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

March 2000
Semi-Annual Report #6

Prepared by Pendleton PRP Group

April 1, 2000 **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)
March 2000, Semi-Annual Report #6
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

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@corp.olin.com.

Sincerely,
Pendleton PRP Group

John M. Burns
Chairman - Technical Committee for
Pendleton PRP Group

Distribution:

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

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

Mr. Gerald Rider (1 copy)
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

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

Jennifer Sargent, Esq.
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

Dennis McCanna
SIVACO New York
P.O. Box 646
3937 River Road
Tonawanda, NY 14151-0646

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

Table of Contents
Semi-Annual Report #5
March 2000

Attachments

Attachment A – Quarry Lake Level Plot versus Time
Quarry Lake Level – March 7, 2000

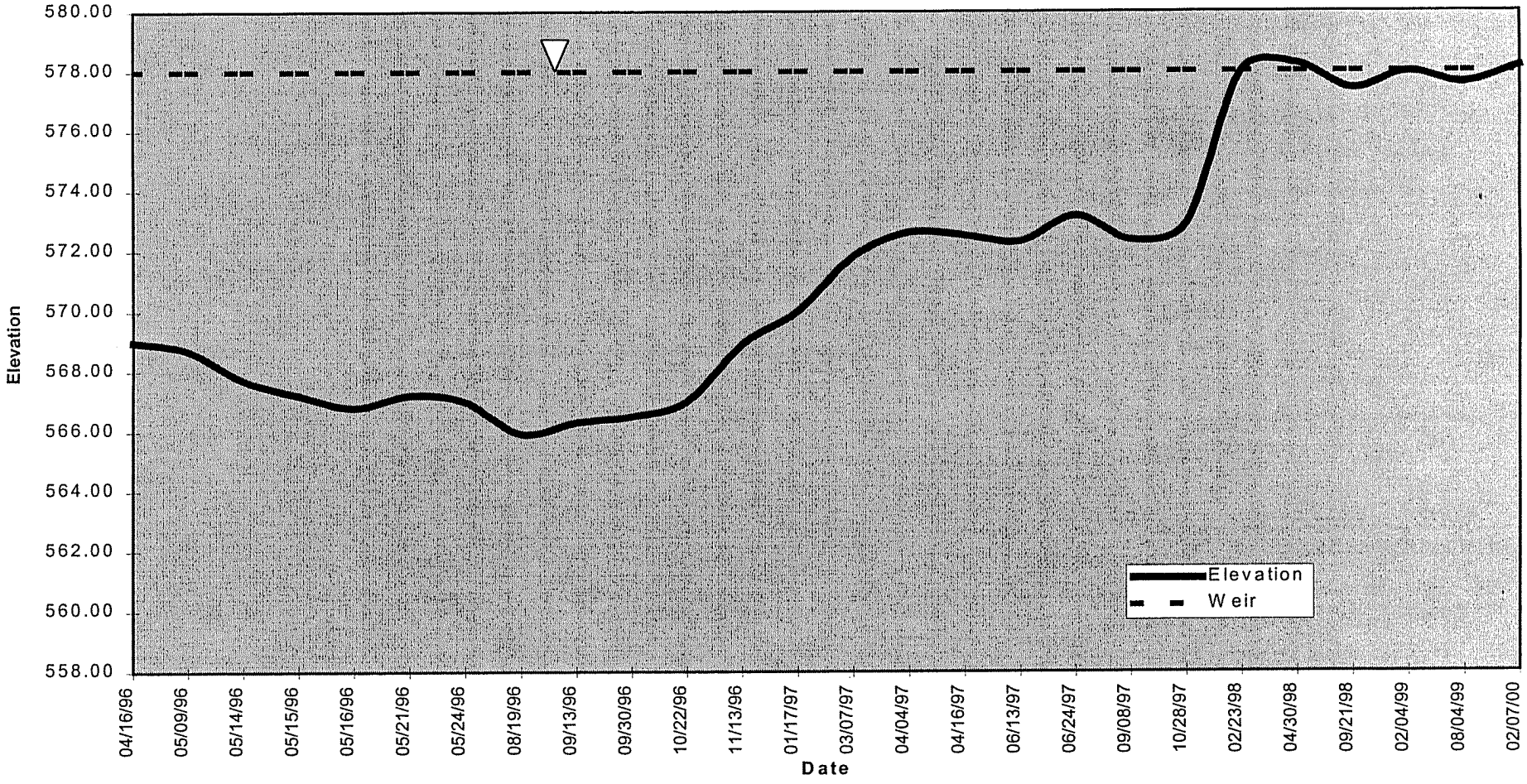
Quarry Lake Level – February 7, 2000

- Table A-1 Quarry Lake Level
- Chart A-1 Quarry Lake Water Elevations

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

CHART A-1
QUARRY LAKE WATER LEVELS



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

Submittal Date	Sampling Date
October 8, 1999	September 1, 1999
November 19, 1999	October 4, 1999
December 1, 1999	November 11, 1999
January 17, 2000	December 3, 1999
February 7, 2000	January 13, 2000
March 10, 2000	February 3, 2000

B-2 Operation, Maintenance and Monitoring Activities

Operation, Maintenance, and Monitoring Activities

Table B-3

Date	Event	Action Taken
September 11, 1999	Mid-joint of vault roof leaking	Evaluating alternatives for corrective action
October 4, 1999	Mid-joint of vault roof leaking	Evaluating alternatives for corrective action
November 11, 1999	Pressure Problems	Changed filter bags
February 26, 1999	Mid-joint of vault roof leaking	Evaluating alternatives for corrective action

ATTACHMENT C – Groundwater Data

C-1 Frontier Chemical – Pendleton Site
Semi-Annual Ground Water Monitoring Report
O'Brien & Gere
March 2000

C-2 Frontier Chemical – Pendleton Site
Town of Pendleton, Niagara County, NY Water Samples
Volume 1 of 3
O'Brien & Gere
February 7, 8, and 9, 2000

C-1 Frontier Chemical – Pendleton Site
Semi-Annual Ground Water Monitoring Report
O'Brien & Gere
March 2000

C-2 Frontier Chemical – Pendleton Site
Town of Pendleton, Niagara County, NY Water Samples
Volume 1 of 3
O'Brien & Gere
February 7, 8, and 9, 2000

Attachment D – Site Maintenance Work Items and Field Observation Reports

D-1 Field Observation Reports

Field Observation Reports

- February 7, 2000, Field Observation Report

- **Introduction**

This sixth 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 September 1999 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 inspection was performed on February 7, 2000. The inspection report is included in this report as Attachment D.

   Relocated wetlands inside the perimeter berm will be inspected and reported in the next semi-annual report. The PRP Group requested a formal wetland inspection on September 24, 1999.

   The relocated wetlands inside the Quarry Lake levee have elevations of 574 feet for aquatic bed species (Zone A), 575 feet for non-persistent emergent species (Zone B), and 576 feet for persistent emergence species (Zone C). A water elevation chart is included as Attachment A-2. This water level chart shows the history of 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,

   Regarding Operation and maintenance of the ground water pre-treatment system, the monthly submittals to the Niagara Country Sewer District #1 detailing analytical and discharge flow data for this reporting period are included in Attachment B. Six months (October 1999 through March 2000 1999) of submittals as shown in Table 2-1 are included with this report.

Table 2-1 Niagara County Sewer District #1 Submittals

Submittal Date	Sampling Date
October 8, 1999	September 1, 1999
November 19, 1999	October 4, 1999
December 1, 1999	November 11, 1999
January 17, 2000	December 3, 1999
February 7, 2000	January 13, 2000
March 10, 2000	February 3, 2000

Also included in Attachment B is Table 2-2, which summarizes Operation, Maintenance, and Monitoring Activities for the site during this reporting period.

3. Performance of a ground water monitoring program to monitor site ground water conditions and to verify the inward hydraulic gradient within the capped area,

   Regarding performance of a ground water monitoring program, the report "Frontier Chemical - Pendleton Site, Semi-Annual Ground Water Monitoring Report" dated March 2000 is included as Attachment C-2.

4. Evaluation of operation, maintenance, and monitoring activities and identification of proposed changes to the O&M Manual or site procedures and policies which would provide a safer and/or more cost-effective operation, and

5. Recordkeeping

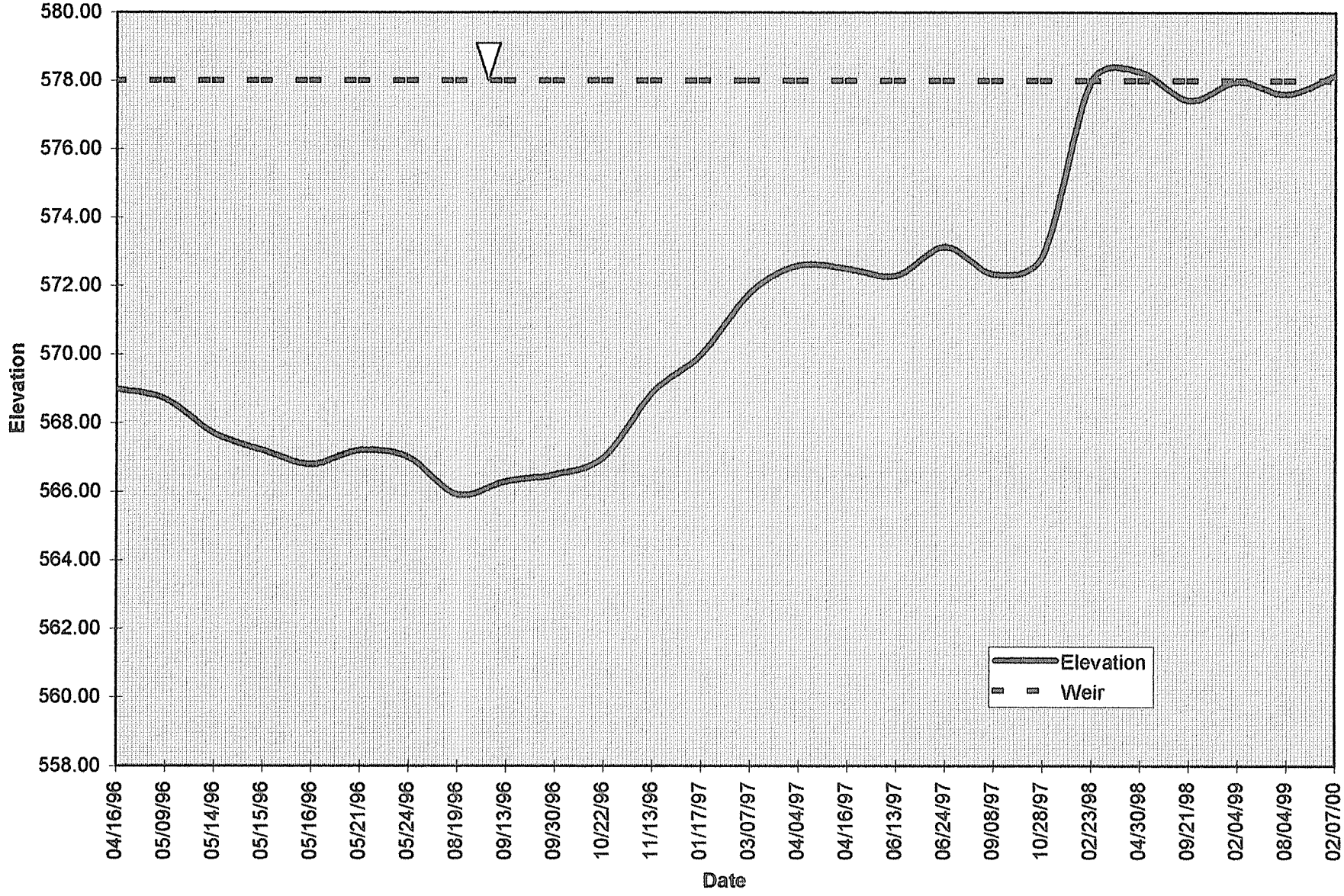
   Records for site operation and maintenance activities are maintained at the site and Olin's Niagara Falls Plant. These records include daily and weekly logs and charts. Glynn Geotechnical provides assistance to the site caretaker and updates O&M documentation. O'Brien & Gere Engineers provide ground 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, October 1999 to March 2000 was reviewed and found to be in accordance with the approved O&M Manual for the Site.

Attachment A

QUARRY LAKE LEVEL vs. TIME



Attachment B

Olin

P.O. BOX 248, 1186 LOWER RIVER ROAD, NW, CHARLESTON, TN 37310-0248
(423) 336-4000 FAX: (423) 336-4183

October 8, 1999

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (9/1/99 Monthly Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the September 1, 1999, 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 (#98-11) 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
For the Frontier Chemical - Pendleton Site PRP Group

John M. Burns

Enclosures: as stated

cc: D. Kummer
Pendleton Site Technical Committee

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

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103

Jennifer Sargent, Esq.
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Dennis McCanna
SIVACO
P.O. Box 646
3937 River Road
Tonawanda, NY 14151-0646

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

FRONTIER CHEMICAL PENDLETON
DAILY FLOW DATA
SEPTEMBER 1999

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
9/1/99		92	avg. flow & Sampling
9/2/99		92	avg. flow
9/3/99		92	avg. flow
9/4/99		92	avg. flow
9/5/99		92	avg. flow
9/6/99		92	avg. flow
9/7/99	343644	92	avg. flow
9/8/99	344180	536	
9/9/99	344235	55	
9/10/99	344499	264	
9/11/99		79	avg. flow
9/12/99	344657	79	avg. flow
9/13/99	344760	103	
9/14/99	344863	103	
9/15/99	344914	51	
9/16/99	345018	104	
9/17/99		85	avg. flow
9/18/99		85	avg. flow
9/19/99	345274	85	avg. flow
9/20/99	345377	103	
9/21/99	345429	52	
9/22/99	345533	104	
9/23/99		90	avg. flow
9/24/99		90	avg. flow
9/25/99		90	avg. flow
9/26/99	345891	90	avg. flow
9/27/99	345991	100	
9/28/99	346042	51	
9/29/99	346198	156	
9/30/99	346464	266	

Avg. Daily Flow (gal). **115.5**

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons

TOTAL GALLONS **0.0**

Avg. Flow = 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 : 09/17/99
Group Number : 9901-1355

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

Site : Frontier - Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC 2 Sample Port	WS56344	Aqueous	09/01/99	09/02/99	14:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
Total Metals	1	Standard
Cyanide	1	Standard
Phenol	1	Standard
Total Suspended Solids	1	Standard
Pesticides	1	Standard
Volatile Organics	1	Standard

Report Released By : Daniel W. Vollmer
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

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 either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets identification criteria, but the result is less than the sample quantitation limit but greater than zero.

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: Frontier - Pendleton
Date Sampled: 09/01/99
Date Received: 09/02/99

Group Number: 9901-1355
Units: mg/L
Matrix: Aqueous

WST ID: WS56344
Client ID: GAC 2 Sample Port
Digestion Date: 09/15/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	09/16/99	EPA 200.9
Boron by ICP	0.012	0.646	09/16/99	EPA 200.7
Chromium by ICP	0.005	Not detected	09/16/99	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier - Pendleton
Date Sampled: 09/01/99
Date Received: 09/02/99

Group Number: 9901-1355
Matrix: Aqueous

WST ID: WS56344
Client ID GAC 2 Sample Port

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	09/03/99
Cyanide in Water	EPA 335.2	0.005	Not detected	mg/L	09/10/99
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	09/07/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

40 CFR Part 136 Method 624

EPA 624

Site: Frontier - Pendleton
Date Sampled: 09/01/99
Date Received: 09/02/99

Group Number: 9901-1355
Units: ug/L
Matrix: Aqueous

WST ID: WS56344
Client ID: GAC 2 Sample Port
Extraction Date: NA
Date Analyzed: 09/07/99

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
romodichloromethane	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	1.2	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	10	Not detected		U
1,2-Dichloroethane-d4 (%)		105	76-114	
Toluene-d8 (%)		108	88-110	
Bromofluorobenzene (%)		100	86-115	

Dilution Factor 1

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

40 CFR 136 Method 608 Pest-PCBs

EPA 608

Site: Frontier - Pendleton
Date Sampled: 09/01/99
Date Received: 09/02/99

Group Number: 9901-1355
Units: ug/L
Matrix: Aqueous

WST ID: WS56344
Client ID: GAC 2 Sample Port
Extraction Date: 09/08/99
Date Analyzed: 09/14/99

Compound	Detection Limit	Result	QC Limits (%)	Qualifier
alpha-BHC	0.003	Not detected		U
beta-BHC	0.006	Not detected		U
gamma-BHC	0.003	Not detected		U
delta-BHC	0.009	Not detected		U
heptachlor	0.020	Not detected		U
aldrin	0.017	Not detected		U
heptachlor epoxide	0.008	Not detected		U
4,4-DDE	0.005	Not detected		U
methoxychlor	0.006	Not detected		U
Tetrachloro-m-xylene (%)		86	60-150	
Decachlorobiphenyl (%)		90	60-150	

Dilution Factor 1

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Method 608 Method Blank Results

EPA 608

Site: Frontier - Pendleton
Date Sampled: NA
Date Received: NA

Group Number: 9901-1355
Units: ug/L

WST ID MB99251
Client ID: NA
Extraction Date: 09/08/99
Date Analyzed: 09/14/99

Compound	Detection Limit	Result	QC Limits (%)	Qualifier
alpha-BHC	0.003	Not detected		U
beta-BHC	0.006	Not detected		U
gamma-BHC	0.003	Not detected		U
delta-BHC	0.009	Not detected		U
heptachlor	0.020	Not detected		U
aldrin	0.017	0.026		
heptachlor epoxide	0.008	Not detected		U
4,4'-DDE	0.005	Not detected		U
methoxychlor	0.006	Not detected		U
Tetrachloro-m-xylene (%)		90	60-150	
Decachlorobiphenyl (%)		94	60-150	

Dilution Factor 1
MB denotes Method Blank
NA denotes Not Applicable

WAST STREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9901-1355

CHAIN OF CUSTODY RECORD

PROJECT NO: E414

SITE NAME: Frontier Pendleton

SAMPLERS (SIGNATURE): Bill Brayley

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Br, Cl, Sb	Phenols	Cyanide	TSS	PEST-608	VOA	VOA	PRESERVATIVES	REMARKS
9I01 664	9-01-99	330p	✓		H2O	GAC 2 Sample Port	1L	1							HNO3	WS56344
9I01 665	9-01 99	330p	✓		H2O	" " "	1L		1						H2SO4	
9I01 666	9-01 99	330p	✓		H2O	" " "	500ML			1					NaOH	
9I01 667	9-01 99	330p	✓		H2O	" " "	500 ml				1				ø3	
9I01 668	9-01 99	330p	✓		H2O	" " "	1L					1			ø3	
9I01 669	9-01 99	330p	✓		H2O	" " "	40 ML						1		HCL	
9I01 670	9-01 99	330p	✓		H2O	" " "	40 ML							1	HCL	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
[signature]	9/1 11:10 AM	[signature]	[signature]	9/2 14:30	[signature]
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME _____

LAB USE: REFRIGERATOR # _____ SHELF # _____ GROUP # _____ DUE DATE _____

FILE COPY

November 19, 1999

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (10/4/99 Monthly 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 4, 1999, 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 (#98-11) 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

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

Jennifer Sargent, Esq.
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

Dennis McCanna
SIVACO
P.O. Box 646
3937 River Road
Tonawanda, NY 14151-0646

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

Frontier Chemical - Pendleton Site
October 1999 Analytical Summary for WS 001
Permit # 98-11
Groundwater Discharge Point: D 002

346,972 Gallons Discharged Prior To 10/4/99
3,974 Gallons Since Last Report
120 Average Daily Flow Based on 33 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		10/4/99 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	10.0	<	10.0
Vinyl Chloride	10.0	2.0	<	2.0
Methylene Chloride	10.0	2.0	<	2.0
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	<	2.0
Bromomethane		2.0	<	2.0
Chloroethane		2.0	<	1.0
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	<	1.0
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	<	1.0
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		47.0
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		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.069
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	<	4.000

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

FRONTIER CHEMICAL PENDLETON
DAILY FLOW SHEET
OCTOBER 1999

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
10/1/99		104	avg. flow
10/2/99		104	avg. flow
10/3/99	346776	104	avg. flow
10/4/99	346974	198	Sampling
10/5/99	347024	50	
10/6/99	347024	0	
10/7/99	347024	0	Investigate/Reset pump #2
10/8/99	347327	303	
10/9/99		247.7	avg. flow
10/10/99		247.7	avg. flow
10/11/99		247.7	avg. flow
10/12/99		247.7	avg. flow
10/13/99		247.7	avg. flow
10/14/99		247.7	avg. flow
10/15/99		247.7	avg. flow
10/16/99		247.7	avg. flow
10/17/99	349556	247.7	avg. flow
10/18/99	349716	160	
10/19/99	349883	167	
10/20/99	350093	210	
10/21/99	350197	104	
10/22/99		129.6	avg. flow
10/23/99		129.6	avg. flow
10/24/99	350576	129.6	avg. flow
10/25/99	350739	163	
10/26/99	350896	157	
10/27/99	351001	105	
10/28/99	351057	56	
10/29/99		125	avg. flow
10/30/99		125	avg. flow
10/31/99	351432	125	avg. flow

Avg. Daily Flow (gal). **160.6**

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons

TOTAL GALLONS **0.0**

Avg. Flow = 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 : 10/19/99
Group Number : 9901-1552

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

Site : Frontier - Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC2 9J04 (671-677)	WS57463	Aqueous	10/04/99	10/05/99	12:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

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

Report Released By : Daniel W. Vollmer
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

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 either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets identification criteria, but the result is less than the sample quantitation limit but greater than zero.

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.

40 CFR Part 136 Method 624

EPA 624

Site: Frontier - Pendleton
Date Sampled: 10/04/99
Date Received: 10/05/99

Group Number: 9901-1552
Units: ug/L
Matrix: Aqueous

WST ID: WS57463
Client ID: GAC2 9JO4 (671-677)
Extraction Date: NA
Date Analyzed: 10/06/99

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
romodichloromethane	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	1.2	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	10	Not detected		U
1,2-Dichloroethane-d4 (%)		101	76-114	
Toluene-d8 (%)		100	88-110	
Bromofluorobenzene (%)		102	86-115	

Dilution Factor 1

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier - Pendleton
Date Sampled: 10/04/99
Date Received: 10/05/99

Group Number: 9901-1552
Units: mg/L
Matrix: Aqueous

WST ID: WS57463
Client ID: GAC2 9JO4 (671-677)
Digestion Date: 10/15/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	10/19/99	EPA 200.9
Boron by ICP	0.012	0.689	10/18/99	EPA 200.7
Chromium by ICP	0.005	Not detected	10/18/99	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier - Pendleton
Date Sampled: 10/04/99
Date Received: 10/05/99

Group Number: 9901-1552
Matrix: Aqueous

WST ID: WS57463
Client ID GAC2 9JO4 (671-677)

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Cyanide in Water	EPA 335.2	0.005	Not detected	mg/L	10/13/99
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	10/11/99
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	10/07/99

WASTE STREAM TECHNOLOGY

CHAIN OF CUSTODY

WASTE STREAM TECHNOLOGY

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

OFFICE USE ONLY
GROUP # 9910-1552
DUE DATE

PAGE ____ OF ____

REPORT TO: [illegible]
[illegible]
CONTACT
PH. # ( )
FAX # ( )
BILL TO:
PO# E414 Frontier Pendleton
PROJECT DESCRIPTION
SAMPLER SIGNATURE [signature]

TURN AROUND TIME: 10 BD
QUOTATION NUMBER:

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

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

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	Be, Co, Sb	Phenols	Cyanide	TSS	VOA	VOA	Trip Blank			TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	9J04 671 (1L)	10/4/99	1000	Comp	1	1									HNO3 G/C 2	WS57[illegible]
2	9J04 672 (1L	10/4/99	1000	Comp	1		1								H2SO4 "	
3	9J04 673 (1L)	10/4/99	1000	Comp	1			1							NaOH "	
4	9J04 674 (500ML)	10/4/99	1000	Comp	1				1						4° C "	
5	9J04 675 (40ML)	10/4/99	1000	Comp	1					1					HCL "	
6	9J04 676 (40ML)	10/4/99	1000	Comp	1						1				HCL "	
7	9J04 677 (40ML)	10/4/99	1000	Comp	1							1			Ø	WS5746
8																
9																
10																

REMARKS:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	10/5/99		[signature]	/ /	
RELINQUISHED BY: [signature]	[illegible]/99	[illegible]	RECEIVED BY: [signature]	[illegible]	

December 1, 1999

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (11/5/99 Monthly Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the November 5, 1999, 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 (#98-11) 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.

In addition, enclosed is a revised Analytical Summary Report and a Laboratory Data Result Report for October 1999. Due to a typographical error the detection limit for 4-methyl-2-pentanone was initially reported as 10 ug/L. The detection limit has been corrected to 5.0 ug/L.

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

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103

Jennifer Sargent, Esq.
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212

Dennis McCanna
SIVACO
P.O. Box 646
3937 River Road
Tonawanda, NY 14151-0646

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

Frontier Chemical - Pendleton Site
November 1999 Analytical Summary for WS 001
Permit # 98-11
Groundwater Discharge Point: D 002

353,362 Gallons Discharged Prior To 11/5/99
6,533 Gallons Since Last Report
204 Average Daily Flow Based on 32 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		11/5/99 Sample Results GPD
Discharge Rate (1)	662			
624 Analytes	ug/L	ug/L		ug/L
Toluene	10.0	1.0		
1,2-Dichloroethane	10.0	1.0		
4-Methyl-2-Pentanone	10.0	5.0		
Vinyl Chloride	10.0	2.0		
Methylene Chloride	10.0	2.8		
trans-1,2-Dichloroethene	10.0	1.0		
1,1,1-Trichloroethane	10.0	1.0		
Trichloroethene	10.0	1.0		
Benzene	10.0	1.0		
Chloromethane		2.0		
Bromomethane		2.0		
Chloroethane		2.0		
Chloroform		1.0		
Carbon Tetrachloride		1.0		
1,1-Dichloroethene		1.0		
Trichlorofluoromethane		2.0		
1,1-Dichloroethane		1.0		
1,2-Dichloropropane		1.0		
Bromodichloromethane		1.0		
2-Chloroethylvinyl ether		2.0		
cis-1,3-Dichloropropene		1.0		
trans-1,3-Dichloropropene		1.0		
1,1,2-Trichloroethane		1.0		
Tetrachloroethene		1.2		
Dibromochloromethane		1.0		
Chlorobenzene		1.0		
Ethylbenezene		1.0		
Bromoform		1.0		
1,1,2,2-Tetrachloroethane		1.0		
1,3-Dichlorobenzene		1.0		
1,4-Dichlorobezene		1.0		
1,2-Dichlorobenzene		1.0		
Sum of 624 Analytes		100.0		0.0
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		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.390
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	<	4.000

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

FRONTIER CHEMICAL PENDLETON
DAILY FLOW SHEET
NOVEMBER 1999

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
11/1/99	351535	103	
11/2/99	352817	1282	Significant Rain Event
11/3/99	353153	336	
11/4/99	353497	344	
11/5/99		109.3	Sampling/Inspection & avg. flow
11/6/99		109.3	avg. flow
11/7/99	353825	109.3	avg. flow
11/8/99	353929	104	
11/9/99	354089	160	
11/10/99	354305	216	
11/11/99	354410	105	
11/12/99		160.3	avg. flow
11/13/99		160.3	Site Inspection & avg. flow
11/14/99	354888	160.3	avg. flow
11/15/99		141.9	avg. flow
11/16/99		141.9	avg. flow
11/17/99		141.9	avg. flow
11/18/99		141.9	Changed filter bags BF1 & BF2 & avg. flow
11/19/99		141.9	avg. flow
11/20/99		141.9	avg. flow
11/21/99	355881	141.9	avg. flow
11/22/99	356040	159	
11/23/99	356146	106	
11/24/99		280	avg. flow
11/25/99		280	avg. flow
11/26/99		280	avg. flow
11/27/99		280	avg. flow
11/28/99	357546	280	avg. flow
11/29/99	357656	110	
11/30/99	357819	163	

Avg. Daily Flow (gal). **213.0**

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons

TOTAL GALLONS **0.0**

Avg. Flow = 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 : 11/19/99
Group Number : 9901-1766

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

Site : Frontier Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
9K05678	WS58798	Aqueous	11/05/99	11/05/99	14:00
9K05679	WS58799	Aqueous	11/05/99	11/05/99	14:00
9K05680	WS58800	Aqueous	11/05/99	11/05/99	14:00
9K05681	WS58801	Aqueous	11/05/99	11/05/99	14:00
Sample Status Upon Receipt : No irregularities.					

Analytical Services

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

Report Released By : Daniel W. Voll
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

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.

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier Pendleton
Date Sampled: 11/05/99
Date Received: 11/05/99

Group Number: 9901-1766
Units: mg/L
Matrix: Aqueous

WST ID: WS58798
Client ID: 9K05678
Digestion Date: 11/08/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	11/11/99	EPA 200.9
Boron by ICP	0.012	0.390	11/15/99	EPA 200.7
Chromium by ICP	0.005	Not detected	11/15/99	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier Pendleton
Date Sampled: 11/05/99
Date Received: 11/05/99

Group Number: 9901-1766
Matrix: Aqueous

WST ID: WS58799
Client ID 9K05679

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	11/12/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier Pendleton
Date Sampled: 11/05/99
Date Received: 11/05/99

Group Number: 9901-1766
Matrix: Aqueous

WST ID: WS58800
Client ID 9K05680

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Cyanide in Water	EPA 335.2	0.005	Not detected	mg/L	11/17/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier Pendleton
Date Sampled: 11/05/99
Date Received: 11/05/99

Group Number: 9901-1766
Matrix: Aqueous

WST ID: WS58801
Client ID 9K05681

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	11/09/99

WASTE STREAM TECHNOLOGY

CHAIN OF CUSTODY

WASTE STREAM TECHNOLOGY

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

OFFICE USE ONLY
GROUP # 9901-1766
DUE DATE

PAGE ____ OF ____

REPORT TO: Olin Corp
CONTACT
PH. # ( )
FAX # ( )
BILL TO:
PO#
PROJECT DESCRIPTION: E414 Frontier Pendleton
SAMPLER SIGNATURE: Bill Brayley

TURN AROUND TIME: 10 BD @ 115
QUOTATION NUMBER:

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

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

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	Ba, Cr, Sb	Phenols	Cyanide	TSS							TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	9K04678	11/5/99	Comp	8" A	1	1										1L HNO3	WS55896
2	9K04679	11/5/99	Comp	8" A	1		1									1L H2SO4	↓99
3	9K04680	11/5/99	Comp	8" A	1			1								1L NaOH	WS55880
4	9K04681	11/5/99	Comp	8" A	1				1							500mL Ø4	↓01
5																	
6																	
7																	
8																	
9																	
10																	

REMARKS:

RELINQUISHED BY:		DATE: 11 5 99	TIME: 1255 pm	RECEIVED BY:		DATE: 11 5 99	TIME: 17
RELINQUISH Y:		DATE:	TIME:	RECEIVED BY:		DATEI	IME:

FAX LEAD SHEET

WASTE STREAM TECHNOLOGY
302 GROTE STREET
BUFFALO, NY 14207
Phone (716)876-5290
Fax (716)876-2412

DATE: 11/22/99 NUMBER OF PAGES (including cover): 2

TO: Mr. John Burns

FROM: Dan Vollmer D.V. FAX NUMBER: 423-336-4166

MESSAGE:

Revised result report for the Method 624 analysis of the GAC 2 sample (WS57463) from the Frontier-Pendleton site collected 10/4/99. The detection limit reported for 4-methyl-2-pentanone has been corrected to 5.0 ug/L. The 10 ug/L detection limit initially reported was a typographical error.

Please contact me if you have any additional questions or comments regarding the result report for this sample. I apologize for the oversight. The original hard copy of the revised Method 624 result report will be in the mail to you tomorrow.

Please call the number listed above if all pages are not received.

Waste Stream Technology, Inc.

40 CFR Part 136 Method 624

EPA 624

Site: Frontier - Pendleton
Date Sampled: 10/4/99
Date Received: 10/5/99

Group Number: 9901-1552
Units: µg/L
Matrix: Aqueous

WST ID: WS57463
lient ID: GAC 2
Extraction Date: NA
Date Analyzed: 10/6/99

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
,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	1.2	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 (%)		101	76-114	
Toluene-d8 (%)		100	88-110	
Bromofluorobenzene (%)		102	86-115	

Dilution Factor 1

Frontier Chemical - Pendleton Site
October 1999 Analytical Summary for WS 001
Permit # 98-11
Groundwater Discharge Point: D 002

346,972 Gallons Discharged Prior To 10/4/99
3,974 Gallons Since Last Report
120 Average Daily Flow Based on 33 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		10/4/99 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	<	2.0
Bromomethane		2.0	<	2.0
Chloroethane		2.0	<	1.0
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	<	1.0
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	<	1.0
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		42.0
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		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.069
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	<	4.000

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

FILE COPY

January 17, 2000

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (12/3/99 Monthly Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the December 3, 1999, 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 (#98-11) 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

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103

Jennifer Sargent, Esq.
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

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

FRONTIER CHEMICAL PENDLETON
DAILY FLOW SHEET
DECEMBER 1999

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
12/1/99	357930	111.0	
12/2/99	358087	157.0	
12/3/99		141.0	Sampling/Inspection & avg. flow
12/4/99		141.0	avg. flow
12/5/99	358510	141.0	avg. flow
12/6/99	358617	107.0	
12/7/99	358784	167.0	
12/8/99	358943	159.0	
12/9/99	359046	103.0	
12/10/99		248.3	avg. flow
12/11/99		248.3	avg. flow
12/12/99	359791	248.3	avg. flow
12/13/99	359948	157.0	
12/14/99	360492	544.0	
12/15/99	361041	549.0	
12/16/99		249.0	avg. flow
12/17/99		249.0	avg. flow
12/18/99		249.0	avg. flow
12/19/99	362037	249.0	avg. flow
12/20/99	362199	162.0	
12/21/99	362356	157.0	
12/22/99	362525	169.0	
12/23/99	362578	53.0	
12/24/99	362631	53.0	
12/25/99	362683	52.0	
12/26/99		123.7	avg. flow
12/27/99		123.7	avg. flow
12/28/99	362896	123.7	avg. flow
12/29/99		35.0	avg. flow
12/30/99		35.0	avg. flow
12/31/99	363001	35.0	avg. flow

Avg. Daily Flow (gal). **172.3**

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons

TOTAL GALLONS **0.0**

Avg. Flow = flow between data points divided by days of missing data

Frontier Chemical - Pendleton Site
November 1999 Analytical Summary for WS 001
Permit # 98-11

Groundwater Discharge Point: D 002

358,702 **Gallons Discharged Prior To** 12/3/99
5,340 **Gallons Since Last Report**
172 **Average Daily Flow Based on 28 days Between Samples**

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		12/3/99 Sample Results GPD
Discharge Rate (1)	662			
624 Analytes	ug/L	ug/L		ug/L
Toluene	10.0	1.0		
1,2-Dichloroethane	10.0	1.0		
4-Methyl-2-Pentanone	10.0	5.0		
Vinyl Chloride	10.0	2.0		
Methylene Chloride	10.0	2.8		
trans-1,2-Dichloroethene	10.0	1.0		
1,1,1-Trichloroethane	10.0	1.0		
Trichloroethene	10.0	1.0		
Benzene	10.0	1.0		
Chloromethane		2.0		
Bromomethane		2.0		
Chloroethane		2.0		
Chloroform		1.0		
Carbon Tetrachloride		1.0		
1,1-Dichloroethene		1.0		
Trichlorofluoromethane		2.0		
1,1-Dichloroethane		1.0		
1,2-Dichloropropane		1.0		
Bromodichloromethane		1.0		
2-Chloroethylvinyl ether		2.0		
cis-1,3-Dichloropropene		1.0		
trans-1,3-Dichloropropene		1.0		
1,1,2-Trichloroethane		1.0		
Tetrachloroethene		1.2		
Dibromochloromethane		1.0		
Chlorobenzene		1.0		
Ethylbenezene		1.0		
Bromoform		1.0		
1,1,2,2-Tetrachloroethane		1.0		
1,3-Dichlorobenzene		1.0		
1,4-Dichlorobezene		1.0		
1,2-Dichlorobenzene		1.0		
Sum of 624 Analytes		100.0		0.0
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		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.422
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	<	4.000

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

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report

Report Date : 12/17/99
Group Number : 9901-1930

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

Site : E414 Frontier Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
9L03682	WS59621	Aqueous	12/03/99	12/03/99	16:00
9L03683	WS59622	Aqueous	12/03/99	12/03/99	16:00
9L03684	WS59623	Aqueous	12/03/99	12/03/99	16:00
9L03685	WS59624	Aqueous	12/03/99	12/03/99	16:00
Sample Status Upon Receipt : No irregularities.					

Analytical Services

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

Report Released By : Daniel W. Voce
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

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.

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: E414 Frontier Pendleton
Date Sampled: 12/03/99
Date Received: 12/03/99

Group Number: 9901-1930
Units: mg/L
Matrix: Aqueous

WST ID: WS59621
Client ID: 9L03682
Digestion Date: 12/07/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	12/15/99	EPA 200.9
Boron by ICP	0.012	0.422	12/08/99	EPA 200.7
Chromium by ICP	0.005	Not detected	12/08/99	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: E414 Frontier Pendleton
Date Sampled: 12/03/99
Date Received: 12/03/99

Group Number: 9901-1930
Matrix: Aqueous

WST ID: WS59622
Client ID 9L03683

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	12/10/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: E414 Frontier Pendleton
Date Sampled: 12/03/99
Date Received: 12/03/99

Group Number: 9901-1930
Matrix: Aqueous

WST ID: WS59623
Client ID 9L03684

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Cyanide in Water	EPA 335.2	0.005	Not detected	mg/L	12/08/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: E414 Frontier Pendleton
Date Sampled: 12/03/99
Date Received: 12/03/99

Group Number: 9901-1930
Matrix: Aqueous

WST ID: WS59624
Client ID 9L03685

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	12/07/99

WASTE STREAM TECHNOLOGY

CHAIN OF CUSTODY

WASTE STREAM TECHNOLOGY

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

OFFICE USE ONLY
GROUP # 9901-1930
DUE DATE

PAGE _____ OF _____

REPORT TO: [illegible] 12/3
CONTACT
PH. # ( )
FAX # ( )
BILL TO:
PO#
PROJECT DESCRIPTION: E414 frontier Pendleton
SAMPLER SIGNATURE: [signature]

TURN AROUND TIME: 10 BD (8) 12/13

QUOTATION NUMBER:

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

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

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	Br, Cr, SS	Phenols	Cyanide	TSS	TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	9L03682	12/3/99	11:20A	Comp	1	1				1L HNO3	WS5516021
2	9L03683	12/3/99	11:20A	Comp	1		1			1L H2SO4	22
3	9L03684	12/3/99	11:20A	Comp	1			1		500mL NAOH	23
4	9L03685	12/3/99	11:20A	Comp	1				1	500mL 4°C	24
5											
6											
7											
8											
9											
10											

REMARKS:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
[signature]	12/3/99	3:25 PM	[signature]	/ /	
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:

FILE COPY

February 7, 2000

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (1/13/2000 Monthly Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the January 13, 2000, 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 (#98-11) 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
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

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

David Paley
Allied Signal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103

Jennifer Sargent, Esq.
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

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

Frontier Chemical - Pendleton Site
November 1999 Analytical Summary for WS 001
Permit # 98-11
Groundwater Discharge Point: D 002

364,042 Gallons Discharged Prior To 1/13/00
6,111 Gallons Since Last Report
149 Average Daily Flow Based on 41 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	1/13/00 Sample Results GPD
Discharge Rate (1)	662		
624 Analytes	ug/L	ug/L	ug/L
Toluene	10.0	1.0	
1,2-Dichloroethane	10.0	1.0	
4-Methyl-2-Pentanone	10.0	5.0	
Vinyl Chloride	10.0	2.0	
Methylene Chloride	10.0	2.8	
trans-1,2-Dichloroethene	10.0	1.0	
1,1,1-Trichloroethane	10.0	1.0	
Trichloroethene	10.0	1.0	
Benzene	10.0	1.0	
Chloromethane		2.0	
Bromomethane		2.0	
Chloroethane		2.0	
Chloroform		1.0	
Carbon Tetrachloride		1.0	
1,1-Dichloroethene		1.0	
Trichlorofluoromethane		2.0	
1,1-Dichloroethane		1.0	
1,2-Dichloropropane		1.0	
Bromodichloromethane		1.0	
2-Chloroethylvinyl ether		2.0	
cis-1,3-Dichloropropene		1.0	
trans-1,3-Dichloropropene		1.0	
1,1,2-Trichloroethane		1.0	
Tetrachloroethene		1.2	
Dibromochloromethane		1.0	
Chlorobenzene		1.0	
Ethylbenezene		1.0	
Bromoform		1.0	
1,1,2,2-Tetrachloroethane		1.0	
1,3-Dichlorobenzene		1.0	
1,4-Dichlorobezene		1.0	
1,2-Dichlorobenzene		1.0	
Sum of 624 Analytes		100.0	0.0
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	mg/L
Antimony	0.1	0.009	< 0.009
Boron	4.00	0.012	0.610
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	< 4.000

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

FRONTIER CHEMICAL PENDLETON
DAILY FLOW SHEET
JANUARY 2000

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
1/1/00	363001	35.0	avg. flow
1/2/00	363173	172.0	
1/3/00		81.0	avg. flow
1/4/00		81.0	avg. flow
1/5/00		81.0	avg. flow
1/6/00		81.0	avg. flow
1/7/00		81.0	avg. flow
1/8/00		81.0	avg. flow
1/9/00	363821	81.0	avg. flow
1/10/00	363872	51.0	
1/11/00	363924	52.0	
1/12/00	363977	53.0	
1/13/00	364271	25.5	Sampling/Inspection & avg. flow
1/14/00		25.5	avg. flow
1/15/00		25.5	avg. flow
1/16/00	364373	25.5	avg. flow
1/17/00	364426	53.0	
1/18/00	364478	52.0	Inspection
1/19/00	364530	52.0	
1/20/00	364581	52.0	avg. flow
1/21/00		52.0	avg. flow
1/22/00		52.0	avg. flow
1/23/00	364789	52.0	avg. flow
1/24/00	364840	51.0	
1/25/00	364892	52.0	
1/26/00	364944	52.0	avg. flow
1/27/00	364996	51.8	avg. flow
1/28/00		51.8	avg. flow
1/29/00		51.8	avg. flow
1/30/00	365203	51.8	avg. flow
1/31/00	365254	51.0	

Avg. Daily Flow (gal). **58.4**

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons

TOTAL GALLONS **0.0**

Avg. Flow = 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 : 01/28/00
Group Number : 2001-094

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

Site : Frontier - Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
0A13686	WS60871	Aqueous	01/13/00	01/14/00	12:30
0A13687	WS60872	Aqueous	01/13/00	01/14/00	12:30
0A13688	WS60873	Aqueous	01/13/00	01/14/00	12:30
0A13689	WS60874	Aqueous	01/13/00	01/14/00	12:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

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

Report Released By : Daniel W. Vollmer
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

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 either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets identification criteria, but the result is less than the sample quantitation limit but greater than zero.

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 Method Blank Analysis

Site: Frontier Pendleton
Date Sampled: NA
Date Received: NA

Group Number: 2001-094
Units: mg/L

WST ID MB012100
Client ID: NA
Digestion Date: 01/21/00

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Cr Method Blank	0.005	Not detected	01/25/00	EPA 200.7
Sb Method Blank	0.009	Not detected	01/27/00	EPA 200.9

MB denotes Method Blank
NA denotes Not Applicable

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier Pendleton
Date Sampled: 01/13/00
Date Received: 01/14/00

Group Number: 2001-094
Units: mg/L
Matrix: Aqueous

WST ID: WS60871
Client ID: 0A13686
Digestion Date: 01/21/00

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	01/27/00	EPA 200.9
Boron by ICP	0.012	0.610	01/25/00	EPA 200.7
Chromium by ICP	0.005	Not detected	01/25/00	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Total Recoverable Phenol

EPA 420.1

Site: Frontier Pendleton
Date Sampled: 01/13/00
Date Received: 01/14/00

Group Number: 2001-094
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS60872	0A13687	0.005	Not detected	01/20/00

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Cyanide in Water

EPA 335.2

Site: Frontier Pendleton
Date Sampled: 01/13/00
Date Received: 01/14/00

Group Number: 2001-094
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS60873	0A13688	0.005	Not detected	01/18/00

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Total Suspended Solids

EPA 160.2

Site: Frontier Pendleton
Date Sampled: 01/13/00
Date Received: 01/14/00

Group Number: 2001-094
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS60874	0A13689	4.0	Not detected	01/19/00

WASTE STREAM TECHNOLOGY

CHAIN OF CUSTODY

REPORT TO: Olin

CONTACT

PH. # ( )

FAX # ( )

BILL TO:

PO# Frontier Pendleton

PROJECT DESCRIPTION

SAMPLER SIGNATURE

WASTE STREAM TECHNOLOGY

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

OFFICE USE ONLY

GROUP # 2001-094

DUE DATE

PAGE _____ OF _____

TURN AROUND TIME:

QUOTATION NUMBER:

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

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

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	Br, Cr, Sb (HNO3)	Phenols (H2SO4)	Cyanide (NaOH)	TSS (63)							TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	ØA13686	11/3/00	1130A		1	1										1L	W60871
2	ØA13687	11/3/00	1130A		1		1									1L	72
3	ØA13688	11/3/00	1130A		1			1								1L	73
4	ØA13689	11/3/00	1130A		1				1							500ML	74
5																	
6																	
7																	
8																	
9																	
10																	

REMARKS:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
	11/14/00	11:50 Am		11/14/00	
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:

FILE COPY

March 10, 2000

VIA AIRBORNE EXPRESS

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

Subject: Analytical Sampling Results (2/3/2000 Monthly Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are the analytical results from the February 3, 2000, 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 (#98-11) 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

Bill Witt
Radian
304 West Wackerly St.
Midland, MI 48640

David Paley
Allied Signal, Inc.
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

Brent Schindler, Esq.
Dow Chemical
Base of Loveridge Road
P.O. Box 1398
Pittsburgh, CA 94565

Frontier Chemical - Pendleton Site
February 2000 Analytical Summary for WS 001
Permit # 98-11

Groundwater Discharge Point: D 002

371,116 Gallons Discharged Prior To 2/3/00

7,074 Gallons Since Last Report

244 Average Daily Flow Based on 21 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	2/3/00 Sample Results GPD
Discharge Rate (1)	662		
624 Analytes	ug/L	ug/L	ug/L
Toluene	10.0	1.0	
1,2-Dichloroethane	10.0	1.0	
4-Methyl-2-Pentanone	10.0	5.0	
Vinyl Chloride	10.0	2.0	
Methylene Chloride	10.0	2.8	
trans-1,2-Dichloroethene	10.0	1.0	
1,1,1-Trichloroethane	10.0	1.0	
Trichloroethene	10.0	1.0	
Benzene	10.0	1.0	
Chloromethane		2.0	
Bromomethane		2.0	
Chloroethane		2.0	
Chloroform		1.0	
Carbon Tetrachloride		1.0	
1,1-Dichloroethene		1.0	
Trichlorofluoromethane		2.0	
1,1-Dichloroethane		1.0	
1,2-Dichloropropane		1.0	
Bromodichloromethane		1.0	
2-Chloroethylvinyl ether		2.0	
cis-1,3-Dichloropropene		1.0	
trans-1,3-Dichloropropene		1.0	
1,1,2-Trichloroethane		1.0	
Tetrachloroethene		1.2	
Dibromochloromethane		1.0	
Chlorobenzene		1.0	
Ethylbenezene		1.0	
Bromoform		1.0	
1,1,2,2-Tetrachloroethane		1.0	
1,3-Dichlorobenzene		1.0	
1,4-Dichlorobezene		1.0	
1,2-Dichlorobenzene		1.0	
Sum of 624 Analytes		100.0	0.0
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	mg/L
Antimony	0.1	0.009	< 0.009
Boron	4.00	0.012	0.610
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	< 4.000

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
FEBRUARY 2000

DATE	TOTALIZER READING	DAILY FLOW	COMMENTS
2/1/00	365305	51.0	
2/2/00	365457	152.0	
2/3/00		42.5	Average Flow & Sampling
2/4/00		42.5	Average Flow
2/5/00		42.5	Average Flow
2/6/00	365627	42.5	Average Flow
2/7/00	365679	52.0	
2/8/00	365782	103.0	
2/9/00	365883	101.0	
2/10/00	365985	102.0	
2/11/00		87.7	Average Flow
2/12/00		87.7	Average Flow
2/13/00	366248	87.7	Average Flow
2/14/00	366299	51.0	
2/15/00	366456	157.0	
2/16/00	366507	51.0	
2/17/00	366609	102.0	
2/18/00		124.0	Average Flow
2/19/00		124.0	Average Flow
2/20/00	366980	123.7	Average Flow
2/21/00	367081	101.0	
2/22/00	367343	262.0	
2/23/00	368279	936.0	Surface water leaking into vault
2/24/00	369169	890.0	Surface water leaking into vault
2/25/00		423.0	Average Flow
2/26/00		423.0	Average Flow
2/27/00	370438	423.0	Surface water leaking into vault & avg flow
2/28/00	370795	357.0	
2/29/00	372327	1532.0	Groundwater relief into sump

AVERAGE DAILY FLOW IN GALLONS 243.9

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	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 : 02/17/00
Group Number : 2001-208

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

Site : Frontier - Pendleton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
00B03686	WS61492	Aqueous	02/03/00	02/03/00	12:50
00B03687	WS61493	Aqueous	02/03/00	02/03/00	12:50
00B03688	WS61494	Aqueous	02/03/00	02/03/00	12:50
00B03689	WS61495	Aqueous	02/03/00	02/03/00	12:50
Sample Status Upon Receipt : No irregularities.					

Analytical Services

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

Report Released By : Daniel W. Vollmer

Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 FDOH #E87581

WASTE STREAM TECHNOLOGY

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.

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier Pendleton
Date Sampled: 02/03/00
Date Received: 02/03/00

Group Number: 2001-208
Units: mg/L
Matrix: Aqueous

WST ID: WS61492
Client ID: 00B03686
Digestion Date: 02/15/00

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	02/15/00	EPA 200.9
Boron by ICP	0.012	Not detected	02/15/00	EPA 200.7
Chromium by ICP	0.005	Not detected	02/15/00	EPA 200.7

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Total Recoverable Phenol

EPA 420.1

Site: Frontier Pendleton
Date Sampled: 02/03/00
Date Received: 02/03/00

Group Number: 2001-208
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS61493	00B03687	0.005	Not detected	02/08/00

Waste Stream Technology, Inc.

Cyanide in Water

EPA 335.2

Site: Frontier Pendleton
Date Sampled: 02/03/00
Date Received: 02/03/00

Group Number: 2001-208
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS61494	00B03688	0.005	Not detected	02/08/00

Waste Stream Technology, Inc.

Total Suspended Solids

EPA 160.2

Site: Frontier Pendleton
Date Sampled: 02/03/00
Date Received: 02/03/00

Group Number: 2001-208
Matrix: Aqueous
Units: mg/L

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS61495	00B03689	4.0	7.2	02/04/00

CHAIN OF CUSTODY

WASTESTREAM TECHNOLOGY

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

OFFICE USE ONLY 208 (6) 2/3
GROUP # 2001-223
DUE DATE

PAGE ____ OF ____

REPORT TO: Olin

CONTACT

PH. # ( )

FAX # ( )

BILL TO:

PO# Frontier Pendleton

PROJECT DESCRIPTION Bill Brayley

SAMPLER SIGNATURE

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

TURN AROUND TIME: 10 BD @ 2/3

QUOTATION NUMBER:

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

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

ANALYSES TO BE PERFORMED

	SAMPLE I.D.	DATE SAMPLED	TIME OF SAMPLING	SAMPLE TYPE	TOTAL NO. OF CONTAINERS	Br, Cr, Sb	Phenols	Cyanide	TSS							TYPE OF CONTAINER/ COMMENTS:	OFFICE USE ONLY WST. I.D.
1	00B03686	2/3/00	300p	Comp	1	1										1L (H2O)	WS011192
2	00B03687	2/3/00	300p	Comp	1		1									1L (H2O)	193
3	00B03688	2/3/00	300p	Comp	1			1								1L (H2O)	194
4	00B03689	2/3/00	300p	Comp	1				1							500mL (H2O)	195
5																	
6																	
7																	
8																	
9																	
10																	

REMARKS:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
	2/3/00	1905 pm		2/3/00	1805
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
	2/3/00	1250		2/3/00	1250

Attachment C

REPORT

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

Pendleton Site PRP Group

March 2000

O'BRIEN & GERE
ENGINEERS, INC.

REPORT

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

Pendleton Site PRP Group

James R. Heckathorne, P.E.
Vice President

March 2000

O'BRIEN & GERE ENGINEERS, INC.

5000 Brittonfield Parkway
Syracuse, New York 13221

Contents

List of Tables

List of Figures

List of Appendices

1. Introduction

This document is the second 1999/2000 Semi-Annual Ground Water Monitoring Report 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. 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.

These items are described in the following sections.

1.1. Piezometer/monitoring well inspection

The piezometer/monitoring well inspection was conducted on February 7, 2000, 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 sampling. Similar maintenance issues to those identified in previous inspection reports were noted at the Site:

- Piezometer P-6 is currently angled 20 to 30 degrees from vertical.
- Monitoring wells URS-14I and URS-14D should have fill material installed around the concrete pads.
- Water (in the form of ice) was observed in the annular space of monitoring well URS-14I.

It should be noted that, at this time, these issues are not affecting the integrity of the piezometers or monitoring wells. February 2000 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 February 7, 2000. Glynn Geotechnical Engineering, Inc. attempted to measure the surface water elevation of Quarry Lake on February 7, 2000. Since the lake was ice covered and could not be penetrated, the ice surface elevation was measured. 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 February 7, 2000 ice surface elevation of Quarry Lake is slightly above the outlet weir elevation of 577.2 ft.

The water level measurements collected on February 7, 2000 are illustrated on Figure 1. These measurements are the eighth 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. 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 less than the ground water elevations outside the capped area (P-5 and P-8, respectively). Along the western portion of the site, the ground water elevation at P-4 is higher than the elevation in

the ground water collection trench (SP-1). The ground water elevation in piezometer P-3, installed within the center of the capped area, is greater 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 less than the ice 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 shallow 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 February 7 and 9, 2000, the sixth 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).

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	USEPA Method 8260B
Inorganics	USEPA Methods 6010B/7470A/7841
Cyanide	USEPA Method 9010B/9014

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 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.

Purge water generated during sampling 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.

Results of the ground water analyses, 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 February 2000 ground water chemistry is similar to previous sampling events.

Detected constituents exceeding New York State Class GA Standards included iron at one location (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 have previously been detected in background wells URS-14I and URS-14D at similar concentrations. Concentrations of sodium have also been detected above the New York State Class GA Standards in background wells URS-14I and URS-14D at similar concentrations. It is likely that the elevated concentrations of sodium are naturally occurring and are not related to previous site activities. VOCs were not detected above the New York State Class GA Standards. The database will be updated with data from future sampling events, and ground water standards will be reviewed annually to evaluate whether standards have been revised.

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 fifteen 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 thirteen analytes (at $\alpha = 0.10$) do not appear to be normally distributed. Magnesium and 1,2-dichloroethene appear to be normally distributed.

The February 2000 data represents the results of the sixth 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 February 2000, 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
URS-5D	Calcium, Manganese, Sodium
85-7R	Calcium, Magnesium, Sodium
URS-7D	Calcium, Magnesium, Manganese, 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. 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 also 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 well 88-12D, 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, 88-12C, 88-12D, URS-14I, and URS-14D are below the New York State Class GA Standard.

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 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.

- 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 February 2000 ground water chemistry 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), 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. 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 well 88-12D, at a confidence level of α=0.05. Concentrations of barium in URS-9I, 88-12C, 88-12D, URS-14I, and URS-14D are below the New York State Class GA Standard.

- T-test analysis results 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.

- Iron was detected in one monitoring well at a concentration 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 this element 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.

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
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
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
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
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
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
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
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
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
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

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
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
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
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
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
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
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
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
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
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
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

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)

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

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	85-5R 7/86	8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)											
Acetone	—	NA	R	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	15	ND	ND	ND	0.34 J	ND	ND	0.10 J	ND
2-Butanone	—	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	NA	ND	ND	ND	ND	ND	ND	ND	ND	18
Chlorobenzene	5	ND	NA	NA	NA	ND	0.28 J	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	NA	ND	ND	ND	ND	ND	ND	ND	0.17 J	0.10 J
Ethylbenzene	5	ND	ND	ND	ND	ND	0.24 J	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	NA	2J	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	0.14 J	ND	ND	ND	ND
Total Xylenes	5	NA	ND	ND	ND	ND	0.96	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)											
Aluminum	—	1,060	214	37.8B	153	ND	300	ND	ND	ND	ND
Antimony	3	NA	ND	42.4B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	NA	1B	ND	ND	ND	ND	ND	ND	ND	ND
Barium	1000	20	73.5B	23.4B	15	40	80	50J	ND	60	60
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	380,000	355,000	378,000	321,000	270,000	220,000	220,000	130,000	220,000	200,000
Chromium	50	40	7.5B	ND	ND	ND	30	10	ND	ND	ND
Cobalt	—	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	10	ND	ND	11	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	1,020	669	915	419	140	2,300	190	ND	100	ND
Lead	25	150	ND	1.2B	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	179,000	106,000	170,000	139,000	130,000	85,000	110,000	59,000	99,000	90,000
Manganese	300	100	40	57.5	42	50	260	40	ND	80	110
Mercury	0.7	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	10	48.1	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	9,500	60,700	6,280	6,400	ND	ND	ND	ND	5,000	ND
Selenium	10	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	30	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	126,000	132,000	120,000	100,000	93,000 J	58,000	87,000	52,000	96,000	67,000
Thallium	—	NA	ND	ND	ND	ND	8	ND	ND	ND	ND
Vanadium	—	35	4B	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	—	75	12.9B	17.6B	ND	ND	ND	ND	ND	10 J	10

Notes:

1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard	URS-5D								
	ug/L (ppb)	8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)										
Acetone	—	250	R	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	1	ND	0.25 J	0.11 J	ND	0.16 J	ND
2-Butanone	—	ND	R	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	ND	ND	ND	ND	4.2
Chlorobenzene	5	NA	NA	NA	ND	0.31 J	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	0.32 J	ND	ND	ND	ND
Methylene Chloride	5	ND	R	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	1J	ND	ND	0.19 J	ND	ND	ND	ND
Total Xylenes	5	ND	0.5J	ND	ND	1.5	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)										
Aluminum	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	3	ND	31.5B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	1.3B	1B	ND	ND	ND	ND	ND	ND	ND
Barium	1000	224	71.7B	32	20	ND	ND	ND	20	ND
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	378,000	407,000	387,000	440,000	300,000	490,000	510,000	490,000	500,000
Chromium	50	3B	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	—	ND	ND	ND	ND	61	210	850	350	59
Copper	200	ND	ND	8	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	188	143	25	ND	120	ND	ND	ND	ND
Lead	25	ND	1.3B	12	ND	ND	ND	ND	ND	ND
Magnesium	—	33,300	2450B	570,000	100,000	24,000	87,000	76,000	93,000	97,000
Manganese	300	8.8B	3.5B	ND	50	10	70	70	50	60
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	11.4B	ND	ND	90	ND	180	90	80	50
Potassium	—	22,700	16,900	8,500	ND	ND	ND	5,000	ND	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	192,000	194,000	114,000	88,000	93,000	94,000	120,000	110,000	120,000
Thallium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	—	3.8B	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	—	19.9B	14.7B	ND	ND	10	ND	ND	10 J	10

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	85-7R 7/86	8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)											
Acetone	—	NA	ND	R	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	6	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	—	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	71	ND	ND	ND	ND	ND	ND	0.93 J	ND	32
Chlorobenzene	5	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	NA	ND	ND	ND	0.14J	0.19 J	0.14 J	0.21 J	0.40 J	0.11 J
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	1J	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)											
Aluminum	—	1,200	277	265	249	ND	ND	ND	ND	ND	ND
Antimony	3	NA	28.3B	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	NA	1.4B	1.7B	ND	ND	ND	ND	ND	ND	ND
Barium	1000	30	91B	143B	106	100	80	50J	ND	40	40
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	490,000	354,000	298,000	389,000	350,000	350,000	420,000	400,000	440,000	410,000
Chromium	50	20	ND	ND	ND	ND	ND	ND	10	ND	ND
Cobalt	—	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	10	ND	ND	8	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	920	586	820	435	190	310	270	170	90	70
Lead	25	120	ND	2.6B	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	131,000	119,000	42,600	124,000	120,000	120,000	140,000	140,000	130,000	130,000
Manganese	300	110	40.5	31.5	30	70	80	90	80	40	40
Mercury	0.7	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	ND	7.4B	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	28,000	5,540	5,770	6,700	5,000	5,000	6,000	6,000	7,000	6,000
Selenium	10	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	107,000	67,900	38,900	73,100	66,000 J	67,000	75,000	74,000	85,000	72,000
Thallium	—	NA	ND	ND	ND	ND	6	ND	ND	ND	ND
Vanadium	—	35	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	—	65	ND	21.5	ND	ND	ND	ND	ND	ND	ND

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	URS-7D 8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)										
Acetone	---	120	R	ND	ND	ND	61	6.0 J	ND	ND
Benzene	1	ND	ND	ND	ND	0.11 J	ND	ND	ND	ND
2-Butanone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	---	0.5J	ND	ND	ND	ND	ND	1.3 J	ND	5.2
Chlorobenzene	5	NA	NA	NA	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	0.37 J	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)										
Aluminum	---	167B	52.5B	ND	ND	ND	ND	ND	ND	100
Antimony	3	20.5B	36.3B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	1000	20.3B	47.2B	29	30	40	ND	ND	30	30
Beryllium	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	---	277,000	333,000	403,000	360,000	300,000	480,000	400,000	470,000	420,000
Chromium	50	ND	ND	ND	ND	ND	10	10	ND	10
Cobalt	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	ND	ND	8	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	387	283	63	ND	70	ND	100	ND	180
Lead	25	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	---	96,200	115,000	140,000	120,000	89,000	140,000	130,000	140,000	140,000
Manganese	300	71.2	140	86	40	30	40	50	50	70
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	23.5B	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	---	5,990	8,550	8,300	5,000	ND	6,000	ND	6,000	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	82,700	68,900	78,900	66,000 J	54,000	79,000	74,000	81,000	68,000
Thallium	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	---	4.2B	6.7B	ND	ND	ND	ND	ND	ND	ND
Zinc	---	5.6B	12.2B	ND	ND	ND	ND	ND	ND	ND

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	URS-9I 8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)										
Acetone	—	R	R	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	0.12J	0.29 J	ND	ND	ND	ND
2-Butanone	—	ND	2J	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	ND	0.13 J	ND	ND	8.5
Chlorobenzene	5	NA	NA	NA	ND	0.20 J	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	0.14 J	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	0.7J	ND	ND	ND	0.11 J	ND	ND	0.16 J	ND
Total Xylenes	5	ND	ND	ND	0.29J	0.54	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)										
Aluminum	—	221	197	110	ND	ND	ND	200	ND	200
Antimony	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	1.7B	ND	ND	ND	ND	ND	ND	ND	ND
Barium	1000	30.1B	22.8B	14	30	ND	ND	ND	ND	ND
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	106,000	143,000	123	170,000	150,000	160,000	160,000	160,000	170,000
Chromium	50	8.6B	10.1	ND	ND	ND	10	10	ND	ND
Cobalt	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	12.7B	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	1,020	1,170	808	460	440	290	590	240	520
Lead	25	ND	1B	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	54,500	71,300	63,500	70,000	69,000	77,000	70,000	75,000	76,000
Manganese	300	67.5	80	75	50	30	40	50	40	50
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	7.6B	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	3,910B	4,250B	2,900	ND	ND	ND	ND	ND	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	34,500	54,000	52,400	43,000 J	45,000	49,000	39,000	54,000	48,000
Thallium	—	ND	ND	ND	ND	11	ND	ND	ND	ND
Vanadium	—	ND	9.6B	ND	ND	ND	ND	ND	ND	ND
Zinc	—	19.3B	34.6	ND	ND	ND	20	ND	10 J	ND

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard	URS-9D								
	ug/L (ppb)	8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)										
Acetone	—	R	R	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	1.9	ND	ND	ND	ND
2-Butanone	—	ND	6J	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	4J	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	ND	ND	ND	ND	16
Chlorobenzene	5	NA	NA	NA	ND	0.79	ND	ND	ND	ND
Chloroform	7	8	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	1J	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	0.7	0.37J	0.34 J	0.17 J	0.16 JN	0.15 J	0.14 J
1,2-Dichloroethene	5	ND	ND	1	0.66	0.59	0.33 J	0.35 J	0.29 J	0.25 J
Ethylbenzene	5	ND	ND	ND	ND	0.44 J	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	2	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	0.6J	ND	ND	ND	0.51	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	1.8	ND	ND	ND	ND
Trichloroethene	5	ND	ND	0.6	0.36J	0.24 J	0.20 J	0.21 J	0.14 J	ND
Vinyl Chloride	2	ND	ND	ND	0.26J	0.44 J	0.11 JN	ND	ND	ND
Metals (ppb)										
Aluminum	—	128	64.2B	ND	ND	ND	ND	ND	ND	ND
Antimony	3	ND	28B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	1.6B	ND	ND	ND	ND	ND	ND	ND	ND
Barium	1000	110B	38.2B	23	ND	ND	ND	ND	ND	ND
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	56,500	146,000	120,000	200,000	190,000	190,000	200,000	210,000	220,000
Chromium	50	ND	ND	ND	ND	ND	10	ND	ND	ND
Cobalt	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	5.2B	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	11.1B	ND	ND	ND	ND	ND	ND	ND
Iron	300	127	506	252	ND	70	80	70	60	50
Lead	25	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	29,900	70,200	60,000	58,000	73,000	71,000	72,000	77,000	78,000
Manganese	300	20.1	25.5	9	ND	ND	10	10	10	10
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	15.3B	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	9,880	4,170B	3,600	ND	ND	ND	ND	ND	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	27,400	37,000	42,800	48,000 J	52,000	41,000	38,000	52,000	48,000
Thallium	—	ND	ND	ND	ND	14	ND	ND	ND	ND
Vanadium	—	10.7B	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	—	50.5	16.7B	ND	ND	ND	ND	ND	ND	ND

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	88-12C 8/90	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)										
Acetone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	ND	ND	ND	ND	0.84
Chlorobenzene	5	NA	NA	NA	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	0.19 J
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	0.15 J
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)										
Aluminum	—	481	187B	453	ND	900	ND	600	ND	ND
Antimony	3	19.2B	28B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	10	12.3B	14	9	7	10	12	11 J	12
Barium	1000	11.4B	17.3	14	ND	ND	ND	ND	ND	ND
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	62,600	68,500	68,900	73,000	70,000	71,000	76,000	80,000	78,000
Chromium	50	21	4.6B	ND	ND	10	10	20	ND	ND
Cobalt	—	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	4.2B	ND	5	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	1,530	1,040	1,560	ND	2,200	330	1,600	100	200
Lead	25	1.5B	1.2B	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	88,500	103,000	92,500	110,000	98,000	110,000	100,000	110,000	110,000
Manganese	300	45.4	37.8	54	10	70	10	40	20	20
Mercury	0.7	ND	ND	NA	ND	ND	ND	ND	ND	ND
Nickel	100	14.6B	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	2,520B	3,200B	3,000	ND	ND	ND	ND	ND	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	34,600	41,100	41,300	47,000 J	43,000	40,000	42,000	50,000	47,000
Thallium	—	ND	ND	ND	ND	13	ND	ND	ND	ND
Vanadium	—	22.1B	10B	ND	ND	ND	ND	ND	ND	ND
Zinc	—	10.1B	15.7B	ND	20	20	ND	ND	20 J	20

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard ug/L (ppb)	88-12D 8/90	2/91	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)									
Acetone	---	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	1J	0.9J	ND	0.13 J	0.13 J	ND	0.16 J	ND
2-Butanone	---	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	---	ND	6	ND	ND	0.56	0.70 J	ND	77
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	2J	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	0.11 J	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	---	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	R	13	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	0.48 J	ND	ND	ND	ND
Trichloroethene	5	ND	6	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)									
Aluminum	---	ND	172B	ND	ND	ND	ND	ND	ND
Antimony	3	50.7B	56.1B	ND	ND	ND	ND	ND	ND
Arsenic	25	ND	1.3BW	ND	ND	ND	ND	ND	6
Barium	1000	2.9B	7.9B	ND	ND	ND	ND	ND	ND
Beryllium	---	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	---	464,000	623,000E	490,000	480,000	630,000	630,000	670,000	720,000
Chromium	50	7.6B	27.8E	10	30	30	90	ND	20
Cobalt	---	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	12	ND
Iron	300	168	250	180	480	110	650	90	70
Lead	25	ND	1.8BW	ND	ND	ND	ND	ND	ND
Magnesium	---	109,000	199,000E	130,000	110,000	180,000	160,000	180,000	210,000
Manganese	300	33.9	696	90	60	40	50	30	30
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	0.2 J
Nickel	100	11.5B	25.5B	ND	ND	ND	70	ND	ND
Potassium	---	5,310	12,000E	600	6,000	10,000	9,000	9,000	11,000
Selenium	10	ND	ND	ND	ND	6	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	66,400	474,000	140,000 J	100,000	330,000	250,000	330,000	450,000
Thallium	---	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	---	51.6	2.4B	ND	ND	ND	ND	ND	ND
Zinc	---	7.9B	ND	ND	10	ND	ND	10 J	10

Notes:
1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

Parameter	Standard	URS-14I							
	ug/L (ppb)	2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)									
Acetone	—	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	1	ND	ND	ND	ND
2-Butanone	—	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	ND	ND	ND	1.2
Chlorobenzene	5	NA	NA	ND	0.81	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	0.13 J	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	0.17 J
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	0.15 J	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)									
Aluminum	—	7,140	1,170	1300	400	ND	300	ND	ND
Antimony	3	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	7.2B	ND	ND	ND	ND	5	ND	6
Barium	1000	115B	47	50	40	40J	40	50	50
Beryllium	—	1.2B	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	1	ND	ND	ND	2
Calcium	—	73,900	35,200	28,000 J	21,000	23,000	26,000	30,000	34,000
Chromium	50	30.9	ND	ND	160	ND	ND	ND	10
Cobalt	—	5.8B	ND	ND	ND	ND	ND	ND	ND
Copper	200	18.5B	8	ND	10	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	10,400	2,060	1,800	2,300	ND	320	ND	ND
Lead	25	7.5	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	32,800	22,300	21,000	17,000	21,000	23,000	25,000	29,000
Manganese	300	484	145	70	60	ND	ND	ND	ND
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	30.4B	ND	ND	170	ND	ND	ND	ND
Potassium	—	17,100	5,500	ND	25,000	8,000	6,000	6,000	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	44,700	42,500	58,000 J	48,000	48,000	54,000	62,000	67,000
Thallium	—	ND	ND	ND	6	ND	ND	ND	ND
Vanadium	—	16.1B	ND	ND	ND	ND	ND	ND	ND
Zinc	—	52.3	ND	10	30	ND	ND	30 J	20

Notes:

1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 2000

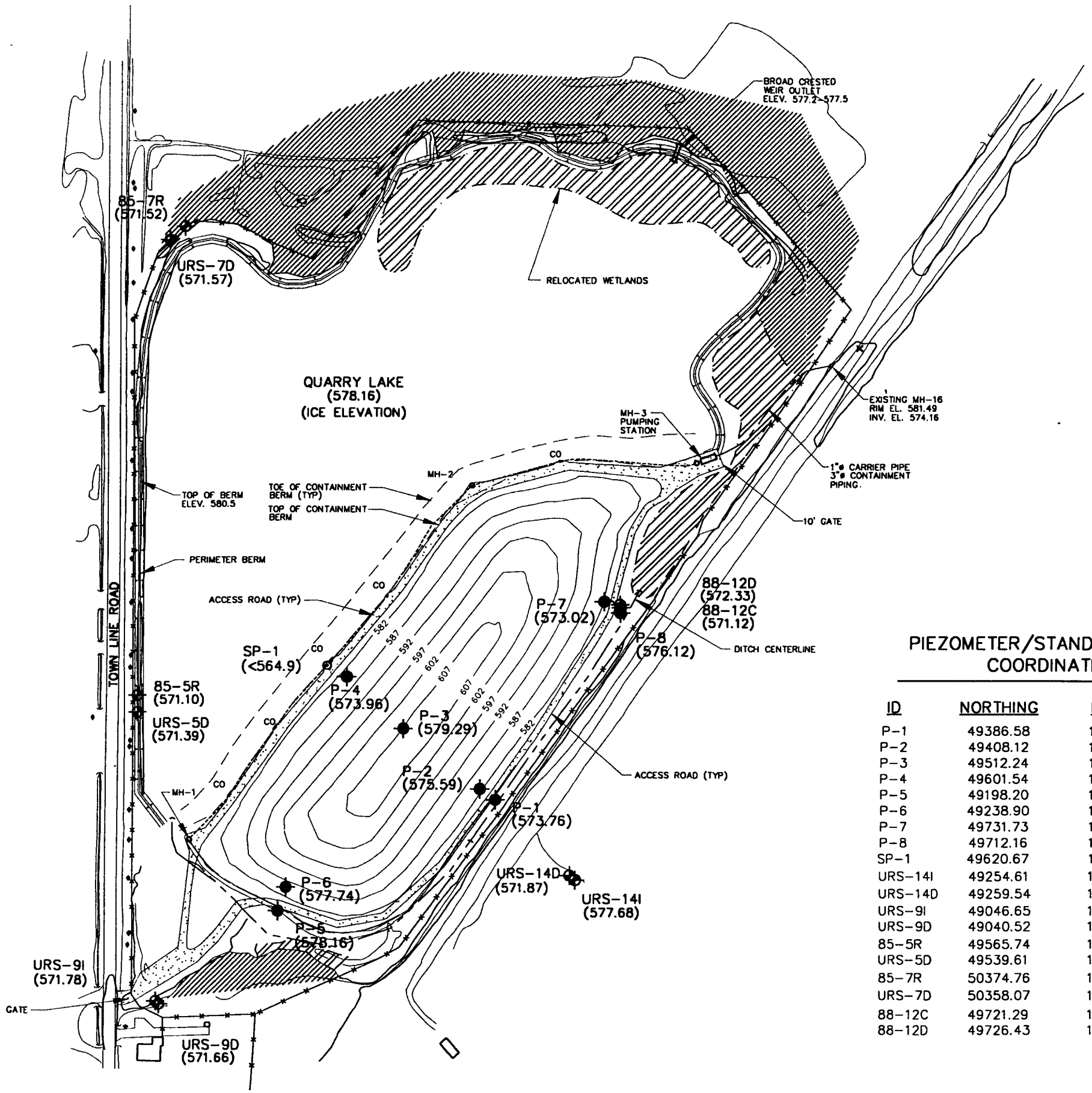
Parameter	Standard ug/L (ppb)	URS-14D							
		2/91	10/92	6/97	2/98	9/98	2/99	8/99	2/00
VOCs (ppb)									
Acetone	—	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	—	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	—	ND	ND	ND	ND	0.47 J	1.1 J	ND	6.7
Chlorobenzene	5	NA	NA	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	—	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	R	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	—	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	0.11J	0.21 J	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND
Metals (ppb)									
Aluminum	—	99.8	ND	ND	ND	ND	ND	ND	ND
Antimony	3	32.1B	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	2B	ND	ND	ND	ND	ND	ND	ND
Barium	1000	25.5B	23	20	ND	ND	40	30	30
Beryllium	—	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	—	255,000	292,000	210,000	250,000	310,000	280,000	360,000	310,000
Chromium	50	10.3	7	ND	ND	10	ND	ND	ND
Cobalt	—	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	ND	8	ND	ND	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	10	10	ND	ND	ND
Iron	300	357	193	ND	ND	ND	80	ND	ND
Lead	25	1.1B	ND	ND	ND	ND	ND	ND	ND
Magnesium	—	75,200	78,000	61,000	66,000	81,000	71,000	91,000	83,000
Manganese	300	30.8	27	ND	ND	ND	ND	10	ND
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	—	4,250B	3,700	ND	ND	ND	ND	ND	ND
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	40,700	38,700	52,000 J	49,000	50,000	48,000	58,000	47,000
Thallium	—	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	—	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	—	26.8	ND	ND	10	10	ND	ND	ND

Notes:

1. R = Indicates compound rejected due to blank contamination.
2. J = Indicates result is less than sample quantitation limit but greater than zero.
3. B = Indicates compound is less than quantitation limits but greater than or equal to instrument detection limits.
4. E = Estimated value due to interferences.
5. W = Post-digestion spike is out of control limits.
6. Sample data presented for 6/97, 2/98, 9/98, 2/99, 8/99, and 2/00 sampling events is for cis-1,2-dichloroethene.
7. NA = Not analyzed; ND = Not detected; N = Tentative.
8. Data validation was performed in accordance with USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review, and the USEPA SOPs HW-2 and HW-6.

i:\div71\5829\24532\4\5.xls

FIGURE 1



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

LEGEND

- URS-7D — MONITORING WELL
- P-1 — PIEZOMETER
- (580.24) — 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

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

HYDRAULIC POTENTIAL MAP (FEBRUARY 7, 2000)

200 0 200

SCALE IN FEET

FILE NO. 5829.24532.002
DATE: MARCH 2000

O'BRIEN & GERE ENGINEERS INC.

Appendix A

Piezometer/monitoring well inspection forms

ONITORING WELL INTEGRITY CHECKLIST

ite Name: Frontier Chem. Well Identification : P-1

ersonnel : TPP/DEC Date : 2/7/00

/ELL SPECIFICATIONS

rotective Casing	~~Above Ground~~	Flush Mounted
/ell Construction	PVC	Stainless Steel
/ell Diameter	~~2-inch~~	4-inch
epth to Ground Water :	9.45'	
/ell Depth:	16.43'	

/ELL INTEGRITY

. Well identification clearly marked ?	yes	no
. Well covers and locks in good condition and secure ?	yes	no
. Is the well stand pipe vertically aligned and secure ?	yes	no
. Is the concrete pad and surface seal in good condition ?	yes	no
. Are soils surrounding the well pad eroded ?	yes	no
. Is the well casing in good condition ?	yes	no
. Is the measuring point on casing well marked ?	yes	no
. Is there standing water in the annular space ?	yes	no
. Is the stand pipe vented at the base to allow drainage ?	yes	no

OMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chem Well Identification : P-2

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~
Well Construction	~~PVC~~	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	7.31'	
Well Depth:	15.73'	

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	N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : P-3

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	TP ~~39.77~~ 27.04'	
Well Depth:	39.77'	

WELL INTEGRITY

. Well identification clearly marked ?	(yes)	no	
. Well covers and locks in good condition and secure ?	(yes)	no	
. Is the well stand pipe vertically aligned and secure ?	(yes)	no	
. Is the concrete pad and surface seal in good condition ?	(yes)	no	
. Are soils surrounding the well pad eroded ?	yes	(no)	
. Is the well casing in good condition ?	(yes)	no	
. Is the measuring point on casing well marked ?	(yes)	no	
. Is there standing water in the annular space ?	yes	(no)	
. Is the stand pipe vented at the base to allow drainage ?	yes	no	N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : P-4

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~ Flush Mounted
Well Construction	~~PVC~~	Stainless Steel
Well Diameter	~~2-inch~~	~~4-inch~~ 4-inch
Depth to Ground Water :	8.35'	
Well Depth:	16.92'	

WELL INTEGRITY

1. Well identification clearly marked ?	~~yes~~ yes	no
2. Well covers and locks in good condition and secure ?	~~yes~~ yes	no
3. Is the well stand pipe vertically aligned and secure ?	~~yes~~ yes	no
4. Is the concrete pad and surface seal in good condition ?	~~yes~~ yes	no
5. Are soils surrounding the well pad eroded ?	yes	~~no~~ no
6. Is the well casing in good condition ?	~~yes~~ yes	no
7. Is the measuring point on casing well marked ?	~~yes~~ yes	no
8. Is there standing water in the annular space ?	yes	~~no~~ no
9. Is the stand pipe vented at the base to allow drainage ?	yes	no N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : P-5

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above Ground~~	Flush Mounted
Well Construction	~~PVC~~	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	4.89'	
Well Depth:	15.58'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : P-6

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~
Well Construction	~~PVC~~	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	6.71'	
Well Depth:	16.15'	

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	N/A

COMMENTS:

Standpipe leaning 20° - 30° at surface.

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : ~~OW~~ - P - 7

Personnel : TPP / DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~
Well Construction	~~PVC~~	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	7.95'	
Well Depth:	16.65'	

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	N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : P-8

Personnel : TPP/DEC Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	(PVC)	Stainless Steel
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	6.71'	
Well Depth:	17.22'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : SP - 1

Personnel : TPP / DE Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above~~ Ground	~~Flush Mounted~~
Well Construction	~~PVC~~	~~Stainless Steel~~ HDPE
Well Diameter	~~2-inch~~	~~4-inch~~ 6" ∅
Depth to Ground Water :	Dry	
Well Depth:	14.9	

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	N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : 85-SR

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	(PVC)	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	9.74'	
Well Depth:	38.02'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : VES -5D

Personnel : TPP/DA Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	(Above Ground)	Flush Mounted
Well Construction	PVC	(Stainless Steel)
Well Diameter	(2-inch)	4-inch
Depth to Ground Water :	9.21'	
Well Depth:	49.84'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : 85-7R

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above Ground~~	Flush Mounted
Well Construction	(PVC)	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	6.38'	
Well Depth:	27.71'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : URS-7D

Personnel : TPP/DEL Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above Ground~~	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	7.78'	
Well Depth:	39.84'	

WELL INTEGRITY

1. Well identification clearly marked ?	~~yes~~	no
2. Well covers and locks in good condition and secure ?	~~yes~~	no
3. 's 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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : URS. 9 I

Personnel : TPP/DEC Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above Ground~~	Flush Mounted
Well Construction	PVC	~~Stainless Steel~~
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	9.90'	
Well Depth:	46.18'	

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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : URS - 9D

Personnel : TPP/DEC Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	9.14'	
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

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : 88-12C

Personnel : TPP/DR Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	2-inch	4-inch
Depth to Ground Water :	12.00'	
Well Depth:	31.31'	

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

COMMENTS:

Concrete pad under gravel.

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : 88 12D

Personnel : TPP/DE Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	~~Above Ground~~	Flush Mounted
Well Construction	PVC	~~Stainless Steel~~
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	10.54'	
Well Depth:	52.38'	

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

COMMENTS: Concrete pad under gravel.

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : ORS - 14 I

Personnel : TPP/DEC Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	Flush Mounted
Well Construction	PVC	Stainless Steel
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	3.46'	
Well Depth:	31.08'	

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	N/A

COMMENTS:

MONITORING WELL INTEGRITY CHECKLIST

Site Name: Frontier Chemical Well Identification : OBS-14D

Personnel : TPP/DEC Date : 2/7/00

WELL SPECIFICATIONS

Protective Casing	Above Ground	~~Flush Mounted~~
Well Construction	PVC	~~Stainless Steel~~
Well Diameter	~~2-inch~~	4-inch
Depth to Ground Water :	8.84'	
Well Depth:	41.61'	

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	N/A

COMMENTS:

Ground water sampling logs

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

Date 2/8/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP/DEC

Weather Sunny 3°
Well # 85-5R
Evacuation Method SS Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	38.02	ft.
Depth to Water *	9.74	ft.
Length of Water Column	28.28	ft.
Volume of Water in Well	4.6	gal.(s)
3X Volume of Water in Well	13.8	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? Yes

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

Instrument Calibration:

pH Buffer Readings
- 4.0 Standard
- 7.0 Standard 7.01
- 10.0 Standard 10.07

Conductivity Standard Readings
- 84 S Standard
- 1413 S Standard

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 0.5	initial 8.5	initial 8.52	initial 959
4.5	8.8	8.48	1148
8.0	7.5	8.05	1142
10.0	7.4	7.35	1335

Water Sample:
Time Collected 1545

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Clear
Odor	None	Odor	None
Turbidity (> 100 NTU)	91	Turbidity (> 100 NTU)	56
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 Liter	plastic	1	Yes	HNO_3	<2
1 Liter	plastic	1	No	NaOH	>10

Notes:
PID - 0 PPM

JAM:ers/div76/admin/4_notes/stad9log

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

Date 2/8/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP / DEC

Weather Sunny 3°
Well # URS-5D
Evacuation Method SS Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	49.84	ft.
Depth to Water *	9.21	ft.
Length of Water Column	40.63	ft.
Volume of Water in Well	6.6	gal.(s)
3X Volume of Water in Well	19.8	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 13 gal.(s)
Did well go dry? yes

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

Instrument Calibration:

pH Buffer Readings

4.0 Standard	
7.0 Standard	7.01
10.0 Standard	10.01

Conductivity Standard Readings

84 S Standard	
1413 S Standard	

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 1	initial 9.2	initial 9.59	initial 1747
6	8.8	8.31	2160
13	9.1	7.70	2680

Water Sample:
Time Collected 1100

Physical Appearance at Start

Color	Clear
Odor	Slight
Turbidity (> 100 NTU)	10
Sheen/Free Product	None

Physical Appearance at Sampling

Color	Light grey
Odor	None
Turbidity (> 100 NTU)	232
Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	< 2
1 Liter	Plastic	1	Yes	HNO_3	< 2
1 Liter	Plastic	1	No	NaOH	> 10

Notes:
PID - 0 PPM Dry @ 10 gal Sample @ 13

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

Date 2/9/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP / DEL

Weather Sunny 44°F
Well # 85-7R
Evacuation Method SS Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	27.71	ft.
Depth to Water *	6.38	ft.
Length of Water Column	21.33	ft.
Volume of Water in Well	3.48	gal.(s)
3X Volume of Water in Well	10.4	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: 11 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	7.00	1413 S Standard	
10.0 Standard	10.00		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial Ø	initial 8.7	initial 11.94	initial 2790
3.5	9.8	11.73	1896
7.0	10.2	8.33	1772
11	9.9	7.46	1799

Water Sample:
Time Collected 15 15

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	lt Brown
Odor	None	Odor	None
Turbidity (> 100 NTU)	20	Turbidity (> 100 NTU)	654
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO_3	<2
1 liter	Plastic	1	No	NaOH	>10

Notes:
PID - Ø ppm

JAM:ers/div76/admin/4_notes/stad9log

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

Date 2/9/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP/DEL

Weather Sunny 44°±
Well # URS 7D
Evacuation Method SS. Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	39.84 ~~49.84~~	ft.
Depth to Water *	7.78 ~~9.27~~	ft.
Length of Water Column	32.06 ~~40.65~~	ft.
Volume of Water in Well	5.23 ~~6.62~~	gal.(s)
3X Volume of Water in Well	15.7 ~~19.9~~	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: [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard	7.00	1413 S Standard	
10.0 Standard	10.00		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial ϕ	initial 8.6	initial 7.16	initial 1295
7.0	9.8	7.74	1435
14	9.0	7.62	1689
20	9.0	7.06	1676

Water Sample:
Time Collected 1525

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	clear/slt cloudy
Odor	Slight Sulphur	Odor	Slight Sulfur
Turbidity (> 100 NTU)	20	Turbidity (> 100 NTU)	134
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO_3	<2
1 liter	Plastic	1	No	NaOH	>10

Notes:
PID - ϕppm

O'Brien & Gere Engineers, Inc.

Standard Ground Water Sampling Log

Date 2/8/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP/DEC

Weather Sunny 30's
Well # URS - 9I
Evacuation Method SS Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	46.18	ft.
Depth to Water *	9.90	ft.
Length of Water Column	36.28	ft.
Volume of Water in Well	5.91	gal.(s)
3X Volume of Water in Well	17.7	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 [x] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard		84 S Standard	
7.0 Standard	7.01	1413 S Standard	
10.0 Standard	10.01		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 1	initial 8.3	initial 7.96	initial 1255
6	8.8	7.82	1289
12	8.3	7.45	1224
18	8.5	7.35	1233

Water Sample:
Time Collected 1300

Physical Appearance at Start		Physical Appearance at Sampling	
Color	LT Grey	Color	Milky
Odor	Slight	Odor	Slight
Turbidity (> 100 NTU)	220	Turbidity (> 100 NTU)	71000
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO_3	<2
1 liter	Plastic	1	No	NaOH	>10

Notes:
PID - 0 PPM

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

Date 2/8/00
Site Name Frontier Chemical
Location Pendleton
Project No. 24532
Personnel TPP/DEC

Weather Sunny 3°
Well # MRS-9D
Evacuation Method SS Bailer
Sampling Method SS Bailer

Well Information:

Depth of Well *	50.89	ft.
Depth to Water *	9.14	ft.
Length of Water Column	41.75	ft.
Volume of Water in Well	6.8	gal.(s)
3X Volume of Water in Well	20.4	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 20.5 gal.(s)
Did well go dry? NO

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

Instrument Calibration:

pH Buffer Readings
- 4.0 Standard
- 7.0 Standard 7.01
- 10.0 Standard 10.01

Conductivity Standard Readings
- 84 S Standard
- 1413 S Standard

Water parameters:

	Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial	0.5	7.7	7.87	1436
	6.5	7.7	7.94	1430
	13	8.5	7.48	1458
	20.5	7.6	7.31	1395

Water Sample:
Time Collected 1315

Physical Appearance at Start

Color	Clear
Odor	None
Turbidity (> 100 NTU)	30
Sheen/Free Product	None

Physical Appearance at Sampling

Color	clear
Odor	None
Turbidity (> 100 NTU)	25
Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO3	<2
1 liter	Plastic	1	No	NaOH	>10

Notes:
PID - 0 PPM
1 BLIND DUPE collected

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

Date 2/7/00
Site Name Frontier Chemical
Location Pendleton, NY
Project No. 24532
Personnel TPP, DEC

Weather Sunny 25°±
Well # 88-12 ~~B~~ C
Evacuation Method Hand Bail
Sampling Method SS Bailer

Well Information:

Depth of Well *	31.31	ft.
Depth to Water *	12.00	ft.
Length of Water Column	19.31	ft.
Volume of Water in Well	3.15	gal.(s)
3X Volume of Water in Well	9.45	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	
4.0 Standard	
7.0 Standard	7.00
10.0 Standard	10.00

Conductivity Standard Readings	
84 S Standard	
1413 S Standard	

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial Ø	initial 9.3	initial 8.01	initial 1158
3.5	9.5	7.71	1130
6.5	8.8	7.43	1108
9.5	8.9	7.46	1127

Water Sample:
Time Collected 1518

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	Brownish
Odor	sulfur	Odor	Sulfur
Turbidity (> 100 NTU)	55.4	Turbidity (> 100 NTU)	7000 - OUT OF RANGE
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO_3	<2
1-liter	Plastic	1	NO	NaOH	>10

Notes:
PID Ø ppm

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

Date 2/7/00
Site Name Frontier Chemical
Location Pendleton, NY
Project No. 24532
Personnel TPP, DEC

Weather Sunny 25° ±
Well # 88-12S&D
Evacuation Method Hand Bail
Sampling Method SS Bailer

Well Information:

Depth of Well *	52.38	ft.
Depth to Water *	10.54	ft.
Length of Water Column	41.84	ft.
Volume of Water in Well	6.82	gal.(s)
3X Volume of Water in Well	20.5	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: 20 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	7.00	1413 S Standard	
10.0 Standard	10.00		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 0	initial 9.1	initial 7.31	initial 4130
4	9.4	6.20	11530
12	8.3	6.70	4780
15	8.9	6.7	4760
20	8.0	6.82	4950

Water Sample:
Time Collected 1555

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	clear
Odor	Slight sulphur	Odor	slight sulfur
Turbidity (> 100 NTU)	17.7	Turbidity (> 100 NTU)	109
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 liter	Plastic	1	Yes	HNO_3	<2
1 liter	Plastic	1	No	NaOH	>10

Notes:
PID - 0 ppm

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

Date: 2/8/00
Site Name: Frontier Chemical
Location: Pendleton
Project No.: 24532
Personnel: TPP / DEL

Weather: Sunny 30's
Well #: URS 14I
Evacuation Method: S.S. Bailer
Sampling Method: S.S. Bailer

Well Information:

Depth of Well *	31.08	ft.
Depth to Water *	3.46	ft.
Length of Water Column	27.62	ft.
Volume of Water in Well	4.50	gal.(s)
3X Volume of Water in Well	13.5	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: 10 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	7.01	1413 S Standard	
10.0 Standard	10.01		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 0.5	initial 6.8	initial 9.04	initial 460
4.5	8.8	9.03	515
9.5	8.7	7.87	605

Water Sample:
Time Collected: 1415 *2/9/00

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear	Color	clear/milky
Odor	None	Odor	none
Turbidity (> 100 NTU)	25	Turbidity (> 100 NTU)	277
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	Glass	2	No	1:1 HCl	<2
1 Liter	Plastic	1	Yes	HNO_3	<2
1 Liter	Plastic	1	No	NaOH	>10

Notes:
PID - 0 ppm Dry @ 10 gals

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

Date 2/8/00
Site Name Frontier Chemical
Location Rendleton
Project No. 24532
Personnel TPP/DEC

Weather Sunny 3° ±
Well # URS 14D
Evacuation Method SS Bailer
Sampling Method S.S. Bailer

Well Information:

Depth of Well *	41.61	ft.
Depth to Water *	8.84	ft.
Length of Water Column	32.77	ft.
Volume of Water in Well	5.34	gal.(s)
3X Volume of Water in Well	16.02	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 16 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	7.01	1413 S Standard	
10.0 Standard	10.01		

Water parameters:

Gallons Removed	Temperature Readings °C	pH Readings	Conductivity Readings uS/cm
initial 0	initial 8.4	initial 10.99	initial 1049
5	8.6	9.04	1128
10	8.4	6.97	1690
16	8.4	6.96	1609

Water Sample:
Time Collected 1003

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Clear / Lt Grey Seeds	Color	Clear
Odor	Slight sulphur	Odor	Slight
Turbidity (> 100 NTU)	20	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	2	No	1:1 HCl	<2
1 Liter	Plastic	1	Yes	HNO_3	<2
1 Liter	Plastic	1	No	NaOH	>10

Notes:
Collect MS/MSD
PID - 0 PPM

O'Brien & Gere Laboratories, Inc.

5000 Brittonfield Parkway
East Syracuse, New York 13057
(315) 437-0200

Chain of Custody

Client: OLIN

Project: FRONTIER CHEMICAL Pendleton NewYork

Sampled by: T. Prawel, D. Canestrari

Client Contact: 24532 Phone #

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Analysis/Method: VOC's	Metals (Filtered) 95-1	CN					Comments
85-5R	2/8/00	1545	Water	Grab	5	3	1	1					
URS - 5D	2/8/00	1600	Water	Grab	5	3	1	1					
EQUIP. BLANK	2/9/00	1355	WATER	GRAB	5	3	1	1					
URS - 14I	2/9/00	1415	Water	Grab	5	3	1	1					
85-7R	2/9/00	1515	Water	Grab	5	3	1	1					
URS-7D	2/9/00	1525	Water	Grab	5	3	1	1					
TRIP BLANKS	2/9/00	—	Water	—	2	2							

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by: Donald E. Canestrari	Date: 2/9/00	Time: 1620	Received by Lab:	Date:	Time.
Shipment Method: FED EX			Airbill Number: 8184 8066 4960		

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature:_____

Original-Laboratory Copy-Client

O'Brien & Gere Laboratories, Inc.

5000 Brittonfield Parkway
East Syracuse, New York 13057
(315) 437-0200

Chain of Custody

Client: OLIN

Project: Frontier Chemical Pendleton

Sampled by: T. Prawel D Canestrari

Client Contact: 24532 **Phone #**

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Analysis/Method: VOC's	95-1 Metals (Filtered)	CN					Comments
88-12C	2/7/00	1518	Water	Grab	5	3	1	1					
88-12D	2/7/00	1555	Water	Grab	5	3	1	1					
URS-14D MS/MSD	2/8/00	1003	Water	Grab	15	9	3	3					
URS-9I	2/8/00	1300	Water	Grab	5	3	1	1					
URS-9D	2/8/00	1315	Water	Grab	5	3	1	1		U			
Blind Dupe	—	—	Water	Grab	5	3	1	1					
Trip Blank	—	—	Water	Grab	2	2							

Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by: Donald E. Canestrari	**Date:** 2/8/00	**Time:** 1630	**Received by Lab:**	**Date:**	**Time.**
Shipment Method: FED EX			**Airbill Number:** 8184 8066 4981		

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature:_____

Original-Laboratory Copy-Client

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

March 21, 2000

Jennifer Smith
O'Brien & Gere Engineers
5000 Brittonfield Parkway
P. O. Box 4873
Syracuse, NY 13221

RE: Validation of Frontier Chemical Site Data Packages
OBG Labs Report for Samples Collected 2/07/00 through 2/09/00

Dear Ms. Smith:

Review has been completed for the data package generated by OBG Laboratories, pertaining to samples collected at the Frontier Chemical Site on February 7 through February 9, 2000. Eleven aqueous samples were analysed for TCL volatiles and TAL filtered metals/cyanide parameters. Matrix spikes/duplicates, and equipment 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
* 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 as reported, or with minor qualification as estimated. Certain edits to, and qualification of, reported results are indicated. These issues are discussed in the following analytical sections.

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.

Data Completeness

The laboratory data packages were not directly in compliance with the required NYSDEC ASP Category B deliverables, but the information needed for validation of the data was present. Volatile summary forms 2, 4, and 5 were not present, the laboratory NYSDEC Sample Preparation and Analysis Summary Forms were not provided, and no verbatim certification statement was made in the case narrative.

Volatile Analyses

Carbon disulfide was detected in some of the project samples, at levels above typical laboratory contamination. None was detected in the associated blanks, and no qualification to the reported results is made. Many samples also showed evidence of sulfur dioxide, which may be related to the detection of carbon disulfide.

The reported value for carbon disulfide in the sample 88-12D should be derived from the dilution analysis. All other analyte values can be used fron. the initial analysis.

Due to low response factors in the calibration standards, results for acetone, 2-butanone, 2-hexanone, and 4-methyl-2-pentanone should be considered estimated in the project samples

Matrix spikes of URS-14D involved evaluation of recoveries of all target analytes. Chloroethane produced an elevated recovery (960%) in one of the matrix spikes due to contribution to the mass fragment response from sulfur dioxide in the spiked sample. Sample reported results are unaffected. All other accuracy and precision values, and control spiked recoveries, were acceptable.

The Tentatively Identified Compounds should be qualified as estimated in value, and should be reported to one significant figure. Those identified as "solvent" or "column bleed" are analysis artifacts and should be disregarded as sample components.

Field duplicate correlation of URS-9D and X-1 was acceptable.

Metals/CN Analyses

Accuracy and precision evaluations for URS-14D were acceptable, with the exception of the recovery of selenium, which was 70%. Therefore the sample selenium results should be considered estimated ("J") in all project samples. This element also produced a low recovery in the low concentration standard (CRI) (57%). No corrective action was required of the laboratory.

Due to elevated recovery of the mercury CRI (130%), the detected value reported in sample 88-12D, which was at a concentration equal to that of the CRDL, should be regarded as estimated, possibly biased high.

The serial dilution determinations for URS-14D produced acceptable correlations.

Field duplicate correlation between URS-9D and X-1 was acceptable.

Reported results are substantiated by the raw data.

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

Very truly yours,

Judy Harry

Data Validation Services

120 Cobble Creek Road P. O. Box 208
North Creek, NY 12853
Phone (518) 251-4429
Facsimile (518) 251-4428

Facsimile Transmission

TO: Jen Smith

COMPANY: OBG Engineers

FAX NUMBER: 315 463 7554

FROM: Judy Harry

DATE: 03-20-00

No. of pages (including cover): 1

COMMENTS: RE: Frontier Chemical data packages

The spectrum that I would like to review is that pertaining to the broad peak present around retention time 3.5-4.0' in sample N9181-DL (file G7775 on 2/17). They may need to do a manual subtract of background from about 3', or after 4.5'. The early part of the response is likely due to moisture, but the latter may be the sulfur dioxide.

Hope this helps. Thanks.

___ Hardcopy to follow _X__ Hardcopy not to follow

TELEFAX

O'BRIEN & GERE ENGINEERS, INC. *Direct Line Fax No. (315) 463-7554*

CONFIDENTIALITY NOTICE

Job Number: 5829/24532

Number of Pages: 3 (including cover sheet) Date: March 21, 2000

If pages are missing or illegible, please contact telefax operator at (315) 437-1990, ext. 2593, as soon as possible. Thank you.

TO: **Judy Harry**

COMPANY: **Data Validation Services**

FAX NO: **518-251-4428**

FROM: **Jennifer Smith**

ORIGINAL —

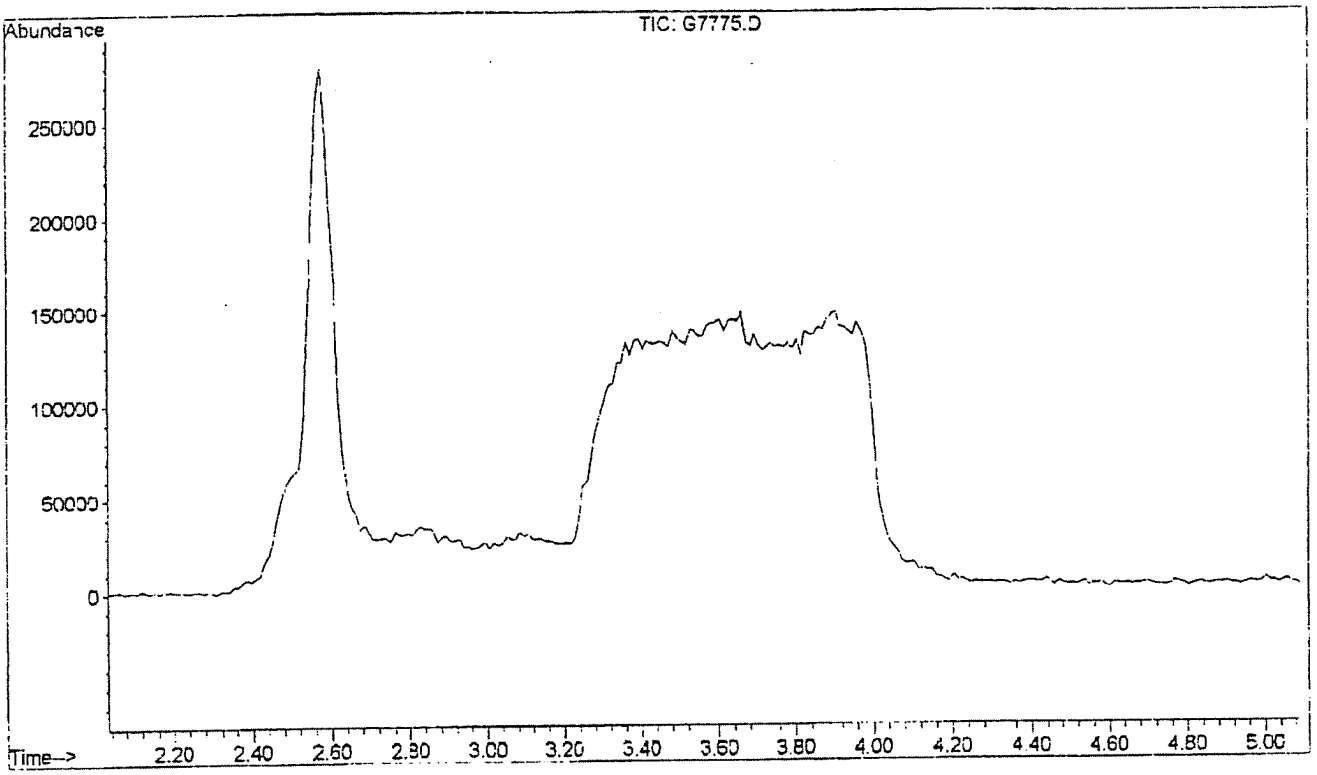
___ will follow via regular mail ___ will follow via overnight delivery x will not follow

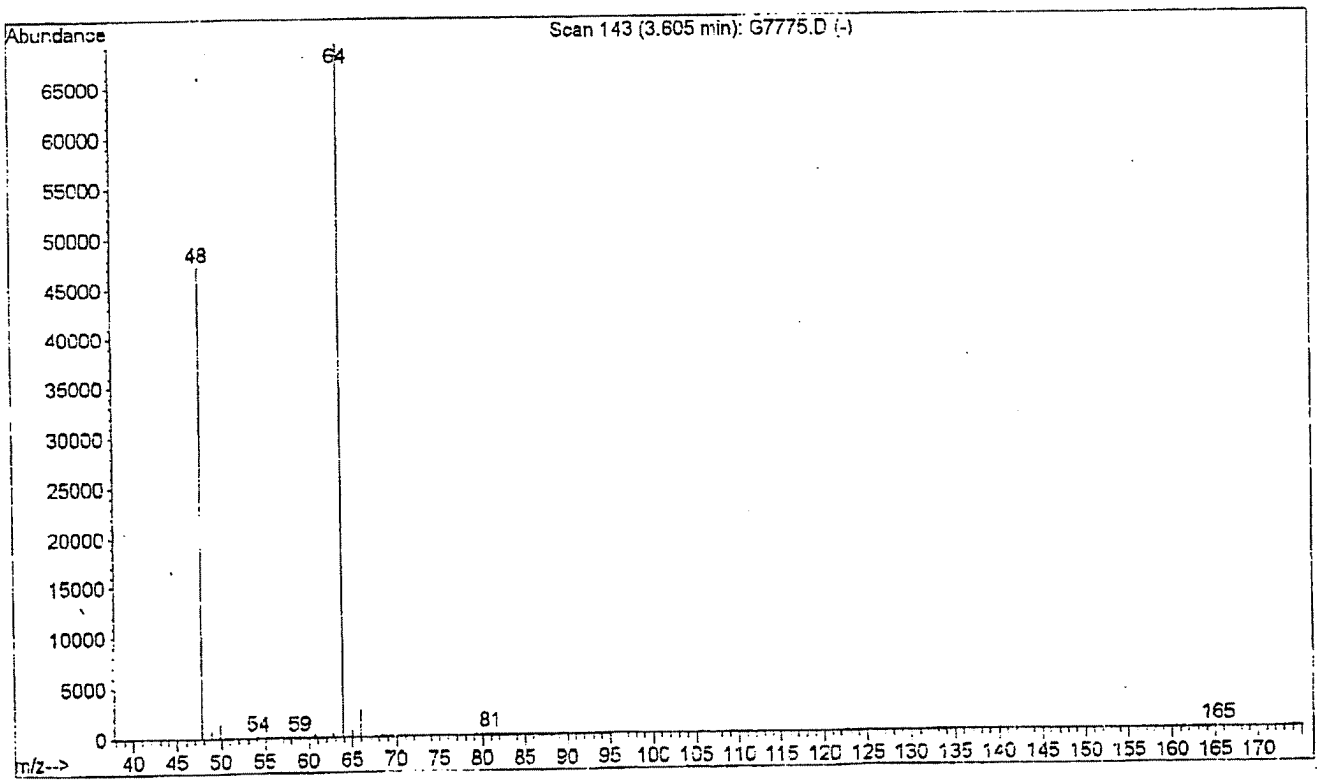
MESSAGE:

Hi Judy,
As discussed, attached is the spectrum for the N9181-DL sample. Please feel free to call me if you have any questions or need additional information.

Thank you,
Jen

File : J:\MS2\G7775.D
Operator : MSV
Acquired : 17 Feb 00 11:37 am using AcqMethod G215VOCW
Instrument : #2MS12
Sample Name: N9181DL 5x
Misc Info :
Vial Number: 6





NARRATIVE

INTRODUCTION/ANALYTICAL RESULTS

This report summarizes the laboratory results for samples from Frontier Chemical - Pendleton Site, Town of Pendleton, Niagara County, NY. Immediately following the narrative is the Cross Reference Table that lists the site descriptions, sample numbers, dates collected, dates received and package numbers.

CONDITION UPON RECEIPT/CHAIN OF CUSTODY

The coolers were received intact. When the coolers were received by the laboratory, the sample custodian(s) opened and inspected the shipments for damage, custody inconsistencies and proper preservation. The chain of custody forms documenting receipt are presented in the chain of custody section. Each sample was assigned a unique laboratory number and a custody file created. The samples were placed in a secured walk-in cooler and signed in and out by the chemists performing the tests. The sign out record, or lab chronicle, is presented in the chain of custody section.

No discrepancies were noted upon receipt. The cooler temperatures upon receipt were 3 and 4°C.

METHODOLOGY

The following methods were used to perform the analyses:

PARAMETER	METHOD	REFERENCE
Volatile Organics	8260B	1
ICP Metals	6010B	1
Mercury	7470A	1
Thallium	7841	1
Cyanide	9010B/9014	1

1) Test Methods for Evaluating Solid Wastes, SW-846 Third Edition, Final Update III, December 1996.

QUALITY CONTROL

The quality control for this program includes internal standards, surrogates, matrix spike (MS), matrix spike duplicate (MSD), laboratory duplicate (D), equipment blank, laboratory control sample (LCS), prep blank and QC trip blank samples. QA/QC results are summarized in the Sample Data Summary Package and are also included in the raw data.

RAW DATA

The raw data is organized in a format similar to the US EPA Contract Laboratory Program order of data requirements.

GC/MS Volatile Organics Case Narrative

Client: Frontier Chemical
Job Number: 5829.001.517
Package #: 4663, 4671
Methodology: 8260B

Analyzed/Reviewed by (Date/Initials): 2-23-00 SG

Supervisor/Reviewed by (Date/Initials): 2-24-00

QA/QC Review (Date/Initials): 3/7/00

File Name in G/ Drive: C:\WPWIN60\WPDOCS\V4663.NAR

GC/MS Volatile Organics

The GC/MS Volatile instruments used a J&W DB-VRX, 75 m x 0.45 mm ID capillary column and a Vocarb 3000 trap.

Holding Times and Sample Preservation

All samples were prepared and analyzed within the method and/or QAPP specified holding time requirements. Samples had a pH of less than 2.

Laboratory Control Sample

All spike recoveries met method and/or project specific QC criteria.

MS/MSD

The following compound(s) did not meet matrix spike/matrix spike duplicate percent recovery and/or RPD criteria:

Sample Description	Sample #	Compound	% REC	RPD	Corrective Action
URS-14D	N9182	Chloroethane	X	X	1

1. Due to high level sulfur dioxide in the sample N9182MSD. Ion 64 of chloroethane was co-eluted with sulfur dioxide. LCS passed for this compound. No corrective action was taken.

Surrogate

All surrogate recoveries met method and/or project specific QC criteria.

Internal Standards

All internal standard areas met method and/or project specific QC criteria.

Calibrations

For calibration check standard compounds that had a linear regression performed, a percent drift was calculated between the true value of the calibration check standard and the calculated value. For compounds using an average response factor, the percent difference between the average response factor and the daily response factor was calculated. Summary sheets for both calculations are included in the raw data section.

Client: Frontier Chemical
Job Number: 5829.001.517
Package #: 4663, 4671
Methodology: 8260B

The following continuing calibration compound(s) exceeded method percent drift and/or RRF criteria:

Calibration Date	Instrument	Compound	%D	RRF	Corrective Action
2/17/00	MS2	1,1-Dichloroethene	-20.5		1

1. The compound failed high. There were no positive hits for the compound in associated samples. The associated LCS met criteria. No corrective action was taken.

Preparation Blanks
All preparation blanks met method and/or project specific QC criteria.

Trace Metals Case Narrative

Client: Frontier Chemical
Job Number: 5829.001.517
Package #: 4663,4671
Methodology: ICP metals - 6010B

Analyzed/Reviewed by (Date/Initials): 3-2-00 MT

Supervisor/Reviewed by (Date/Initials): 3-2-00 MT

QA/QC Review (Date/Initials): 3-7-00

File Name in G/ Drive: G:\NARRATIV\4663FRON.ICP

Trace Metals

Holding Times
All samples were prepared and analyzed within the method and/or QAPP specified holding time requirements.

Laboratory Control Sample
All spike recoveries met method and/or project specific QC criteria.

MS/MSD AND MS/MSD RPD
The following analytes did not meet matrix spike/matrix spike duplicate percent recovery and/or MS/MSD RPD criteria:

Sample Description	Sample #	Analyte	% REC	RPD	Corrective Action
UPS-14D (Field Filtered)	N9189	Calcium	X		2
		Magnesium	X		2
		Selenium	X		1
		Potassium		X	3

1. A post-digestion spike was performed as required. No further corrective action was taken.

2. The concentration of the analyte in the sample was much greater than the concentration of the spike added. A post-digestion spike was performed as required. No further corrective action was taken.

3. The RPD for the sample and duplicate was within control limits. No further corrective action was taken.

Sample Duplicate
All sample duplicate RPD data met method and/or project specific QC criteria.

Client: Frontier Chemical
Job Number: 5829.001.517
Package #: 4663,4671
Methodology: ICP metals - 6010B

ICP Serial Dilution
All percent differences met method and/or project specific QC criteria.

.Calibrations
All calibrations and calibration verifications met method and/or project specific QC criteria.

Preparation Blanks
All preparation blanks met method and/or project specific QC criteria.

Trace Metals Case Narrative

Client:	Frontier Chemical
Job Number:	5829.001.517
Package #:	4663,4671
Methodology:	Mercury - 7470A
Analyzed/Reviewed by (Date/Initials):	3-2-00 mt
Supervisor/Reviewed by (Date/Initials):	3-2-00 mt
QA/QC Review (Date/Initials):	3/7/00
File Name in G/ Drive:	G:\NARRATIV\4663FRON.HG

Trace Metals

There were no excursions to note. All QC results were within established control limits.

Trace Metals Case Narrative

Client:	Frontier Chemical
Job Number:	5829.001.517
Package #:	4663,4671
Methodology:	Thallium - 7841
Analyzed/Reviewed by (Date/Initials):	3-2-00 MT
Supervisor/Reviewed by (Date/Initials):	3-2-00 MT
QA/QC Review (Date/Initials):	3/7/00
File Name in G/ Drive:	G:\NARRATIV\4663FRON.TL

Trace Metals

There were no excursions to note. All QC results were within established control limits.

Wet Chemistry Case Narrative

Client:	Frontier Chemical
Job Number:	5829.001.517
Package #:	4663,4671
Methodology:	Total cyanide - 9010B/9014
Analyzed/Reviewed by (Date/Initials):	3-2-00 mt
Supervisor/Reviewed by (Date/Initials):	3-2-00 mt
QA/QC Review (Date/Initials):	3/4/00
File Name in G/ Drive:	G:\NARRATIV\4663FRON.WC

Wet Chemistry

There were no excursions to note. All QC results were within established control limits.

CROSS REFERENCE TABLE

Site	Sample Number	Date Collected	Date Received	Pkg
88-12C	N9180	02/07/00	02/09/00	4663
88-12D	N9181	02/07/00	02/09/00	4663
URS-14D	N9182	02/08/00	02/09/00	4663
URS-14D	N9182MS	02/08/00	02/09/00	4663
URS-14D	N9182MSD	02/08/00	02/09/00	4663
URS-14D	N9182D	02/08/00	02/09/00	4663
URS-9I	N9183	02/08/00	02/09/00	4663
URS-9D	N9184	02/08/00	02/09/00	4663
Blind Dup	N9185	02/08/00	02/09/00	4663
QC Trip Blank	N9186	02/07/00	02/09/00	4663
88-12C (Field Filtered)	N9187	02/07/00	02/09/00	4663
88-12D (Field Filtered)	N9188	02/07/00	02/09/00	4663
URS-14D (Field Filtered)	N9189	02/08/00	02/09/00	4663
URS-14D (Field Filtered)	N9189MS	02/08/00	02/09/00	4663
URS-14D (Field Filtered)	N9189MSD	02/08/00	02/09/00	4663
URS-14D (Field Filtered)	N9189D	02/08/00	02/09/00	4663
URS-9I (Field Filtered)	N9190	02/08/00	02/09/00	4663
URS-9D (Field Filtered)	N9191	02/08/00	02/09/00	4663
Blind Dup (Field Filtered)	N9192	02/08/00	02/09/00	4663
85-5R	N9219	02/08/00	02/10/00	4671
URS-5D	N9220	02/08/00	02/10/00	4671
Equip. Blank	N9221	02/09/00	02/10/00	4671
URS-14I	N9222	02/09/00	02/10/00	4671
85-7R	N9223	02/09/00	02/10/00	4671
URS-7D	N9224	02/09/00	02/10/00	4671
QC Trip Blank	N9225	02/08/00	02/10/00	4671
85-5R (Field Filtered)	N9226	02/08/00	02/10/00	4671
URS-5D (Field Filtered)	N9227	02/08/00	02/10/00	4671
Equip. Blank (Field Filtered)	N9228	02/09/00	02/10/00	4671

URS-14I (Field Filtered)	N9229	02/09/00	02/10/00	4671
85-7R (Field Filtered)	N9230	02/09/00	02/10/00	4671
URS-7D (Field Filtered)	N9231	02/09/00	02/10/00	4671

Volume 1 of 3 of the validated analytical data is separately bound.

Attachment D

GGE GLYNN GEOTECHNICAL ENGINEERING

LETTER OF TRANSMITTAL

APRIL 6, 2000

TO:

Pendleton PRP Group
P. O. Box 248
1186 Lower River Road
Charleston, Tennessee 37310

DATE: February 8, 2000
ATTENTION: Mr. John Burns JAMES YOUNG
SUBJECT: Pendleton (Frontier Chemical) Site Remediation
GGE PROJECT NO: 94-1014-0

WE ARE SENDING ATTACHED:

☐ LABORATORY TEST DATA ☐ FIELD TEST DATA ☒ REPORT
☐ ENGINEERING DRAWINGS ☐ _____

COPIES	DATE	REPORT NO.	DESCRIPTION
1	2.8.00	00-01	Field Observation Report

THESE ARE BEING SENT:

☒ FOR YOUR USE ☐ PER YOUR REQUEST ☐ _____

SINCERELY,
GLYNN GEOTECHNICAL ENGINEERING

Jesse E. Grossman, P.E.
Project Manager

DISTRIBUTION

~~Jen Smith - O'Brien & Gere~~

415 South Transit Street, Lockport, New York 14094
voice: 716.625.6933 / fax: 716.625.6983
• VISIT OUR WEB SITE AT www.glynngroup.com / E-MAIL: gge@glynngroup.com •

DOCFILE:ggeletXL

GLYNN GEOTECHNICAL ENGINEERING

FIELD OBSERVATION REPORT

PROJECT NO.:	94-1014-O	REPORT NO.:	00-01	DATE:	07-Feb-00
PAGE:	1	OF	1		
PROJECT:	Pendleton (Frontier Chemical) Site Remediation			DAY:	Monday
SUBJECT:	Semi-Annual Sampling, Lake Level Survey			PROJECT TIME:	10:00 am - 12:00 pm
CLIENT:	Pendleton Site PRP Group			SITE TIME:	10:45 am - 11:30 am
WEATHER:	Cold, Partly Cloudy (25° F)			PHOTOS:	YES X NO

- On site per O'Brien & Gere notification to record lake water elevation coincidental with semi-annual groundwater sampling event.
- Record Quarry Lake water surface elevation via level survey. Lake is ice covered. The ice surface elevation is 578.16'. Attempt to break through the ice to record free water elevation. The ice cannot be penetrated and the free water surface is not measured.
- The O'Brien & Gere sampling team is also on site for sample collection. O'B&G team is clearing the interior sample locations of snow and recording water elevations.
- Site accessibility is limited due to drifted snow on the perimeter access road.
- Observe general site conditions and no major problems are noted. The pump vault is not accessed.

PERSONNEL ON SITE / CONTACTED:

Tim Prawel, Don Canastrari - O'B&G

DISTRIBUTION:

John Burns - PPRP

Jen Smith - O'B&G

Man-hours: 2.0

REPORTED BY: Jesse E. Grossman, P.E., Project Manager

REVIEWED BY: Mark W. Glynn, P.E.

DOCFILE:00fer0001

415 South Transit Street, Lockport, New York 14094
voice: 716.625.6933 / fax: 716.625.6983

• VISIT OUR WEB SITE AT www.glynngroup.com / E-MAIL: gge@glynngroup.com •