Frontier Chemical - Pendleton Site
March 1999

Semi-Annual Report #4

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

Prepared by Pendleton PRP Group
March 1999

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Attachments

Introduction

This is the fourth semi-annual report from 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 1998 for Post-Closure Operation, Maintenance, and Monitoring of the Closure Components of the Frontier Chemical-Pendleton Site by the Pendleton PRP Group.

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
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,

Regarding routine inspection and maintenance of constructed features, no site inspections were conducted during this reporting period. Site inspections are normally performed during April and September.

Relocated wetlands inside the perimeter berm will be inspected and reported in the next semiannual report.

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 flow data for this reporting period are included in Attachment B. Six months (October 1998 through March 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 13, 1998	September 24, 1998
November 5, 1998	October , 1998
December 10, 1998	November 5, 1998
January 6, 1999	December 4, 1998
February 10, 1999	January 8, 1999
March 11, 1999	February 4, 1999

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

3. Performance of a ground water monitoring program to monitor ground water conditions at the site 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 1999 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

Regarding evaluation of operation, maintenance, and monitoring activities and identification of proposed changes, a letter detailing the status of the maintenance work completed in April 1998 is include in Attachment D-1.

5. Recordkeeping

Regarding recordkeeeping activities, Ben Brayley who has replaced Jim Reed, maintains site records both at the Site and at Olin's Niagara Falls Plant including daily and weekly logs and charts. Glynn Geotechnical (Jesse Grossman) provides assistance to Ben Brayley and updates O&M documentation. O'Brien & Gere Engineers (Steve Anagnost) provide ground water level measurement, sampling, monitoring, and analytical field and office support. John Burns maintains analytical results and reports to NCSD #1 and NYSDEC from Olin's Charleston Plant. All these records are available for review and inspection upon reasonable notice.

6. Miscellaneous

The PRP Group's discharge permit, #96-11, with the Niagara County Sewer District #1 was renewed during this reporting period. The new discharge permit, #98-11 is included in the attachments. There were no changes in reporting requirements.

Conclusion

The work performed for the Site from September 1998 to March 1999 was reviewed and found to be in accordance with the approved O&M Manual for the Site.

Attachment A –Quarry Lake Level Plot versus Time

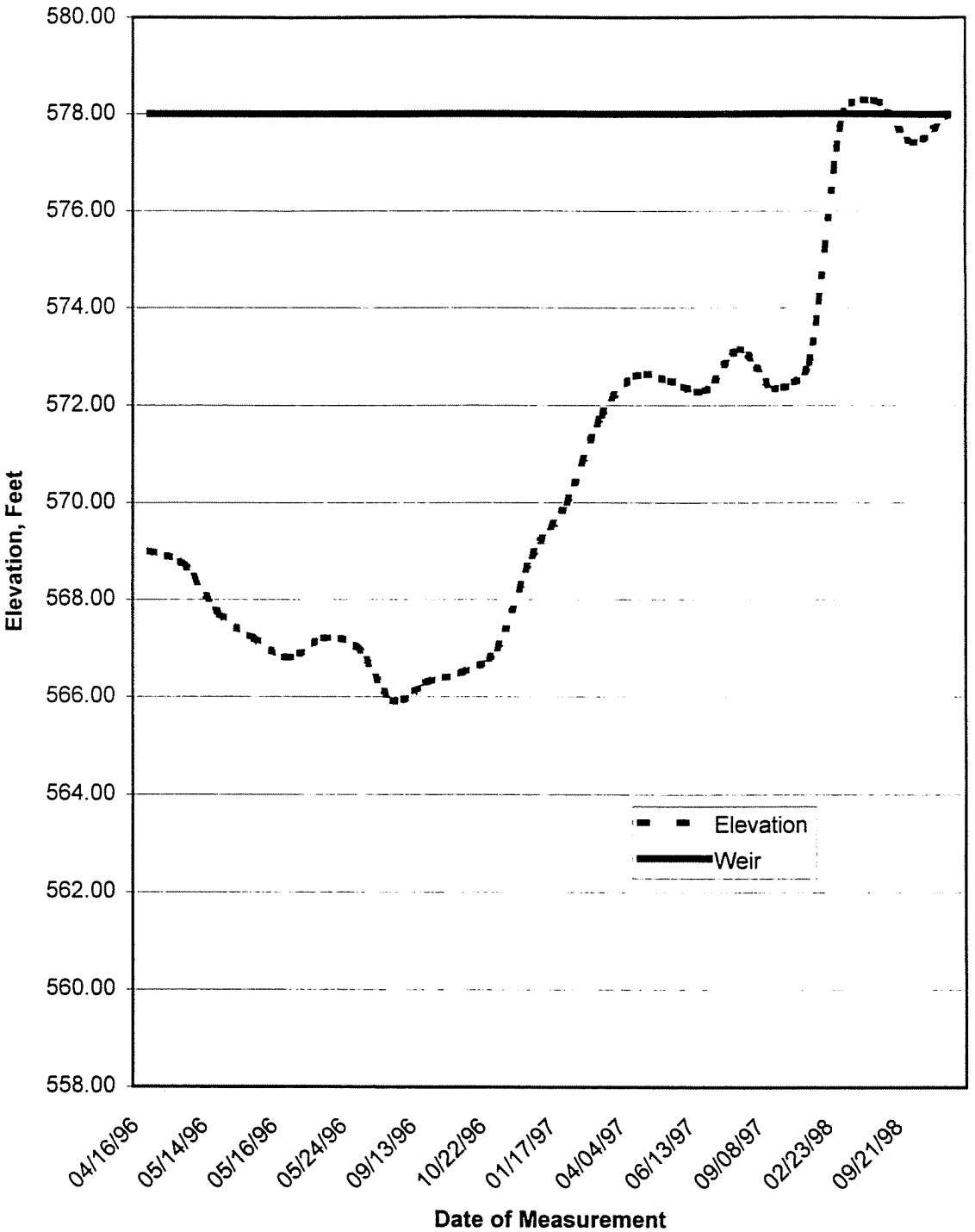
1 Quarry Lake Level - February 2, 1999

1 Quarry Lake Level - February 2, 1999

- Table A-1 Quarry Lake Level Plot versus Time
- Chart A-1 Quarry Lake Water Elevationsa

Table A-1 Frontier Chemical – Pendleton Site Quarry Lake Level Plot versus Time	
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

Chart A-1
Frontier Chemical - Pendleton Site
Quarry Lake Water Elevations



ATTACHMENT B

October 13, 1998

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

Subject: Analytical Sampling Results (9/24/94 Samples)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the September 24, 1998, monthly sampling event for discharge of collected groundwater from the pre-treatment system at the Pendleton Site. The sample taken on September 3, 1998 was not picked up by the laboratory and was discarded. Analytical results for this sampling event are compared against the Permit (#96-11) 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

DAILY FLOW DATA - PENDLETON SITE
SEPTEMBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
9/1/98	291268	158	avg.
9/2/98		158	avg.
9/3/98	291583	104	
9/4/98	291687	155	
9/5/98	291842	104	
9/6/98	291946	101	
9/7/98	292047	155	
9/8/98	292202	104	
9/9/98	292306	104	
9/10/98	292410	105	
9/11/98	292515	122	avg.
9/12/98		122	avg.
9/13/98		122	avg.
9/14/98	292881	102	
9/15/98	292983	155	
9/16/98	293138	104	
9/17/98	293242	156	
9/18/98	293398	181	avg.
9/19/98		181	avg.
9/20/98	293759	103	
9/21/98	293862	102	avg.
9/22/98	293964	121	avg.
9/23/98		121	
9/24/98	294206	104	
9/25/98	294310	104	
9/26/98	294414	104	
9/27/98	294518	158	
9/28/98	294676	157	
9/29/98	294833	102	
9/30/98	294935		
AVERAGE DAILY FLOW IN GALLONS		126	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(291583-291268)/2 or 158 gallons per day for data between 9/1/98 and 9/3/98

Frontier Chemical - Pendleton Site
Analytical Summary for WS 001
Permit # 96-11
Groundwater Discharge Point: D 002

287 717 Gallons Discharged Prior To 8/5/98

6 489 Gallons Since Last Report

132 Average Daily Flow Based on 49 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	9/24/98 * 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	0.003	
beta BHC	20.0	0.006	
delta BHC	10.0	0.010	
gamma BHC	10.0	0.003	
Heptachlor	8.0	0.022	
Aldrin	8.0	0.018	
Heptachlor Epoxide	9.0	0.009	
4,4-DDE	20.0	0.005	
Methoxychlor	18.0	0.007	
Metals	mg/L	mg/L	mg/L
Antimony	0.1	0.009	< 0.009
Boron	4.00	0.012	0.826
Chromium	5.33	0.005	0.007
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) Discontinue per April 14, 1997 Letter from F. Narrone to PRP Group

(a) Detected in blank

NA Not applicable

(*) Resampled date due to laboratory not picking up sample taken on 9/3/98

WASTE STREAM TECHNOLOGY, INC.
302 Grote Street
Buffalo, NY 14207
(716) 876-5290

Analytical Data Report

Report Date : 09/29/98
Group Numbers : 9801-1290, 1309

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

Site : Frontier Chemical - Pendelton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC II	WS45593	Aqueous	9/3/98	9/22/98	1300
GAC II	WS45647	Aqueous	9/24/98	9/25/98	1155
Trip Blank	WS45648	Aqueous	9/24/98	9/25/98	1155
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
624	2	Standard
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. (18th 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 indentification 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 (QC Limits) are indicated in the detection limit column.

Waste Stream Technology, Inc.

Wet Chemistry Result Report

Site : Frontier Chemical - Pendelton
Date Sampled : 9/03/98
Date Received : 9/22/98
Client ID : GAC II
Lab ID: WS45593

Group Number : 9801-1290
Matrix : Aqueous

Parameter	Units	Detection Limit	Result	Analysis Date	Analysis Method
Phenol	mg/l	0.005	< 0.005	9/25/98	EPA 420.1

Waste Stream Technology, Inc.

Metals Analysis Result Report

Site : Frontier Chemical - Pendelton
Date Sampled : 9/03/98
Date Received : 9/22/98

Group Number:9801-1290
Report Units : mg/L
Matrix :Aqueous

Lab ID Number	WS45593
Client ID	GAC II
Date Digested	9/29/98

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Boron by ICP	0.012	0.826	9/29/98	EPA 200.7
Antimony by GFAA	0.009	< 0.009	9/29/98	EPA 200.9
Chromium by ICP	0.005	0.007	9/29/98	EPA 200.7

Waste Stream Technology, Inc.
Wet Chemistry Result Report

Site : Frontier Chemical - Pendelton
Date Sampled : 9/24/98
Date Received : 9/25/98
Client ID : GAC II
Lab ID: WS45647

Group Number : 9801-1309
Matrix : Aqueous

Parameter	Units	Detection Limit	Result	Analysis Date	Analysis Method
TSS	mg/L	4.0	< 4.0	9/28/98	EPA 160.2
Cyanide	mg/L	0.005	< 0.005	9/29/98	EPA 335.2

Waste Stream Technology, Inc
Volatile Organics Analysis
40 CFR 136 Method 624

Site : Frontier Chemical - Pendelton
Date Sampled : 9/24/98
Date Received : 9/25/98

Group Number : 9801-1309
Report Units : ug/L
Matrix : Aqueous

	WST Lab ID	WS45647	
	Client ID	GAC II	
	Analysis Date	9/29/98	
Compound	Detection Limit/ QC Limits (%)	Result	Q
chloromethane	2.0	2.0	U
bromomethane	2.0	2.0	U
vinyl chloride	2.0	2.0	U
chloroethane	2.0	2.0	U
methylene chloride	2.8	2.8	U
trichlorofluoromethane	2.0	2.0	U
1,1-dichloroethene	1.0	1.0	U
1,1-dichloroethane	1.0	1.0	U
trans-1,2-dichloroethene	1.0	1.0	U
chloroform	1.0	1.0	U
1,2-dichloroethane	1.0	1.0	U
1,1,1-trichloroethane	1.0	1.0	U
carbon tetrachloride	1.0	1.0	U
bromodichloromethane	1.0	1.0	U
1,2-dichloropropane	1.0	1.0	U
cis-1,3-dichloropropene	1.0	1.0	U
trichloroethene	1.0	1.0	U
benzene	1.0	1.0	U
dibromochloromethane	1.0	1.0	U
trans-1,3-dichloropropene	1.0	1.0	U
1,1,2-trichloroethane	1.2	1.2	U
2-chloroethylvinyl ether	2.0	2.0	U
bromoform	1.0	1.0	U
tetrachloroethene	1.0	1.0	U
1,1,2,2-tetrachloroethane	1.0	1.0	U
toluene	1.0	1.0	U
chlorobenzene	1.0	1.0	U
ethylbenzene	1.0	1.0	U
1,3-dichlorobenzene	1.0	1.0	U
1,4-dichlorobenzene	1.0	1.0	U
1,2-dichlorobenzene	1.0	1.0	U
4-methyl-2-pentanone	5.0	5.0	U
1,2-Dichloroethane-d4 (%)	76 - 114	82	
Toluene-d8 (%)	88 - 110	90	
Bromofluorobenzene (%)	86 - 115	96	

Dilution Factor 1

Waste Stream Technology, Inc
Volatile Organics Analysis
40 CFR 136 Method 624

Site : Frontier Chemical - Pendelton
Date Sampled : 9/24/98
Date Received : 9/25/98

Group Number : 9801-1309
Report Units : ug/L
Matrix : Aqueous

	WST Lab ID	WS45648	
	Client ID	Trip Blank	
	Analysis Date	9/29/98	
Compound	Detection Limit/ QC Limits (%)	Result	Q
chloromethane	2.0	2.0	U
bromomethane	2.0	2.0	U
vinyl chloride	2.0	2.0	U
chloroethane	2.0	2.0	U
methylene chloride	2.8	2.8	U
trichlorofluoromethane	2.0	2.0	U
1,1-dichloroethene	1.0	1.0	U
1,1-dichloroethane	1.0	1.0	U
trans-1,2-dichloroethene	1.0	1.0	U
chloroform	1.0	1.0	U
1,2-dichloroethane	1.0	1.0	U
1,1,1-trichloroethane	1.0	1.0	U
carbon tetrachloride	1.0	1.0	U
bromodichloromethane	1.0	1.0	U
1,2-dichloropropane	1.0	1.0	U
cis-1,3-dichloropropene	1.0	1.0	U
trichloroethene	1.0	1.0	U
benzene	1.0	1.0	U
dibromochloromethane	1.0	1.0	U
trans-1,3-dichloropropene	1.0	1.0	U
1,1,2-trichloroethane	1.2	1.2	U
2-chloroethylvinyl ether	2.0	2.0	U
bromoform	1.0	1.0	U
tetrachloroethene	1.0	1.0	U
1,1,2,2-tetrachloroethane	1.0	1.0	U
toluene	1.0	1.0	U
chlorobenzene	1.0	1.0	U
ethylbenzene	1.0	1.0	U
1,3-dichlorobenzene	1.0	1.0	U
1,4-dichlorobenzene	1.0	1.0	U
1,2-dichlorobenzene	1.0	1.0	U
4-methyl-2-pentanone	5.0	5.0	U
1,2-Dichloroethane-d4 (%)	76 - 114	81	
Toluene-d8 (%)	88 - 110	87	#
Bromofluorobenzene (%)	86 - 115	94	

Dilution Factor 1

Waste Stream Technology, Inc
VOCs Method Blank Analysis
40 CFR 136 Method 624

Site : Frontier Chemical - Pendelton
Date Sampled : NA
Date Received : NA

Group Number : 9801-1309
Report Units : ug/L

	WST Lab ID	IB092998	
	Client ID	NA	
	Analysis Date	9/29/98	
Compound	Detection Limit/ QC Limits (%)	Result	Q
chloromethane	2.0	2.0	U
bromomethane	2.0	2.0	U
vinyl chloride	2.0	2.0	U
chloroethane	2.0	2.0	U
methylene chloride	2.8	2.8	U
trichlorofluoromethane	2.0	2.0	U
1,1-dichloroethene	1.0	1.0	U
1,1-dichloroethane	1.0	1.0	U
trans-1,2-dichloroethene	1.0	1.0	U
chloroform	1.0	1.0	U
1,2-dichloroethane	1.0	1.0	U
1,1,1-trichloroethane	1.0	1.0	U
carbon tetrachloride	1.0	1.0	U
bromodichloromethane	1.0	1.0	U
1,2-dichloropropane	1.0	1.0	U
cis-1,3-dichloropropene	1.0	1.0	U
trichloroethene	1.0	1.0	U
benzene	1.0	1.0	U
dibromochloromethane	1.0	1.0	U
trans-1,3-dichloropropene	1.0	1.0	U
1,1,2-trichloroethane	1.2	1.2	U
2-chloroethylvinyl ether	2.0	2.0	U
bromoform	1.0	1.0	U
tetrachloroethene	1.0	1.0	U
1,1,2,2-tetrachloroethane	1.0	1.0	U
toluene	1.0	1.0	U
chlorobenzene	1.0	1.0	U
ethylbenzene	1.0	1.0	U
1,3-dichlorobenzene	1.0	1.0	U
1,4-dichlorobenzene	1.0	1.0	U
1,2-dichlorobenzene	1.0	1.0	U
4-methyl-2-pentanone	5.0	5.0	U
1,2-Dichloroethane-d4 (%)	76 - 114	87	
Toluene-d8 (%)	88 - 110	89	
Bromofluorobenzene (%)	86 - 115	92	

Dilution Factor 1

IB Denotes Instrument Blank

NA Denotes Not Applicable

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

9801-1290

CHAIN OF CUSTODY RECORD

PROJECT NO: E 414 SITE NAME: Frontier Pendelton

SAMPLERS (SIGNATURE): Jam. Reed

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Phenolics	Br, Cr & Sb	CN	O.T.S.S.	V.O.A. 624	PRESERVATIVES	REMARKS
9I 03608	9/3 96	10AM	✓		H_2O	GAC II	1-L Amber ①	✓					H_2SO_4	WS45593
9I 03609							1-L ①		✓				HNO_3	
9I 03610							1-L ①			✓			NaOH	
9I 03611							500ml ①				✓			
9I 03612							40ml ②					✓	HCl	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
	9/12 10AM			9/12/96 1740	
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME _____

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

WASTESTREAM TECHNOLOGY

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

9801-1309

PROJECT NO: Frontier Pendelton
SITE NAME:
SAMPLERS (SIGNATURE): James Reed

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CON-TAINERS	CN-	T.S.S	V.O.A	VOA		
9I 24610	9/24/98	10:00 am	✓		H_2O	GAC II	1-L	✓					
9I 24611	✓	✓	✓		"	"	1-500ml		✓				
9I 24612	✓	✓	✓		"	"	2-40-ml			✓			
9I 24613	✓	✓	✓		"	"	1-40 ml				✓		

...ples + Blank WS45648

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
James Reed	9/25/98 10:30 am	[signature]	[signature]	9/25/98 11:55	[signature]
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 10 BD

LAB USE: REFRIGERATOR # ______ SHELF #

November 5, 1998

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

Subject: Analytical Sampling Results (10/8/98 Samples)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the October 10, 1998, monthly 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 (#96-11) 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

DAILY FLOW DATA - PENDLETON SITE
OCTOBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
10/1/98	295038	135	
10/2/98	295173	105	
10/3/98	295278	105	
10/4/98	295383	104	
10/5/98	295487	104	
10/6/98	295591	117	
10/7/98		117	
10/8/98	295825	203	
10/9/98	296028	106	
10/10/98	296134	102	
10/11/98	296236	107	
10/12/98	296343	103	
10/13/98	296446	104	
10/14/98	296550	106	
10/15/98	296656	107	
10/16/98	296763	79	
10/17/98		79	
10/18/98	296921	105	
10/19/98	297026	211	
10/20/98	297237	106	
10/21/98	297343	103	
10/22/98	297446	104	
10/23/98	297550	54	
10/24/98		54	
10/25/98		54	
10/26/98	297711	105	
10/27/98	297816	101	
10/28/98	297917	100	
10/29/98	298017	53	
10/30/98		53	
10/31/98	298123		
AVERAGE DAILY FLOW IN GALLONS		103	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =Flow between data points divided by days of missing data.
avg =(295591-295825)/2 or 117 gallons per day for data between 10/6/98 and 10/8/98.

Frontier Chemical - Pendleton Site
Analytical Summary for WS 001
Permit # 96-11
Groundwater Discharge Point: D 002

294,206 Gallons Discharged Prior To 9/24/98
1,619 Gallons Since Last Report
116 Average Daily Flow Based on 14 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		10/8/98 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	0.003		
beta BHC	20.0	0.006		
delta BHC	10.0	0.010		
gamma BHC	10.0	0.003		
Heptachlor	8.0	0.022		
Aldrin	8.0	0.018		
Heptachlor Epoxide	9.0	0.009		
4,4-DDE	20.0	0.005		
Methoxychlor	18.0	0.007		
Metals	mg/L	mg/L		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.811
Chromium	5.33	0.005	<	0.005
Cyanide(T)	2.0	0.005		0.006
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) Discontinue per April 14, 1997 Letter from F. Narrone to PRP Group.
(a) Detected in blank
NA Not applicable

WASTE STREAM TECHNOLOGY, INC.
302 Grote Street
Buffalo, NY 14207
(716) 876-5290

Analytical Data Report
Report Date : 10/26/98
Group Number : 9801-1383

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

Site : Frontier - Pendelton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC II	WS46135	Aqueous	10/8/98	10/9/98	1300
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 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. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Metals Analysis Result Report

Site: FRONTIER-PENDELTON
Date Sampled: 10/08/98
Date Received: 10/09/98

Group Number: 9801-1383
Report Units: mg/L
Matrix: AQUEOUS

Lab ID Number	WS46135
Client ID	GAC II
Date Digested	10/14/98

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Boron by ICP	0.012	0.811	10/14/98	EPA 200.7
Chromium by ICP	0.005	< 0.005	10/14/98	EPA 200.7
Antimony by GFAA	0.009	< 0.009	10/19/98	EPA 200.9

Waste Stream Technology, Inc.

Analysis Result Report

Site: FRONTIER-PENDELTON
Date Sampled: 10/08/98
Date Received: 10/09/98

Group Number: 9801-1383
Report Units: mg/L
Matrix: AQUEOUS

	Lab ID Number:	WS46135		
	Client ID:	GAC II		
Analyte	**Detection Limit**	**Result**	**Date Analyzed**	**Analysis Method**
Total Recoverable Phenol	0.005	< 0.005	10/13/98	EPA 420.1
Cyanide in Water	0.005	0.006	10/21/98	EPA 335.2

Waste Stream Technology, Inc.

Total Suspended Solids
EPA 160.2

Site: FRONTIER-PENDELTON
Date Sampled: 10/08/98
Date Received: 10/09/98

Group Number: 9801-1383
Report Units: mg/L
Matrix: AQUEOUS

WST Lab ID	Client ID	Analysis Date	Detection Limit	Result
WS46135	GAC II	10/13/98	4.0	< 4.0

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

9801-1383

CHAIN OF CUSTODY RECORD

PROJECT NO: SITE NAME: Frontier - Pendelton

SAMPLERS (SIGNATURE): James Reed

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Phenolics	Br,Cr, Sb	CN	T.S.S			PRESERVATIVES	REMARKS
10J 08614	10/8/90	10Am	✓		H_2O	GAC II	1-L Amber	✓						H_2SO_4	WS46 P.V. 10/12/90 135
10J 08615	"	"	✓		✓	✓			✓					HNO_3	
10J 08616	"	"	✓		✓	✓				✓				NaOH	
10J 08617	"	"	✓		✓	✓					✓			Ø	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
[signature]	10/9 1200	[signature]	[signature]	10/9	[signature]
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 10 BD

LAB U REFRIGERATOR # _____ SHELF # _____ GROUP # _____ DUE DATE _____

December 10, 1998

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

Subject: Analytical Sampling Results (11/5/98 Samples)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the November 5, 1998, monthly 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 (#96-11) 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

Frontier Chemical - Pendleton Site
Analytical Summary for WS 001
Permit # 96-11
Groundwater Discharge Point: D 002

295,825 Gallons Discharged Prior To 10/8/98
2,788 Gallons Since Last Report
57 Average Daily Flow Based on 23 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	11/5/98 * 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	0.003	
beta BHC	20.0	0.006	
delta BHC	10.0	0.010	
gamma BHC	10.0	0.003	
Heptachlor	8.0	0.022	
Aldrin	8.0	0.018	
Heptachlor Epoxide	9.0	0.009	
4,4-DDE	20.0	0.005	
Methoxychlor	18.0	0.007	
Metals	**mg/L**	**mg/L**	**mg/L**
Antimony	0.1	0.009	< 0.009
Boron	4.00	0.012	0.725
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) Discontinue per April 14, 1997 Letter from F. Narrone to PRP Group.
(a) Detected in blank
NA Not applicable
(*) Resampled date due to laboratory not picking up sample taken on 9/3/98

DAILY FLOW DATA - PENDLETON SITE
NOVEMBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
11/1/98	298229	106	
11/2/98	298335	53	
11/3/98	298388	113	avg.
11/4/98		113	avg.
11/5/98	298613	106	Sampled
11/6/98	298719	71	avg.
11/7/98		71	avg.
11/8/98		71	avg.
11/9/98	298933	107	
11/10/98	299040	105	
11/11/98	299145	107	
11/12/98	299252	108	
11/13/98	299360	53	
11/14/98	299413	105	
11/15/98	299518	107	
11/16/98	299625	53	
11/17/98	299678	107	
11/18/98	299785	81	avg.
11/19/98		81	avg.
11/20/98	299947	105	
11/21/98	300052	82	avg.
11/22/98		82	avg.
11/23/98	300215	53	
11/24/98	300268	53	
11/25/98	300321	105	
11/26/98	300426	106	
11/27/98	300532	53	
11/28/98	300585	106	
11/29/98	300691	52	
11/30/98	300743		
AVERAGE DAILY FLOW IN GALLONS		87	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(298613-298388)/2 or 113 gallons per day for data between 11/3/98 and 11/5/98

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report

Report Date : 11/23/98
Group Number : 9801-1532

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

Site : Frontier - Pendelton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC II	WS46988	Aqueous	11/5/98	11/6/98	1220
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 CDHS ELAP #2189

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. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: FRONTIER-PENDELTON
Date Sampled: 11/05/98
Date Received: 11/06/98

Group Number: 9801-1532
Report Units: mg/L
Matrix: AQUEOUS

Lab ID Number	WS46988
Client ID	GAC II
Date Digested	11/19/98

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	< 0.009	11/20/98	EPA 200.9
Chromium by ICP	0.005	< 0.005	11/19/98	EPA 200.7
Boron by ICP	0.012	0.725	11/19/98	EPA 200.7

Waste Stream Technology, Inc.
Total Suspended Solids
EPA 160.2

Site: FRONTIER-PENDELTON
Date Sampled: 11/05/98
Date Received: 11/06/98

Group Number: 9801-1532
Report Units: mg/L
Matrix: AQUEOUS

WST Lab ID	Client ID	Analysis Date	Detection Limit	Result
WS46988	GAC II	11/09/98	4.0	< 4.0

Waste Stream Technology, Inc.
Total Recoverable Phenol
EPA 420.1

Site: FRONTIER-PENDELTON
Date Sampled: 11/05/98
Date Received: 11/06/98

Group Number: 9801-1532
Report Units: mg/L
Matrix: AQUEOUS

WST Lab ID	Client ID	Analysis Date	Detection Limit	Result
WS46988	GAC II	11/18/98	0.005	< 0.005

Waste Stream Technology, Inc.
Cyanide in Water
EPA 335.2

Site: FRONTIER-PENDELTON
Date Sampled: 11/05/98
Date Received: 11/06/98

Group Number: 9801-1532
Report Units: mg/L
Matrix: AQUEOUS

WST Lab ID	Client ID	Analysis Date	Detection Limit	Result
WS46988	GAC II	11/17/98	0.005	< 0.005

WASTE STREAM TECHNOLOGY

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

olin

9901-1[illegible]

CHAIN OF CUSTODY RECORD

PROJECT NO: E 414 SITE NAME: Frontier - Pendelton

SAMPLERS (SIGNATURE): James Reed

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Phenolics	BRCr Sb	CN	T.S.S.				PRESERVATIVES	REMARKS
IIK 05618	11/5/98	10[illegible]	✓		H_2O	GAC II	1-L Amb	✓							H_2SO_4	[illegible]98.3
IIK 05619	"	"	✓		"	"	1-L		✓						HNO_3	~~999~~ TC
IIK 05620	"	"	✓		"	"	1-L			✓					NaOH	~~990~~ TC
IIK 05621	"	"	✓		"	"	1-500ml				✓				Ø	991 TC

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
James Reed	11/6/98 11:10A			11/9 12:20	
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 10BD

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

FILE COPY

January 6,1999

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

Subject: Analytical Sampling Results (12/4/98 Samples)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the December 4, 1998, monthly 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 (#96-11) 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

Distribution: Niagara County Sewer District Monthly Report

Frank Nerone Original Copy of all documents; express mailed for next day delivery.
Dan Kummer Copy of all information; include Dan's copy with Frank Nerrone Copy.
PRP Group from Distribution labels; send copy of cover letter, daily flow data and analytical summary via regular mail.

Tom Morris
IBM Corporation
Building #2
Route #100
Somers, NY 10589
Phone: 914-766-2739
FAX: 914-766-2824

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2030 Dow Center
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David Cook, Esq.
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Rochester, NY 14604
Phone: 716-263-1596
FAX: 716-263-1600

Dennis McCanna
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Tonawanda, NY 14151-0646
Phone: 716-j874-5681
FAX: 716-874-4440

Ted Hadzi-Antich, Esq.
Key Center
Suite 1230
50 Fountain Plaza
Buffalo, NY 14202-2212
Phone: 716-852-3300
FAX: 716-852-4174

David Paley
AlliedSignal, Inc.
101 Columbia Road
P.O. Box 1139
Morristown, NJ 07962-1139
Phone: 201-455-3302
FAX: 201-455-4835

Mark Piazza
Elf AtoChem
2000 Market Street
Philadelphia, PA 19103
Phone: 215-419-5884
FAX: 215-419-5670

Bill Witt
Radian International, LLC
304 West Wackerly Street
Midland, MI 48640
Phone: 517-636-2264
FAX: 517-636-8612

Frank Nerone, Chief Operator
Niagara County Sewer District #1
7346 Liberty Drive
Niagara Falls, NY 14304
Phone: 716-693-0001
FAX: 726-693-8759

Dan Kummer, Laboratory Director
Niagara County Sewer District #1
7346 Liberty Drive
Niagara Falls, NY 14304
Phone: 716-693-0001
FAX: 716-693-8759

Federal Express/Airborne R.Y36.1008.1321

DAILY FLOW DATA - PENDLETON SITE
DECEMBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
12/1/98	300861	114	avg.
12/2/98		114	avg.
12/3/98	301088	69	Sampled
12/4/98	301157	93	
12/5/98	301250	108	avg.
12/6/98		108	avg.
12/7/98	301465	107	
12/8/98	301572	57	
12/9/98	301629	107	
12/10/98	301736	53	
12/11/98	301789	106	avg.
12/12/98		106	avg.
12/13/98	302001	54	
12/14/98	302055	53	
12/15/98	302108	53	
12/16/98	302161	105	
12/17/98	302266	53	
12/18/98	302319	106	
12/19/98	302425	106	
12/20/98	302531	53	
12/21/98	302584	105	
12/22/98	302689	394	
12/23/98	303083	220	
12/24/98	303303	110	avg.
12/25/98		110	avg.
12/26/98	303523	107	
12/27/98	303630	53	
12/28/98	303683	105	
12/29/98	303788	52	
12/30/98	303840	108	
12/31/98	303948		
AVERAGE DAILY FLOW IN GALLONS		103	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(301088-300861)/2 or 114 gallons per day for data between 12/1/98 and 12/3/98

DAILY FLOW DATA - PENDLETON SITE
DECEMBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
12/1/98	300861	114	avg.
12/2/98		114	avg.
12/3/98	301088	69	Sampled
12/4/98	301157	93	
12/5/98	301250	108	avg.
12/6/98		108	avg.
12/7/98	301465	107	
12/8/98	301572	57	
12/9/98	301629	107	
12/10/98	301736	53	
12/11/98	301789	106	avg.
12/12/98		106	avg.
12/13/98	302001	54	
12/14/98	302055	53	
12/15/98	302108	53	
12/16/98	302161	105	
12/17/98	302266	53	
12/18/98	302319	106	
12/19/98	302425	106	
12/20/98	302531	53	
12/21/98	302584	105	
12/22/98	302689	394	
12/23/98	303083	220	
12/24/98	303303	110	avg.
12/25/98		110	avg.
12/26/98	303523	107	
12/27/98	303630	53	
12/28/98	303683	105	
12/29/98	303788	52	
12/30/98	303840	108	
12/31/98	303948		
AVERAGE DAILY FLOW IN GAL		103	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
TOTAL GALLONS		0	

avg =flow between data points divided by days of missing data
avg =(301088-300861)/2 or 114 gallons per day for data between 12/1/98 and 12/3/98

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report

Report Date : 12/18/98
Group Number : 9801-1687

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

Site : Frontier-Pendelton

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
GAC II	WS47803	Aqueous	12/04/98	12/04/98	1300
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 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 followong 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. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

Wet Chemistry Analyses

Site: Frontier-Pendelton
Date Sampled: 12/04/98
Date Received: 12/04/98

Group Number: 9801-1687
Matrix: Aqueous

WST ID: WS47803
Client ID GAC II

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Cyanide in Water	EPA 335.2	0.005	0.007	mg/L	12/09/98
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	12/08/98
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	12/11/98

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier-Pendelton
Date Sampled: 12/04/98
Date Received: 12/04/98

Group Number: 9801-1687
Units: mg/L
Matrix: Aqueous

WST ID: WS47803
Client ID: GAC II
Digestion Date: 12/10/98

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	12/15/98	EPA 200.9
Boron by ICP	0.012	0.765	12/16/98	EPA 200.7
Chromium by ICP	0.005	Not detected	12/16/98	EPA 200.7

WASTE STREAM TECHNOLOGY

WASTE STREAM TECHNOLOGY

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

CHAIN OF CUSTODY RECORD

PROJECT NO: E 414   SITE NAME: Frontier ...

SAMPLERS (SIGNATURE): ...

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Phenolics	Cr, Cd, Sn	CN	TSS	Pest	VOA	Triptophane	PRESERVATIVES	REMARKS
12L 03622	12/4/90		✓		H_2O	GAC II	1 L Amber	✓							H_2SO_4	WS...
12L 03623	"		✓		"	"	500 ML		✓						HNO_3	
12L 03624	"		✓		"	"	1 L			✓					NaOH	
12L 03625	"		✓		"	"	1 500 ml				✓				Ø	
12L 03626	"		✓		"	"	1-L Amber					✓			Ø	Method 608
12L 03627	"		✓		"	"	2 40 ml VOA						✓		HCL	Method 624
12L 03628	"		✓		"	"	1-40 ml							✓	Ø	WS47812

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
[signature]	12/4/90 10 A	[signature]	[signature]	12/4/90 1300	[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

February 10, 1999

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

Subject: Analytical Sampling Results (1/8/99 Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the January 8, 1998, monthly 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 (#96-11) 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

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

301 088 Gallons Discharged Prior To 12/4/98

3,546 Gallons Since Last Report

96 Average Daily Flow Based on 37 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits		1/8/99 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	0.003		
beta BHC	20.0	0.006		
delta BHC	10.0	0.010		
gamma BHC	10.0	0.003		
Heptachlor	8.0	0.022		
Aldrin	8.0	0.018		
Heptachlor Epoxide	9.0	0.009		
4,4-DDE	20.0	0.005		
Methoxychlor	18.0	0.007		
Metals	mg/L	mg/L		mg/L
Antimony	0.1	0.009	<	0.009
Boron	4.00	0.012		0.691
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) Discontinue per April 14, 1997 Letter from F. Narrone to PRP Group

(a) Detected in blank

NA Not applicable

DAILY FLOW DATA - PENDLETON SITE
DECEMBER 1998

DATE	TOTALIZER READING	DAILY FLOW	
12/1/98	300861	114	avg.
12/2/98		114	avg.
12/3/98	301088	69	Sampled
12/4/98	301157	93	
12/5/98	301250	108	avg.
12/6/98		108	avg.
12/7/98	301465	107	
12/8/98	301572	57	
12/9/98	301629	107	
12/10/98	301736	53	
12/11/98	301789	106	avg.
12/12/98		106	avg.
12/13/98	302001	54	
12/14/98	302055	53	
12/15/98	302108	53	
12/16/98	302161	105	
12/17/98	302266	53	
12/18/98	302319	106	
12/19/98	302425	106	
12/20/98	302531	53	
12/21/98	302584	105	
12/22/98	302689	394	
12/23/98	303083	220	
12/24/98	303303	110	avg.
12/25/98		110	avg.
12/26/98	303523	107	
12/27/98	303630	53	
12/28/98	303683	105	
12/29/98	303788	52	
12/30/98	303840	108	
12/31/98	303948		
AVERAGE DAILY FLOW IN GALLONS		103	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(301088-300861)/2 or 114 gallons per day for data between 12/1/98 and 12/3/98

DAILY FLOW DATA - PENDLETON SITE
JANUARY 1999

DATE	TOTALIZER READING	DAILY FLOW	
1/1/99		80	avg.
1/2/99		80	avg.
1/3/99	304161	54	
1/4/99	304215	53	
1/5/99	304268	108	
1/6/99	304376	45	
1/7/99	304421	0	
1/8/99	304421	213	
1/9/99	304634	0	Sampled
1/10/99	304634	108	
1/11/99	304742	108	
1/12/99	304850	54	
1/13/99	304904	108	
1/14/99	305012	83	avg.
1/15/99		83	avg.
1/16/99	305178	109	
1/17/99	305287	105	
1/18/99	305392	107	
1/19/99	305499	109	
1/20/99	305608	107	
1/21/99	305715	51	
1/22/99	305766	105	
1/23/99	305871	348	avg.
1/24/99		348	avg.
1/25/99	306567	107	
1/26/99	306674	53	
1/27/99	306727	106	
1/28/99	306833	54	
1/29/99	306887	80	avg.
1/30/99		80	avg.
1/31/99	307047		
AVERAGE DAILY FLOW IN GALLONS		102	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(304161-303840)/4 or 80 gallons per day for data between 12/30/98 and 1/3/99

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report

Report Date : 01/22/99
Group Number : 9901-023

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 II	WS48623	Aqueous	01/08/99	01/08/99	1300
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. (18th 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: 01/08/99
Date Received: 01/08/99

Group Number: 9901-023
Units: mg/L
Matrix: Aqueous

WST ID: WS48623
Client ID: GAC II
Digestion Date: 01/11/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	01/19/99	EPA 200.9
Boron by ICP	0.012	0.691	01/19/99	EPA 200.7
Chromium by ICP	0.005	Not detected	01/19/99	EPA 200.7

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier-Pendleton
Date Sampled: 01/08/99
Date Received: 01/08/99

Group Number: 9901-023
Matrix: Aqueous

WST ID: WS48623
Client ID GAC II

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Suspended Solids	EPA 160.2	4.0	Not detected	mg/L	01/13/99
Cyanide in Water	EPA 335.2	0.005	0.005	mg/L	01/20/99
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	01/18/99

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

9901-093

CHAIN OF CUSTODY RECORD

PROJECT NO: E414
SITE NAME: Frontier Pendleton
SAMPLERS (SIGNATURE): Reggie Halloway

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	BNA	Phenols	Cyanide	TSS				PRESERVATIVES	REMARKS
9A08 629	1-8-99	9AM	✓		H_2O	GAC II	1L	1							HNO_3	# WS48623
9A08 630	"	"	✓				1L		1						H_2SO_4	
9A08 631	"	"	✓				1L			1					NaOH	
9A08 632	"	"	✓				500ml				1				[illegible]	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
Reggie Halloway	1-8-99	[illegible]	[illegible]	[illegible]	[illegible]
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
					[illegible]

SPECIAL INSTRUCTIONS:

TURNAROUND TIME [illegible]

LAB REFRIGERATOR # ______ SHELF # ______ GROUP # ______ DUE DATE ______

FILE COPY

March 11, 1999

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

Subject: Analytical Sampling Results (2/4/99 Sample)
Groundwater Discharge Through Pre-Treatment System
Pendleton (Frontier Chemical) Site

Dear Mr. Nerone:

Enclosed for your review are analytical results from the February 4, 1999, monthly 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 stated permit 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
cc: D. Kummer
Pendleton Site Technical Committee

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

304,634 Gallons Discharged Prior To 1/8/99
2,572 Gallons Since Last Report
95 Average Daily Flow Based on 27 days Between Samples

Parameters Treatment System Discharge	Permit Limit GPD	Detection Limits	2/5/99 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	0.003	
beta BHC	20.0	0.006	
delta BHC	10.0	0.010	
gamma BHC	10.0	0.003	
Heptachlor	8.0	0.022	
Aldrin	8.0	0.018	
Heptachlor Epoxide	9.0	0.009	
4,4-DDE	20.0	0.005	
Methoxychlor	18.0	0.007	
Metals	mg/L	mg/L	mg/L
Antimony	0.1	0.009	< 0.009
Boron	4.00	0.012	0.581
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	5.200

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

DAILY FLOW DATA - PENDLETON SITE
FEBRUARY 1999

DATE	TOTALIZER READING	DAILY FLOW	
2/1/99	307101	51	
2/2/99	307152	54	
2/3/99	307206	512	avg.
2/4/99		512	Sampled
2/5/99	308229	441	
2/6/99	308670	364	avg.
2/7/99		364	avg.
2/8/99	309397	331	
2/9/99	309728	372	
2/10/99	310100	373	
2/11/99	310473	371	avg.
2/12/99		371	avg.
2/13/99		371	avg.
2/14/99	311585	337	
2/15/99	311922	272	
2/16/99	312194	273	
2/17/99	312467	275	
2/18/99	312742	319	
2/19/99	313061	285	
2/20/99	313346	224	
2/21/99	313570	173	
2/22/99	313743	218	
2/23/99	313961	165	
2/24/99	314126	109	
2/25/99	314235	165	
2/26/99	314400	135	avg.
2/27/99		135	avg.
2/28/99	314670		
AVERAGE DAILY FLOW IN GALLONS		280	

	= DRY VAULT GROUNDWATER RELIEF		
			gallons
			gallons
			gallons
			gallons
	TOTAL GALLONS	0	

avg =flow between data points divided by days of missing data
avg =(308229-307206)/2 or 80 gallons per day for data between 2/3/99 and 2/5/99

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report

Report Date : 02/19/99
Group Number : 9901-161

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 II	WS49332	Aqueous	02/04/99	02/05/99	12:20
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 CDHS ELAP #2189

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. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.
Wet Chemistry Analyses

Site: Frontier - Pendelton
Date Sampled: 02/04/99
Date Received: 02/05/99

Group Number: 9901-161
Matrix: Aqueous

WST ID: WS49332
Client ID GAC II

Analysis	Method Reference	Detection Limit	Result	Units	Date Analyzed
Total Suspended Solids	EPA 160.2	4.0	5.2	mg/L	02/09/99
Cyanide in Water	EPA 335.2	0.005	0.005	mg/L	02/15/99
Total Recoverable Phenol	EPA 420.1	0.005	Not detected	mg/L	02/11/99

Waste Stream Technology, Inc.
Metals Analysis Result Report

Site: Frontier - Pendelton
Date Sampled: 02/04/99
Date Received: 02/05/99

Group Number: 9901-161
Units: mg/L
Matrix: Aqueous

WST ID: WS49332
Client ID: GAC II
Digestion Date: 02/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Antimony by GFAA	0.009	Not detected	02/19/99	EPA 200.9
Boron by ICP	0.012	0.581	02/11/99	EPA 200.7
Chromium by ICP	0.005	Not detected	02/11/99	EPA 200.7

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

9901-161

CHAIN OF CUSTODY RECORD

PROJECT NO: E 414
SITE NAME: Frontier Pendleton
SAMPLERS (SIGNATURE): Reggie Hathaway

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	BrCrSb	Phenols	Cyanide	TSS				PRESERVATIVES	REMARKS
9B04 633	2-4 99	1000	✓		H_2O	GAC II	1 L	1							HNO_3	WS49-332
9B04 634	"	"	✓		"	"	1L		1						H_2SO_4	WS49332
9B04 635	"	"	✓		"	"	1L			1					NaOH	
9B04 636	"	"	✓		"	"	500ml				1				—	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
Reggie Hathaway	2/5 11:30	[illegible signature]	[illegible signature]	[illegible] 12:20	[illegible signature]
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME ______

LAB . REFRIGERATOR # ______ SHELF # ______ GROUP # ______ DUE DATE ______

Distribution:

Frank Nerrone Original Copy of all documents; express mailed for next day delivery.
Dan Commer Copy of all information; include Dan's copy with Frank Nerrone Copy.
PRP Group from Distribution labels; send copy of cover letter, daily flow data and analytical summary via regular mail

B-2 Niagara County Sewer District #1 Permit

7346 Liberty Drive
Niagara Falls, NY 14304-3762
Phone 716-693-0001
FAX 716-693-8759

NIAGARA COUNTY SEWER DISTRICT NO. 1

WATER POLLUTION CONTROL CENTER

January 11, 1999

Pendleton Site PRP Group
c/o Olin Corporation
P.O. Box 248
Charleston, TN 37310-0248

ATTN: Mr. John Burns

Re: PRP Group Industrial Waste Permit
Pendleton (Frontier Chemical) Site

Gentlemen:

Enclosed is a renewed permit for the discharge of contaminated groundwater.

Please review the permit carefully. If there are any questions, please feel free to contact me.

Very truly yours,

NIAGARA COUNTY SEWER DISTRICT #1

Frank A. Nerone, P.E.
Chief Operator

FAN/dm
IPDIX/IWPFCG9811

Enclosure

Niagara County Sewer District #1

Industrial Waste Permit

Industrial User: Pendleton Site PRP Group
(Permittee)

Division Name (if Applicable): c/o Olin Corporation

Mailing Address: P.O. Box 248
Street or P.O. Box

Charleston, TN 37310-0248
City, State and Zip Code

Site Address: Pendleton Site Townline Road
Street Address

Pendleton, New York
City, State

The above Industrial User is authorized to discharge contaminated groundwater to the Niagara County Sewer District #1 sewer system in compliance with the District's Sewer Use Law, Local Law No.1, Resolution No. 7-94, any applicable provisions of Federal or State law or regulation, and in accordance with discharge points(s), effluent limitations, monitoriing requirements, and other conditions set forth herein.

Effective Date: August 28, 1998

Expiration Date: August 28, 2000

(Application for renewal shall be submitted 90 days prior to expiration)

District Permit No. 98-11

Date: 1/11/99 Signed: _____
(Authorized Signature)

Schedule A - Listing of Discharged Wastestreams

Industry Name: Pendleton (Frontier Chemical) Site
Groundwater Remediation

The following wastestreams are discharged to sanitary sewer system tributary of Niagara County Sewer District #1.

Waste-Streams	Nature Of Waste	Volume gallons per day	Discharge Point
WS 001	Groundwater Remediation	250	D 002

PART I - WASTEWATER DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

Industry Name: Pendleton (Frontier Chemical) Site
Sample Point A:
Sample Point: Groundwater Pump Station Discharge

Description : Contaminated Groundwater

Parameter	Discharge Limitations(1)	Monitoring Requirements: Sampling Frequency	Sample Type
Flow		Continuous	
a.) Groundwater Remediation	2500 GPD, Daily Maximum		
Pollutants	**Discharge Limit**		
624	0.100 mg/L (Sum of all EPA 624 cmpds.)	Semi-Annual	24C(2)
Antimony	0.1 mg/L	Monthly	24C
Boron	4.0 mg/L	Monthly	24C
Chromium	5.33 mg/L	Monthly	24C
Cyanide (T)	2.0 mg/L	Monthly	24C
Total Phenolics (4AAP)	Surveillance Only	Monthly	
Total Suspended Solids	300 mg/L	Monthly	24C

These Limitations shall be effective immediately.

Notes:

(1) All other limitations as set forth in the District's Sewer Use Law shall also apply.

(2) 24-hour composite samples for volatile (624) organics to consist of a minimum of four (4) grabs within a 24-hour period. (See Sampling Measurement & Analytical Guidelines, Section 9, Paragraph 2.)

(3) Pesticides shall be analyzed by Method 608. [redacted]

PART II - SPECIAL CONDITIONS/COMPLIANCE SCHEDULE

1. Compliance Schedules: If additonal pretreatment and/or operation and maintenance are required to meet discharge limitation and/or Pretreatment Regulations, the User will immediately advise District of the shortest schedule by which the User will provide such additional pretreatment or reduction in flow discharged. The completion date in this schedule shall not be later than the compliance date established for any applicable Pretreatment Regulations.

PART III - REPORTING REQUIREMENTS

1. The Industrial User shall notify the District immediately upon any accidental or slug discharge to the sanitary sewer system. Formal written notification discussing circumstances of the event and remedies to prevent recurrence shall be submitted to the District within 3 days of occurrence.

2. The Industrial User shall notify the District and apply for a revised permit 30 days prior to the introduction of new wastewater or pollutants or any substantial change in the volume or characteristics of the wastewater being introduced into the POTW from the User's industrial processes.

3. Any upset experienced by the Industrial User of its treatment that places it in a temporary state of non-compliance with wastewater discharge limitations contained in this permit or other limitations specified in the District's Sewer Use Law shall be reported to the District within 24 hours of first awareness of the commencement of the upset. A detailed report shall be filed within 5 days.

4. Self-monitoring reports are due at the NCSD #1 office within 30 days of sampling. When reporting results, the following information shall be provided:

   a.) 1. The date, exact place, and time of sampling or measurements;
   2. The individual(s) who performed the sampling or measurements;
   3. The date(s) analyses were performed;
   4. The individual(s) who performed the analyses;
   5. The analytical techniques or methods used;
   6. The results of such analyses

   b.) A copy of the original lab report(s) as provided by the certified testing lab(s), including properly completed chain(s) of custody.

   c.) The original data from the lab report shall be transcribed into a table comparing the permit requirements to the obtained results. In cases where the permit contains requirements for daily maximum and maximum monthly average, columns for both of these shall be included in the table. When a single value applies to both daily max. and max. mo. avg. (because monitoring was only performed once during a month), separate columns shall still be included in the table, clearly indicating that the value is both the daily maximum and the monthly average.

   d.) All daily flows obtained since the previous reporting period, as well as the maximum and average daily flow for each month.

   e.) A certification statement as to whether the Industrial User is in compliance with the permit limitations. If the permit contains limitations for both daily max. and max. mo. avg., the statement must specify whether the User is in compliance with both limitations.

   f.) A certification statement that all normally operated (applicable) processes were operating (and discharging) during the monitoring period. Any processes not in operation shall be cited together with a listing of pollutants which might normally be present in said process discharge.

PART III - REPORTING REQUIREMENTS (cont'd.)

5. Additional Monitoring by Permittee - If the permittee monitors any pollutants at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of values required under Part I. Such increased frequency shall also be indicated.

6. All self-monitoring reports prepared shall be submitted to:

Frank A. Nerone, Chief Operator
Niagara County Sewer District #1 Water Pollution Control Center
7346 Liberty Drive
Niagara Falls, New York 14304

7. Signatory Requirements - All reports required by this permit shall be signed by an authorized representative of the Industrial User.

8. If sampling performed by the Industrial User indicates a violation, the Industrial User is required to repeat the sampling and analysis and submit the results to the District within thirty (30) days after becoming aware of the violation.

   Additionally, applicable quality control is mandatory in cases where the Industrial User is conducting additional self-monitoring as a result of non-compliance. (See Sampling Measurement and Analytical Guidelines, Item #19 "Quality Control.")

9. Toxic Organic Management Plan - For Industrial Users who are required to monitor for Total Toxic Organics (TTO), and who are implementing a District-Approved, Toxic Organic Management Plan in lieu of this monitoring, the following certification shall be included with each self-monitoring report:

   "Based on my inquiry of the person or persons directly responsible for managing compliance with the permit limitation for total toxic organics, I certify that, to the best of my knowledge and belief, no dumping of concentrated toxic organics into the wastewaters has occurred since filing of the last discharge monitoring report. I further certify that this facility is implementing the toxic organic management plan submitted to the control authority."

PART IV - STANDARD CONDITIONS

1. PROHIBITED DISCHARGES

   The Industrial User shall comply with all the general prohibitive discharge standards.

2. INSPECTION/RIGHT-OF-ENTRY

   The administrator and/or other duly authorized employees of the District, NYSDEC and/or USEPA, bearing proper credentials and identification, shall be permitted to enter all industrial properties without advance notice for the purpose of inspection, observation, measurement, sampling, monitoring, and testing in accordance with the provisions of its Sewer Use Law. The District shall also have the right to inspect and copy records pertaining to the Industry's self-monitoring procedures.

PART IV - STANDARD CONDITIONS (cont'd.)

3. RECORDS RETENTION

The Industrial User shall retain and preserve for no less than (3) years, any records, books, documents, memoranda, reports, correspondence, records of calibration and maintenance of instrumentation, recordings from continous monitoring instrumentation, and any summaries thereof, relating to monitoring, sampling and chemical analysis made by or in behalf of the user in connection with its discharge. All records that pertain to matters that are the subject of special orders, or any other enforcement or litigation activities brought by the District, shall be retained and observed by the Industrial User until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

4. CONFIDENTIAL INFORMATION

Except for data determined to be confidential under Section 5.15 of the District's Sewer Use Law, all reports required by this permit shall be available for public inspection at the office of the Pretreatment Administrator, 7346 Liberty Drive, Niagara Falls, New York 14304.

5. DILUTION

No Industrial User shall increase the use of potable or process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

6. PROPER DISPOSAL OF PRETREATMENT SLUDGES AND SPENT CHEMICALS

The disposal of sludges and spent chemicals generated shall be done in a manner such as to prevent the pollutants from such material from entering the NCSD #1 sewer system. Said disposal shall also conform to all applicable State/Federal regulations.

7. REVOCATION OF PERMIT

The permit issued to the Industrial User by the District may be revoked when after inspection, monitoring or analysis, it is determined that the discharge of wastewater to the sanitary sewer is in violation of Federal, State, or local laws, ordinances, or regulations. Additionally, falsification or intentional misrepresentation of data or statements pertaining to the permit application or any other required reporting form, shall be cause for permit revocation, revocation of sewer discharges privileges, and/or imposition of criminal penalties.

8. LIMITATION ON PERMIT TRANSFER

Wastewater discharge permits are issued to a specific user for a specific operation and are not assignable to another user or transferrable to any other location without the prior written approval of the District. Sale of a facility by a User shall obligate the purchaser to seek prior written approval of the District for continued discharge to the sewerage system.

9. PERMIT AVAILABILITY

The original signed permit must be available upon request at all times for review at the Industrial User's address stated on the first page of this permit.

PART IV - STANDARD CONDITIONS (cont'd.)

10. **MODIFICATION OR REVISION OF THE PERMIT**

a. The terms and conditions of this permit may be subject to modification by the District at any time as limitations or requirements, as identified in the District Sewer Use Law, are modified or other just cause exists.

b. This permit may also be modified to incorporate special conditions resulting from the issuance of a special order by NYSDEC or EPA.

c. The terms and conditions may be modified as a result of EPA promulgating a new federal pretreatment standard. If a pretreatment standard or prohibition (including Schedule of Compliance specified in such pretreatment standard or prohibition) is established under Section 807 (b) of the Act for a pollutant which is present, the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in permit, this permit shall be revised or modified in accordance with such pretreatment standard or prohibition.

d. The terms and conditions of this permit shall remain in effect until the permit is terminated or replaced by a subsequent permit.

11. **DUTY TO REAPPLY**

Within ninety (90) days of the expiration, the User shall reapply for reissuance of the permit. Application forms are available from the District upon request.

12. **SEVERABILITY**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

13. **ENFORCEMENT AND PENALTIES**

Any violation of Section 2 or 3 of the Niagara County Sewer Use Law (adopted January 18, 1994) is declared a violation except as otherwise provided by law. Any violation of Section 4, 5 or 6 of the Niagara County Sewer Use Law is thereby a misdemeanor except as otherwise provided by law. A User who is found to have violated any provision of the Niagara County Sewer Use Law (or permits and orders issued thereunder) and/or applicable pretreatment standards and requirements, shall be subject to applicable civil and criminal penalties including but not limited to fines not to exceed five thousand dollars ($5,000) per violation per day for each day on which non-compliance shall occur or continue.

PART V - SPECIFIC CONDITIONS

NONE

NIAGARA COUNTY SEWER DISTRICT #1

SAMPLING MEASUREMENT AND ANALYTICAL GUIDELINES

1. Prior to implementing the self-monitoring sampling and analyses, the Industrial User must submit the following information to the District.

   a. The name(s) and address(es) of the laboratory or laboratories proposed to perform each of the chemical analyses.
   b. A description of the equipment and test methods proposed for the chemical analyses for each parameter.
   c. A list of the lower level of detectability expected for each parameter.
   d. A description of the overall recovery efficiency of the prepared sample, where applicable.
   e. A description of the quality control procedures used by the laboratory or laboratories to ensure reliable test results.
   f. A description of the sample collection point and sample collection procedures.
   g. A description of the compositing technique and equipment.
   h. A description of the sample preservation methods used for each parameter.

2. Before commencement of any sampling or flow monitoring, Niagara County Sewer District #1 Water Pollution Control Center shall be notified in writing at least seventy-two (72) hours in advance by the firm or designee. The District will give a twenty-four (24) hour verbal notification to the firm or District designee of whether split sampling will be initiated.

3. Before sampling is done, the sample points must be approved by the District.

4. All discharge lines from one (1) building, or all discharge lines from only one (1) single process must be sampled at the same time.

5. Sampling record must be used and submitted with monitoring reports. The sampling report shall contain the following minimum information:

   a. Date of each sample day.
   b. Exact location of sampling points - attach drawing for reference.
   c. If done manually, time of each grab sample with sampler's inititals each time.
   d. Type of auto-sampler used. Size and type of tubing and sampling interval.
   e. Record all physical observation (sight, smell etc.) of the discharge at start-up, during inspections and changing of samples.
   f. Note weather conditions.
   g. Signature of immediate sampling supervisor at the bottom of page.

6. If an auto-sampler is used, new tubing must be at least 1/4 I.D. If visibly contaminated after sampling, it must be cleaned with detergent or methanol and deionized water each day. Proper refrigeration of the sample must be maintained during entire sampling period, when necessary. The intake hose velocity must be at least 2.0 f.p.s. with a maximum lift of twenty (20) feet.

7. All sampling shall be taken at the highest velocity, greatest turbulence and center of flow.

8. All sampling must be done on normal work days. If there is a process discharge after normal working hours, sampling must continue until no further discharge.

9. "COMPOSITE SAMPLE" "Composite" shall mean a combination of individual (or continously taken) samples obtained at regular intervals over the entire discharge day. The volume of each sample shall be proportional to the discharge flow rate, when possible. For a continuous discharge, a minimum of forty-eight (48) individual grab samples (at half hour intervals shall be collected and combined to constitute a twenty-four (24) hour composite sample. For intermittent discharges of less than four hours duration, grab samples shall be taken at a minimum of fifteen (15) minute intervals.

Composite samples for purgeable halocarbons (Method 601/8010), purgeable aromatics (Method 602/8020), acrolein/acrylonitrile (Method 603), or volatile organics (Method 624/8240), shall be lab composited from grab samples taken at regular intervals over the entire discharge day utilizing the appropriate special sample vials and collection techniques. The number of grabs collected is dependent on the length of the sampling period, and shall be determined the following:

For a 24-hour sampling period, a minimum of four (4) grabs will be taken at regular intervals. If the collection period is 12 hours or less, a minimum of two (2) grabs shall be collected over the period. If the duration is longer than 12 hours but less than 24 hours, a minimum of one grab for every 6-hour period, or fraction thereof, shall be collected (i.e., a 14-hour period requires a minimum of three (3) grabs.)

"SPLIT SAMPLE" - must be done on site with both parties present before preservatives are added.

"DAILY" - each operating day

"DAILY MAXIMUM" - shall mean the highest allowable discharge of a pollutant and/or flow measured during any twenty-four (24) hour sampling period. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the daily discharge is calculated as the average measurement of the pollutant over the day.

"GRAB" - shall mean an individual sample which is taken from a wastestream on a one (1) time basis with no regard to the flow in the wastestream and without consideration of time.

"MONTHLY" on day each month (the same day each month) and a normal operating day (i.e. the 2nd Tuesday of each month).

"MONTHLY AVERAGE" - discharge limitation means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month, divided by the number of daily discharges measured during that month.

"WEEKLY" - every seventh day (the same day each week) and a normal operating day.

10. Total water consumption shall be recorded for each day's composite using the water meters. Water consumption method must be explained in report.

11. All discharges shall be flow-monitored whenever possible. If flow monitoring cannot be done, flow determination should be a best practical engineering estimate without being economically burdensome to the firm involved. Results and procedure used to determine flow must be included with the analysis report.

12. <u>Sample Collection Techniques for Single Discharge Lines</u>

On single discharge lines (all regulated wastes discharge through one outlet), sample collection for the required parameters will be collected according to the following:

a. The following parameters should only be analyzed on manually taken grab samples:

pH
Temperature
Chlorine Residual
Dissolved Oxygen
Fecal Coliforms

Sample Collection Techniques for Single Discharge Lines (cont'd.)

b. The following parameters should only be analyzed on composite samples made from manually collected grab samples:

Oil and Grease
Purgeable Halocarbons (EPA 601)
Purgeable Aromatics (EPA 602)
Acrolein/Acrylonitrile (EPA 603)
Purgeables (EPA 624)

(For a 24-hour sampling period, a minimum of four (4) grabs will be taken at regular intervals when testing for the above parameters. Proper sample collection containers and techniques must be used. Where applicable, grab samples must be lab composited only.)

c. The following parameters should be analyzed on an automatically collected composite sample or, if an auto sampler is unavailable, a manually collected composite sample:

Metals
Phenol-4AAP
BOD
Total Suspended Solids
Total Phosphorus
TKN/Ammonia
Cyanide
Base/Neutral Acids (EPA 625)
EPA Methods 604-614

(For a continuous discharge, a minimum of forty-eight (48) individual grab samples (at half-hour intervals) shall be collected and combined to constitute a twenty-four (24) hour composite sample. For intermittent discharges of less than four (4) hours duration, grab samples shall be taken at a minimum of fifteen (15) minute intervals.)

13. Sample Collection Techniques for Multiple Discharge Lines

For multiple discharge lines (all regulated wastes discharge through more than one outlet), sample collection for the required parameters will be collected according to the following:

a. The following parameters must be analyzed separately from each discharge line's individual grab samples:

pH
Temperature
Chlorine Residual
Dissolved Oxygen
Fecal Coliforms

b. For the following parameters, a composite made from manually collected grab samples must be used. A separate composite must be made from each discharge line. The composites from the different discharge lines cannot be combined for analysis.

Oil and Grease
Purgeable Halocarbons (EPA 601)
Purgeable Aromatics (EPA 602)
Acrolein/Acrylonitrile (EPA 603)
Purgeables (EPA 624)

(For a 24-hour sampling period, a minimum of four (4) grabs will be taken at regular intervals, from each discharge line, when testing for the above parameters. Proper sample collection containers and techniques must be used. Where applicable, grab samples must be lab composited only.)

SAMPLING MEASUREMENT AND ANALYTICAL GUIDELINES (cont'd.)

Sample Collection Techniques for Multiple Discharge Lines (cont'd.)

c. For the following parameters, composites from each discharge line may be combined proportional to their flow only if physical flow measurement can be done.

Metals
Phenol-4AAP
BOD
Total Suspended Solids
Total Phosphorus
TKN/Ammonia
Cyanide
Base/Neutral Acids (EPA 625)
EPA Methods 604-613

(For a continuous discharge, a minimum of forty-eight (48) individual grab samples (at half-hour intervals) shall be collected from each discharge line and combined to constitute a twenty-four (24) hour composite sample. For intermittent discharges of less than four (4) hours duration, grab samples shall be taken at a minimum of fifteen (15) minute intervals.)

14. A chain of custody log sheet is required to be used for all sampling and analysis of each sample and attached to the report.

15. The handling, storage preservation and analytical procedures for each parameter shall follow Environmental Protection Agency Guidelines published in the Federal Register, pursuant to 40 CFR 136, dated October 26, 1984, or as subsequently revised.

16. The monitoring results report, sampling record(s), and chain of custody log sheet must be sent by the industry to the District and not by the consulting firm.

17. If any exemptions or changes have to made due to unique situations, the District must be notified immediately for approval. When approved, a written explanation of the change must accompany the analysis sheet.

18. Any split samples that indicate a discrepenancy of greater than 20% may be grounds for requring resampling and analyses.

19. **"QUALITY CONTROL"** - All additional analyses which were run along with self-monitoring samples as a quality control measure, such as field blanks, duplicates or matrix spikes, etc., must be included in the self-monitoring report submitted to the District. Applicable quality control is mandatory in cases where the industrial user is conducting additional self-monitoring as a result of non-compliance.

20. All analyses conducted pursuant to this permit shall be performed by a laboratory certified for said analyses by the New York State Department of Health.

B-3 Operation, Maintenance and Monitoring Activities

Table B-3
Operation, Maintenance, and Monitoring Activities
Frontier Chemical - Pendleton Site
March 1999

Date	Event	Response
September 3, 1998	NCSD Monthly Sampling; Pressure Problem.	Completed; Changed 25 micro filter bag due to hole.
September 24, 1998	NCSD Monthly Sampling	Needed to do complete analysis; inspected site.
October 8, 1998	NYSDEC Site Inspection	No items to report.
October 8, 1998	NCSD Monthly Sampling	Completed.
October 29, 1998	Pressure Problems	Changed filter bags.
November 5, 1998	NCSD Monthly Sampling	Completed.
November12, 1998	Exhaust Fan Failed.	Replaced.
December 12, 1998	Pressure Problems.	Changed filter bags.
December 4, 1998	NCSD Monthly Sampling	Completed.
January 8, 1999	NCSD Monthly Sampling; Pressure Problem.	Completed; Changed filter bag.
February 4, 1999	NCSD Monthly Sampling	Completed.

ATTACHMENT C

REPORT

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

Pendleton Site PRP Group

March 1999

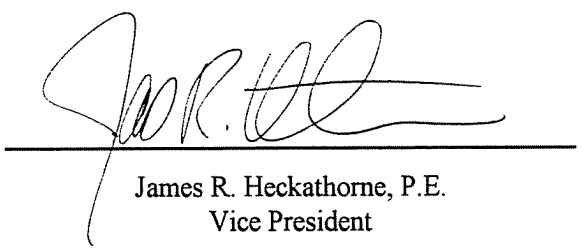
O'BRIEN & GERE
ENGINEERS, INC.

5829/22038

REPORT

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

Pendleton Site PRP Group



James R. Heckathorne, P.E.
Vice President

March 1999

O'BRIEN & GERE ENGINEERS, INC.

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1. Introduction

This document is the second 1998/1999 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 for the Site (O'Brien & Gere Engineers, 1997), 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 3, 1999, 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.

In addition, the following maintenance issues were identified during the February 3, 1999 inspection event:

- Standing water was observed in the annular space of piezometers P-2, P-6, and P-7 and monitoring wells URS-14I and URS-14D.

It should be noted that at this time these issues are not affecting the integrity of the piezometers or monitoring wells. February 1999 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 3, 1999. The surface water elevation of Quarry Lake was measured on February 4, 1999, by Glynn Geotechnical Engineering, Inc. 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 surface water elevations are summarized on Table 3. As shown on Table 3, Quarry Lake is slightly below the outlet weir elevation of 578.0 ft.

The water level measurements collected on February 3, 1999 are illustrated on Figure 1. These measurements are the sixth 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 a slight outward hydraulic gradient exists in the eastern and southern portions of the capped area. The ground water elevations in piezometers P-2 and P-6 located inside the capped area are higher than the ground water elevations at piezometers P-1 and P-5, installed outside the capped area. An inward hydraulic gradient exists in the northern portion of the capped area, as the ground water elevation inside the capped area (P-7) is less than the ground water elevation outside the capped area (P-8). 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 collected in piezometers P-1, P-5, and P-8, installed outside the capped area.

Although the data indicates a slight outward hydraulic gradient within the eastern and southern portions 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. In addition, the water elevations in the piezometers installed within the capped area have decreased since the September 1998 monitoring event, with the exception of piezometer P-3. The slight fluctuations in water elevations within piezometer P-3 may be attributed to: barometric pressure changes during sampling events; the movement of water within the capped area; or the low-permeability of the materials. In addition, the water levels in the piezometers located outside the capped area (P-1, P-5, and P-8) are lower than have been previously measured, due 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 surface water 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 toward 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 3 and 5, 1999, the fourth 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 8260
Inorganics	USEPA Methods 6010/7470/7841
Cyanide	USEPA Method 9010

Source: O'Brien & Gere Engineers

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. Sampling will 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, 1998). In general, the February 1999 ground water chemistry is similar to previous sampling events.

Detected constituents exceeding New York State Class GA Standards included: chromium at one location (88-12D); iron at four locations (URS-9I, 88-12C, 88-12D, and URS-14I); 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 chromium have previously been detected in monitoring well 88-12D at concentrations slightly below the New York State Class GA Standards. In addition, chromium has previously been detected above the New York State Class GA Standards in background monitoring well URS-14I. Concentrations of iron have previously been

detected in the 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. 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 data base will be updated with data from future sampling events, and ground water standards will be reviewed annually to evaluate whether standards have been revised.

Statistical Analyses of Analytes -

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 twelve analytes that have been detected a total of nine or more times in various monitoring wells since the initial post-construction sampling event in July 1997. Based on the results of the preliminary exploratory data analysis, concentrations for the twelve analytes (at $\alpha = 0.10$) do not appear to be normally distributed.

The February 1999 data represents the results of the fourth 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 1999, 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. 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	Analyte
85-5R	Calcium, Magnesium
URS-5D	Calcium, Magnesium, Sodium
85-7R	Calcium, Magnesium, Sodium
URS-7D	Magnesium, Manganese, Sodium
URS-9I	Barium, Calcium, Magnesium
88-12C	Arsenic, Calcium, Magnesium
88-12D	Calcium, Magnesium, Manganese, Potassium

Source: O'Brien & Gere Engineers

It should be noted that there are currently no New York State Class GA Standards for calcium, magnesium, or potassium. Concentrations of arsenic, barium, and manganese have not been detected above the New York State Class GA Standards during the post-construction sampling. In addition, as discussed, it is likely that elevated concentrations of sodium are naturally occurring and are not related to previous site activities.

Results of the t-test analysis also indicate that cis-1,2-dichloroethene concentrations are greater in upgradient well URS-14I than in 85-7R, at a confidence level at the statistical significance threshold of α=0.05, and concentrations of cis-1,2-dichloroethene in 85-7R are below the New York State Class GA Standard.

Results of the t-test analysis also indicate that concentrations of iron and chromium, although detected above the New York State Class GA Standards, are not statistically higher downgradient than upgradient at the Site, indicating that the capped area is not impacting ground water.

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 1999 ground water chemistry is similar to previous sampling events.
- Results of the t-test analysis indicate that concentrations of arsenic (88-12C), barium (URS-9I), calcium (85-5R, URS-5D, 85-7R, URS-9I, 88-12C, and 88-12D), magnesium (85-5R, URS-5D, 85-7R, URS-7D, URS-9I, 88-12C, and 88-12D), manganese (URS-7D and 88-12D), potassium (88-12D), and sodium (URS-5D, 85-7R, and URS-7D) 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, barium, 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 sodium are naturally occurring and are not related to previous site activities
- Results of the t-test analysis indicate that cis-1,2-dichloroethene concentrations are greater in upgradient well URS-14I than in 85-7R, at a confidence level at the statistical significance threshold of α=0.05. Concentrations of cis-1,2-dichloroethene in 85-7R are below the New York State Class GA Standard.

References

New York State Department of Environmental Conservation, 1998. *Title 6, Chapter X, Subchapter A, Article 2, Part 703.5, Table 1, Water Quality Standards Surface Waters and Groundwater*, March 1998.

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.

TABLES

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
P-1	(O)	East portion of	583.21	583.30	16.4	576.8 - 566.8	579.54	577.09	579.25	579.60	575.62	572.97
P-2	(I)	capped area	582.90	583.20	15.7	577.2 - 567.2	579.60	579.24	578.20	578.37	578.76	576.96
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
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
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
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
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
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
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

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
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
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
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
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
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
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
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
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
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
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

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)
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

Notes:

1. Elevation based on USGS Datum.

Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

Notes:

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

Parameter	Standard ug/L (ppb)	85-7R 7/86	8/90	2/91	10/92	6/97	2/98	9/98	2/99
VOCs (ppb)									
Acetone	---	NA	ND	R	ND	ND	ND	ND	ND
Benzene	1	ND	6	ND	ND	ND	ND	ND	ND
2-Butanone	---	NA	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	---	71	ND	ND	ND	ND	ND	ND	0.93 J
Chlorobenzene	5	ND	NA	NA	NA	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	NA	ND	ND	ND	0.14J	0.19 J	0.14 J	0.21 J
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	---	NA	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	1J	ND	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	---	1,200	277	265	249	ND	ND	ND	ND
Antimony	3	NA	28.3B	ND	ND	ND	ND	ND	ND
Arsenic	25	NA	1.4B	1.7B	ND	ND	ND	ND	ND
Barium	1000	30	91B	143B	106	100	80	50J	ND
Beryllium	---	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	5	ND	ND	ND	ND	ND	ND	ND
Calcium	---	490,000	354,000	298,000	389,000	350,000	350,000	420,000	400,000
Chromium	50	20	ND	ND	ND	ND	ND	ND	10
Cobalt	---	20	ND	ND	ND	ND	ND	ND	ND
Copper	200	10	ND	ND	8	ND	ND	ND	ND
Cyanide	200	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	920	586	820	435	190	310	270	170
Lead	25	120	ND	2.6B	ND	ND	ND	ND	ND
Magnesium	---	131,000	119,000	42,600	124,000	120,000	120,000	140,000	140,000
Manganese	300	110	40.5	31.5	30	70	80	90	80
Nickel	100	ND	7.4B	ND	ND	ND	ND	ND	ND
Potassium	---	28,000	5,540	5,770	6,700	5,000	5,000	6,000	6,000
Selenium	10	NA	ND	ND	ND	ND	ND	ND	ND
Silver	50	10	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
Thallium	---	NA	ND	ND	ND	ND	6	ND	ND
Vanadium	---	35	ND	ND	ND	ND	ND	ND	ND
Zinc	---	65	ND	21.5	ND	ND	ND	ND	ND

Notes:

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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6. Sample data presented for 6/97, 2/98, 9/98, and 2/99 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.

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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Table 4
Frontier Chemical-Pendleton Site
Summary of Ground Water Analytical Data
February 1999

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

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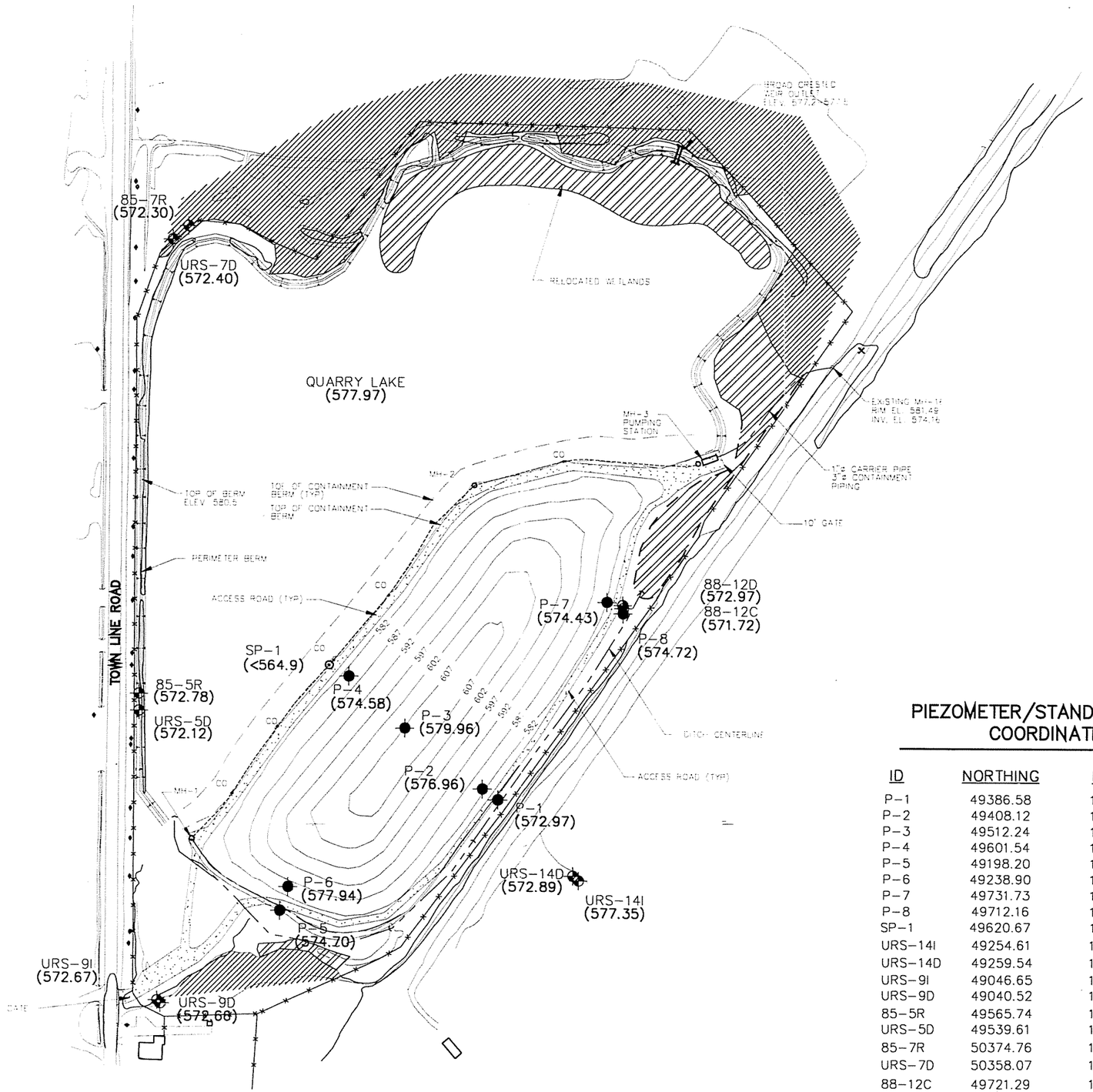
FIGURES

FIGURE 1



LEGEND

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

PIEZOMETER/STANDPIPE AND MONITORING WELL COORDINATES AND ELEVATIONS

ID	NORTHING	EASTING	RISER	COVER
P-1	49386.58	100656.87	583.21	583.30
P-2	49408.12	100630.30	582.90	583.20
P-3	49512.24	100496.39	606.33	606.64
P-4	49601.54	100399.33	582.31*	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	580.97*	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

NOTE: * = MODIFIED 4/28/98

REV DATE: 3/11/99

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

HYDRAULIC POTENTIAL MAP (FEBRUARY 3, 1999)

0 200 400

SCALE IN FEET

DATE: MARCH 1999

FILE NO. 5829.22038.001

O'BRIEN & GERE
ENGINEERS INC.

PLOT_DATE

Appendix A

Piezometer/monitoring well inspection forms

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-1

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	10.24	
Well Depth	16.28	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-2

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	5.94	
Well Depth	15.78	

WELL INTEGRITY

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

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-3

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	26.37	
Well Depth	39.96	

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 standpipe vented at the base to allow drainage?	**Yes**	**No** NA

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-4

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	7.73	
Well Depth	16.98	

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 standpipe vented at the base to allow drainage?**	**Yes**	**No** NA

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-5

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	8.35	
Well Depth	15.69	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical

Well Identification: P-6

Personnel: Peter Bogardus/Chawn O'Dell

Date: 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	6.51	
Well Depth	16.23	

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** Very little in flush mount Cover.
9. **Is the standpipe vented at the base to allow drainage?**	**Yes**	**No** ← NA

Comments:

* Standpipe at surface is leaning 20°-30°.

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-7

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted** (circled)
Well Construction	**PVC** (circled)	**Stainless Steel**
Well Diameter	**2-inch** (circled)	**4- inch**
Depth to Ground Water	6.54	
Well Depth	16.70	

WELL INTEGRITY

1. Well identification clearly marked?	**Yes** (circled)	**No**
2. Well covers and locks in good condition and secure?	**Yes** (circled)	**No**
3. Is the well stand pipe vertically aligned and secure?	**Yes** (circled)	**No**
4. Is the concrete pad and surface seal in good condition?	**Yes** (circled)	**No**
5. Are soils surrounding the well pad eroded?	**Yes**	**No** (circled)
6. Is the well casing in good condition?	**Yes** (circled)	**No**
7. Is the measuring point on casing well marked?	**Yes** (circled)	**No**
8. Is there standing water in the annular space?	**Yes** (circled)	**No**
9. Is the standpipe vented at the base to allow drainage?	**Yes**	**No** NA

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** P-8

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	8.11	
Well Depth	17.28	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** SP-1

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	~~PVC~~ HDPE	**Stainless Steel**
Well Diameter	~~2-inch~~	~~4-inch~~ 6-inch
Depth to Ground Water	Dry	
Well Depth	15.38	

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 standpipe vented at the base to allow drainage?**	**Yes**	**No** NA

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** 85-5R

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	~~**Stainless Steel**~~
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	~~8.60~~ 8.06	
Well Depth	38.05	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** URS-5D

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	8.48	
Well Depth	49.93	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

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

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	5,60	
Well Depth	27.78	

WELL INTEGRITY

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

Comments:

Monitoring Well Integrity Checklist

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

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	6.95	
Well Depth	39.89	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** UAS - 9I

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	9.01	
Well Depth	46.40	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical

Well Identification: URS-9D

Personnel: Peter Bogardus/Chawn O'Dell

Date: 2/3/99

WELL SPECIFICATIONS

Protective Casings	(Above Ground)	**Flush Mounted**
Well Construction	**PVC**	(Stainless Steel)
Well Diameter	(2-inch)	**4- inch**
Depth to Ground Water	8.14	
Well Depth	50.99	

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 standpipe vented at the base to allow drainage?		

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical

Well Identification: 88-12C

Personnel: Peter Bogardus/Chawn O'Dell

Date: 2/3/99

WELL SPECIFICATIONS

Protective Casings	(Above Ground)	**Flush Mounted**
Well Construction	**PVC**	(Stainless Steel)
Well Diameter	(2-inch)	**4- inch**
Depth to Ground Water	11.40	
Well Depth	31.37	

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 standpipe 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: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	9.90	
Well Depth	53.36	

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 standpipe vented at the base to allow drainage?	**Yes**	**No**

Comments:

Concrete pad under gravel.

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** URS-141

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	3.79	
Well Depth	31.18	

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 standpipe vented at the base to allow drainage?	**Yes**	**No** NA

Comments:

Monitoring Well Integrity Checklist

Site Name: Frontier Chemical **Well Identification:** URS-14D

Personnel: Peter Bogardus/Chawn O'Dell **Date:** 2/3/99

WELL SPECIFICATIONS

Protective Casings	**Above Ground**	**Flush Mounted**
Well Construction	**PVC**	**Stainless Steel**
Well Diameter	**2-inch**	**4- inch**
Depth to Ground Water	7.82	
Well Depth	41.68	

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 standpipe vented at the base to allow drainage?	**Yes**	**No** NA

Comments:

Appendix B

Ground water sampling logs

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather OVERCAST; ~ 40°F
Well # 85-5R
Evacuation Method S. S. BAILER
Sampling Method S. S. BAILER

Well Information:

Depth of Well *	38.05	ft.
Depth to Water *	8.06	ft.
Length of Water Column	29.99	ft.
Volume of Water in Well	4.89	gal.(s)
3X Volume of Water in Well	14.67	gal.(s)

Water Volume /ft. for:
- ____ 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 80 gal.(s)
Did well go dry? Yes

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity (ntu)
initial	0.3	9.7	8.43	660	9.6 ntu
	5.0	9.6	8.06	958	102 ntu
	~~10.0~~ 8.0	9.6	7.97	970	375
	~~15.0~~ DRY				

Water Sample:
Time Collected 1615

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Brown
Odor	None	Odor	No
Turbidity (> 100 NTU)	9.6 ntu	Turbidity (> 100 NTU)	375 ntu
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather OVERCAST, ~40°F
Well # WRS-5D
Evacuation Method S.S. Bailer
Sampling Method S.S Bailer.

Well Information:

Depth of Well * 49.93 ft.
Depth to Water * 8.48 ft.
Length of Water Column 41.45 ft.
Volume of Water in Well 6.76 gal.(s)
3X Volume of Water in Well 20.28 gal.(s)

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

Volume removed before sampling 12.0 gal.(s)
Did well go dry? yes

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	TURBIDITY (ntu)
initial	0.3	9.9	8.48	2740	15.1 ntu
	7.0	9.3	7.98	2860	47.2
	~~14.0~~ 12.0	8.9	7.31	2910	65.4
	~~21.0~~ DRY	~~0~~			

Water Sample:
Time Collected 1635

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Gray
Odor	Sulfur	Odor	Sulfur
Turbidity (> 100 NTU)	15.1 ntu	Turbidity (> 100 NTU)	65.4
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather OVERCAST in 45°F
Well # 85-7R
Evacuation Method S.S. bailer
Sampling Method S.S. bailer

Well Information:

Depth of Well *	27.78	ft.
Depth to Water *	5.60	ft.
Length of Water Column	22.18	ft.
Volume of Water in Well	3.62	gal.(s)
3X Volume of Water in Well	10.86	gal.(s)

Water Volume /ft. for:
- ___ 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 11.0 gal.(s)
Did well go dry? ___

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	
initial	0.3	8.9	8.61	2410	6.2 ntu
	4.0	9.4	7.86	2960	
	7.5	9.6	7.41	3040	
	11.0	9.7	7.32	3110	~~571~~ 473

Water Sample:
Time Collected 1430

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Brown
Odor	No	Odor	No
Turbidity (> 100 NTU)	6.2	Turbidity (> 100 NTU)	473 ntu
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather OVERCAST, ~45°F
Well # MRS-7D
Evacuation Method S.S. bailer
Sampling Method S.S. bailer

Well Information:

Depth of Well *	39.89	ft.
Depth to Water *	6.95	ft.
Length of Water Column	32.94	ft.
Volume of Water in Well	5.37	gal.(s)
3X Volume of Water in Well	16.11	gal.(s)

Water Volume /ft. for:
- ___ 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 16.5 gal.(s)
Did well go dry? Yes

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	
initial	0.3	9.1	7.85	706 uS/cm	10.4 ntu
	5.5	9.4	7.61	2,560	36.7
	11.0	9.8	7.42	2960	41.2
	~~16.5~~ DRY	~~9.5~~	~~7.42~~		
	16.5	9.9	7.36	3,010	57.1

Water Sample:
Time Collected 1445

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Color less	Color	Cloudy
Odor	No - sulfur	Odor	sulfur
Turbidity (> 100 NTU)	10.4 ntu	Turbidity (> 100 NTU)	57.1
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/03/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather Partly Sunny, ~45°F
Well # URS-9I
Evacuation Method Grundfos Pump
Sampling Method Grundfos Pump

Well Information:

Depth of Well *	46.40	ft.
Depth to Water *	9.01	ft.
Length of Water Column	37.39	ft.
Volume of Water in Well	6.09	gal.(s)
3X Volume of Water in Well	18.27	gal.(s)

Water Volume /ft. for:
- ___ 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 18.5 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	4.04
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	pH Readings	Conductivity Readings uS/cm	TURBIDITY
initial	initial 10.0°C	initial 7.58	initial 1352 uS/cm	>1000 ntu
6.5	9.9	7.22	1291	77.8
13.0	9.9	7.24	1262	31.4
18.5	9.9	7.25	1253	16.1

Water Sample:
Time Collected 1705

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Gray-brown	Color	Colorless
Odor	Sulfur	Odor	Sulfur
Turbidity (> 100 NTU)	>1,000 ntu	Turbidity (> 100 NTU)	16.1 ntu
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/03/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather Partly Sunny ~45°F
Well # URS-9D
Evacuation Method Grundfos Pump
Sampling Method Grundfos Pump

Well Information:

Depth of Well *	50.99	ft.
Depth to Water *	8.14	ft.
Length of Water Column	42.25	ft.
Volume of Water in Well	6.98	gal.(s)
3X Volume of Water in Well	20.94	gal.(s)

Water Volume /ft. for:
- ____ 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 21 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	4.04	84 S Standard	
7.0 Standard	7.00	1413 S Standard	
10.0 Standard	10.00		

Water parameters:

Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	Turbidity
initial	initial 10.5 °C	initial 7.29	initial 1890 uS/cm	4.24 ntu
7.0	10.1	7.21	1860	0.73
14.0	10.1	7.19	1452	0.56
21.0	10.0	7.18	1,446	0.51

Water Sample:
Time Collected 1610

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Colorless
Odor	NO	Odor	NO
Turbidity (> 100 NTU)	4.24 ntu	Turbidity (> 100 NTU)	0.51 ntu
Sheen/Free Product	NO	Sheen/Free Product	NO

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes: Collect blind duplicate sample

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather Lt. rain in 40°F
Well # 98-12C
Evacuation Method Grundfos pump
Sampling Method Grundfos pump

Well Information:

Depth of Well *	31.37	ft.
Depth to Water *	11.40	ft.
Length of Water Column	19.97	ft.
Volume of Water in Well	3.26	gal.(s)
3X Volume of Water in Well	9.78	gal.(s)

Water Volume /ft. for:
- ____ 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 10.5 gal.(s)
Did well go dry? no

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	
initial	0.5	9.6 °C	7.45	1110 uS/cm	462 ntu
	3.5	10.5	7.43	1070	27.3
	7.0	10.7	7.42	1030	19.6
	10.5	10.6	7.43	1020	3.84

Water Sample:
Time Collected 1145

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Colorless
Odor	no	Odor	No
Turbidity (> 100 NTU)	462 ntu	Turbidity (> 100 NTU)	3.84
Sheen/Free Product	no	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather OVERCAST; ~40°F
Well # 98 MRS-12D
Evacuation Method Grundfos Pump
Sampling Method Grundfos Pump

Well Information:

Depth of Well *	53.36	ft.
Depth to Water *	9.90	ft.
Length of Water Column	42.46	ft.
Volume of Water in Well	6.82	gal.(s)
3X Volume of Water in Well	20.46	gal.(s)

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

Volume removed before sampling 12.0 gal.(s)
Did well go dry? Yes

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	TURBIDITY (ntu)
initial	~~8~~ 12.0	10.5	7.06	7,010	18.4 ntu
	7.0	10.6	6.84	~~6~~ 5,630	13.6
	~~14.0~~ 12.0	10.7	6.75	5220	12.1
	~~24.0~~ DRY				

Water Sample:
Time Collected 1045

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Colorless
Odor	Sulfur	Odor	Sulfur
Turbidity (> 100 NTU)	18.4 ntu	Turbidity (> 100 NTU)	12.1 ntu
Sheen/Free Product	NO	Sheen/Free Product	NO

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/03/99 - 02/04/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather Partly Cloudy, ~40°F
Well # MRS-14I
Evacuation Method stainless steel bailer
Sampling Method stainless steel bailer

Well Information:

Depth of Well *	31.18	ft.
Depth to Water *	3.79	ft.
Length of Water Column	27.39	ft.
Volume of Water in Well	4.46	gal.(s)
3X Volume of Water in Well	13.38	gal.(s)

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

Volume removed before sampling 9.5 gal.(s)
Did well go dry? ____

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

Instrument Calibration:

pH Buffer Readings		Conductivity Standard Readings	
4.0 Standard	4.04	84 S Standard	
7.0 Standard	7.00	1413 S Standard	
10.0 Standard	10.00		

Water parameters: Evacuated 2/3/99.

Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	TURBIDITY
initial 0.3	initial 8.6	initial 8.37	initial 461 uS/cm	13.2 ntu
4.5	9.1	8.28	436	
9.0	9.2	8.19	422	

Water Sample:
Time Collected 9:15 2/5/99.

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Colorless	Color	Clear
Odor	NO	Odor	None
Turbidity (> 100 NTU)	13.2 ntu	Turbidity (> 100 NTU)	12
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

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

Date 02/05/99
Site Name Frontier Chemical
Location Pendleton, NY
Project No 22038
Personnel C. O'Dell/P. Bogardus

Weather Partly Clear ~20°F
Well # MW5-14D
Evacuation Method Grundfos Pump
Sampling Method Grundfos Pump

Well Information:

Depth of Well *	41.68	ft.
Depth to Water *	7.82	ft.
Length of Water Column	33.86	ft.
Volume of Water in Well	5.52	gal.(s)
3X Volume of Water in Well	16.56	gal.(s)

Water Volume /ft. for:
- ___ 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 18.0 gal.(s)
Did well go dry? No

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

Instrument Calibration:

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

Water parameters:

	Gallons Removed	Temperature Readings	pH Readings	Conductivity Readings uS/cm	
initial	0.5	10.5	7.65	315 us/cm	132 ntu
	6.0	10.3	6.94	1790	3.85
	12.0	10.1	6.71	1910	1.77
	18.0	10.1	6.75	1930	1.70

Water Sample:
Time Collected 0900

Physical Appearance at Start		Physical Appearance at Sampling	
Color	Cloudy	Color	Colorless
Odor	Sulfur	Odor	Sulfur
Turbidity (> 100 NTU)	132 ntu	Turbidity (> 100 NTU)	1.70
Sheen/Free Product	No	Sheen/Free Product	No

Samples collected:

Container Size	Container Type	# Collected	Field Filtered	Preservative	Container pH
40 ml	vial	2	no	Hcl	<2
1 liter	plastic	1	yes	HNO3	<2
1 liter	plastic	1	no	Na2SO4	>10

Notes:

O'Brien & Gere Laboratories, Inc.

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

Chain of Custody

Client: OBRIEN & GERE ENGINEERS INC.
Project: FRONTIER CHEMICAL - HEADQUARTERS SITE
Sampled by: CARLIN ODELL
Client Contact: JOHN JAY SMITH Phone #(315)457-6100

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Analysis/Method: VOCs (8260)	Metals 6010/7000	CN 7411					Comments
URS-9D	02/03/99	1610	WATER	GRAB	5	X	X	X					
URS-9I	02/03/99	1705	WATER	GRAB	5	X	X	X					
BLIND DUPLICATE	02/03/99	—	WATER	GRAB	5	X	X	X					
88-12D	02/04/99	1045	WATER	GRAB	5	X	X	X					
88-12C	02/04/99	1145	WATER	GRAB	5	X	X	X					
85-7R	02/04/99	1430	WATER	GRAB	5	X	X	X					FIELD FILTERED
URS-7D	02/04/99	1445	WATER	GRAB	5	X	X	X					FIELD FILTERED
85-5R	02/04/99	1615	WATER	GRAB	5	X	X	X					FIELD FILTERED
URS-5D	02/04/99	1635	WATER	GRAB	5	X	X	X					FIELD FILTERED
Equipment blank	02/05/99	0830	WATER	GRAB	5	X	X	X					
URS-14D	02/05/99	0900	WATER	GRAB	5	X	X	X					
URS-14D MATRIX SPIKE	02/05/99	0900	WATER	GRAB	5	X	X	X					

Relinquished by: Carlin Odell	Date: 02/05/99	Time: 1350	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab: Mark Spencer	Date: 2/5/99	Time: 13:50
Shipment Method:			Airbill Number:		

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature: 5°C

Original-Laboratory Copy-Client

O'Brien ... ratories, Inc.

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

Chain of Custody

Client: OBRIEN & GERE ENGINEERS, INC.
Project: FRONTIER CHEMICAL - PENDLETON SITE
Sampled by: [illegible]
Client Contact: Jennifer Smith   Phone # (315) 437-6100

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	VOCs (8260)	METALS 6010/7000	CN 7471					Comments
URS-14D MATRIX SPIKE Dup	02/5/99	0900	WATER	GRAB	5	+	+	+					
URS-14I	02/5/99	0915	WATER	GRAB	5	+	+	+					
TRIP BLANK	02/05/99	—	WATER	GRAB	4	X							

Relinquished by: [signature]	Date: 02/05/99	Time: 1350	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab: [signature]	Date: 2/5/99	Time: 13:50
Shipment Method:			Airbill Number:		

Turnaround Time Required:
Routine X
Rush (Specify)

Comments:

Cooler Temperature: 5°C

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

March 10, 1999

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 of 2/17/99

Dear Ms. Smith:

Review has been completed for the data package generated by OBG Laboratories, pertaining to samples collected at the Frontier Chemical Site. Eleven aqueous samples were analysed for TCL volatiles and TAL metals/cyanide parameters. Matrix spikes/duplicates, and field and trip blanks were also processed. Methodologies utilized are those of the USEPA SW846.

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

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

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

In summary, sample processing was primarily conducted with compliance to protocol requirements and with adherance to quality criteria, and most reported results are usable with minor qualification. 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. 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 the field blank at a level of 0.10 ug/L. Due to possible contamination contribution, the reported results for that analyte in the project samples which reported detection below 0.50 ug/L should be edited to reflect nondetection at the CRDL (i.e. "<0.50 ").

Sample URS-14D produced a slightly low recovery for surrogate standard d8-toluene (76%, below required limit of 84%). Sample results (which were nondetection) are therefore considered estimated ("J").

Matrix spikes of URS-14D involved evaluation of recoveries of all target analytes. Carbon disulfide produced elevated recoveries of (231% and 211%), which indicates that the detected result for that analyte in the sample should be considered estimated ("J" qualifier). In consideration of the presence of this analyte in the field blank, detected results for this analyte in samples which were not edited to nondetection (see above) should also be considered estimated ("J"). Other spiked compounds also produced elevated recoveries, but the samples do not contain these components, and results are therefore not affected. Three compounds produced low recoveries (34% to 59%) which indicate that those analyte results should be considered estimated ("J"), possibly biased low in the sample. They are cis-1,3-dichloropropene, trans-1,3-dichloropropene, and sytrene. The laboratory case narrative discussion cites that the presence of sulfur in the sample may be responsible for the depressed recoveries. This sample also exhibited low recovery for surrogate standard d8-toluene, and all reported results for this sample are qualified as estimated ("J"). Other of the project samples also showed sulfur compounds present (reported as Tentatively Identified Compounds (TICs), but surrogates showed acceptable recoveries, and those results are not recommended for qualification. Duplicate correlation, and spiked blank recoveries were acceptable.

Due to poor spectral quality, the identification of 1,1-dichloroethane in URS-9D should be considered tentative ("N" qualifier). It is noted that this analyte spectrum in the blind duplicate of that sample was acceptable for identification.

Field duplicate correlation between Blind Duplicate and URS-9D was acceptable.

Metals/CN Analyses

Four of the samples were filtered prior to the metals/cyanide analyses.

The filtered sample results for antimony, which were all nondetection, were reported to an incorrect detection limit of 0.06 mg/L. Raw data supports editing the detection limits to be those of the other samples (and the QAPP reporting level), 0.005 mg/L.

Accuracy and precision evaluations for URS-14D were acceptable, with the exception of the recoveries of selenium, which were 32% and 37%. Therefore the sample selenium results should be considered estimated ("J").

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

The IDLs for thallium are outdated (11/97) and should be regenerated.

Field duplicate correlation between URS-9D and Blind Duplicate was acceptable.

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

Very truly yours,

Judy Harry

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 temperature upon receipt was 5°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, blind duplicate, 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.

Volatile Organics

The GC/MS Volatile instruments used a J&W DB-VRX, 60 m x 0.25 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 criteria:

Sample Description	Sample #	Compound	Corrective Action
URS-14D	K5554	1,1-Dichloroethene	1
		Carbon disulfide	1
		trans-1,2-Dichloroethene	1
		1,1,1-Trichloroethane	1
		Carbon tetrachloride	1
		Bromodichloromethane	1
		cis-1,3-Dichloropropene	1
		trans-1,3-Dichloropropene	1
		Dibromochloromethane	1
		Bromoform	1
		Styrene	1

1. Sulfur was detected in the sample. The failed recovery is attributed to sulfur interference. The MS/MSD met RPD criteria. LCS criteria was met for this compound. No corrective action was taken.

Surrogate
The following sample(s) did not meet surrogate recovery criteria:

Sample Description	Sample #	Surrogate	Corrective Action
URS-14I	K5555	Toluene-d8	1

1. Sulfur was detected in the sample. The failed recovery may be attributed to sulfur interference. The sample was not reanalyzed due to holding time constraints. There were no compounds detected above the PQL. No corrective action was taken.

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

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

For calibration check standard compounds that had a linear regression performed, a % drift was calculated between the true value of the calibration check standard and the calculated value. For compounds using an average response factor, the % 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.

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

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.

D/MS/MSD
The following analyte(s) did not meet matrix spike/matrix spike duplicate percent recovery and/or duplicate RPD criteria:

Sample Description	Sample #	Analyte	% REC	RPD	Corrective Action
URS-14D	K5554	Calcium	X		1
		Selenium	X		2
		Iron		X	3

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

2. The failing matrix spike is likely due to matrix interference. A post-digestion spike was performed. No further corrective action was taken.

3. The sample result is <5x the PQL and the difference between sample/duplicate is less than the PQL. No further corrective action was taken.

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

Graphite Furnace Analysis
The following analytes did not meet furnace analytical spike percent recovery criteria:

Sample Description	Sample #	Analyte	Corrective Action
Laboratory Control Sample	L021899W2	Thallium	1

1 The percent recovery was over 60%. No corrective action was required.

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.

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

RAW DATA

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

CROSS REFERENCE TABLE

Site	Sample Number	Date Collected	Date Received	Pkg
URS-9D	K5544	02/03/99	02/05/99	704
URS-9I	K5545	02/03/99	02/05/99	704
Blind Duplicate	K5546	02/03/99	02/05/99	704
88-12D	K5547	02/04/99	02/05/99	704
88-12C	K5548	02/04/99	02/05/99	704
85-7R	K5549	02/04/99	02/05/99	704
URS-7D	K5550	02/04/99	02/05/99	704
85-5R	K5551	02/04/99	02/05/99	704
URS-5D	K5552	02/04/99	02/05/99	704
Equipment Blank	K5553	02/05/99	02/05/99	704
URS-14D	K5554	02/05/99	02/05/99	704
URS-14D	K5554MS	02/05/99	02/05/99	704
URS-14D	K5554MSD	02/05/99	02/05/99	704
URS-14D	K5554D	02/05/99	02/05/99	704
URS-14I	K5555	02/05/99	02/05/99	704
QC Trip Blank	K5556	02/03/99	02/05/99	704
85-7R (Field Filtered)	K5557	02/04/99	02/05/99	704
URS-7D (Field Filtered)	K5558	02/04/99	02/05/99	704
85-5R (Field Filtered)	K5559	02/04/99	02/05/99	704
URS-5D (Field Filtered)	K5560	02/04/99	02/05/99	704

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

Laboratory Report

Frontier Chemical
Pendleton Site
Town of Pendleton
Niagara County, NY
Water Samples

Volume 1 of 3

February 3, 4, and 5, 1999

O'BRIEN & GERE
LABORATORIES, INC.

ANALYTICAL PACKAGE

for

Frontier Chemical
Pendleton Site
Town of Pendleton
Niagara County, NY

Samples collected: February 3, 4, and 5, 1999

Volume 1 of 3

Prepared for:

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

Prepared by:

O'Brien & Gere Laboratories, Inc.
5000 Brittonfield Parkway
Suite 300, P.O. Box 4942
Syracuse, NY 13221

Authorized _____

Date 2/25/99

Reviewed _____

Date 2/26/99

TABLE OF CONTENTS

Sample Data Summary Package

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 temperature upon receipt was 5°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, blind duplicate, 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.

Volatile Organics

The GC/MS Volatile instruments used a J&W DB-VRX, 60 m x 0.25 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 criteria:

Sample Description	Sample #	Compound	Corrective Action
URS-14D	K5554	1,1-Dichloroethene	1
		Carbon disulfide	1
		trans-1,2-Dichloroethene	1
		1,1,1-Trichloroethane	1
		Carbon tetrachloride	1
		Bromodichloromethane	1
		cis-1,3-Dichloropropene	1
		trans-1,3-Dichloropropene	1
		Dibromochloromethane	1
		Bromoform	1
		Styrene	1

1. Sulfur was detected in the sample. The failed recovery is attributed to sulfur interference. The MS/MSD met RPD criteria. LCS criteria was met for this compound. No corrective action was taken.

Surrogate
The following sample(s) did not meet surrogate recovery criteria:

Sample Description	Sample #	Surrogate	Corrective Action
URS-14I	K5555	Toluene-d8	1

1. Sulfur was detected in the sample. The failed recovery may be attributed to sulfur interference. The sample was not reanalyzed due to holding time constraints. There were no compounds detected above the PQL. No corrective action was taken.

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

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

For calibration check standard compounds that had a linear regression performed, a % drift was calculated between the true value of the calibration check standard and the calculated value. For compounds using an average response factor, the % 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.

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

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.

D/MS/MSD
The following analyte(s) did not meet matrix spike/matrix spike duplicate percent recovery and/or duplicate RPD criteria:

Sample Description	Sample #	Analyte	% REC	RPD	Corrective Action
URS-14D	K5554	Calcium	X		1
		Selenium	X		2
		Iron		X	3

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

2. The failing matrix spike is likely due to matrix interference. A post-digestion spike was performed. No further corrective action was taken.

3. The sample result is <5x the PQL and the difference between sample/duplicate is less than the PQL. No further corrective action was taken.

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

Graphite Furnace Analysis
The following analytes did not meet furnace analytical spike percent recovery criteria:

Sample Description	Sample #	Analyte	Corrective Action
Laboratory Control Sample	L021899W2	Thallium	1

1. The percent recovery was over 60%. No corrective action was required.

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.

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

RAW DATA

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

CROSS REFERENCE TABLE

Site	Sample Number	Date Collected	Date Received	Pkg
URS-9D	K5544	02/03/99	02/05/99	704
URS-9I	K5545	02/03/99	02/05/99	704
Blind Duplicate	K5546	02/03/99	02/05/99	704
88-12D	K5547	02/04/99	02/05/99	704
88-12C	K5548	02/04/99	02/05/99	704
85-7R	K5549	02/04/99	02/05/99	704
URS-7D	K5550	02/04/99	02/05/99	704
85-5R	K5551	02/04/99	02/05/99	704
URS-5D	K5552	02/04/99	02/05/99	704
Equipment Blank	K5553	02/05/99	02/05/99	704
URS-14D	K5554	02/05/99	02/05/99	704
URS-14D	K5554MS	02/05/99	02/05/99	704
URS-14D	K5554MSD	02/05/99	02/05/99	704
URS-14D	K5554D	02/05/99	02/05/99	704
URS-14I	K5555	02/05/99	02/05/99	704
QC Trip Blank	K5556	02/03/99	02/05/99	704
85-7R (Field Filtered)	K5557	02/04/99	02/05/99	704
URS-7D (Field Filtered)	K5558	02/04/99	02/05/99	704
85-5R (Field Filtered)	K5559	02/04/99	02/05/99	704
URS-5D (Field Filtered)	K5560	02/04/99	02/05/99	704

Analytical Results

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5544
Samp. Description: URS-9D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide <0.50	~~J .10~~		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	J .16		1	02/12/99	N
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	J .35		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	J .21		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas Alexander
Date: February 17,1999

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5544
Samp. Description: URS-9D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	90.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	95.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	95.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/12/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

3000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 15:18
Data File: C:\HPCHEM\1\DATA\J3673.D
Name: K5544
Misc: URS-9D
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
Title: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
rbonyl sulfide ✓	5.91	1.6	ug/L	270536	ISTD01	14.97	1673850	10.0

J3673.D J212TCLW.M Tue Feb 16 08:21:06 1999

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5545
Samp. Description: URS-9I
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	~~J .15~~ < .50		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5545
Samp. Description: URS-9I
nstrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	89.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	91.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	93.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	87.%	77-117	1	02/12/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

3000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 15:56
ata File: C:\HPCHEM\1\DATA\J3674.D
ame: K5545
Misc: URS-9I
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
ibrary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ilfur dioxide ✓	5.94	5.7	ug/L	1021560	ISTD01	14.98	1780270	10.0

J3674.D J212TCLW.M Tue Feb 16 08:21:16 1999

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5546
Samp. Description: Blind Duplicate
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide <0.50	~~J .14~~		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	J .18		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	J .38		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	J .19		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5546
Samp. Description: Blind Duplicate
nstrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	92.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	95.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	97.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/12/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 16:33
ta File: C:\HPCHEM\1\DATA\J3675.D
me: K5546
Misc: Blind Duplicate
ethod: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
ibrary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.95	7.4	ug/L	1304300	ISTD01	14.98	1770520	10.0

J3675.D J212TCLW.M Tue Feb 16 08:21:30 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5547
Samp. Description: 88-12D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	.70		1	02/12/99	J
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-16-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5547
Samp. Description: 88-12D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	93.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	98.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	102.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	96.%	77-117	1	02/12/99	

Notes:

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 17:10
ıta File: C:\HPCHEM\1\DATA\J3676.D
ıme: K5547
Misc: 88-12D
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
.tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name		RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
~~{2-(2-Hydroxyethyl~~	1	5.61	1.5	ug/L	263364	ISTD01	14.98	1725540	10.0
Propane ✓	2	5.84	15.8	ug/L	2726840	ISTD01	14.98	1725540	10.0
Sulfur dioxide ✓	3	5.94	18.0	ug/L	3112330	ISTD01	14.98	1725540	10.0
~~obutane~~	4	6.47	5.0	ug/L	866621	ISTD01	14.98	1725540	10.0
Butane ✓	5	6.96	2.8	ug/L	477550	ISTD01	14.98	1725540	10.0

J3676.D J212TCLW.M Tue Feb 16 08:21:48 1999

1 Unknown
2 ✓
3 ✓
4 Unknown Hydrocarbon
5 ✓

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5548
Samp. Description: 88-12C
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	<.50		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

- Outside control limits J-Estimated value

Authorized: Thomas Alexander
Date: February 17, 1999

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5548
Samp. Description: 88-12C
nstrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	95.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	95.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	93.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	91.%	77-117	1	02/12/99	

Notes:

· Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 17:48
ta File: C:\HPCHEM\1\DATA\J3677.D
me: K5548
Misc: 88-12C
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.94	6.5	ug/L	1134940	ISTD01	14.98	1750760	10.0

J3677.D J212TCLW.M Tue Feb 16 08:21:59 1999

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5549
Samp. Description: 85-7R
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	.93 J		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	J .21		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

edit 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5549
Samp. Description: 85-7R
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	93.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	97.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	99.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/12/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 18:25
Data File: C:\HPCHEM\1\DATA\J3678.D
Name: K5549
Misc: 85-7R
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
Title: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.94	9.5	ug/L	1645900	ISTD01	14.97	1732960	10.0

J3678.D J212TCLW.M Tue Feb 16 08:24:46 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5550
Samp. Description: URS-7D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	J 6.0		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	1.3		1	02/12/99	J
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5550
Samp. Description: URS-7D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	94.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	96.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	98.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	92.%	77-117	1	02/12/99	

Notes:

· Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 19:02
ta File: C:\HPCHEM\1\DATA\J3679.D
me: K5550
Misc: URS-7D
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.94	11.7	ug/L	2033860	ISTD01	14.97	1740160	10.0

J3679.D J212TCLW.M Tue Feb 16 08:26:43 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5551
Samp. Description: 85-5R
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide	~~J .16~~ < .50		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

Edits 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5551
Samp. Description: 85-5R
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	95.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	93.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	99.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/12/99	

Notes:

- Outside control limits J-Estimated value

Authorized: Thomas Q. Alexander
Date: February 17,1999 Thomas Alexander

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 19:40
ta File: C:\HPCHEM\1\DATA\J3680.D
me: K5551
Misc: 85-5R
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.94	5.7	ug/L	985458	ISTD01	14.97	1716360	10.0

J3680.D J212TCLW.M Tue Feb 16 08:26:53 1999

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5552
Samp. Description: URS-5D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/12/99	
Vinyl chloride	<1.0		1	02/12/99	
Bromomethane	<1.0		1	02/12/99	
Chloroethane	<1.0		1	02/12/99	
Acetone	<10.		1	02/12/99	
1,1-Dichloroethene	<.50		1	02/12/99	
Methylene chloride	<.50		1	02/12/99	
Carbon disulfide <0.50	~~J .14~~		1	02/12/99	
trans-1,2-Dichloroethene	<.50		1	02/12/99	
1,1-Dichloroethane	<.50		1	02/12/99	
2-Butanone	<10.		1	02/12/99	
cis-1,2-Dichloroethene	<.50		1	02/12/99	
Chloroform	<.50		1	02/12/99	
1,2-Dichloroethane	<.50		1	02/12/99	
1,1,1-Trichloroethane	<.50		1	02/12/99	
Carbon tetrachloride	<.50		1	02/12/99	
Benzene	<.50		1	02/12/99	
1,2-Dichloropropane	<.50		1	02/12/99	
Trichloroethene	<.50		1	02/12/99	
Bromodichloromethane	<.50		1	02/12/99	
cis-1,3-Dichloropropene	<.50		1	02/12/99	
4-Methyl-2-pentanone	<5.0		1	02/12/99	
trans-1,3-Dichloropropene	<.50		1	02/12/99	
1,1,2-Trichloroethane	<.50		1	02/12/99	
Toluene	<.50		1	02/12/99	
Dibromochloromethane	<.50		1	02/12/99	
2-Hexanone	<5.0		1	02/12/99	
Tetrachloroethene	<.50		1	02/12/99	
Chlorobenzene	<.50		1	02/12/99	

E.Lits 3/10/99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5552
Samp. Description: URS-5D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/04/99
Received: 02/05/99
Prepared: 02/12/99

Matrix: Water
QC Batch: 021299W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/12/99	
Bromoform	<.50		1	02/12/99	
Xylene (total)	<.50		1	02/12/99	
Styrene	<.50		1	02/12/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/12/99	
1,2-Dichloroethane-d4 (surrogate)	95.%	80-135	1	02/12/99	
Dibromofluoromethane (surrogate)	94.%	61-136	1	02/12/99	
Toluene-d8 (surrogate)	97.%	84-114	1	02/12/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/12/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 17,1999 Thomas Alexander

1000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 12 Feb 1999 20:17
Data File: C:\HPCHEM\1\DATA\J3681.D
Name: K5552
Misc: URS-5D
Method: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
Title: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide ✓	5.94	4.6	ug/L	779480	ISTD01	14.97	1709520	10.0

J3681.D J212TCLW.M Tue Feb 16 08:27:04 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5553
Samp. Description: Equipment Blank
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/17/99	
Vinyl chloride	<1.0		1	02/17/99	
Bromomethane	<1.0		1	02/17/99	
Chloroethane	<1.0		1	02/17/99	
Acetone	<10.		1	02/17/99	
1,1-Dichloroethene	<.50		1	02/17/99	
Methylene chloride	<.50		1	02/17/99	
Carbon disulfide	~~J .10~~ J .10		1	02/17/99	
trans-1,2-Dichloroethene	<.50		1	02/17/99	
1,1-Dichloroethane	<.50		1	02/17/99	
2-Butanone	<10.		1	02/17/99	
cis-1,2-Dichloroethene	<.50		1	02/17/99	
Chloroform	<.50		1	02/17/99	
1,2-Dichloroethane	<.50		1	02/17/99	
1,1,1-Trichloroethane	<.50		1	02/17/99	
Carbon tetrachloride	<.50		1	02/17/99	
Benzene	<.50		1	02/17/99	
1,2-Dichloropropane	<.50		1	02/17/99	
Trichloroethene	<.50		1	02/17/99	
Bromodichloromethane	<.50		1	02/17/99	
cis-1,3-Dichloropropene	<.50		1	02/17/99	
4-Methyl-2-pentanone	<5.0		1	02/17/99	
trans-1,3-Dichloropropene	<.50		1	02/17/99	
1,1,2-Trichloroethane	<.50		1	02/17/99	
Toluene	<.50		1	02/17/99	
Dibromochloromethane	<.50		1	02/17/99	
2-Hexanone	<5.0		1	02/17/99	
Tetrachloroethene	<.50		1	02/17/99	
Chlorobenzene	<.50		1	02/17/99	

~~# 3-10-99 <0.50 no edit~~

- Outside control limits J-Estimated value

Edits
3-10-99

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5553
Samp. Description: Equipment Blank
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/17/99	
Bromoform	<.50		1	02/17/99	
Xylene (total)	<.50		1	02/17/99	
Styrene	<.50		1	02/17/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/17/99	
1,2-Dichloroethane-d4 (surrogate)	94.%	80-135	1	02/17/99	
Dibromofluoromethane (surrogate)	94.%	61-136	1	02/17/99	
Toluene-d8 (surrogate)	92.%	84-114	1	02/17/99	
Bromofluorobenzene (surrogate)	90.%	77-117	1	02/17/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

)perator ID: SG Date Acquired: 17 Feb 1999 17:14
a File: C:\HPCHEM\1\DATA\J3699.D
ne: K5553
lisc: Equipment Blank
ethod: C:\HPCHEM\1\METHODS\J217TCLW.M (RTE Integrator)
le: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
ibrary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc

J3699.D J217TCLW.M Fri Feb 19 09:07:41 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5554
Samp. Description: URS-14D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/17/99	
Vinyl chloride	<1.0		1	02/17/99	
Bromomethane	<1.0		1	02/17/99	
Chloroethane	<1.0		1	02/17/99	
Acetone	<10.		1	02/17/99	
1,1-Dichloroethene	<.50		1	02/17/99	
Methylene chloride	<.50		1	02/17/99	
Carbon disulfide	1.1		1	02/17/99	
trans-1,2-Dichloroethene	<.50		1	02/17/99	
1,1-Dichloroethane	<.50		1	02/17/99	
2-Butanone	<10.		1	02/17/99	
cis-1,2-Dichloroethene	<.50		1	02/17/99	
Chloroform	<.50		1	02/17/99	
1,2-Dichloroethane	<.50		1	02/17/99	
1,1,1-Trichloroethane	<.50		1	02/17/99	
Carbon tetrachloride	<.50		1	02/17/99	
Benzene	<.50		1	02/17/99	
1,2-Dichloropropane	<.50		1	02/17/99	
Trichloroethene	<.50		1	02/17/99	
Bromodichloromethane	<.50		1	02/17/99	
cis-1,3-Dichloropropene	<.50		1	02/17/99	
4-Methyl-2-pentanone	<5.0		1	02/17/99	
trans-1,3-Dichloropropene	<.50		1	02/17/99	
1,1,2-Trichloroethane	<.50		1	02/17/99	
Toluene	<.50		1	02/17/99	
Dibromochloromethane	<.50		1	02/17/99	
2-Hexanone	<5.0		1	02/17/99	
Tetrachloroethene	<.50		1	02/17/99	
Chlorobenzene	<.50		1	02/17/99	

3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5554
Samp. Description: URS-14D
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50 J		1	02/17/99	
Bromoform	<.50 J		1	02/17/99	
Xylene (total)	<.50 J		1	02/17/99	
Styrene	<.50 J		1	02/17/99	
1,1,2,2-Tetrachloroethane	<.50 J		1	02/17/99	
1,2-Dichloroethane-d4 (surrogate)	90.%	80-135	1	02/17/99	
Dibromofluoromethane (surrogate)	90.%	61-136	1	02/17/99	
Toluene-d8 (surrogate)	89.%	84-114	1	02/17/99	
Bromofluorobenzene (surrogate)	83.%	77-117	1	02/17/99	

Notes:

Edit 3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 17 Feb 1999 17:51
ta File: C:\HPCHEM\1\DATA\J3700.D
me: K5554
Misc: URS-14D
Method: C:\HPCHEM\1\METHODS\J217TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name		RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
~~drochloric Acid~~	1	5.61	1.7	ug/L	285267	ISTD01	14.97	1630620	10.0
Sulfur dioxide ✓	2	5.94	3.9	ug/L	638502	ISTD01	14.97	1630620	10.0
1-Propanethiol ✓	3	12.62	1.3	ug/L	204761	ISTD01	14.97	1630620	10.0

J3700.D J217TCLW.M Fri Feb 19 09:07:59 1999

1 Unknown
2 ✓
3 ✓

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

'lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5555
Samp. Description: URS-14I
nstrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/17/99	
Vinyl chloride	<1.0		1	02/17/99	
Bromomethane	<1.0		1	02/17/99	
Chloroethane	<1.0		1	02/17/99	
Acetone	<10.		1	02/17/99	
1,1-Dichloroethene	<.50		1	02/17/99	
Methylene chloride	<.50		1	02/17/99	
Carbon disulfide	~~J .28~~ <0.50		1	02/17/99	
trans-1,2-Dichloroethene	<.50		1	02/17/99	
1,1-Dichloroethane	<.50		1	02/17/99	
2-Butanone	<10.		1	02/17/99	
cis-1,2-Dichloroethene	<.50		1	02/17/99	
Chloroform	<.50		1	02/17/99	
1,2-Dichloroethane	<.50		1	02/17/99	
1,1,1-Trichloroethane	<.50		1	02/17/99	
Carbon tetrachloride	<.50		1	02/17/99	
Benzene	<.50		1	02/17/99	
1,2-Dichloropropane	<.50		1	02/17/99	
Trichloroethene	<.50		1	02/17/99	
Bromodichloromethane	<.50		1	02/17/99	
cis-1,3-Dichloropropene	<.50		1	02/17/99	
4-Methyl-2-pentanone	<5.0		1	02/17/99	
trans-1,3-Dichloropropene	<.50		1	02/17/99	
1,1,2-Trichloroethane	<.50		1	02/17/99	
Toluene	<.50		1	02/17/99	
Dibromochloromethane	<.50		1	02/17/99	
2-Hexanone	<5.0		1	02/17/99	
Tetrachloroethene	<.50		1	02/17/99	
Chlorobenzene	<.50		1	02/17/99	

Edits
3-10-99

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5555
Samp. Description: URS-14I
Instrument: HP5973 GCMS#3
Units: ug/L
Number of analytes: 38

Collected: 02/05/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/17/99	
Bromoform	<.50		1	02/17/99	
Xylene (total)	<.50		1	02/17/99	
Styrene	<.50		1	02/17/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/17/99	
1,2-Dichloroethane-d4 (surrogate)	85.%	80-135	1	02/17/99	
Dibromofluoromethane (surrogate)	89.%	61-136	1	02/17/99	
Toluene-d8 (surrogate)	76.%	# 84-114	1	02/17/99	
Bromofluorobenzene (surrogate)	81.%	77-117	1	02/17/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 17 Feb 1999 18:29
ta File: C:\HPCHEM\1\DATA\J3701.D
me: K5555
Misc: URS-14I
Method: C:\HPCHEM\1\METHODS\J217TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
lfur dioxide J	5.94	2.5	ug/L	406050	ISTD01	14.97	1609470	10.0

J3701.D J217TCLW.M Fri Feb 19 09:08:10 1999

O'Brien & Gere Laboratories,Inc.

Analytical Results Method: 8260

'lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ɔample: K5556
Samp. Description: QC Trip Blank
ɪstrument: HP5973 GCMS#3
Jnits: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Chloromethane	<1.0		1	02/17/99	
Vinyl chloride	<1.0		1	02/17/99	
Bromomethane	<1.0		1	02/17/99	
Chloroethane	<1.0		1	02/17/99	
Acetone	<10.		1	02/17/99	
1,1-Dichloroethene	<.50		1	02/17/99	
Methylene chloride	<.50		1	02/17/99	
Carbon disulfide	<.50		1	02/17/99	
trans-1,2-Dichloroethene	<.50		1	02/17/99	
1,1-Dichloroethane	<.50		1	02/17/99	
2-Butanone	<10.		1	02/17/99	
cis-1,2-Dichloroethene	<.50		1	02/17/99	
Chloroform	<.50		1	02/17/99	
1,2-Dichloroethane	<.50		1	02/17/99	
1,1,1-Trichloroethane	<.50		1	02/17/99	
Carbon tetrachloride	<.50		1	02/17/99	
Benzene	<.50		1	02/17/99	
1,2-Dichloropropane	<.50		1	02/17/99	
Trichloroethene	<.50		1	02/17/99	
Bromodichloromethane	<.50		1	02/17/99	
cis-1,3-Dichloropropene	<.50		1	02/17/99	
4-Methyl-2-pentanone	<5.0		1	02/17/99	
trans-1,3-Dichloropropene	<.50		1	02/17/99	
1,1,2-Trichloroethane	<.50		1	02/17/99	
Toluene	<.50		1	02/17/99	
Dibromochloromethane	<.50		1	02/17/99	
2-Hexanone	<5.0		1	02/17/99	
Tetrachloroethene	<.50		1	02/17/99	
Chlorobenzene	<.50		1	02/17/99	

- Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

O'Brien & Gere Laboratories, Inc.

Analytical Results Method: 8260

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5556
amp. Description: QC Trip Blank
strument: HP5973 GCMS#3
nits: ug/L
Number of analytes: 38

Collected: 02/03/99
Received: 02/05/99
Prepared: 02/17/99

Matrix: Water
QC Batch: 021799W1
%Solids:
Purge volume: 25 mL

Parameter	Result	Surrog Limits	Dilution	Analyzed	Notes
Ethylbenzene	<.50		1	02/17/99	
Bromoform	<.50		1	02/17/99	
Xylene (total)	<.50		1	02/17/99	
Styrene	<.50		1	02/17/99	
1,1,2,2-Tetrachloroethane	<.50		1	02/17/99	
1,2-Dichloroethane-d4 (surrogate)	105.%	80-135	1	02/17/99	
Dibromofluoromethane (surrogate)	108.%	61-136	1	02/17/99	
Toluene-d8 (surrogate)	107.%	84-114	1	02/17/99	
Bromofluorobenzene (surrogate)	99.%	77-117	1	02/17/99	

Notes:

Outside control limits J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

)erator ID: SG Date Acquired: 17 Feb 1999 16:37
:a File: C:\HPCHEM\1\DATA\J3698.D
ne: K5556
.sc: QC Trip Blank
:thod: C:\HPCHEM\1\METHODS\J217TCLW.M (RTE Integrator)
:le: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
.orary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc

J3698.D J217TCLW.M Fri Feb 19 09:07:28 1999

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

ient: Frontier Chemical
roject: Pendleton Site
-oj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5544
amp. Description: URS-9D
nits: mg/L

Collected: 02/03/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	200.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	.07	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	72.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	.01	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	J
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	38.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5545
Samp. Description: URS-9I
Units: mg/L

Collected: 02/03/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	.2	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	160.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	.59	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	70.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	.05	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	J
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	39.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

Estimated value

Authorized: Thomas E. Alexander
Date: February 19, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5546
Samp. Description: Blind Duplicate
Units: mg/L

Collected: 02/03/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method		Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	<.1	6010		02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010		02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010		02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010		02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010		02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010		02/18/99	02/18/99	021899W1	1	
Calcium	200.	6010		02/18/99	02/18/99	021899W1	1	
Chromium	<.01	6010		02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010		02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010		02/18/99	02/18/99	021899W1	1	
Iron	.07	6010		02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010		02/18/99	02/18/99	021899W1	1	
Magnesium	72.	6010		02/18/99	02/18/99	021899W1	1	
Manganese	.01	6010		02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470		02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010		02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010		02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	J	02/18/99	02/18/99	021899W1	1	
Silver	<.01	6010		02/18/99	02/18/99	021899W1	1	
Sodium	38.	6010		02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841		02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010		02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010		02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

J Estimated value

Authorized: Thomas C Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5547
Samp. Description: 88-12D
nits: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	630.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	.09	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	.65	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	160.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	.05	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	.07	6010	02/18/99	02/18/99	021899W1	1	
Potassium	9.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	250.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

-Estimated value

Authorized: Thomas A. Alexander
Date: February 19, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Trace Metals

lient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5548
Samp. Description: 88-12C
nits: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	.6	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	.012	6010	02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	76.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	.02	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	1.6	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	100.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	.04	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	42.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

ent: Frontier Chemical
roject: Pendleton Site
roj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5553
amp. Description: Equipment Blank
its: mg/L

Collected: 02/05/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	<.02	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	<.1	6010	02/18/99	02/18/99	021899W1	1	
Chromium	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	<.05	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	<.3	6010	02/18/99	02/18/99	021899W1	1	
Manganese	<.01	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	J
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	<.3	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

EDD
3-10-99

-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

ient: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

ample: K5554
Samp. Description: URS-14D
nits: mg/L

Collected: 02/05/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	.04	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	280.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	.08	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	71.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	<.01	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	48.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit
3-10-99

-Estimated value

Authorized: Thomas A Alexander
Date: February 19, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5555
Samp. Description: URS-14I
Units: mg/L

Collected: 02/05/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum	.3	6010	02/18/99	02/18/99	021899W1	1	
Antimony	<.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic	.005	6010	02/18/99	02/18/99	021899W1	1	
Barium	.04	6010	02/18/99	02/18/99	021899W1	1	
Beryllium	<.003	6010	02/18/99	02/18/99	021899W1	1	
Cadmium	<.001	6010	02/18/99	02/18/99	021899W1	1	
Calcium	26.	6010	02/18/99	02/18/99	021899W1	1	
Chromium	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt	<.025	6010	02/18/99	02/18/99	021899W1	1	
Copper	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron	.32	6010	02/18/99	02/18/99	021899W1	1	
Lead	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium	23.	6010	02/18/99	02/18/99	021899W1	1	
Manganese	<.01	6010	02/18/99	02/18/99	021899W1	1	
Mercury	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium	6.	6010	02/18/99	02/19/99	021899W1	1	
Selenium	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium	54.	6010	02/18/99	02/18/99	021899W1	1	
Thallium	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

J

Elk 3-10-99

J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5557
Samp. Description: 85-7R (Field Filtered)
Units: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony, filtered	~~<.06~~ <.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Beryllium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cadmium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Calcium, filtered	400.	6010	02/18/99	02/18/99	021899W1	1	
Chromium, filtered	.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Copper, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron, filtered	.17	6010	02/18/99	02/18/99	021899W1	1	
Lead, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium, filtered	140.	6010	02/18/99	02/18/99	021899W1	1	
Manganese, filtered	.08	6010	02/18/99	02/18/99	021899W1	1	
Mercury, filtered	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium, filtered	6.	6010	02/18/99	02/19/99	021899W1	1	
Selenium, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	J
Silver, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium, filtered	74.	6010	02/18/99	02/18/99	021899W1	1	
Thallium, filtered	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

Edit 3-10-99

Edits 3-10-99

J -Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5558
Samp. Description: URS-7D (Field Filtered)
Units: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony, filtered	~~<.06~~ <.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Beryllium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cadmium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Calcium, filtered	400.	6010	02/18/99	02/18/99	021899W1	1	
Chromium, filtered	.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Copper, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron, filtered	.10	6010	02/18/99	02/18/99	021899W1	1	
Lead, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium, filtered	130.	6010	02/18/99	02/18/99	021899W1	1	
Manganese, filtered	.05	6010	02/18/99	02/18/99	021899W1	1	
Mercury, filtered	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium, filtered	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	J
Silver, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium, filtered	74.	6010	02/18/99	02/18/99	021899W1	1	
Thallium, filtered	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

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Edits 3-10-99

J-Estimated value

Authorized: Thomas C. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5559
Samp. Description: 85-5R (Field Filtered)
Units: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony, filtered	<.005 ~~<.06~~	6010	02/18/99	02/18/99	021899W1	1	
Arsenic, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Beryllium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cadmium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Calcium, filtered	130.	6010	02/18/99	02/18/99	021899W1	1	
Chromium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Copper, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Lead, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium, filtered	59.	6010	02/18/99	02/18/99	021899W1	1	
Manganese, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Mercury, filtered	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Potassium, filtered	<5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium, filtered	52.	6010	02/18/99	02/18/99	021899W1	1	
Thallium, filtered	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

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J-Estimated value

Authorized: Thomas A. Alexander
Date: February 19,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Trace Metals

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5560
Samp. Description: URS-5D (Field Filtered)
Units: mg/L

Collected: 02/04/99
Received: 02/05/99

Matrix: Water
%Solids:
Number of analytes: 23

Parameter	Result	Method	Prepared	Analyzed	QC Batch	Dilut.	Note
Aluminum, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Antimony, filtered	~~<.06~~ <.005	6010	02/18/99	02/18/99	021899W1	1	
Arsenic, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Barium, filtered	<.1	6010	02/18/99	02/18/99	021899W1	1	
Beryllium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cadmium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Calcium, filtered	510.	6010	02/18/99	02/18/99	021899W1	1	
Chromium, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Cobalt, filtered	.85	6010	02/18/99	02/18/99	021899W1	1	
Copper, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Iron, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Lead, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Magnesium, filtered	76.	6010	02/18/99	02/18/99	021899W1	1	
Manganese, filtered	.07	6010	02/18/99	02/18/99	021899W1	1	
Mercury, filtered	<.0002	7470	02/17/99	02/17/99	021799W1	1	
Nickel, filtered	.09	6010	02/18/99	02/18/99	021899W1	1	
Potassium, filtered	5.	6010	02/18/99	02/19/99	021899W1	1	
Selenium, filtered	<.005	6010	02/18/99	02/18/99	021899W1	1	
Silver, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	
Sodium, filtered	120.	6010	02/18/99	02/18/99	021899W1	1	
Thallium, filtered	<.001	7841	02/18/99	02/18/99	021899W2	1	
Vanadium, filtered	<.05	6010	02/18/99	02/18/99	021899W1	1	
Zinc, filtered	<.01	6010	02/18/99	02/18/99	021899W1	1	

Notes:

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J-Estimated value

Authorized: Thomas Alexander
Date: February 19, 1999

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Wet Chemistry

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5544
Samp. Description: URS-9D

Collected: 02/03/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5545
Samp. Description: URS-9I

Collected: 02/03/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5546
Samp. Description: Blind Duplicate

Collected: 02/03/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

-Estimated value

Authorized: Thomas A. Alexander
Date: February 21,1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Wet Chemistry

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5547
Samp. Description: 88-12D

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5548
Samp. Description: 88-12C

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5549
Samp. Description: 85-7R

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

·Estimated value

Authorized: Thomas A. Alexander
Date: February 21, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Wet Chemistry

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5550
Samp. Description: URS-7D

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5551
Samp. Description: 85-5R

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5552
Samp. Description: URS-5D

Collected: 02/04/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

-Estimated value

Authorized: Thomas A. Alexander
Date: February 21, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories, Inc.

Analytical Results Wet Chemistry

Client: Frontier Chemical
Project: Pendleton Site
Proj. Desc: Niagara County, NY

Job No.: 5829.001.517
Certification NY No.: 10155

Sample: K5553
Samp. Description: Equipment Blank

Collected: 02/05/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5554
Samp. Description: URS-14D

Collected: 02/05/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/12/99	02/16/99	021299W21	

Notes:

Sample: K5555
Samp. Description: URS-14I

Collected: 02/05/99
Received: 02/05/99 13:50

Matrix: Water

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Total cyanide	<.01	mg/L	9010B/9014	02/16/99	02/16/99	021299W21	

Notes:

Estimated value

Authorized: Thomas Alexander
Date: February 21, 1999 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Quality Control Results

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Matrix Spike/Matrix Spike Duplicate
Method: 8260

Sample: K5554
Samp. Description: URS-14D
Units: ug/L
Instrument: HP5973 GCMS#3

Matrix: Water

%Solids:
Number of analytes: 38

Parameter	Dilution	Result	Spike Added	MS Value	%R	MSD Value	%R	%R Limits	RPD	RPD Limits	Note
Chloromethane	1	<1	10	8.72	87	9.33	93	78-122	7	0-13	
Vinyl chloride	1	<1	10	9.09	91	9.31	93	85-123	2	0-13	
Bromomethane	1	<1	10	8.87	89	9.61	96	71-127	8	0-16	
Chloroethane	1	<1	10	8.87	89	8.97	90	88-121	1	0-13	
Acetone	1	<10	20	18.89	94	20.71	104	46-151	9	0-28	
1,1-Dichloroethene	1	<.5	10	7.84 #	78	8.3 #	83	85-124	6	0-10	
Methylene chloride	1	<.5	10	9.05	91	9.52	95	81-116	5	0-10	
Carbon disulfide	1	1.11	10	24.21 #	231	22.24 #	211	80-130	8	0-10	
trans-1,2-Dichloroethene	1	<.5	10	8.7 #	87	9.21	92	90-118	6	0-10	
1,1-Dichloroethane	1	<.5	10	9.12	91	9.51	95	91-120	4	0-11	
2-Butanone	1	<10	20	19.17	96	21.01	105	77-129	9	0-25	
cis-1,2-Dichloroethene	1	<.5	10	9.1	91	9.46	95	88-118	4	0-12	
Chloroform	1	<.5	10	8.8	88	9.18	92	87-116	4	0-10	
1,2-Dichloroethane	1	<.5	10	8.83	88	9.43	94	82-115	7	0-12	
1,1,1-Trichloroethane	1	<.5	10	8.94 #	89	9.43	94	91-120	5	0-11	
Carbon tetrachloride	1	<.5	10	12.45 #	125	12.9 #	129	93-120	4	0-10	
Benzene	1	<.5	10	9.38	94	9.87	99	89-118	5	0-10	
1,2-Dichloropropane	1	<.5	10	9.25	93	9.67	97	90-113	4	0-10	
Trichloroethene	1	<.5	10	8.91	89	9.55	96	84-120	7	0-11	
Bromodichloromethane	1	<.5	10	16.78 #	168	17.64 #	176	87-117	5	0-10	
cis-1,3-Dichloropropene	1	<.5	10	5.88 #	59	5.57 #	56	87-117	5	0-10	
4-Methyl-2-pentanone	1	<5	20	17.66	88	18.75	94	67-137	6	0-16	

J-Estimated value #-Outside limits

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Matrix Spike/Matrix Spike Duplicate
Method: 8260

Sample: K5554
Samp. Description: URS-14D
Units: ug/L
Instrument: HP5973 GCMS#3

Matrix: Water

%Solids:
Number of analytes: 38

Parameter	Dilution	Result	Spike Added	MS Value	%R	MSD Value	%R	%R Limits	RPD	RPD Limits	Note
trans-1,3-Dichloropropene	1	<.5	10	5.25 #	53	5.03 #	50	84-122	4	0-12	
1,1,2-Trichloroethane	1	<.5	10	9.36	94	9.66	97	84-123	3	0-12	
Toluene	1	<.5	10	9.74	97	10.35	104	88-120	6	0-10	
Dibromochloromethane	1	<.5	10	17.03 #	170	17.52 #	175	84-119	3	0-11	
2-Hexanone	1	<5	20	17.95	90	20.21	101	63-143	12	0-16	
Tetrachloroethene	1	<.5	10	9.34	93	9.85	99	88-119	5	0-11	
Chlorobenzene	1	<.5	10	9.09	91	9.63	96	85-116	6	0-10	
Ethylbenzene	1	<.5	10	9.29	93	9.77	98	89-119	5	0-10	
Bromoform	1	<.5	10	19.55 #	196	19.5 #	195	72-126	0	0-13	
Xylene (total)	1	<.5	30	28.44	95	30.01	100	88-118	5	0-10	
Styrene	1	<.5	10	3.41 #	34	3.61 #	36	86-116	6	0-10	
1,1,2,2-Tetrachloroethane	1	<.5	10	9.11	91	9.82	98	76-132	8	0-13	
1,2-Dichloroethane-d4 (surrogate)	1	89.63%			91		92	80-135			
Dibromofluoromethane (surrogate)	1	90%			93		97	61-136			
Toluene-d8 (surrogate)	1	89.06%			93		99	84-114			
Bromofluorobenzene (surrogate)	1	82.56%			91		95	77-117			

Notes:

J-Estimated value #-Outside limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Matrix Spike/Matrix Spike Duplicate
Trace Metals

Sample: K5554
Samp. Description: URS-14D

Matrix: Water Units: mg/L
% Solids: Number of analytes: 23

Parameter	MS Result	Sample Result	Spike Added	MSD Result	MS %R		MSD %R	MS/MSD Limits	RPD	RPD Limits	Method	Note
Aluminum	.9342	<.1	1.000	.9426	93		94	82-116	1	0-15	6010	
Antimony	.1922	<.005	.200	.1904	96		95	78-110	1	0-10	6010	
Arsenic	.1917	<.005	.200	.1937	96		97	83-109	1	0-10	6010	
Barium	.2247	.0367	.200	.2248	94		94	81-108	0	0-10	6010	
Beryllium	.1848	<.003	.200	.1849	92		92	81-114	0	0-10	6010	
Cadmium	.1789	<.001	.200	.1799	89		90	75-104	1	0-10	6010	
Calcium	285.0000	276.1	10.000	282.0000	89	#	59	65-123	1	0-10	6010	35
Chromium	.1935	<.01	.200	.1938	97		97	79-112	0	0-10	6010	
Cobalt	.1782	<.025	.200	.1792	89		90	81-106	1	0-10	6010	
Copper	.2002	<.01	.200	.2000	100		100	87-110	0	0-10	6010	
Iron	.9965	.0773	1.000	.9888	92		91	70-117	1	0-10	6010	
Lead	.1845	<.005	.200	.1855	92		93	81-111	1	0-10	6010	
Magnesium	80.6600	71.11	10.000	79.9700	96		89	69-119	1	0-10	6010	
Manganese	.1969	<.01	.200	.1970	98		99	76-110	0	0-10	6010	
Mercury	.0011	<.0002	.001	.0010	111		101	73-131	9	0-19	7470	
Nickel	.1819	<.05	.200	.1840	91		92	80-110	1	0-10	6010	
Potassium	13.3930	J3.1926	10.000	13.5880	102		104	71-130	1	0-10	6010	
Selenium	.0642	<.005	.200	.0746	# 32	#	37	78-115	15	0-19	6010	2
Silver	.0468	<.01	.050	.0471	94		94	82-103	1	0-10	6010	
Sodium	57.9300	47.71	10.000	57.3000	102		96	70-143	1	0-10	6010	
Thallium	.0452	<.001	.050	.0431	90		86	64-122	5	0-10	7841	
Vanadium	.1883	<.05	.200	.1888	94		94	80-110	0	0-10	6010	
Zinc	.1926	<.01	.200	.1931	96		97	82-105	0	0-10	6010	

Notes:
2: Low recovery due to matrix interference.
35: Sample concentration was much greater than the concentration of the analyte in the spike.

J-Estimated value #-Outside limits

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Brien & Gere
ıboratories,Inc.

Quality Control Summary
Post Digestion Spike
Trace Metals

ample: K5554
np. Description: URS-14D

Matrix: Water Units: mg/L
% Solids: Number of analytes: 22

Parameter	MS Result	Sample Result	Spike Added	MS %R	%R Limits	Method
Aluminum	.9848	<.1	1.000	98	82-116	6010
Antimony	.1978	<.005	.200	99	78-110	6010
Arsenic	.1957	<.005	.200	98	83-109	6010
Barium	.2271	.0367	.200	95	81-108	6010
Beryllium	.1970	<.003	.200	93	81-114	6010
Cadmium	.1803	<.001	.200	91	75-104	6010
Calcium	281.6000	276.1	10.000 #	55	65-123	6010
Chromium	.1970	<.01	.200	9	79-112	6010
Cobalt	.1820	<.025	.200	91	81-106	6010
Copper	.2023	<.01	.200	101	87-110	6010
Iron	1.0232	.0773	1.000	95	70-117	6010
Lead	.1888	<.005	.200	94	81-111	6010
Magnesium	80.0800	71.11	10.000	90	69-119	6010
Manganese	.2001	<.01	.200	100	76-110	6010
Nickel	.1854	<.05	.200	93	80-110	6010
Potassium	13.8480	J3.1926	10.000	107	71-130	6010
Selenium	.1878	<.005	.200	94	78-115	6010
Silver	.0478	<.01	.050	96	82-103	6010
Sodium	57.8900	47.71	10.000	102	70-143	6010
Thallium	.1897	<.005	.200	95	85-110	6010
Vanadium	.1913	<.05	.200	96	80-110	6010
Zinc	.1974	<.01	.200	99	82-105	6010

J-Estimated value #-Outside limits

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O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Duplicates
Trace Metals

Sample: K5554
Samp. Description: URS-14D

Matrix: Water
%Solids:

Units: mg/L
Number of analytes: 23

Parameter	Sample Result	Duplicate Result	RPD	RPD Limits	Method	Note
Aluminum	<.1	<.1			6010	
Antimony	<.005	<.005			6010	
Arsenic	<.005	<.005			6010	
Barium	.0367	.0364	1	0-11	6010	
Beryllium	<.003	<.003			6010	
Cadmium	<.001	<.001			6010	
Calcium	276.1	275.2	0	0-10	6010	
Chromium	<.01	<.01			6010	
Cobalt	<.025	<.025			6010	
Copper	<.01	<.01			6010	
Iron	.0773	.0974	# 23	0-16	6010	42
Lead	<.005	<.005			6010	
Magnesium	71.11	70.88	0	0-10	6010	
Manganese	<.01	<.01			6010	
Mercury	<.0002	<.0002			7470	
Nickel	<.05	<.05			6010	
Potassium	J3.1926	<5			6010	
Selenium	<.005	<.005			6010	
Silver	<.01	<.01			6010	
Sodium	47.71	47.89	0	0-10	6010	
Thallium	<.001	<.001			7841	
Vanadium	<.05	<.05			6010	
Zinc	<.01	<.01			6010	

Notes:
42: Sample result is less than 5xPQL and the difference between sample/duplicate is less than PQL

J-Estimated value #-Outside limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Matrix Spike/Matrix Spike Duplicate
Wet Chemistry

Sample: K5554
Samp. Description: URS-14D

Matrix: Water
Number of analytes: 1

Parameter	MS Result	Sample Result	Spike Added	MSD Result	%R	MS/MSD Limits	MSD %R	RPD	RPD Limits	Units	Method	Note
Total cyanide	.0630	<.01	.050		126	70-131				mg/L	9010B/9014	

Notes:

J-Estimated value #-Outside limits

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O'Brien & Gere Laboratories, Inc.

Quality Control Summary
Duplicates
Wet Chemistry

Sample: K5554
Samp. Description: URS-14D

Number of analytes: 1

Parameter	Sample Result	Duplicate Result	RPD	RPD Limits	Units	Note
Total cyanide	<.01	<.01			mg/L	

Notes:

-Estimated value #-Outside limits

Brien & Gere
boratories, Inc.

Quality Control Summary
Laboratory Control Sample
GC/MS Volatile Organics

aple: L021299W1
alyzed: 02/12/99

QC Batch: 021299W1
Instrument: HP5973 GCMS#3
Number of analytes: 38

Parameter	LCS Result	Spike Added	Units	%R	QC Limits	Note
Chloromethane	3.5400	4	ug/L	89	63-122	
Vinyl chloride	3.8400	4	ug/L	96	62-134	
Bromomethane	3.6600	4	ug/L	92	52-141	
Chloroethane	3.9100	4	ug/L	98	74-128	
Acetone	4.6300	4	ug/L	116	42-155	
1,1-Dichloroethene	4.0200	4	ug/L	101	89-135	
Methylene chloride	3.7900	4	ug/L	95	82-125	
Carbon disulfide	4.2100	4	ug/L	105	74-133	
trans-1,2-Dichloroethene	3.9900	4	ug/L	100	84-147	
1,1-Dichloroethane	4.1200	4	ug/L	103	84-129	
2-Butanone	3.4500	4	ug/L	86	62-135	
cis-1,2-Dichloroethene	4.0700	4	ug/L	102	70-131	
Chloroform	3.9400	4	ug/L	99	84-123	
1,2-Dichloroethane	4.3400	4	ug/L	109	80-124	
1,1,1-Trichloroethane	4.2500	4	ug/L	106	85-137	
Carbon tetrachloride	4.2400	4	ug/L	106	88-134	
Benzene	4.1000	4	ug/L	103	84-126	
1,2-Dichloropropane	4.1600	4	ug/L	104	86-122	
Trichloroethene	4.1400	4	ug/L	104	87-131	
Bromodichloromethane	4.0900	4	ug/L	102	86-123	
cis-1,3-Dichloropropene	4.2300	4	ug/L	106	76-139	
-Methyl-2-pentanone	3.3000	4	ug/L	83	62-131	
rans-1,3-Dichloropropene	4.0800	4	ug/L	102	73-146	
2-Trichloroethane	3.9300	4	ug/L	98	80-126	
ene	4.2500	4	ug/L	106	87-126	
Dib omochloromethane	3.9900	4	ug/L	100	79-122	
2-He anone	3.7800	4	ug/L	95	58-127	
Tetrachloroethene	4.2100	4	ug/L	105	82-132	
Chlorobenzene	4.0700	4	ug/L	102	86-122	
Ethylbenzene	4.1900	4	ug/L	105	80-127	
Bromoform	3.9400	4	ug/L	99	75-128	
Xylene (total)	13.0200	12	ug/L	109	78-128	
Styrene	3.6600	4	ug/L	92	79-124	
1,1,2,2-Tetrachloroethane	4.1200	4	ug/L	103	71-128	
1,2-Dichloroethane-d4 (surrogate)			%	96	80-135	
Dibromofluoromethane (surrogate)			%	97	61-136	
Toluene-d8 (surrogate)			%	102	84-114	
Bromofluorobenzene (surrogate)			%	97	77-117	

Notes:

- Outside control limits

O'Brien & Gere Laboratories, Inc.

Quality Control Summary Laboratory Control Sample Trace Metals

Sample: L021899W1
Analyzed: 02/18/99
Units: mg/L

QC Batch: 021899W1
Number of analytes: 26

Parameter	LCS Result	Spike Added	%R	QC Limits	Instrument Note
Aluminum	.9177	1	92	86-117	ICAP-61
Antimony	.9608	1	96	85-108	ICAP-61
Arsenic	.9672	1	97	89-105	ICAP-61
Barium	.9841	1	98	90-104	ICAP-61
Beryllium	.9564	1	96	90-111	ICAP-61
Boron	.9568	1	96	88-108	ICAP-61
Cadmium	.9594	1	96	89-104	ICAP-61
Calcium	9.5650	10	96	88-106	ICAP-61
Chromium	.9724	1	97	91-104	ICAP-61
Cobalt	.9702	1	97	91-107	ICAP-61
Copper	.9999	1	100	92-108	ICAP-61
Iron	.9722	1	97	89-108	ICAP-61
Lead	.9635	1	96	91-107	ICAP-61
Magnesium	9.5780	10	96	89-103	ICAP-61
Manganese	.9841	1	98	91-104	ICAP-61
Molybdenum	1.0069	1	101	91-107	ICAP-61
Nickel	.9797	1	98	91-107	ICAP-61
Selenium	.9218	1	92	88-108	ICAP-61
Silver	.1918	.2	96	84-106	ICAP-61
Sodium	9.5870	10	96	92-106	ICAP-61
Strontium	.9901	1	99	90-105	ICAP-61
Thallium	.9566	1	96	91-107	ICAP-61
Tin	.9977	1	100	81-117	ICAP-61
Titanium	.9931	1	99	92-107	ICAP-61
Vanadium	.9915	1	99	93-106	ICAP-61
Zinc	.9575	1	96	90-105	ICAP-61

Notes:

- Outside control limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary Laboratory Control Sample Trace Metals

Sample: L021899W1
Analyzed: 02/19/99
Units: mg/L

QC Batch: 021899W1
Number of analytes: 1

Parameter	LCS Result	Spike Added	%R	QC Limits	Instrument Note
Potassium	9.5791	10	96	88-106	ICAP-61

Notes:

- Outside control limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary Laboratory Control Sample Trace Metals

Sample: L021899W2
Analyzed: 02/18/99
Units: mg/L

QC Batch: 021899W2
Number of analytes: 1

Parameter	LCS Result	Spike Added	%R	QC Limits	Instrument Note
Thallium	.8924	1	89	82-108	PE5100

Notes:

- Outside control limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary Laboratory Control Sample Trace Metals

Sample: L021799W1
Analyzed: 02/17/99
Units: mg/L

QC Batch: 021799W1
Number of analytes: 1

Parameter	LCS Result	Spike Added	%R	QC Limits	Instrument Note
Mercury	.0055	.005	110	81-114	PE3100

Notes:

- Outside control limits

O'Brien & Gere Laboratories,Inc.

Quality Control Summary Laboratory Control Sample Wet Chemistry

Sample: L021299W21
Analyzed: 02/16/99

QC Batch: 021299W21
Number of parameters: 1

Parameter	LCS Result	Spike Added	Units	%R	QC Limits	Instrument Note
Total cyanide	.3940	.4	mg/L	99	80-120	SPEC 21

Notes:

- Outside control limits

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O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Preparation Blank
GC/MS Volatile Organics

Sample: PB021299W1
Analyzed: 02/12/99

Instrument: HP5973 GCMS#3
Number of analytes: 38

Parameter	Sample Result	Surrog Limits	Det. Limit	Units	QC Batch
Chloromethane	<1.		1	ug/L	021299W1
Vinyl chloride	<1.		1	ug/L	021299W1
Bromomethane	<1.		1	ug/L	021299W1
Chloroethane	<1.		1	ug/L	021299W1
Acetone	<10.		10	ug/L	021299W1
1,1-Dichloroethene	<.50		.5	ug/L	021299W1
Methylene chloride	J .12		.5	ug/L	021299W1
Carbon disulfide	<.50		.5	ug/L	021299W1
trans-1,2-Dichloroethene	<.50		.5	ug/L	021299W1
1,1-Dichloroethane	<.50		.5	ug/L	021299W1
2-Butanone	<10.		10	ug/L	021299W1
cis-1,2-Dichloroethene	<.50		.5	ug/L	021299W1
Chloroform	<.50		.5	ug/L	021299W1
1,2-Dichloroethane	<.50		.5	ug/L	021299W1
1,1,1-Trichloroethane	<.50		.5	ug/L	021299W1
Carbon tetrachloride	<.50		.5	ug/L	021299W1
Benzene	<.50		.5	ug/L	021299W1
1,2-Dichloropropane	<.50		.5	ug/L	021299W1
Trichloroethene	<.50		.5	ug/L	021299W1
Bromodichloromethane	<.50		.5	ug/L	021299W1
cis-1,3-Dichloropropene	<.50		.5	ug/L	021299W1
4-Methyl-2-pentanone	<5.0		5	ug/L	021299W1
trans-1,3-Dichloropropene	<.50		.5	ug/L	021299W1
1,1,2-Trichloroethane	<.50		.5	ug/L	021299W1
Toluene	<.50		.5	ug/L	021299W1
Dibromochloromethane	<.50		.5	ug/L	021299W1
2-Hexanone	<5.0		5	ug/L	021299W1
Tetrachloroethene	<.50		.5	ug/L	021299W1
Chlorobenzene	<.50		.5	ug/L	021299W1
Ethylbenzene	<.50		.5	ug/L	021299W1
Bromoform	<.50		.5	ug/L	021299W1
Xylene (total)	<.50		.5	ug/L	021299W1
Styrene	<.50		.5	ug/L	021299W1
1,1,2,2-Tetrachloroethane	<.50		.5	ug/L	021299W1
1,2-Dichloroethane-d4 (surrogate)	93.	80-135	.1	%	021299W1
Dibromofluoromethane (surrogate)	97.	61-136	.1	%	021299W1
Toluene-d8 (surrogate)	100.	84-114	.1	%	021299W1
Bromofluorobenzene (surrogate)	94.	77-117	.1	%	021299W1

Notes:

- Outside control limits J - Estimated value

Tentatively Identified Compound (LSC) summary

)erator ID: SG Date Acquired: 12 Feb 1999 14:41
.ta File: C:\HPCHEM\1\DATA\J3672.D
.me: PB021299W1
isc: V4286, 87
ethod: C:\HPCHEM\1\METHODS\J212TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
.brary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc

J3672.D J212TCLW.M Tue Feb 16 08:20:45 1999

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Preparation Blank
GC/MS Volatile Organics

Sample: PB021799W1
Analyzed: 02/17/99

Instrument: HP5973 GCMS#3
Number of analytes: 38

Parameter	Sample Result	Surrog Limits	Det. Limit	Units	QC Batch
Chloromethane	<1.		1	ug/L	021799W1
Vinyl chloride	<1.		1	ug/L	021799W1
Bromomethane	<1.		1	ug/L	021799W1
Chloroethane	<1.		1	ug/L	021799W1
Acetone	<10.		10	ug/L	021799W1
1,1-Dichloroethene	<.50		.5	ug/L	021799W1
Methylene chloride	<.50		.5	ug/L	021799W1
Carbon disulfide	<.50		.5	ug/L	021799W1
rans-1,2-Dichloroethene	<.50		.5	ug/L	021799W1
1-Dichloroethane	<.50		.5	ug/L	021799W1
Butanone	<10.		10	ug/L	021799W1
s-1,2-Dichloroethene	<.50		.5	ug/L	021799W1
hloroform	<.50		.5	ug/L	021799W1
,2-Dichloroethane	<.50		.5	ug/L	021799W1
1,1,1-Trichloroethane	<.50		.5	ug/L	021799W1
Carbon tetrachloride	<.50		.5	ug/L	021799W1
Benzene	<.50		.5	ug/L	021799W1
1,2-Dichloropropane	<.50		.5	ug/L	021799W1
Trichloroethene	<.50		.5	ug/L	021799W1
Bromodichloromethane	<.50		.5	ug/L	021799W1
cis-1,3-Dichloropropene	<.50		.5	ug/L	021799W1
4-Methyl-2-pentanone	<5.0		5	ug/L	021799W1
trans-1,3-Dichloropropene	<.50		.5	ug/L	021799W1
1,1,2-Trichloroethane	<.50		.5	ug/L	021799W1
Toluene	<.50		.5	ug/L	021799W1
Dibromochloromethane	<.50		.5	ug/L	021799W1
2-Hexanone	<5.0		5	ug/L	021799W1
Tetrachloroethene	<.50		.5	ug/L	021799W1
Chlorobenzene	<.50		.5	ug/L	021799W1
Ethylbenzene	<.50		.5	ug/L	021799W1
Bromoform	<.50		.5	ug/L	021799W1
Xylene (total)	<.50		.5	ug/L	021799W1
Styrene	<.50		.5	ug/L	021799W1
1,1,2,2-Tetrachloroethane	<.50		.5	ug/L	021799W1
,2-Dichloroethane-d4 (surrogate)	86.	80-135	.1	%	021799W1
Dibromofluoromethane (surrogate)	91.	61-136	.1	%	021799W1
Toluene-d8 (surrogate)	95.	84-114	.1	%	021799W1
Bromofluorobenzene (surrogate)	89.	77-117	.1	%	021799W1

Notes:

- Outside control limits J - Estimated value

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Tentatively Identified Compound (LSC) summary

)erator ID: SG Date Acquired: 17 Feb 1999 15:59
ta File: C:\HPCHEM\1\DATA\J3697.D
me: PB021799W1
isc: V4286, 87
ethod: C:\HPCHEM\1\METHODS\J217TCLW.M (RTE Integrator)
tle: VOC's w/J & W DB-VRX: 0.25 mm x 60 m
ıbrary Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc

J3697.D J217TCLW.M Fri Feb 19 09:07:13 1999

O'Brien & Gere Laboratories, Inc.

Quality Control Summary
Preparation Blank
Trace Metals

Sample: PB021899W1
Units: mg/L
Date analyzed: 02/18/99

QC Batch: 021899W1
Number of analytes: 26

Parameter	Sample Result	Det. Limit	Instrument	Note
Aluminum	<.1	.1000	ICAP-61	
Antimony	<.005	.0050	ICAP-61	
Arsenic	<.005	.0050	ICAP-61	
Barium	<.02	.0200	ICAP-61	
Beryllium	<.003	.0030	ICAP-61	
Boron	<.05	.0500	ICAP-61	
Cadmium	<.001	.0010	ICAP-61	
Calcium	<.1	.1000	ICAP-61	
Chromium	<.01	.0100	ICAP-61	
Cobalt	<.025	.0250	ICAP-61	
Copper	<.01	.0100	ICAP-61	
Iron	<.05	.0500	ICAP-61	
Lead	<.005	.0050	ICAP-61	
Magnesium	<.3	.3000	ICAP-61	
Manganese	<.01	.0100	ICAP-61	
Molybdenum	<.05	.0500	ICAP-61	
Nickel	<.05	.0500	ICAP-61	
Selenium	<.005	.0050	ICAP-61	
Silver	<.01	.0100	ICAP-61	
Sodium	<.3	.3000	ICAP-61	
Strontium	<.05	.0500	ICAP-61	
Thallium	<.005	.0050	ICAP-61	
Tin	<.05	.0500	ICAP-61	
Titanium	<.05	.0500	ICAP-61	
Vanadium	<.05	.0500	ICAP-61	
Zinc	<.01	.0100	ICAP-61	

Notes:

J - Estimated value

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Preparation Blank
Trace Metals

Sample: PB021899W1
Units: mg/L
Date analyzed: 02/19/99

QC Batch: 021899W1
Number of analytes: 1

Parameter	Sample Result	Det. Limit	Instrument	Note
Potassium	<5.	5.000	ICAP-61	

Notes:

J - Estimated value

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Preparation Blank
Trace Metals

Sample: PB021899W2
Units: mg/L
Date analyzed: 02/18/99

QC Batch: 021899W2
Number of analytes: 1

Parameter	Sample Result	Det. Limit	Instrument	Note
Thallium	<.001	.0010	PE5100	

Notes:

J - Estimated value

O'Brien & Gere Laboratories, Inc.

Quality Control Summary
Preparation Blank
Trace Metals

Sample: PB021799W1
Units: mg/L
Date analyzed: 02/17/99

QC Batch: 021799W1
Number of analytes: 1

Parameter	Sample Result	Det. Limit	Instrument	Note
Mercury	<.0002	.0002	PE3100	

Notes:

J - Estimated value

O'Brien & Gere Laboratories,Inc.

Quality Control Summary
Preparation Blank
Wet Chemistry

Sample: PB021299W21
Analyzed: 02/16/99
Number of analytes: 1

Parameter	Sample Result	Det. Limit	Units	QC Batch	Instrument Note
Total cyanide	<.01	.0100	mg/L	021299W21	SPEC 21

Notes:

J - Estimated value

O'BRIEN & GERE Laboratories, Inc.

Volatile Organics Method 8260

Internal Standard Summary

Client:	Frontier Chemical	**CCC Data File:**	J3668.D	**Inst. I.D.:**	#3MS10
Job No.:	5829.001.517	**Date Analyzed:**	2/12/99	**Matrix:**	WATER
Site:					

	Data File	ISTD 1		ISTD 2		ISTD 3	
		Area	R.T.	Area	R.T.	Area	R.T.
CCC STD	J3668.D	834779	14.97	633169	20.52	376371	25.66
Upper Limit		1669558	15.47	1266338	21.02	752742	26.16
Lower Limit		417390	14.47	316585	20.02	188186	25.16
Sample No.							
L021299W1	J3671.D	822984	14.97	628686	20.52	369710	25.67
PB021299W1	J3672.D	821341	14.98	603331	20.52	354526	25.67
K5544	J3673.D	778298	14.97	583308	20.52	348439	25.67
K5545	J3674.D	819714	14.98	596296	20.52	346372	25.67
K5546	J3675.D	826913	14.98	603011	20.52	348598	25.67
K5547	J3676.D	800328	14.98	590939	20.52	347742	25.67
K5548	J3677.D	817529	14.98	589996	20.52	339057	25.67
K5549	J3678.D	796369	14.97	591720	20.52	339071	25.67
K5550	J3679.D	808092	14.97	586204	20.52	336375	25.67
K5551	J3680.D	806471	14.97	578313	20.52	327950	25.67
K5552	J3681.D	805777	14.97	582237	20.52	328952	25.67

ISTD 1 Fluorobenzene
ISTD 2 Chlorobenzene-d5
ISTD 3 1,4-Dichlorobenzene-d4

O'BRIEN & GERE Laboratories, Inc.

Volatile Organics Method 8260

Internal Standard Summary

Client:	Frontier Chemical	**CCC Data File:**	J3692.D	**Inst. I.D.:**	#3MS10
Job No.:	5829.001.517	**Date Analyzed:**	2/17/99	**Matrix:**	WATER
Site:					

	Data File	ISTD 1		ISTD 2		ISTD 3	
		Area	R.T.	Area	R.T.	Area	R.T.
CCC STD	J3692.D	713526	14.98	551954	20.52	323931	25.67
Upper Limit		1427052	15.48	1103908	21.02	647862	26.17
Lower Limit		356763	14.48	275977	20.02	161966	25.17
Sample No.							
L021799W1	J3696.D	793794	14.98	600086	20.51	356501	25.67
PB021799W1	J3697.D	783170	14.97	572286	20.52	325824	25.67
K5556	J3698.D	777579	14.98	566560	20.52	317676	25.67
K5553	J3699.D	757390	14.97	544031	20.52	308175	25.67
K5554	J3700.D	761046	14.97	547724	20.52	307412	25.67
K5555	J3701.D	739871	14.97	530362	20.52	295794	25.67
'5554MS	J3702.D	766634	14.98	581208	20.51	349506	25.67
5554MSD	J3703.D	760151	14.97	581091	20.52	337508	25.67

ISTD 1 Fluorobenzene
ISTD 2 Chlorobenzene-d5
ISTD 3 1,4-Dichlorobenzene-d4

Chain of Custody

External Chain of Custody

O'Brien & Gere Laboratories, Inc.

3000 Buttonfield Parkway
East Syracuse, New York 13057
(315) 437-0200

Chain of Custody

5891.001.517

Client: O'BRIEN & GERE ENGINEERS INC.
Project: FRONTIER CHEMICAL - PENDLETON SITE
Sampled by: CHAWN ODELL
Client Contact: Jennifer Smith Phone # (315) 457-6100

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Analysis/Method: VOCs (8260)	Method 6000/7000 CN 7471						Comments
URS-9D	02/03/99	1610	WATER	GRAB	5	X	X	X					
URS-9I	02/03/99	1705	WATER	GRAB	5	X	X	X					
BLIND DUPLICATE	02/03/99	—	WATER	GRAB	5	X	X	X					
88-12D	02/04/99	1045	WATER	GRAB	5	X	X	X					
88-12C	02/04/99	1145	WATER	GRAB	5	X	X	X					
85-7R	02/04/99	1430	WATER	GRAB	5	X	X	X					FIELD FILTERED
URS-7D	02/04/99	1445	WATER	GRAB	5	X	X	X					FIELD FILTERED
85-5R	02/04/99	1615	WATER	GRAB	5	X	X	X					FIELD FILTERED
URS-5D	02/04/99	1635	WATER	GRAB	5	X	X	X					FIELD FILTERED
Equipment blank	02/05/99	0830	WATER	GRAB	5	X	X	X					
URS-14D	02/05/99	0900	WATER	GRAB	5	X	X	X					
URS-14D MATRIX SPIKE	02/05/99	0900	WATER	GRAB	3	X	X	X					

Relinquished by: Chawn ODell	Date: 02/05/99	Time: 1350	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Lab: Mark F. Jackson
Shipment Method:			Airbill Number:

Date: 2/5/99 Time: 13:50

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature: 5°C

Original-Laboratory Copy-Client

O'Brien & Gere Laboratories, Inc.

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

Chain of Custody

Client: O'BRIEN & GERE ENGINEERS, INC.

Project: FRONTIER CHEMICAL – PENDLETON SITE

Sampled by: CHAWN O'DELL

Client Contact: Jennifer Smith Phone #(315) 437-6100

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	VOCs (8260)	METALS 6000/7000	CN 7471	Comments
URS-14D MATRIX SPIKE Dup.	02/05/99	0900	WATER	GRAB	5	+	+	+	
URS-14I	02/05/99	0915	WATER	GRAB	5	+	+	+	
TRIP BLANK	02/05/99	—	WATER	GRAB	4	X			

Analysis/Method

Relinquished by: Chawn O'Dell	Date: 02/05/99	Time: 1350	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab: Marlet Jackson	Date: 2/5/99	Time: 13:50
Shipment Method:			Airbill Number:		

Turnaround Time Required:

Routine 7

Rush (Specify)

Comments:

Cooler Temperature: 5°C

Original-Laboratory Copy-Client

SAMPLE CONTROL RECORD

CLIENT: Frontier Chemical JOB #: 5829-001-517 DATE RECEIVED: 02/08/99

package
~~BTN~~ #: 704 PROJECT MANAGER: TAA SAMPLE NUMBER(S): K5544-5560

Laboratory Sample Number	Removed By	Date and Time Removed	Reason	Date and Time Returned
5544-5554	D. SaintAmar	12-12-99 0845	Cyanide	2-12-99 1335
K5544-52	S Guy	12-12-99 1130	8260	12-12-99 16:30
K5552-56	S. Guy	12-17-99 9:30	8260	12-17-99 16:30
5544-48	D ROBERTS	2.17.99 13:00	Hg	2.17.99 16:00
5553-55	D. ROBERTS	2.17.99 13:00	Hg	2.17.99 16:00
5557-60	D. ROBERTS	2.17.99 13:00	Hg	2.17.99 16:00
5544-48 K5553-55, K5557-60	C. Tran	2/18/99 10:00 AM	ICAP & GFAA digestion	2/18/99 11:00 AM

Internal Chain of Custody

ICP METALS SAMPLE CONTROL LOG

QC Batch #: 021897C01 **Date Digested:** 2/18/99

Client/Job Number	Laboratory Sample Number Range
FRONTIER CHEMICAL 5829-001-517	K5544-48 K5553-55 K5557-60

Laboratory Sample Numbers Removed	Removed by	Date Removed	Time Removed	Time Returned
K5544-48, K5553-55, K5557-60	C. Tran	2/18/99	15:30 PM	17:30 PM
K5544-48, K5553-55, K5557-60	C. Tran	2/19/99	9:00 AM	11:30 AM

~~ICP~~ GFAA METALS SAMPLE CONTROL LOG
mT 2/16/99

QC Batch #: 021899W2 **Date Digested:** 2/19/99

Client/Job Number	Laboratory Sample Number Range	Laboratory Sample Numbers Removed	Removed by	Date Removed	Time Removed	Time Returned
Frontier chemical 5929.001.517	K5544-49 K5553-55 K5557-60	K5544-49, K5553-55, K5557-60	MT	2/19/99	15:00	17:00

ATTACHMENT D

Attachment D – Site Maintenance Work Items and Field Observation Reports

D-1 Field Observation Reports

1 Field Observation Reports

- Field Observation Report Dated February 12, 1999

GLYNN GEOTECHNICAL ENGINEERING
GEOTECHNICAL AND CIVIL ENGINEERING SERVICES

LETTER OF TRANSMITTAL

TO:

Olin Chemicals
1186 Lower River Road
P.O. Box 248
Charleston, Tennessee 37310

DATE: February 12, 1999
ATTENTION: Mr. John Burns
SUBJECT:

Pendleton (Frontier Chemical) Site

GGE PROJECT NO: **94 - 1014- O**

WE ARE SENDING ATTACHED:

☐ LABORATORY TEST DATA ☒ FIELD REPORT ☐ REPORT

☐ ENGINEERING DRAWINGS ☐ _____

COPIES	DATE	REPORT NO.	DESCRIPTION
1	02/04/99	99 - 01	Field Observation Report

THESE ARE BEING SENT:

☒ FOR YOUR USE ☐ PER YOUR REQUEST ☐ _____

SINCERELY,
GLYNN GEOTECHNICAL ENGINEERING

Ann Baker
Secretary

DISTRIBUTION

Ms. Jennifer Smith - O'Brien & Gere Engineers

6503 Campbell Blvd., Lockport, New York 14094 (716) 625-6933 / fax (716) 625-6983
• VISIT OUR WEB SITE AT www.glynngroup.com / E-MAIL: ggeny@earthlink.net •

GLYNN GEOTECHNICAL ENGINEERING
GEOTECHNICAL AND CIVIL ENGINEERING SERVICES

FIELD OBSERVATION REPORT

PROJECT NO.: 94-1014-O REPORT NO.: 99-01 DATE: 4-Feb-99 PAGE: 1 OF 1

PROJECT: Pendleton (Frontier Chemical) Site Remediation DAY: Thursday

SUBJECT: On Site Supervisor's Report PROJECT TIME: 1:00 pm - 2:30 pm

CLIENT: Pendleton Site PRP Group SITE TIME: 1:15 pm - 2:15 pm

WEATHER: Cool, Overcast (35° 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 578.12'. The free water surface elevation is 577.97'.
- The O'Brien & Gere sampling team is also on site for sample collection.
- Site accessibility is limited due to snow / ice on the access road.
- Observe general site conditions and no major problems are noted. The pump vault is not accessed.

PERSONNEL ON SITE / CONTACTED:

Peter Bogardus, Shawn O'Dell - O'B&G

DISTRIBUTION:

John Burns - PPRP

Jen Smith - O'B&G

Man-hours: 1.5

REPORTED BY: Jesse E. Grossman, Project Manager

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

DOCFILE:99for9901

6503 Campbell Blvd., Lockport, New York 14094 (716) 625-6933 / fax (716) 625-6983