#4 Containment Pipe Alarm	ok	ok
#5 High Wet Well Alarm	ok	ok
#6 Pump #1 Fail	ok	ok
#7 Pump # 2 Fail	ok	ok
#8 Bag Filter Differential Pressure High	ok	ok
#9 Wet Well Level (Actual Measure Spoken)	1.9	1.9
#10 Flow Rate	0	0
#11 #16; Reserved for future use		
FOR CURRENT STATUS CALL: (716) 743-1335		

Operator Name: Ben Brayley

Operator Signature: *Ben Brayley*

Field Observation Reports

- June 28, 2001, Field Observation Report

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Date:	6/28/01

Time In:	8:15 am
Time Out:	9:15 am

Weather: clear & sunny

Precipitation:	0

Temperature:	76' f

Reason for Visit: Monthly inspection & chart change

	Reading		Time
Flowmeter Totalization Reading (upon arrival)	512309	Gal	8:15am
Flowmeter Totalization Reading (upon departure)	512309	Gal	8:15am
Flow rate	0	GPM	
Pump Hour Meter Readings: Pump #1	566.2	Hours	
Pump Hour Meter Readings: Pump #2	421.9	Hours	
Wet Well Level	1.7	Ft	
Pressure Sensor Reading (Bar Graph)	0.0	PSI	

	Influent Gauge	Effluent Gauge	Differential
BF1			
BF2			
GAC1			
GAC2			

Change Filter Bags (Check One)	YES		NO	X	TIME	

Details: Grass needs cutting. Varmint holes (2) still show activity.

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Actions taken to correct problems:

Recommended actions to prevent future problems:

Other relevant information:

SYSTEM CHECK LIST	*Arrival*	*Departure*
#1 Vault Door	OK	OK
#2 Panel Door	OK	OK
#3 Vault Sump High	OK	OK
#4 Containment Pipe Alarm	OK	OK
#5 High Wet Well Alarm	OK	OK
#6 Pump #1 Fail (Yes / No)	NO	NO
#7 Pump # 2 Fail (Yes / No)	NO	NO
#8 Bag Filter Differential Pressure High	OK	OK
#9 Wet Well Level (Actual Measure Spoken)	1.7	1.7
#10 Flow Rate	0	0
#11 #16; Reserved for future use		
FOR CURRENT STATUS CALL: (716) 743-1335		

Operator Name: Ben Brayley

Operator Signature: *Ben Brayley*

Field Observation Reports

- August 30, 2001, Field Observation Report

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Date:	8/30/01

Time In:	7:00am
Time Out:	8:00am

Weather: clear & sunny

Precipitation:	0

Temperature:	67' f

Reason for Visit: Monthly inspection & chart change.

	Reading		Time
Flowmeter Totalization Reading (upon arrival)	519688	Gal	7:00 am
Flowmeter Totalization Reading (upon departure)	519688	Gal	8:00 am
Flow rate	0	GPM	
Pump Hour Meter Readings: Pump #1	573.1	Hours	
Pump Hour Meter Readings: Pump #2	428.3	Hours	
Wet Well Level	1.7	Ft	
Pressure Sensor Reading (Bar Graph)	0.0	PSI	

	Influent Gauge	Effluent Gauge	Differential
BF1			
BF2			
GAC1			
GAC2			

Change Filter Bags (Check One)	YES		NO	X	TIME	

Details: Varmint holes (2) still show activity.

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Actions taken to correct problems:

Recommended actions to prevent future problems:

Other relevant information:

SYSTEM CHECK LIST	*Arrival*	*Departure*
#1 Vault Door	OK	OK
#2 Panel Door	OK	OK
#3 Vault Sump High	OK	OK
#4 Containment Pipe Alarm	OK	OK
#5 High Wet Well Alarm	OK	OK
#6 Pump #1 Fail (Yes / No)	NO	NO
#7 Pump # 2 Fail (Yes / No)	NO	NO
#8 Bag Filter Differential Pressure High	OK	OK
#9 Wet Well Level (Actual Measure Spoken)	1.7	1.7
#10 Flow Rate	0	0
#11 #16; Reserved for future use		
FOR CURRENT STATUS CALL: (716) 743-1335		

Operator Name: Ben Brayley

Operator Signature: *Ben Brayley*

Field Observation Reports

- October 5, 2001, Field Observation Report

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Date:	10/05/01

Time In:	8:10am
Time Out:	9:55 am

Weather: rain & cloudy

Precipitation:	Yes

Temperature:	52' f

Reason for Visit: Monthly inspection, sampling, & chart change. Meet w/Sevenson (Mike Walker) turnover.

	Reading		Time
Flowmeter Totalization Reading (upon arrival)	523558	Gal	8:30 am
Flowmeter Totalization Reading (upon departure)	523705	Gal	9:30 am
Flow rate	8.22	GPM	
Pump Hour Meter Readings: Pump #1	576.8	Hours	
Pump Hour Meter Readings: Pump #2	432.5	Hours	
Wet Well Level	1.79	Ft	
Pressure Sensor Reading (Bar Graph)	20.2	PSI	

	Influent Gauge	Effluent Gauge	Differential
BF1	19#	17.5#	1.5#
BF2	17.5#	16.0 #	1.5#
GAC1	13#	5#	8#
GAC2	13#	5#	8#

Change Filter Bags (Check One)	YES		NO	X	TIME	

Details: Varmint holes (2) still show activity.

FRONTIER CHEMICAL – PENDLETON SITE
Pretreatment System' Operator's Log

Actions taken to correct problems:

Recommended actions to prevent future problems:

Other relevant information:

SYSTEM CHECK LIST	*Arrival*	*Departure*
#1 Vault Door	OK	OK
#2 Panel Door	OK	OK
#3 Vault Sump High	OK	OK
#4 Containment Pipe Alarm	OK	OK
#5 High Wet Well Alarm	OK	OK
#6 Pump #1 Fail (Yes / No)	NO	NO
#7 Pump # 2 Fail (Yes / No)	NO	NO
#8 Bag Filter Differential Pressure High	OK	OK
#9 Wet Well Level (Actual Measure Spoken)	1.79	0.7
#10 Flow Rate	0	0
#11 #16; Reserved for future use		
FOR CURRENT STATUS CALL: (716) 743-1335		

Operator Name: Ben Brayley

Operator Signature: *Ben Brayley*

Field Observation Reports

- October 8, 2001, Field Observation Report

GGE
a member of the GLYNN GROUP

FIELD OBSERVATION REPORT

Civil • Structural • Geotechnical • Materials Testing • Consulting

PROJECT NO.:	94-1014-O REPORT NO.: 01-2	DATE: 10/8/01	PAGE: 1 OF 1
PROJECT:	Pendleton – Frontier Chemical Site	DAY:	Monday
SUBJECT:	Semi-Annual Sampling	PROJECT TIME:	1:00 pm – 2:45 pm
CLIENT:	Pendleton PRP Group	SITE TIME:	1:30 pm – 2:15 pm
WEATHER:	Cool, Clear (55°F)	PHOTOS: YES X	NO

- As notified by Dave Carnevale (O'B&G) regarding scheduled semi-annual sampling event, GGE visits site to record Quarry Lake water level coincidental with groundwater sampling.
- Record the Quarry Lake water level at El. 577.39' by level survey using the top of the pre-treatment vault (El. 580.50) as a BM.
- O'Brien & Gere sampling team is on site as well as a sampling technician from Sevenson Environmental Services (SES). SES has been contracted to take over sampling and treatment system operation after this sampling event.
- Briefly observe general site conditions: (1) note standing water in the wetlands area east of the treatment vault, (2) the lake water level is below the overflow weir invert elevation, (3) lake shore evidences previous, below normal water levels which may have adversely affected wetlands plantings along the north shore, (4) the lakeside slope along the access road is fully vegetated and the stone fill placed 9/97 is in good condition (no sign of erosion), (5) the capped area is in good condition and turf is well-maintained. Two woodchuck holes in the cap barrier noted previously on the mid lakeside slope between P-3 and P-4 remain. It is not apparent if woodchucks are still active.
- Leave site at 2:15 pm.

PERSONNEL ON SITE / CONTACTED:
Tim Prawel, Don Canestrari – O'B&G
Mike Walker – SES

DISTRIBUTION:
Jim Young, John Burns – PPRP
Dave Carnevale – O'Brien & Gere

DAILY MANHOURS: 1.75

Jesse E. Grossman, P.E., Project Manager

Mark W. Glynn, P.E.

GLYNN GEOTECHNICAL ENGINEERING

415 South Transit Street, Lockport, New York 14094
voice 716.625.6933 / fax 716.625.6983
www.glynngroup.com