CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF CUSTODY FORM R6011-02

Sample #: 1003260064 Address: _____

Source: NWTP - Final Date Sample Taken: 3-26-10 Time Sample Taken: _____

Composite Sample Time Period: ~~24hr~~ 0700 Grab: Cr+6, O&G, TOT. or Free CN, Phenolics, PH, Hg

Date Grab Taken: 3-26-10 Investigator/ Sampler: Andy Blackson

Date/ Time

Relinquished By: _____ Accepted By: S. Chung Date/ Time 3/30/10 16

Relinquished By: _____ Accepted By: _____

Relinquished By: _____ Accepted By: _____

Received in Laboratory By: S. Chung Analyst: _____

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1	✓	~~ALUMINUM~~ STRONTIUM		200.7 6010B
	✓	TOTAL ALPHA	<3pCi/L	05/03/10 KG		✓	TOTAL RADIUM		
	✓	TOTAL BETA	=4.4±2.5pCi/L	05/03/10 KG			TOTAL THORIUM		
	✓	TOTAL U	<1pCi/L	4/15/10 SC		✓	BARIUM		

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody ~~3~~ 4

Ra-228 = 1.08±1.00pCi/L 05/12/10 KG

COMMENTS: Ra-226 <1 pCi/L 05/25/10 KG

LABORATORY RESULTS CERTIFIED BY: _____ DATE _____

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 4/6/2010
This Report's Date: 6/7/2010
ODH-Lab Order#: R6017

Sample# R6017-01 Collector: Andy Blocks Site: Client # 1004020075
Collect Date: 4/2/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**<4**	pCi/L	5/3/2010	K_Grandfield
Ra-226	**<1**	pCi/L	6/3/2010	K_Grandfield
Ra-228	**2.14 +/- 0.79**	pCi/L	5/28/2010	K_Grandfield
U-Natural	**<1**	pCi/L	4/15/2010	SChung

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF CUSTODY FORM

R6017-01

Sample #: 1004020075 Address:

Source: FINAL Date Sample Taken: 4-7-10 Time Sample Taken: 0800

Composite Sample Time Period: Grab: Cr+6, O&G, TOT. or Free CN, Phenolics, PH, Hr

Date Grab Taken: 0800 Investigator/ Sampler: ANDY B.

	Date/ Time		Date/ Tim
Relinquished By: * Andy Bladem		Accepted By: * Sang Chung	4/6/10
Relinquished By: *		Accepted By: *	
Relinquished By:		Accepted By:	
Received in Laboratory By:		Analyst:	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B
	✓	TOTAL ALPHA	<3 pCi/L	05/03/10 KG	✓		BARIUM		
	✓	TOTAL BETA	<4 pCi/L	05/03/10 KG	✓		STRONTIUM		
	✓	TOTAL U	<1 pCi/L	4/15/10 SC	✓		TOTAL RADIUM Ra 226 TOTAL THORIUM Ra-228		

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody # 3

COMMENTS: Ra-226 <1 pCi/L 06/03/10 KG Ra-228 2.14 ± 0.79 pCi/L 05/28/10 KG

LABORATORY RESULTS CERTIFIED BY: DATE

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 2/1/2010
This Report's Date: 3/30/2010
ODH-Lab Order#: R5964

Sample# R5964-01 Collector: Site: Client # Brine Water
Collect Date: 1/27/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	2/12/2010	K_Grandfield
Beta	**45.2 +/- 5.1**	pCi/L	3/22/2010	K_Grandfield
Ra-226	**<1**	pCi/L	3/30/2010	SChung
Ra-228	**<1**	pCi/L	3/24/2010	K_Grandfield
U-Natural	**<1**	pCi/L	3/12/2010	SChung

ODH BRP (CDM) NOTE:

This sample was NOT included in the STUDY. Taken before pilot study began.

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

Sample Chain of Custody Record

R5964-01

Site Name: Patriot Water Treatment
Site Address: 7716 Depot Road, Lisbon, Ohio 44432
Project #:
Project Name:

Water & Wastewater Laboratories, Inc.
2779 Rockefeller Avenue
Cleveland, Ohio 44115
Phone:(216)696-0280
Fax:(216)696-6831

Sample Date	Sample Time	Comp.	Grab	Sample Location/site ID	Number of Containers	Analysis / Preservative: Total Uranium(pCi/L)	Total Radium 226 (pCi/L)	Total Radium 228 (pCi/L)	Total Alpha Radiation (pCi/L)	Total Beta Radiation (pCi/L)	Sample Comments	Lab #
1/27/10	11:15AM		X	Brine Water	6	X	X	X	X	X		

R5964-01 : Gross - Alpha: <3 pCi/L 02/12/10 KG
Gross - Beta: 45.2 +/- 5.1 pCi/L 3/22/10 KG
Ra-226: <1 pCi/L 3/30/10 SC
Ra-228: <1 pCi/L 03/24/10 KG
U-Nat: <1 pCi/L 3/12/10 SC

Comments: There are six bottles with the same sample in each. The sample is a brine solution w/ 5-10% salts.

R5964-01

Phone: 614-644-4658
Attn: John
Ohio Department of Health
Building 22
8995 E. Main Street
Reynoldsburg, Ohio 43068

Sampler(s) [print name(s)-sign below]:
Andy Blocksom

Relinquished by: (sampler signature)	Date/Time:	Received by: (signature or shipper)
	1/27/10 @ 5:15pm	J. Ondo
Relinquished by: (signature) J. Ondo	Date/Time: 1/28/10 @ 11:30AM	Received by: (signature or shipper) UPS
Relinquished by: (signature)	Date/Time:	Received by: (signature or shipper)

Report to: **Andy Blocksom**
Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432
Phone: cell 330-853-9321
Fax:

P.O.#: Verbal-Andy
Bill to: Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 4/13/2010
This Report's Date: 5/11/2010
ODH-Lab Order#: R6022

Sample# R6022-01 Collector: Tonya Kuzm Site: Final Client # 1004090085
Collect Date: 4/9/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**9.0 +/- 4.0**	pCi/L	5/3/2010	K_Grandfield

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF CUSTODY FORM

R6022-01

Sample #: 1004090085 Address:

Source: Final Effluent-WWTP Date Sample Taken: 04-09-10 Time Sample Taken: 0900am CD

Composite Sample Time Period: Grab: Cr+6, O&G, TOT, or Free CN, Phenolics, PH, Hg

Date Grab Taken: 0900 on CD Investigator/ Sampler: Tonya Kuzma

	Date/ Time		Date/ Time
Relinquished By:	4-9-10	Accepted By:	4/9/10 11:[illegible] A
Relinquished By:	4-9-10	Accepted By:	
Relinquished By:		Accepted By:	
Received in Laboratory By:	4/13/2010	Analyst:	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B
4	✓	total alpha radiation in pCi/L		<3 pCi/L 05/03/10 KG					
4	✓	total beta radiation in pCi/L		= 9.0 ± 4.0 pCi/L 05/03/10 KG					

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody 2

COMMENTS:

LABORATORY RESULTS CERTIFIED BY: DATE

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Environmental
Protection Agency

Ted Strickland, Governor
Lee Fisher, Lt. Governor
Chris Korleski, Director

July 23, 2010

RE: WARREN/PATRIOT TEST

Mr. Charles D. McCracken
Bureau of Radiation Protection
Ohio Department of Health
246 North High Street
Columbus, OH 43215

Dear Mr. McCracken:

We have compiled the results we have received for the radiological parameters included in the Warren/Patriot brine study (attachment), and have reviewed your July 2, 2010 letter.

Your letter requests the Ohio EPA to provide data which appears to be missing or explain why it is missing. Our data compilation shows that the Ohio EPA has not been given this information. The majority of the information in our possession was sent to us by you because the ODH lab reported it to you directly. We have forwarded your request for the data or an explanation why it was not provided to Warren, who was responsible for following the agreed upon testing procedures. We will also request a copy of the ODH lab report for the 2/17/10 sludge gamma scan. That is the only sludge data we have.

As I noted in an e-mail sent to you on July 7, 2010, the proposal to forego future radiological sampling was requested by Warren in their report. The decision for future radiological sampling requirements will be based on ODH recommendations.

Information sharing and cooperation is essential for evaluating new proposals such as this project. We will forward any information received from Warren, Patriot, or their consultants and request you do the same. If you have any questions or comments, please contact me.

Sincerely,

Donna J Kniss

Donna Kniss
Environmental Engineer
Division of Surface Water

DK/mt

Attachment

ec: Rich Blasick, Ohio EPA, DSW, NEDO
Virginia Wilson, Ohio EPA, DSW, NEDO
Brian Hall, Ohio EPA, DSW, CO
Paul Novak, Ohio EPA, DSW, CO
Laurie Stevenson, Ohio EPA, DIR, CO

Northeast District Office
2110 East Aurora Road
Twinsburg, OH 44087-1924

330 | 963 1200
330 | 487 0769 (fax)
www.epa.ohio.gov

Warren Test - Rad Data

Final Effluent 001

Date	Alpha, pCi/L	Beta, pCi/L	U-natural, pCi/l	Ra-226, pCi/L	Ra-228, pCi/L
2.10.10					
2.11.10					
2.12.10	<3	9.2 +/- 4.3			
2.16.10					
2.17.10					
2.18.10					
2.19.10					
2.23.10*					
2.24.10					
2.25.10					
2.26.10					
3.1.10					
3.2.10					
3.3.10					
3.4.10					
3.5.10	<3	<4	<1	<1	<1
3.8.10					
3.9.10					
3.10.10					
3.11.10					
3.12.10	<3	<4	<1	<1	<1
3.15.10					
3.16.10					
3.17.10					
3.18.10					
3.19.10	<3	6.6 +/- 2.9	<1	<1	<1
3.22.10					
3.23.10					
3.24.10					
3.25.10					
3.26.10	<3	4.4 +/- 2.5	<1	<1	1.08 +/- 1.00
3.29.10					
3.30.10					
3.31.10					
4.1.10					
4.2.10	<3	<4	<1	<1	2.14 +/- 0.79
4.5.10					
4.6.10					
4.7.10					
4.8.10					
4.9.10	<3	9.0 +/- 4.0			
4.12.10					
4.13.10					
4.14.10					
4.15.10					
4.16.10					

Warren Test - Rad Data

Copied from Warren's spreadsheet

Final Effluent 001

Final	Tot. Alpha Radiation	Tot. Beta Radiation	tot. Uranium	Tot. Radium	Tot. Thorium
frequency code	W, T, B	W, T, B	W, T, B	W, T, B	W, T, B
units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
date: 24 or 8hr					
2.10.10					
2.11.10					
2.12.10	<3	9.2 +/-4.3			
2.16.10					
2.17.10					
2.18.10					
2.19.10					
2.23.10*					
2.24.10					
2.25.10					
2.26.10					
3.1.10					
3.2.10					
3.3.10					
3.4.10					
3.5.10	<3	<4			
3.8.10					
3.9.10					
3.10.10					
3.11.10					
3.12.10	<3	<4			

Sludge

Gamma Scan	K-40
pCi/L	pCi/L
<LLD	2.6E+02 +/- 2.6E+01

Warren Test - Rad Data

Final Effluent 001

Date	Alpha, pCi/L	Beta, pCi/L	U-natural, pCi/l	Ra-226, pCi/L	Ra-228, pCi/L
2.10.10	Note A	Note A			
2.11.10					
2.12.10	<3	9.2 +/- 4.3			
2.16.10					
2.17.10					
2.18.10					
2.19.10					
2.23.10*					
2.24.10					
2.25.10					
2.26.10					
3.1.10			Note B	Note B	Note B
3.2.10					
3.3.10					
3.4.10					
3.5.10	<3	<4	<1	<1	<1
3.8.10					
3.9.10					
3.10.10					
3.11.10					
3.12.10	<3	<4	<1	<1	<1
3.15.10					
3.16.10					
3.17.10					
3.18.10					
3.19.10	<3	6.6 +/- 2.9	<1	<1	<1
3.22.10					
3.23.10					
3.24.10					
3.25.10					
3.26.10	<3	4.4 +/- 2.5	<1	<1	1.08 +/- 1.00
3.29.10			not on TK 7/26 spreadsheet		
3.30.10					
3.31.10					
4.1.10					
4.2.10	<3	<4	<1	<1	2.14 +/- 0.79
4.5.10					
4.6.10					
4.7.10					
4.8.10					
4.9.10	<3	9.0 +/- 4.0		Note C ?	
4.12.10	not on TK 7/26 spreadsheet				
4.13.10					
4.14.10					
4.15.10					
4.16.10	<3	9.2 +/- 3.3	0.13 +/- 0.08	<1	<1

Notes

A requirement for weekly gross alpha and beta not communicated until 2/10/10

B requirement for specific isotopes not communicated until 3/1/10

C See 4/29 e-mail from A. Blocksom: lab states Th not run unless gross alpha is over threshold

Warren Test - Rad Data

Sludge

Date	Gamma Scan	Alpha, pCi/g	Beta, pCi/L	U-natural, pCi/l	Ra-226, pCi/L	Ra-228, pCi/L
2.10.10						
2.11.10						
2.12.10						
2.16.10						
2.17.10	< LLD					
2.18.10						
2.19.10						
2.23.10*						
2.24.10						
2.25.10						
2.26.10						
3.1.10						
3.2.10						
3.3.10						
3.4.10						
3.5.10						
3.8.10						
3.9.10						
3.10.10						
3.11.10						
3.12.10						
3.15.10						
3.16.10						
3.17.10						
3.18.10						
3.19.10						
3.22.10						
3.23.10						
3.24.10						
3.25.10						
3.26.10						
3.29.10						
3.30.10						
3.31.10						
4.1.10						
4.2.10						
4.5.10						
4.6.10						
4.7.10						
4.8.10						
4.9.10						
4.12.10						
4.13.10						
4.14.10						
4.15.10						
4.16.10	< LLD					

K-40 2.6E2 ± 26E1

Warren Test - Rad Data

Copied from Warren's spreadsheet

Final Effluent 001

Final	Tot. Alpha Radiation	Tot. Beta Radiation	tot. Uranium	Tot. Radium	Tot. Thorium
frequency code	W, T, B	W, T, B	W, T, B	W, T, B	W, T, B
units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
date: 24 or 8hr					
2.10.10					
2.11.10					
2.12.10	<3	9.2 +/-4.3			
2.16.10					
2.17.10					
2.18.10					
2.19.10					
2.23.10*					
2.24.10					
2.25.10					
2.26.10					
3.1.10					
3.2.10					
3.3.10					
3.4.10					
3.5.10	<3	<4			
3.8.10					
3.9.10					
3.10.10					
3.11.10					
3.12.10	<3	<4			

Sludge

Gamma Scan	K-40
pCi/L	pCi/L
<LLD	2.6E+02 +/- 2.6E+01

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 4/19/2010
This Report's Date: 7/12/2010
ODH Lab Order#: R6027

Sample# R6027-01 Collector: Andy Blocks Site: Client # final
Collect Date: 4/16/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**9.2 +/- 3.3**	pCi/L	5/3/2010	K_Grandfield
Ra-226	**<1**	pCi/L	6/3/2010	K_Grandfield
Ra-228	**<1**	pCi/L	5/28/2010	K_Grandfield

Sample# R6027-02 Collector: Andy Blocks Site: Client # liquid sludge
Collect Date: 4/16/2010 Matrix: Other Radiological

Parameter	Result	Units	Analysis Date	Analyzed by
Ac-228	**3.28E02 +/- 1.02E01**	pCi/kg	4/23/2010	K_Grandfield
Ce-139	**9.30E01 +/- 5.58E00**	pCi/kg	4/23/2010	K_Grandfield
Gamma Scan	**All other nuclides <LLD**	pCi/kg	4/23/2010	K_Grandfield
I-131	**5.95E03 +/- 1.60E02**	pCi/kg	4/23/2010	K_Grandfield
K-40	**3.17E02 +/- 3.12E01**	pCi/kg	4/23/2010	K_Grandfield

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

Wisconsin State Laboratory of Hygiene
2601 Agriculture Drive, PO Box 7996
Madison, WI 53707-7996
(800)442-4618 • FAX (608)224-6213
http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division — Radiochemistry

WDNR LAB ID: 113133790 NELAP LAB ID: E37658 EPA LAB ID: WI00007 WI DATCP ID: 105-415

Supplement to test report#: 9321307

WSLH Sample: RU002128

OHIO DEPARTMENT OF HEALTH LABO
8995 E MAIN ST/RADCHEM BLDG 22
REYNOLDSBURG, OH 43068

Bill To
Billing ID: 7324709
Customer ID: 339055
OHIO DEPARTMENT OF HEALTH
LABORATORY
8995 E MAIN ST/RADIOCHEM BUILDING 22
REYNOLDSBURG OH 43068

Collection Date: 04/16/2010 13:00:00
Owner:
Unique Well #:
Well Construction:
County:
Driller or Pump Installers License #: KATHERINE GRANDFIELD
Sampling Location: PATRIOT WATER TREATMENT
Sampling Point: PUBLIC DRINKING ENTRY POINT
Sampling information: OHIO SAMPLE # R6027-01
Lat Deg: Min: Long Deg: Min: Method:
Driller:

Collected By:
Well Completion Date:
Account: PP009
Date Received: 06/09/2010 10:41:00
Date Reported: 06/29/2010
Sample Reason: GRAB SAMPLE

Analyses and Results:

Analysis Date 06/30/2010 — Lab Comment

Analysis Method	Result	Units	LOD
SM7500_U_C URANIUM 234 ACTIVITY	0.13±0.07	pCi/L	0.09
SM7500_U_C URANIUM 234 ACTIVITY	0.0000±0.0000	ug/L	0.0000
SM7500_U_C URANIUM 235 ACTIVITY	0.01±0.03	pCi/L	0.06
SM7500_U_C URANIUM 235 ACTIVITY	0.00±0.01	ug/L	0.03
SM7500_U_C URANIUM 238 ACTIVITY	0.04±0.03	pCi/L	0.04
SM7500_U_C URANIUM 238 ACTIVITY	0.11±0.08	ug/L	0.11
SM7500_U_C TOTAL URANIUM ACTIVITY	0.13±0.08	pCi/L	0.04
SM7500_U_C TOTAL URANIUM ACTIVITY	0.00±0.08	ug/L	0.11

Sample Chain of Custody Record

Site Name: Patriot Water Treatment /
Project #:
Site Address: 7716 Depot Road, Lisbon, Ohio 44432
Project Name:

Sample Date	Sample Time	Comp.	Grab	Sample Location/site ID	Number of Containers	Total Uranium(pCi/L)	Total Radium 226 (pCi/L)	Total Radium 228 (pCi/L)	Total Alpha Radiation (pCi/L)	Total Beta Radiation (pCi/L)	Thorium	Sample Comments	Lab #
4/16/10				Final Liquid Sludge (0.663 kg)		X	X	X	X	X	X	R6027-01 /	
4/16/10						X	X	X	X	X	X	R6027-02	

Analysis / Preservative

R6027-01
alpha < 3 pCi/L 05/03/10 KG
beta = 9.2 ± 3.3 pCi/L 05/03/10 KG
Ra-228 < 1 pCi/L 05/28/10 KG
Ra-226 < 1 pCi/L 06/03/10 KG

R6027-02
gamma Ac-228 3.28E^{02} ± 1.02E^{01} pCi/kg
Ce-139 9.30E^{01} ± 5.58E^{00} pCi/kg
I-131 5.95E^{03} ± 1.60E^{02} pCi/kg
K-40 3.17E^{02} ± 3.12E^{01} pCi/kg
All other nuclides < LLD
04/23/10 KG

Field Acidified PH < 2.0

Water & Wastewater Laboratories, Inc.
2779 Rockefeller Avenue
Cleveland, Ohio 44115
Phone (216)696-0280
Fax (216)696-6831

Phone: 614-644-4658
Attn: John
Ohio Department of Health
Building 22
8995 E. Main Street
Reynoldsburg, Ohio 43068

Sampler(s) [print name(s)-sign below]:

Relinquished by: (sampler signature) — Date/Time: 4-16 1PM — Received by: (signature or shipper)
Relinquished by: (signature) — Date/Time: — Received by: (signature or shipper) 4/19/10
Relinquished by: (signature) — Date/Time: — Received by: (signature or shipper) Dan Heberton 6-9-10
Relinquished by: (signature) — Date/Time: — Received by: (signature or shipper)

Report to: **Andy Blocksom**
Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432
Phone:
Fax:

P.O.#: Verbal-Andy
Bill to: Patriot Water Treatmer
7716 Depot Road

PP009
06/09/10
10:41

McCracken, Chuck

From: Ram Chandrasekar
Sent: Thursday, July 01, 2010 10:27 AM
To: Chuck McCracken
Cc: Katherine Grandfield; Larry King
Subject: FW: WWTP lab results
Attachments: Pages from EPA certificate 2009.pdf

Chuck

The USEPA method cross reference is attached

Thanks and call me if you have any questions

Ram Chandrasekar, Ph.D.,
Manager, Lab Operations
Bureau of Public Health Laboratories
Ohio Department of Health
8955 East Main Street, Bldg 22
Reynoldsburg OH 43068
Telephone: 614-466-5600
Fax: 614-644-4648
ram.chandrasekar@odh.ohio.gov

From: Katherine Grandfield
Sent: Thursday, July 01, 2010 8:31 AM
To: Ram Chandrasekar
Subject: FW: WWTP lab results

RC,

Any chance you can take care of this while I'm gone? If not, he'll be waiting awhile because I can't do the research on this until next week.

-Katie

From: Chuck McCracken
Sent: Wednesday, June 30, 2010 2:42 PM
To: Katherine Grandfield
Subject: FW: WWTP lab results

Katherine:

I have been tasked with responding on behalf of ODH to OEPA-NEDO relative to these samples.

I note that you list OEPA methods that I am unfamiliar with.
I assume that the OEPA methods are equivalent to the USEPA methods.
Could you please give me a cross reference between OEPA methods and USEPA methods?

Thanks,

Chuck McCracken

Supervisor, Bureau of Radiation Protection
Ohio Department of Health
Ph: 614.466.5136

From: Robert Leidy
Sent: Tuesday, June 22, 2010 2:14 PM
To: Chuck McCracken
Cc: Stephen Helmer
Subject: WWTP lab results

Chuck,

I received two packages of environmental data from the lab yesterday and WWTP results were included. I have attached copies of all the WWTP results I received.

Let me know if you need me to send hard copies down to you.

Thanks

ENCLOSURE A

LABORATORY CERTIFICATION SUMMARY
Ohio Department of Health
(November 17, 2008 Visit)

Parameters/Method	Certification Status
1. Gross Alpha / EPA 00-02	Fully Certified
2. Gross Beta / 900.0	Fully Certified
3. Radium 226 / 903.0	Fully Certified
4. Radium 228 / 904.0	Fully Certified
5. Uranium / 908.0	Fully Certified
6. Tritium / 906.0	Fully Certified
7. Strontium 89,90 / 905.0	Fully Certified
8. Photon Emitters / 901.0	Fully Certified

McCracken, Chuck

From: Brian Nickel <Brian.Nickel@epa.state.oh.us>
Sent: Wednesday, June 30, 2010 11:56 AM
To: Chuck McCracken
Cc: Rich Blasick
Subject: Fwd: Re: Marcellus Brine Disposal
Attachments: Re: Marcellus Brine Disposal

Chuck,
Attached is the email Rich sent me regarding the Marcellus Brine, including the Summary Report I mention on the phone. Donna may have already sent this so forgive me if this is all old news. Rich said Donna will be back next week, of course you will be on vacation. I will be on vacation July 2 thru 7 so no more pesky emails or phone calls from me.

Thanks
Brian

>>> Rich Blasick 6/30/2010 11:33 AM >>>
Donna Kniss of our office has been in contact with Chuck McCracken on a regular basis, so I assume he has the information I sent you. It's all public record, so feel free to send it on if he needs it.
Rich

>>> Brian Nickel 6/30/2010 10:50 AM >>>
Rich,
Thanks again for the information. I was talking to Chuck McCracken at ODH about the project I'm working on and some the information you sent me. Does ODH have all the information you sent me? It sounded like he may not have the Report Summary from Warren but I wasn't sure if I should forward your email to me to Chuck.

Thanks
Brian

>>> Rich Blasick 6/29/2010 11:56 AM >>>
Brian,

Donna Kniss is on vacation this week. Attached are:

2 pdf reports on the RAD data
pdf Report Summary from Warren
excel sheet with the sampling data for the other parameters recent email regarding drilling suspension in NY

We have not received any guidance from ODH yet regarding the RAD data.

Hope this provides you the information requested, if you need anything else, feel free to contact us.

Richard D. Blasick, P.E.
Environmental Manager
Division of Surface Water

Northeast District Office, Ohio EPA

>>> Brian Nickel 6/28/2010 9:05 AM >>>
Donna,
I've worked with Federal Facilities down here in Southwest District Office and been involved in radiological issues. I recently became aware of the proposed disposal of the Marcellus brine in Ohio WWTPs and the Warren Water Treatment Plant pilot project. I spoke with Keith Riley and he suggested I contact you. Through my work with ASTSWMO Radiation Focus Group, I've heard a little bit about the radiological issues associated with the brine. Radium 226 and 228 have been found at very high levels. The links below discuss/contain the data New York developed. I apologize if this is all old news but I was surprised with the elevated levels of radium in the brine and wanted to learn more.

Has ODH completed their review the pilot project? I have calls into my contacts at ODH. I am interested in any conclusions or concerns they may have regarding the disposal or reuse of the WWTP sludge after treatment of the brine. Also, can you email me copy of the report?

http://marcelluseffect.blogspot.com/2009/12/radioactivity-present-in-marcellus.html

http://www.tiogagaslease.org/images/BVW_11_26_09_2.pdf

Appendix 13
NYS Marcellus Radiological Data
From Production Brine

http://www.dec.ny.gov/docs/materials_minerals_pdf/ogsgeisapp1.pdf

Call me at 937-285-6468 if you have any questions.

Thanks
Brian Nickel

Ohio Environmental Protection Agency
Unless otherwise provided by law,
this communication and any response to it constitutes a public record.

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 2/25/2010
This Report's Date: 4/27/2010
ODH-Lab Order#: R5981

Sample# R5981-01 Collector: Site: Client #
Collect Date: 2/12/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	3/29/2010	K_Grandfield
Beta	**9.2 +/- 4.3**	pCi/L	4/26/2010	K_Grandfield

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 159
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

Sample Chain of Custody Record

Site Name: Patriot Water Treatment
Project #:
Site Address: 7716 Depot Road
Lisbon, Ohio 44432
Project Name: [illegible]

Water & Wastewater Laboratories, Inc.
2779 Rockefeller Avenue
Cleveland, Ohio 44115
Phone (216)696-0280
Fax (216)696-6831

Sample Date	Sample Time	Comp.	Grab	Sample Location/site ID	Number of Containers	Plastic - Unpres TDS, Cl, pH, Cond.	[illegible]	Sample Comments	Lab #
[illegible]			✓	[illegible]	1	1	✓	(W - list) [illegible]	R5981-01

R5981-01 alpha <3pCi/L 03/29/10 KG
beta = 9.2 ± 4.3 pCi/L 04/26/10 KG

Sampler(s) [print name(s)-sign below]:

Relinquished by:	Date/Time:	Received by: (signature or shipper)
(sampler signature) [illegible]	[illegible] 1700	[illegible]
(signature) [illegible]	[illegible] 1200	
(signature)		
(signature)		

Report to: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432
Phone:
Fax:

P.O.#: Verbal-Andy
Bill to: Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E. Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 3/10/2010
This Report's Date: 4/27/2010
ODH-Lab Order#: R5993

Sample# R5993-01 Collector: Andy Blocks Site: Client # FINAL
Collect Date: 3/5/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	3/29/2010	K_Grandfield
Beta	**<4**	pCi/L	4/26/2010	K_Grandfield
Ra-226	**<1**	pCi/L	3/30/2010	SChung
Ra-228	**<1**	pCi/L	3/24/2010	K_Grandfield
U-Natural	**<1**	pCi/L	4/5/2010	SChung

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

Sample Chain of Custody Record

Site Name: Patriot Water Treatment
Site Address: 7716 Depot Road, Lisbon, Ohio 44432
Project #: 010
Project Name:

Sample Date	Sample Time	Comp.	Grab	Sample Location/site ID	Number of Containers	Total Uranium (pCi/L)	Total Radium 226 (pCi/L)	Total Radium 228 (pCi/L)	Total Alpha Radiation (pCi/L)	Total Beta Radiation (pCi/L)	Sample Comments	Lab #
						X	X	X	X	X		R5993-01
R5993-01	Gross-Alpha <3 pCi/L 03/29/10 KG											
	Gross+Beta <4 pCi/L 04/26/10 KG											
	Ra-228 <1 pCi/L 03/29/10 KG											
	Ra-226 <1 pCi/L 3/30/10 SC											
	U-Nat <1 pCi/L 4/5/10 SC											

Analysis / Preservative

Water & Wastewater Laboratories, Inc.
2779 Rockefeller Avenue
Cleveland, Ohio 44115
Phone (216)696-0280
Fax (216)696-6831

Phone: 614-644-4658
Attn: John
Ohio Department of Health
Building 22
8995 E. Main Street
Reynoldsburg, Ohio 43068

Sampler(s) [print name(s)-sign below]:

Relinquished by: *(sampler signature)*	Date/Time:	Received by: *(signature or shipper)*
Relinquished by: *(signature)*	Date/Time:	Received by: *(signature or shipper)*
Relinquished by: *(signature)*	Date/Time:	Received by: *(signature or shipper)*
Relinquished by: *(signature)*	Date/Time:	Received by: *(signature or shipper)*

Report to: **Andy Blocksom**
Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432
Phone: 330-[illegible]
Fax:

P.O.#: Verbal-Andy
Bill to: Patriot Water Treatment
7716 Depot Road
Lisbon, Ohio 44432

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

~~2320 ROBIN AVE. S.W. WARREN, OHIO 44481~~
~~PHONE 330-841-2504~~

CHAIN OF CUSTODY FORM

Sample # _____ Address R5993-01

Source Final Date Sample Taken 3/9/10 Time Sample Taken 0900

Composite Sample Time Period — Grab Cr+6, O&G, TOT or Free CN, Phenolics, PH, Hg

Date Grab Taken 3/9/10 Investigator/ Sampler Aaron Erickson

	Date/ Time		Date/ Time
Relinquished By	Aaron Erickson 3/9/10	Accepted By	
Relinquished By		Accepted By	
Relinquished By		Accepted By	
Received in Laboratory By	S. Chung 3/10/10 0900	Analyst	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CN-	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B

PRESERVATIVES NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody 2

COMMENTS: _____

LABORATORY RESULTS CERTIFIED BY: _____ DATE _____

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E. Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 3/15/2010
This Report's Date: 4/27/2010
ODH-Lab Order#: R5999

Sample# R5999-01 Collector: Andy Blocks Site: Final Client # 1003120052
Collect Date: 3/12/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	<3	pCi/L	3/29/2010	K_Grandfield
Beta	<4	pCi/L	4/26/2010	K_Grandfield
Ra-226	<1	pCi/L	3/30/2010	SChung
Ra-228	<1	pCi/L	3/24/2010	K_Grandfield
U-Natural	<1	pCi/L	4/5/2010	SChung

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO

WATER POLLUTION CONTROL DEPARTMENT

~~2323 MAIN AVE. S.W WARREN, OHIO 44481~~

~~PHONE 330-841-2591~~

CHAIN OF COUSTODY FORM

R5999-01

Sample # [illegible] Address

Source [illegible] Date Sample Taken [illegible] Time Sample Taken [illegible]

Composite Sample Time Period ---- Grab Cr+6, O&G, TOT or Free CN, Phenolics, PH, Hg

Date Grab Taken [illegible] Investigator/ Sampler [illegible]

		Date/ Time			Date/ Time
Relinquished By	Arthur Buckson (?)		Accepted By	S. Chung	3/15/10 15:30
Relinquished By			Accepted By		
Relinquished By			Accepted By		
Received in Laboratory By			Analyst		

PLEASE CHECK PARAMETERS FOR ANALYSIS

RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		3010A 4500PE	1		ALUMINUM		200.7 6010B
	✓	[illegible]	<3 pCi/L	03/29/10 KG		✓	[illegible]	Ra-228 <1 pCi/L 03/24/10 KG	
	✓	[illegible]	<4 pCi/L	04/26/10 KG		✓	[illegible]	Ra-226 <1 pCi/L 3/30/10 SC	
		[illegible]	<1 pCi/L	4/5/10 SC					

PRESERVATIVES NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody ____________

COMMENTS: ____________

LABORATORY RESULTS CERTIFIED BY: ____________ **DATE** ____________

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY 330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 3/30/2010
This Report's Date: 6/7/2010
ODH-Lab Order#: R6011

Sample# R6011-01 Collector: Site: Client # 1003190054
Collect Date: 3/19/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**6.6 +/- 2.9**	pCi/L	5/3/2010	K_Grandfield
Ra-226	**<1**	pCi/L	5/25/2010	K_Grandfield
Ra-228	**<1**	pCi/L	5/12/2010	K_Grandfield
U-Natural	**<1**	pCi/L	4/15/2010	SChung

Sample# R6011-02 Collector: Site: Client # 1003260064
Collect Date: 3/26/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**4.4 +/- 2.5**	pCi/L	5/3/2010	K_Grandfield
Ra-226	**<1**	pCi/L	5/25/2010	K_Grandfield
Ra-228	**1.08 +/- 1.00**	pCi/L	5/12/2010	K_Grandfield
U-Natural	**<1**	pCi/L	4/15/2010	SChung

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

~~2323 MAIN AVE. S.W. WARREN, OHIO 44481~~
~~PHONE 330-841-2591~~

CHAIN OF CUSTODY FORM

Bill to Patriot
~~[illegible]~~ R6011_01

Sample #: [illegible] Address: ______

Source: Final Date Sample Taken: 3-19-10 Time Sample Taken: 0800

Composite Sample Time Period: —— Grab: Cr+6, O&G, TOT or Free CN, Phenolics, PH, Hg

Date Grab Taken: 3-19-10 Investigator/ Sampler: Andy Blackson

	Date/ Time		Date/ Time
Relinquished By: Andy Blackson		Accepted By: S. Chung	3/30/10 160[illegible]
Relinquished By:		Accepted By:	
Relinquished By:		Accepted By:	
Received in Laboratory By: S. Chung		Analyst:	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/L UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4	✓	~~[illegible]~~ Strontium		~~150.1~~ DL SUB
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B
	✓	Total Alpha	<3 pCi/L	05/03/10 KG		✓	Total Radium		
	✓	Total Beta	= 6.6 ± 2.9 pCi/L	05/03/10 KG		✓	Total Thorium		
	✓	Total U	<1 pCi/L	4/15/10 SC		✓	Barium		DL SUB

PRESERVATIVES: NITRIC ACID - 1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED - 4

Ra-228 <1 pCi/L 05/12/10 KG
Ra-226 <1 pCi/L 05/25/10 KG

Number of sample bottles used on this Chain Of Custody ______

COMMENTS: ______

LABORATORY RESULTS CERTIFIED BY: ______ DATE ______

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY 330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF COSTODY FORM R6011-02

Sample #: 10C3260001

Address:

Source: [illegible]

Date Sample Taken: 3-26-10

Time Sample Taken:

Composite Sample Time Period: ~~[illegible]~~ 2400

Grab: Cr+6, O&G, TOT. or Free CN, Phenolics, PH, Hg

Date Grab Taken: 3-26-10

Investigator/ Sampler: [illegible]

		Date/ Time			Date/ Time
Relinquished By:	[signature]		Accepted By:	S. Chung	3/30/10 16[illegible]
Relinquished By:			Accepted By:		
Relinquished By:			Accepted By:		
Received in Laboratory By:	S. Chung		Analyst:		

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1	✓	~~ALUMINUM~~ STRONTIUM		200.7 6010B
	✓	Total Alpha	<3 pCi/L	05/03/10 KG		✓	Total Radium		
	✓	Total Beta	=4.4 ± 2.5 pCi/L	05/03/10 KW			Total Thorium		
	✓	Total U	<1 pCi/L	4/15/10 SC		✓	Barium		

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody ~~2~~ 4

Ra-228 = 1.08 ± 1.00 pCi/L 05/12/10 KG

COMMENTS: [illegible] Ra-226 <1 pCi/L 05/25/10 KG

LABORATORY RESULTS CERTIFIED BY: ______ DATE ______

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY 330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 4/6/2010
This Report's Date: 6/7/2010
ODH-Lab Order#: R6017

Sample# R6017-01 Collector: Andy Blocks Site: Client # 1004020075
Collect Date: 4/2/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**<4**	pCi/L	5/3/2010	K_Grandfield
Ra-226	**<1**	pCi/L	6/3/2010	K_Grandfield
Ra-228	**2.14 +/- 0.79**	pCi/L	5/28/2010	K_Grandfield
U-Natural	**<1**	pCi/L	4/15/2010	SChung

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL: http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Snesky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF CUSTODY FORM

R6017-01

Sample # 10WC20035 Address:

Source: Final Date Sample Taken: 4-2-10 Time Sample Taken: 0800

Composite Sample Time Period: Grab: Cr+6 O&G, TOT or Free CN, Phenolics, PH, Hr

Date Grab Taken: 0800 Investigator/ Sampler: Andy B.

	Date/ Time		Date/ Tim
Relinquished By: Andy Bledsoe		Accepted By: Sang Chung	4/6/10
Relinquished By:		Accepted By:	
Relinquished By:		Accepted By:	
Received in Laboratory By:		Analyst:	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B
	✓	TOTAL Radio	<3pCi/L	05/03/10 KL	✓		BARIUM		
	✓	TOTAL Ra-228	<4pCi/L	05/03/10 KL	✓		STRONTIUM		
	✓	TOTAL U	<1pCi/L	4/15/10 SC	✓		TOTAL RADIUM (TOTAL Ra-226 + Ra-228)		

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody 3

COMMENTS: Ra-226 <1 pCi/L 05/03/10 KL Ra-228 2.14 ± 0.79 pCi/L 05/28/10 KL

LABORATORY RESULTS CERTIFIED BY: DATE

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

Ohio Department of Health, Division of Prevention
ODH Laboratory Report

Ohio Department of Health Laboratory
Radiochemistry Section, Building 22
8995 E Main ST
Reynoldsburg, OH 43068

Ted Strickland, Governor
Alvin Jackson M.D., Director of Health

Patriot Water Treatment (CustomerID# water & wa)
7716 Depot Road
Lisbon OH 44432
330-853-9321

Receive Date: 4/13/2010
This Report's Date: 5/11/2010
ODH-Lab Order#: R6022

Sample# R6022-01 Collector: Tonya Kuzm Site: Final Client # 1004090085
Collect Date: 4/9/2010 Matrix: Water

Parameter	Result	Units	Analysis Date	Analyzed by
Alpha	**<3**	pCi/L	5/3/2010	K_Grandfield
Beta	**9.0 +/- 4.0**	pCi/L	5/3/2010	K_Grandfield

Chemistry Fax: (614) 728-2671 Voice: (614) 466-5600 E-mail: Ram.Chandrasekar@odh.ohio.gov
URL : http://www.ohio.gov/ohio/

Attn: Andy Blocksom
Patriot Water Treatment
7716 Depot Road
Lisbon OH 44432

OEPA Analyst #'s
Katherine Grandfield, 3548
Rita Shosky, 1407
Sang H Chung, 2934

OEPA Method#
Total Alpha, 222
Total Beta, 165
Radium-226, 169
Radium-228, 183
Radon-222, 223
Tritium, 198
Strontium, 196
Uranium-Nat, 184
Gamma, 207

CITY OF WARREN, OHIO
WATER POLLUTION CONTROL DEPARTMENT

2323 MAIN AVE. S.W WARREN, OHIO 44481
PHONE 330-841-2591

CHAIN OF CUSTODY FORM

R0022-01

Sample # 1004090085 Address:

Source: Final Effluent-WWTP Date Sample Taken: 04-09-10 Time Sample Taken: 0900am CD

Composite Sample Time Period: Grab: Cr+6, O&G, TOT. or Free CN, Phenolics, PH, Hg

Date Grab Taken: 0900 am CD Investigator/ Sampler: Tonya Kuzma

	Date/ Time		Date/ Time
Relinquished By: Tonya Kuzma	4-9-10	Accepted By: L Dudley	4/9/10 11:[illegible] A
Relinquished By: L Dudley	4-9-10	Accepted By:	
Relinquished By:		Accepted By:	
Received in Laboratory By:	11/3/2010	Analyst:	

PLEASE CHECK PARAMETERS FOR ANALYSIS
RESULTS IN ug/l UNLESS OTHERWISE SPECIFIED *

PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD	PRESERVATIVE	SELECTED	PARAMETER	RESULT	EPA TEST METHOD
3		* NH3-N		350.2	1		SILVER		200.7
3		* TKN		351.3	1		ARSENIC		200.7 6010B
3		* COD		410.4	1		LEAD		200.7 6010B
1		CADMIUM		200.7 6010B	1		ZINC		200.7 6010B
1		CHROMIUM		200.7 6010B	4		* TSS		160.2
1		COPPER		200.7 6010B	4		PHENOLICS		420.1
2		* TOT CYANIDE		335.2	4		PH		150.1
2		* FREE CN		4500CNI	4		HEX CHROMIUM		3500CrB
1		MERCURY		1631 245.1 7471A	1		MOLYBDENUM		200.7 6010B
1		NICKEL		200.7 6010A	1		ANTIMONY		200.7 6010B
3		* OIL & GREASE		1664	1		SELENIUM		200.7 6010B
3		* PHOSPHORUS		6010A 4500PE	1		ALUMINUM		200.7 6010B
4	✓	total alpha radiation in pCi/L					<3 pCi/L 05/03/10 KG		
4	✓	total beta radiation in pCi/L					9.0 ± 4.0 pCi/L 05/03/10 KG		

PRESERVATIVES: NITRIC ACID -1, SODIUM HYDROXIDE - 2, SULFURIC ACID - 3, UNPRESERVED -4

Number of sample bottles used on this Chain Of Custody 2

COMMENTS:

LABORATORY RESULTS CERTIFIED BY: DATE

DIRECT INQUIRIES AND THIS FORM TO: SAM LUDWICK, CHEMIST, CITY OF WARREN, WATER POLLUTION CONTROL FACILITY
330-841-2591 EXT 112 OR BY E-MAIL sludwick@warren.org

McCracken, Chuck

From: Tom Allen <Tom.Allen@epa.state.oh.us>
Sent: Tuesday, June 29, 2010 8:25 AM
To: Laurie Stevenson
Cc: Larry Wickstrom; Tom Tomastik; Bill Skowronski; Craig Butler; Lindsay Taliaferro; Michael Eggert; Mike Baker; Ralph J Haefner, Hydrologist (Geol), Columbus, OH
Subject: Fwd: Sweeney Water Bill

FYI

>>> <Ronsgonefishing@aol.com> 6/23/2010 5:18 PM >>>

The Sweeney water withdrawal bill passed today.

See below.

RULES COM (Request of Sweeney, Fields, P. Rivera, Rosenthal)
Suspends hydraulic fracturing for the extraction of natural gas or oil until May 15, 2011; suspends the issuance of new permits for such drilling.

STATE OF NEW YORK

11443--B

IN ASSEMBLY

June 14, 2010

Introduced by COMMITTEE ON RULES -- (at request of M. of A. Sweeney, Fields) -- read once and referred to the Committee on Environmental Conservation -- committee discharged, bill amended, ordered reprinted as amended and recommitted to said committee -- again reported from said committee with amendments, ordered reprinted as amended and recommitted to said committee

AN ACT to suspend hydraulic fracturing; and providing for the repeal of such provisions upon the expiration thereof

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. There is hereby established a suspension of the issuance of new permits for the drilling of a well which utilizes the practice of hydraulic fracturing for the purpose of stimulating natural gas or oil in low permeability natural gas reservoirs, such as the Marcellus and Utica shale formations.

The purpose of such suspension shall be to afford the state and its residents the opportunity to continue the review and analysis of the effects of hydraulic fracturing on water and air quality, environmental safety and public health.

For the purposes of this section, "hydraulic fracturing" shall mean the fracturing of rock by fluid for the purpose of stimulating natural gas or oil for any purpose.

This section shall not apply to permits issued prior to the effective date of this act which utilize hydraulic fracturing that are subject to

renewal.

§ 2. This act shall take effect immediately, and shall expire and be deemed repealed on May 15, 2011.

--

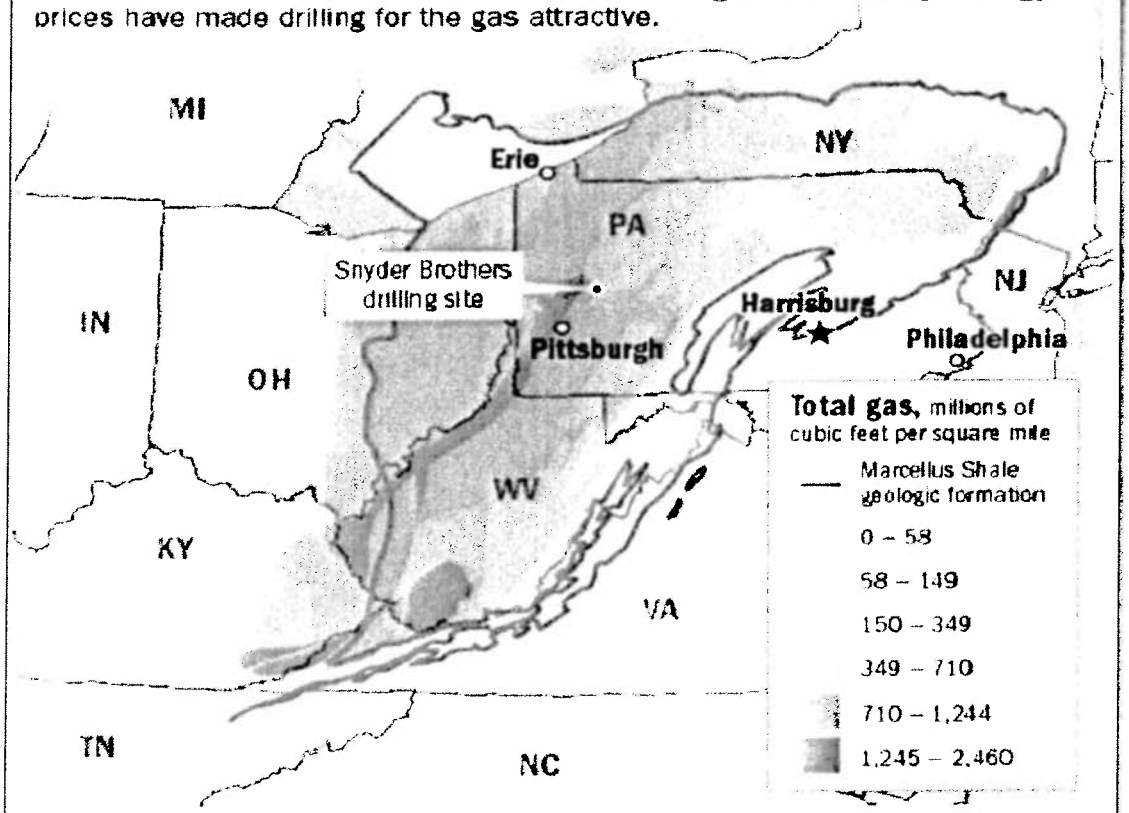
Linda B. Rosenthal
Member of Assembly - District 67

Marcellus Shale

Brine Water Pilot Study

Untapped riches

The Marcellus Shale formation, which stretches all through the Appalachians, holds as much as 516 trillion cubic feet of natural gas. Current, high energy prices have made drilling for the gas attractive.



Source: U.S. Bureau of Land Management, Geology.com, Catskillmountainkeeper.org

Ed Yozwick, Keith McCafferty/Post-Gazette

Thomas A. [illegible]

City of [illegible]

Water Pollution Control

5/4/2010

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OVERVIEW

In May of 2009, The City of Warren and Patriot Water Treatment LLC began discussions with the Ohio Environmental Protection Agency (OEPA) to initiate the treatment of brine water from the Marcellus Shale. A series of letters and meetings culminated to a letter issued to Warren by OEPA to perform an eight (8) week pilot study to "clearly identify the amount of brine that Warren can receive without causing WWTP or water quality issues."

Charged with this task, Warren first had a whole effluent toxicity (WET) test accomplished on September 4, 2009 to determine the ceiling of brine water acceptance. This demonstrated that the facility could accept up to 664,000 gallons of brine water at 50,000 mg/l TDS before toxic conditions caused a water flea kill. This was based on an 8 MGD flow. Knowing that typical flow rates are approximately 13.38 MGD allowed for a protective buffer of 5.38 MGD dilution ratio.

An organizational meeting was held January 8, 2010 to review current information and to set guidelines for the pilot study. The guidelines were set as follows:

- Patriot Water Systems would supply ten 20,000 gallon frac tanks.
- The tanks would be connected together to create one 100,000 gallon mixing system.
- Brine water would be re-circulated in the combined tanks to create a homogeneous mix.
- The initial mix will be tested for the parameters as defined by OEPA.
- The City will sample influent, effluent, upstream and downstream prior to the discharge of brine water to develop a baseline concentration of TDS.
- The City would conduct a live, 8 week, phased in trial to monitor and record effects on treatment processes, accumulation loading and receiving stream TDS.
- The maximum amount of TDS in the brine water will not exceed 50,000 mg/l.
- Brine water will be phased in as follows (all flows will be over an 8 hour period):
    - Week 1 – 5 days at 20,000 gallons
    - Week 2 – 5 days at 40,000 gallons
    - Week 3 – 5 days at 60,000 gallons
    - Week 4 – 5 days at 80,000 gallons
    - Week 5 – 5 days at 100,000 gallons
    - Week 6 – 5 days at 100,000 gallons
    - Week 7 – 5 days at 100,000 gallons
    - Week 8 – 5 days at 100,000 gallons
- Testing will be accomplished as defined in Addenda 3 (revised 3/1/10).

The pilot study was initiated on Tuesday, February 9, 2010. This required a deviation from the schedule because the first week did not start on a Monday. As a result, week 1 only had 4 days of discharge. The pilot was postponed mid way through week 2 because source water wasn't available due to extreme weather conditions making the remote well site locations inaccessible to truck traffic. The pilot study resumed on March 1, 2010 at 40,000 gallons per day and followed the documented schedule throughout the remainder of the study.

BASELINE SAMPLING

Initial baseline testing was accomplished on the river and plant flow to determine TDS levels prior to start-up of the pilot study. The baseline levels are as follows:

Baseline Levels	TDS	Chloride
Raw	584	143
Final	599	157
Up	336	70
Down	332	60
Liquid Sludge		296

Initial radioactivity sampling:

Collect date 2/17/10

Parameter	Results	Units
Gamma Scan	All other nuclides <LLD	pCi/L
K-40	2.6E+02 +/- 2.6E+01	pCi/L

K-40 is the radioactive isotope in Potassium. It is naturally occurring and common. The average human being carries approximately 140g of potassium. We ingest and excrete approximately 2.5g per day. Potassium has two other stable isotopes, K-39 and K-41. The most abundant is K-39 at 93.26% of the total. This is followed by K-41 at 6.73% and finally K-40 at 0.0188%. K-40 has a very long half-life, 1,260,000,000 years. Very little beta ray and gamma ray energy is released as it decays.

Potassium Content and Potassium-40 Activity in Some Selected Foods				
Food	Portion	Potassium [mg]	K-40 [µg]	Activity [Bq]
Hot Dog	1 plain @ 98 g	143	16.7	4.5
Double Hamburger	1 loaded @ 226 g	570	66.7	18.1
Chicken, roasted	¼ @ 195 g (light & dark)	447	52.3	14.2
French Fries (veg. oil)	10 strips @ 50 g	306	35.8	9.7
Broccoli (raw)	3 spears @ 93 g	302	35.3	9.6
Brewed Coffee (black)	250 mL @ 250 g	135	15.8	4.3
Banana	1 medium @ 150 g	454	53.1	14.4
Orange juice, chilled	250 mL @ 263 g	500	58.5	15.9
2% Milk	250 mL @ 258 g	398	46.6	12.6
Skim Milk	250 mL @ 259 g	429	50.2	13.6
Figs, dried, uncooked	10 @ 137 g	1331	155.7	42.2
Potato, baked, skin on	1 @ 202 g	844	98.7	26.8
Bran Flakes, Post™	175 mL @ 37 g	177	20.6	5.6
Maple syrup	15 mL @ 20 g	41	4.8	1.3
Whole Wheat Bread	1 slice @ 28 g	71	8.3	2.3
White Bread	1 slice @ 25 g	30	4.0	1.0
Sunflower Seeds, dried	75 mL @ 41 g	345	40.4	10.9
Peanut Butter	30 mL @ 32 g	234	27.4	7.4
Egg	1 large @ 33 g	47	5.0	1.5

Ram Chandrasekar, Ph. D., Manager of Lab Operations for the Bureau of Public Health Laboratories, Ohio Department of Health, provided this explanation on why Thorium tests were not conducted:

Subject: Thorium versus Gross Alpha
ODH Lab methods for radiological testing includes gross alpha screen which includes alpha emitted by Thorium nuclides. Hence if the gross alpha value is below the threshold value, there is no need to perform the Thorium estimation. When the initial gross alpha value is high, separate Thorium determination is required to identify the level.

PILOT STUDY

The pilot study commenced as scheduled with no other interruptions except for the one noted above. Sampling was accomplished as scheduled. OEPA was on site March 17, and March 31, 2010 and conducted sampling. At the time of this writing, the results of these samples have not been received.

The treatment operations did not have any adverse effects as a result of the introduction of brine water. The only operational issue that occurred was a result of Patriot discharging at a higher rate in order to meet gallons requirement before an assumed cut off time of 3:30pm. This produced a shock load that was identified in the sampling protocol but did not cause any disruptions to the biological flock or treatability of the wastewater, however some toxicology issues were noted on the April 2nd tests concerning chronic C. Dubia.

TDS OVERVIEW

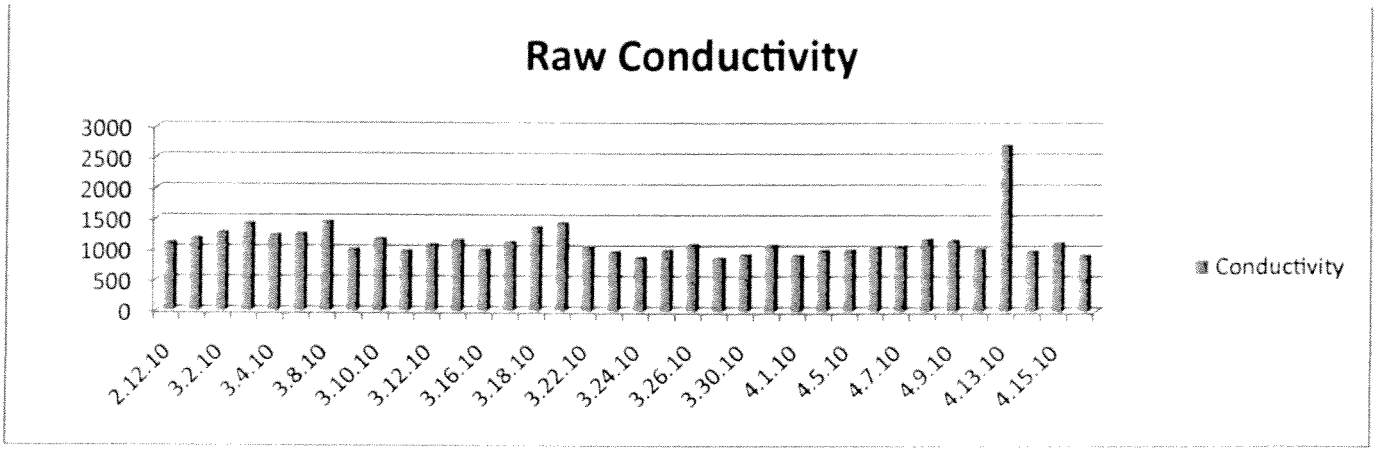
Sludge
Three (3) sludge samples were tested for Chlorides during the pilot study. The results of these samples are:

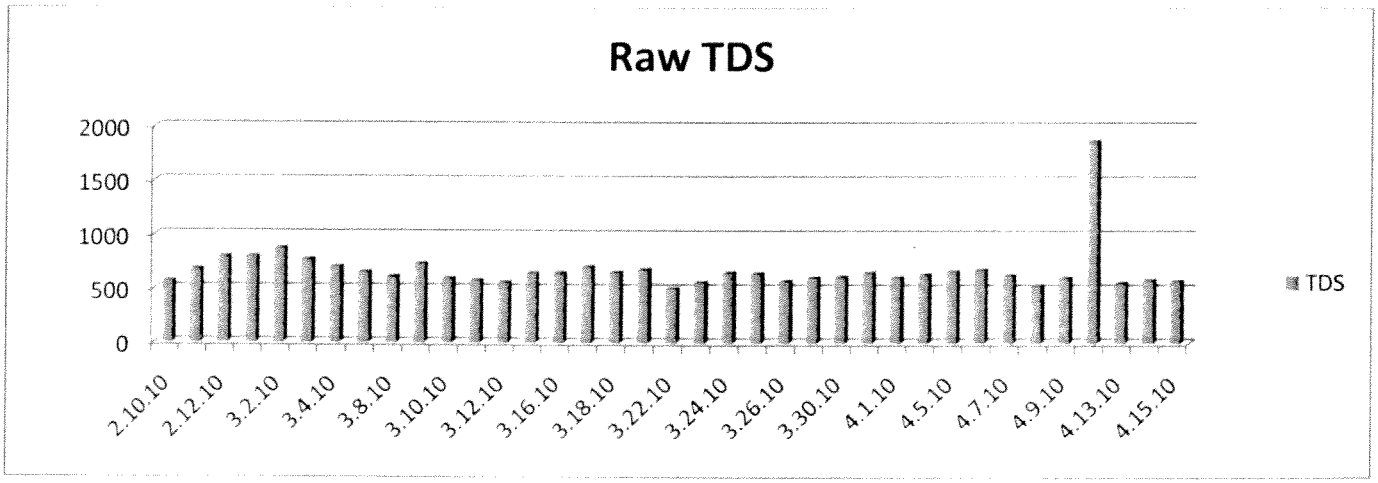
Sample Date	Chloride mg/Kg
2/17/2010	250
4/05/2010	184
4/16/2010	456

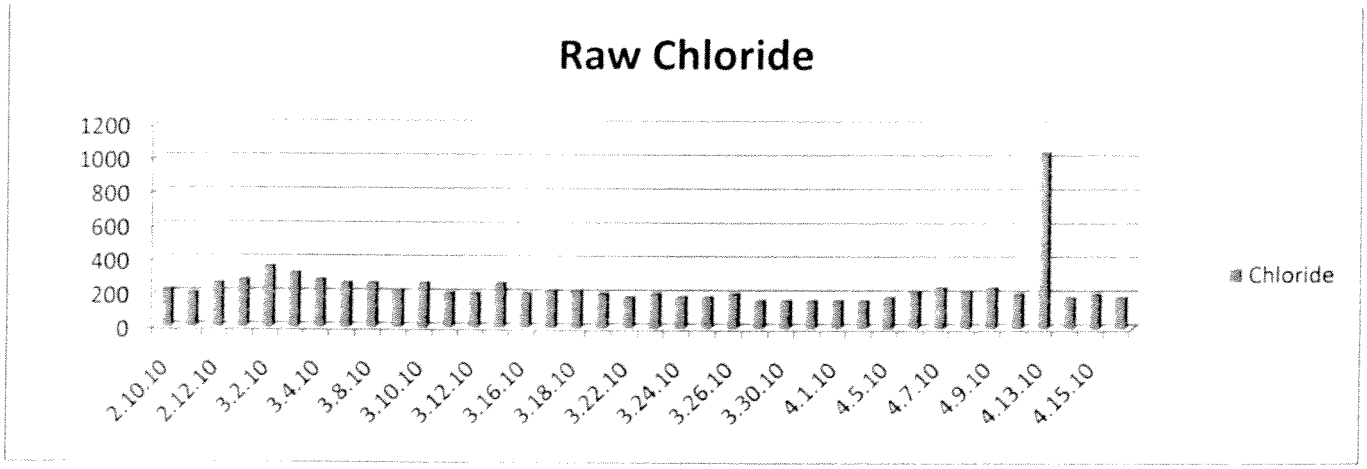
The increase in Chlorides in the sludge potentially can be a result of TDS becoming colloquial solids and settling. However, one data point does not provide sufficient evidence to make a clear determination. Therefore, additional observations will be necessary in order to see if this is actually occurring. If this is a fact, than a percentage of the brine water is actually being treated. Additional observations will allow for a percentage of treatment to be determined if this continues as a trend.

Raw Influent

The average raw TDS did not increase significantly over the 8 week pilot study. Raw TDS average increased to 679 mg/l which is approximately 16% over the baseline of 584 mg/l. Raw chlorides averaged 239 mg/l which is approximately 67% more than the baseline of 143 mg/l. These increases are most likely due to seasonal fluctuations within the collection system as a result of user operations or seasonal runoff from spring rains. (Raw does not have any Patriot Influence or plant return flows)

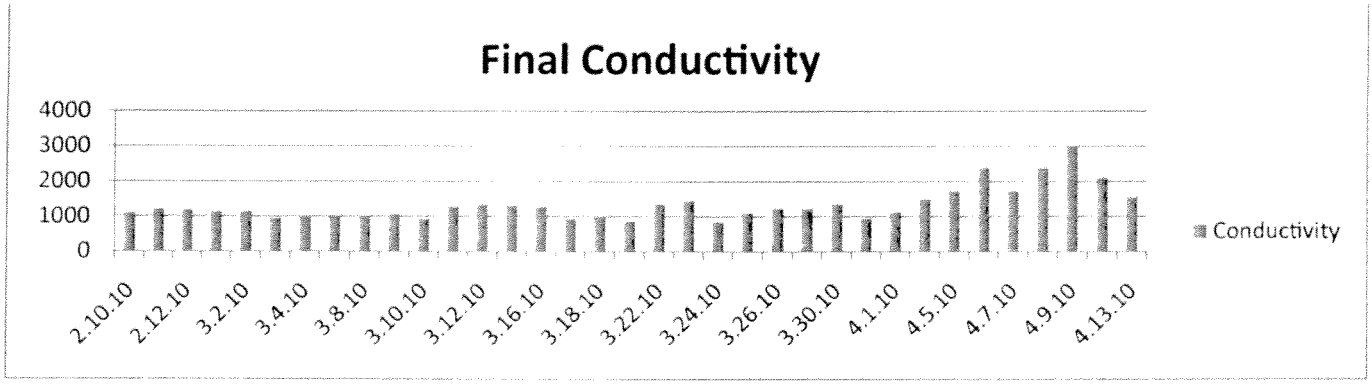


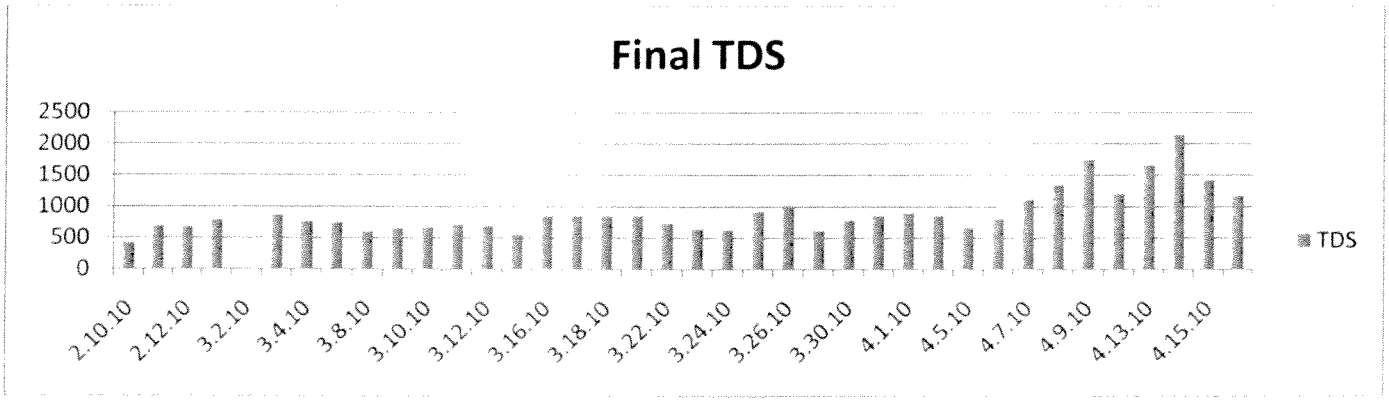


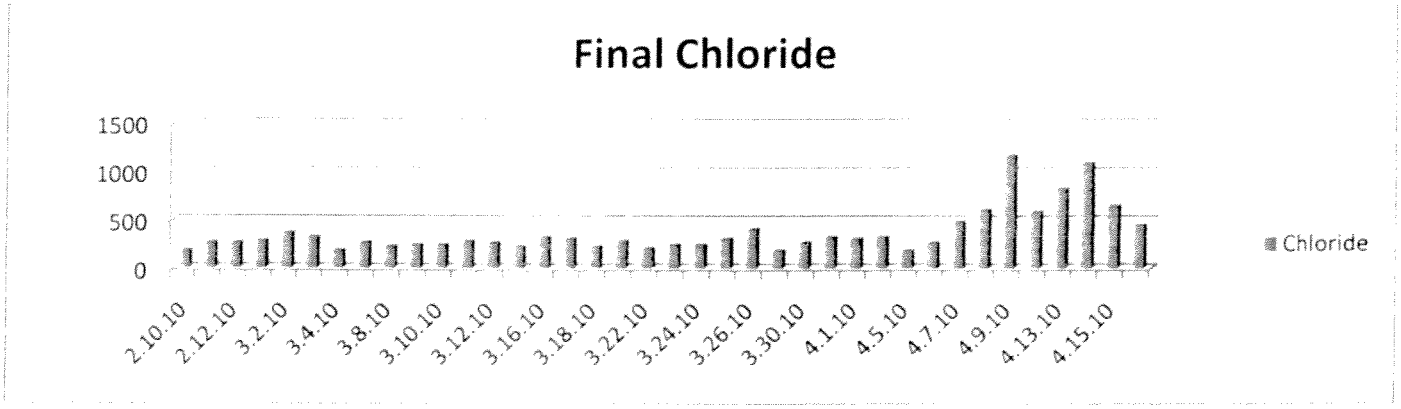


Final Effluent

The average final effluent TDS increased by 47.8% above the baseline to 885 mg/l and the average final effluent Chlorides increased by 122% over the baseline to 348 mg/l. This was expected as most of the TDS would pass through the system. However, since raw chlorides increased at a greater percentage than raw TDS, it cannot be ruled out that seasonal fluctuations within the collection system, as a result of user operations and spring rains, may be causing these increases. The higher increases in chlorides in both the raw and final could have resulted from runoff water from the roads entering the collection system during early spring rains. These rains would have carried additional salt that had acuminated from winter de-icing procedures and was washed off the roads with the spring rains. Infiltration and Inflow into the collection system would have allowed this additional source of salts to add to the overall total. While the timeline, as demonstrated by the graphs below, suggest that this hypothesis may be accurate, it also coincides with the increase to 100,000 gallons per day discharge of brine. Additional observations, during this critical period of time, will help to establish if the hypothesis is accurate.

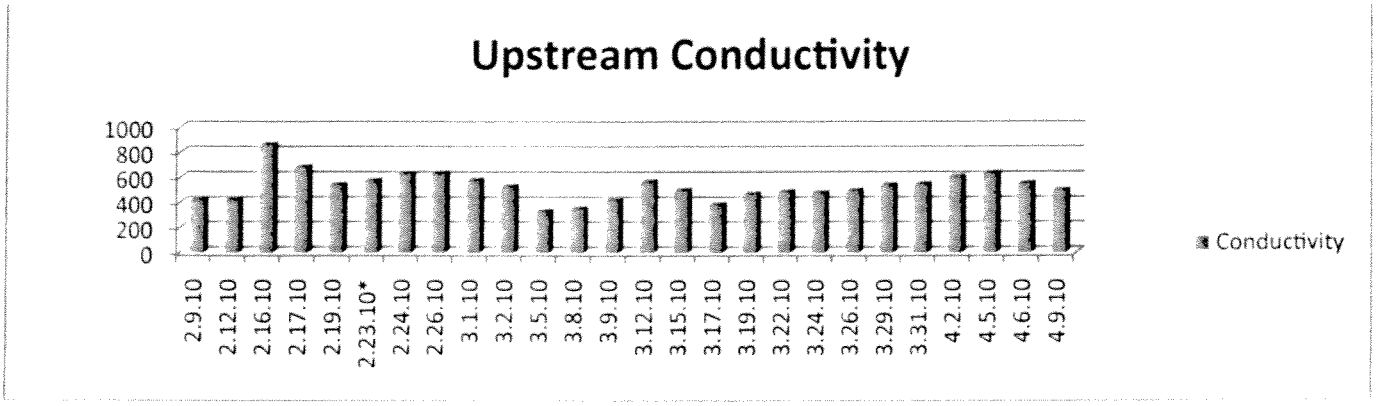


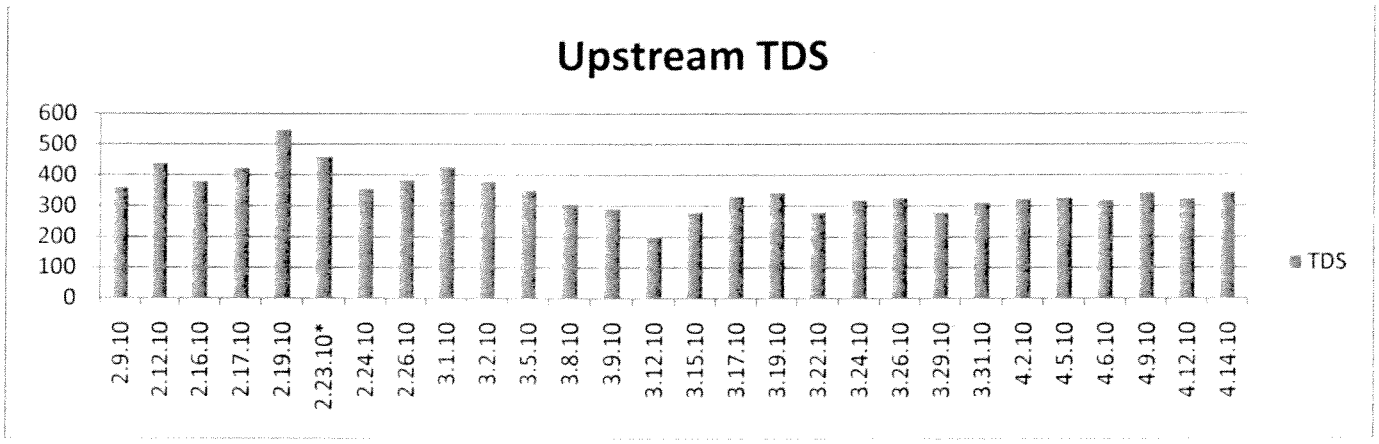


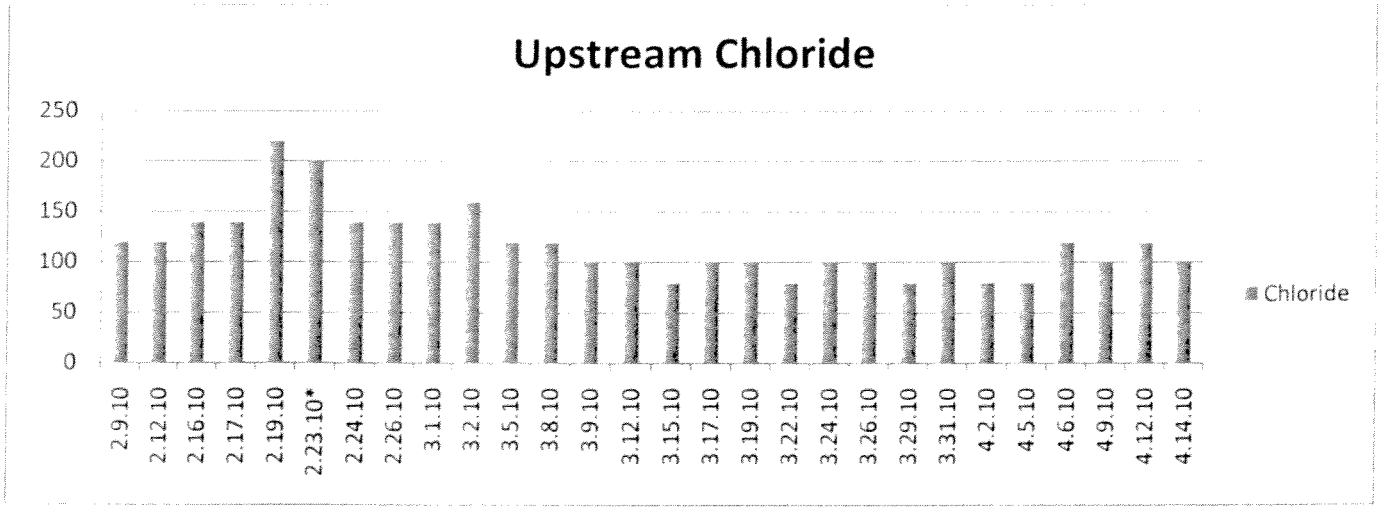


River - Upstream

The average Upstream River TDS of 348 mg/l remained close to the baseline value of 336 mg/l. This represents an increase of 3.6%. However, the average chlorides, at 123 mg/l, were 76% higher than the baseline of 70 mg/l. This is most likely due to seasonal de-icing practices where salts applied to roadways were washed into the river from storm outlets.

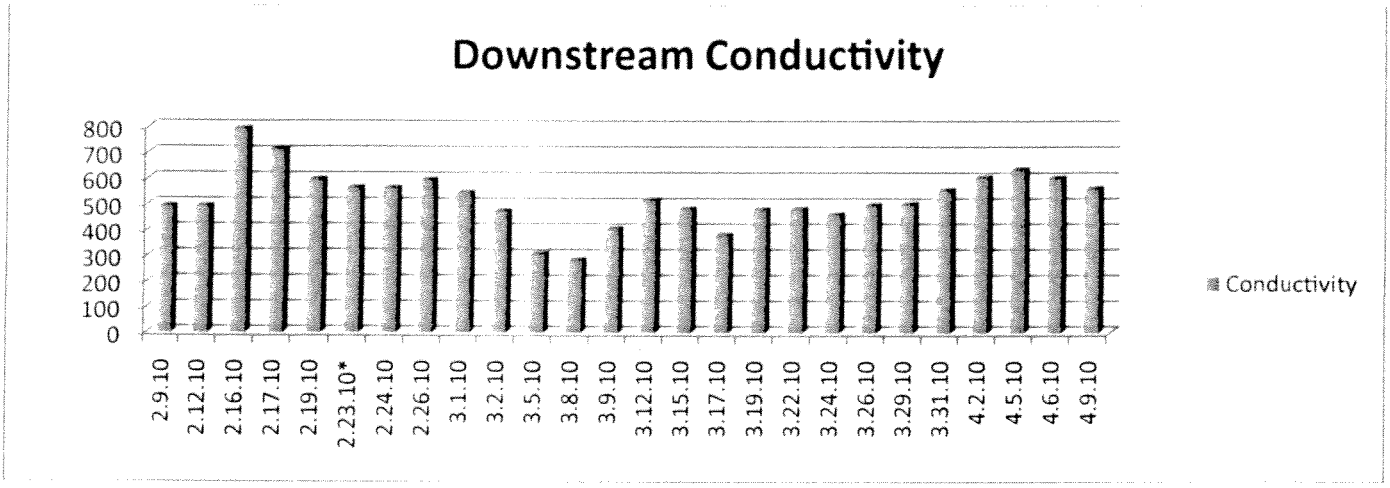


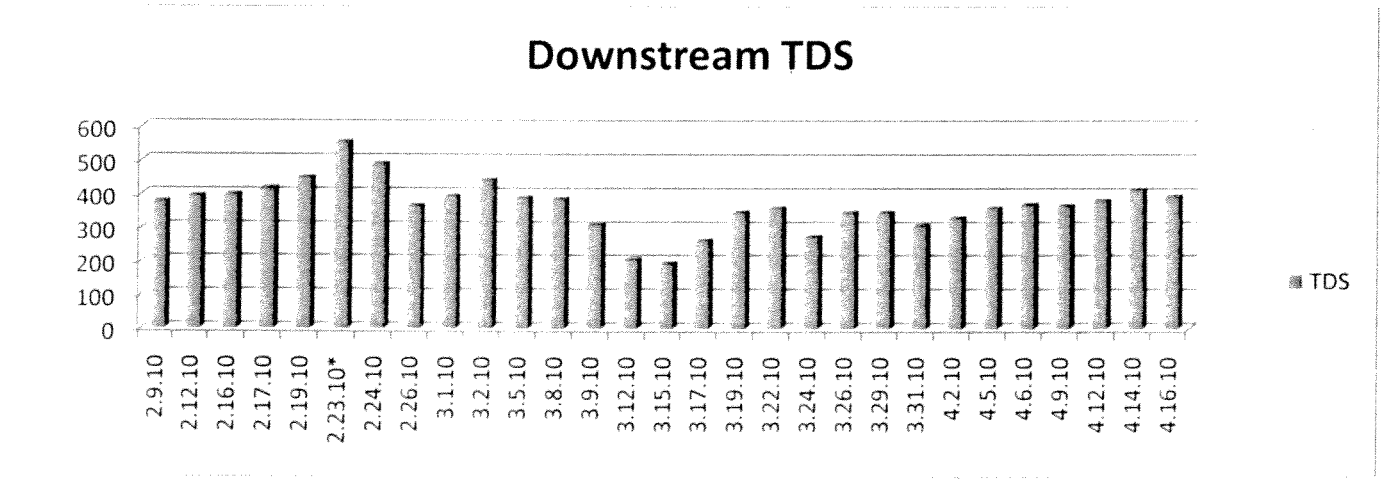


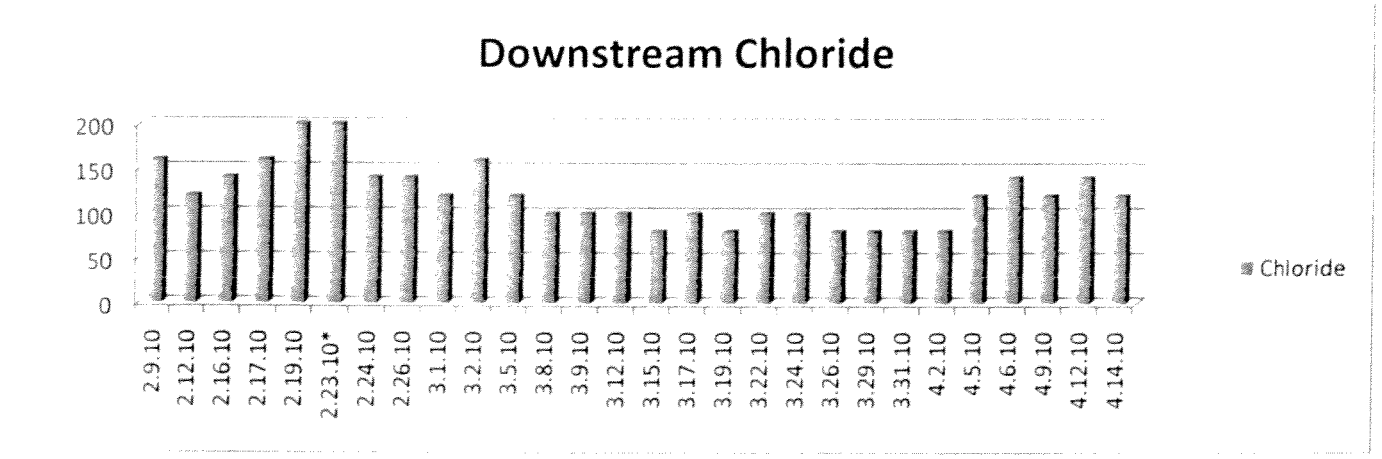


River – Downstream

The average Downstream River TDS of 364 mg/l remained close to the baseline value of 332 mg/l. This represents an increase of 9.7%. However, the average chlorides, at 121 mg/l, were 81% higher than the baseline of 67 mg/l. The majority of this increase is most likely due to seasonal de-icing practices where salts applied to roadways were washed into the river from storm outlets. This is evidenced by the deviation as already noted in the Upstream Chlorides. The additional increase of 5% from Upstream to Downstream would include chlorides from non-point sources along the river way and the introduction of chlorides from the brine water study.







Toxicology

Date	Ceriodaphnia dubia		Pimephales promelas	
	TUa	TUc	TUa	TUc
February 20, 2010	AA	AA	-	-
March 6, 2010	AA	AA	-	-
March 13, 2010	AA	AA	-	-
March 20, 2010	AA	AA	-	-
March 27, 2010	AA	AA	-	-
April 3, 2010	AA	1.8	-	-
April 10, 2010	AA	AA	-	-
April 17, 2010	AA	AA	AA	AA

AA = below detectable limit

Patriot Water Treatment in conjunction with Warren WWTP performed 8 weeks of chronic toxicity testing to determine whether the release of brine from Patriot Water Treatment would impact the water quality of Warren WWTP effluent discharged from Outfall 001. Although it is not required in Warren's NPDES permit, receiving water samples were taken and tested alongside the effluent samples to give insight into the overall water quality of the Mahoning River (receiving stream) and determine any impacts the effluent may have after it is discharged. Due to the fact that increased salt concentrations impact *Ceriodaphnia dubia* more readily than the *Pimephales promelas*, the water fleas were the primary species used in this study, however, during the last week of testing the minnows were subjected to the brine water also to investigate any potential impacts.

The data from 8 weeks of toxicity tests is summarized in the table above. As indicated by the results no increased toxicity was observed from the brine water provided by Patriot Water Treatment with the exception of one testing event, April 3, 2010. This test was unique as compared to the others due to some confusion by Patriot on dispersal rates of the brine. This week, due to outside influences not controlled by Patriot Water Treatment, the brine was released in large slugs over a short period of time instead of the previous slow release over 8 hours as was done in previous weeks and the last 2 weeks of sample collection. Due to the large slugs of water released there was more potential to pick up a large amount of brine during the sampling process and this is the probable cause of toxicity observed to the water fleas. The slug loads occurred due to disruptions in discharge flow to accommodate Septic Sewerage Sludge contractors. The same line was used by the contractors as Patriot. Patriot was supposed to discharge the 100,000 gallons over an 8 hour period but was also instructed to stop discharge by 3:30pm. These two conflicting directives caused the slug loads. After Warren was made aware of the conflict, Patriot was instructed to maintain the 8 hour requirement even if it meant that discharge would continue past 3:30pm. This operational correction resolved the problems.

There was some effect seen intermittently in the upstream and farfield receiving water samples. The largest impacts were observed in the upstream water which is outside of the influence of the effluent. These effects are not indicative of toxicity as a result of Warren's effluent or Patriot's brine water. The two testing events that indicated toxicity in the upstream receiving water showed that the toxicity was reduced or no longer present in the farfield water samples.

Overall the results of this study have indicated that if Patriot Water Treatment discharges a consistent amount of brine water over an extended period of time then there will be no adverse changes in the water quality of Warren WWTP or in the Mahoning River downstream of outfall 001.

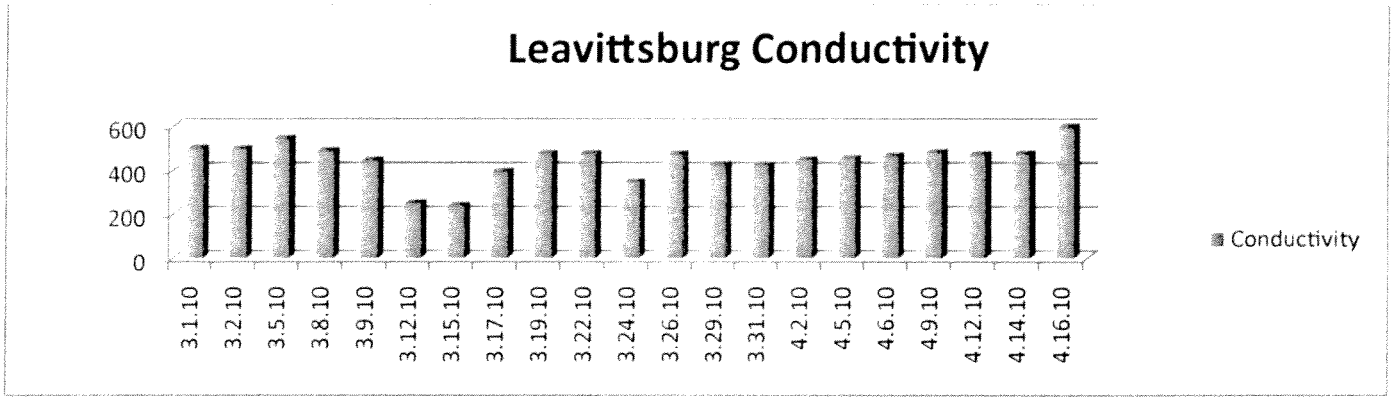
Additional Sampling

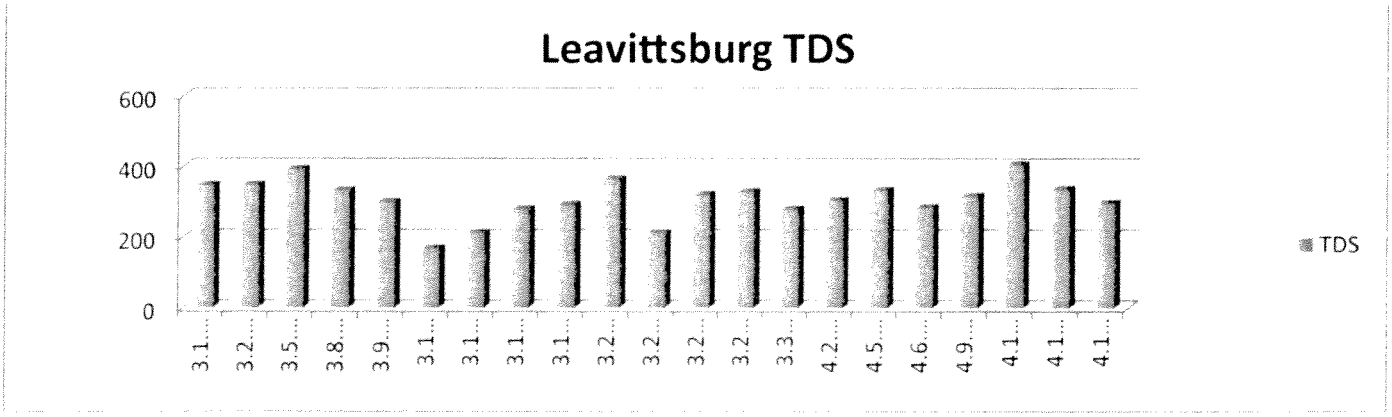
To better understand the impact of TDS on the receiving stream, Warren expanded sampling points to better model what was occurring throughout the Pilot Study. Two additional sampling points were added for the river. These sampling points were the North Leavitt Road bridge in Leavittsburg, Ohio and Belmont Road bridge in Niles, Ohio. These two points were sampled every Monday, Wednesday and Friday or as close to these days as possible. Sampling began on March 1, 2010. Averages for the additional sampling points were:

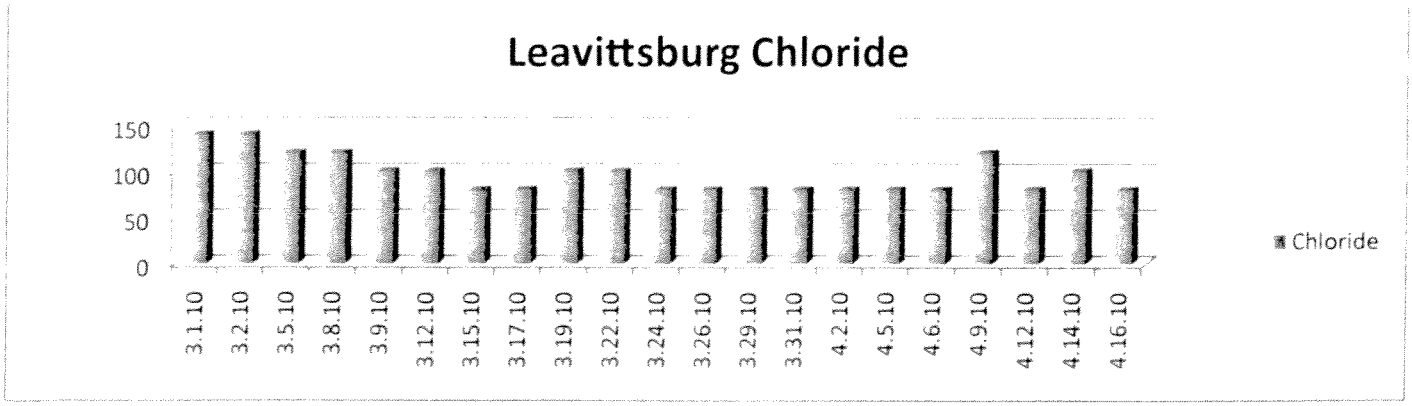
Leavittsburg TDS – 307 mg/l Chlorides – 96 mg/l

Niles TDS – 347 mg/l Chlorides – 123 mg/l

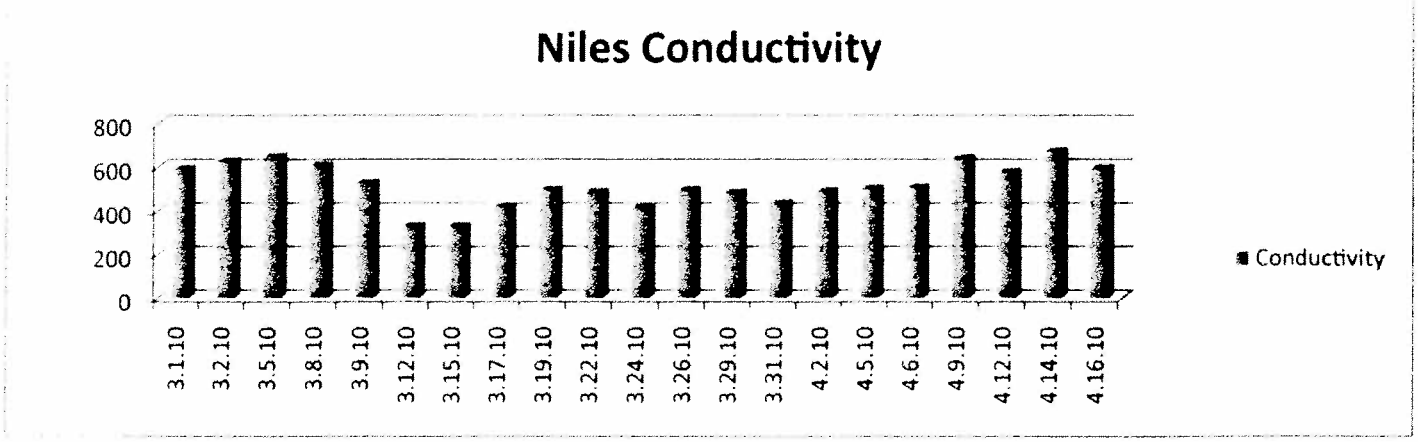
Leavittsburg Sampling

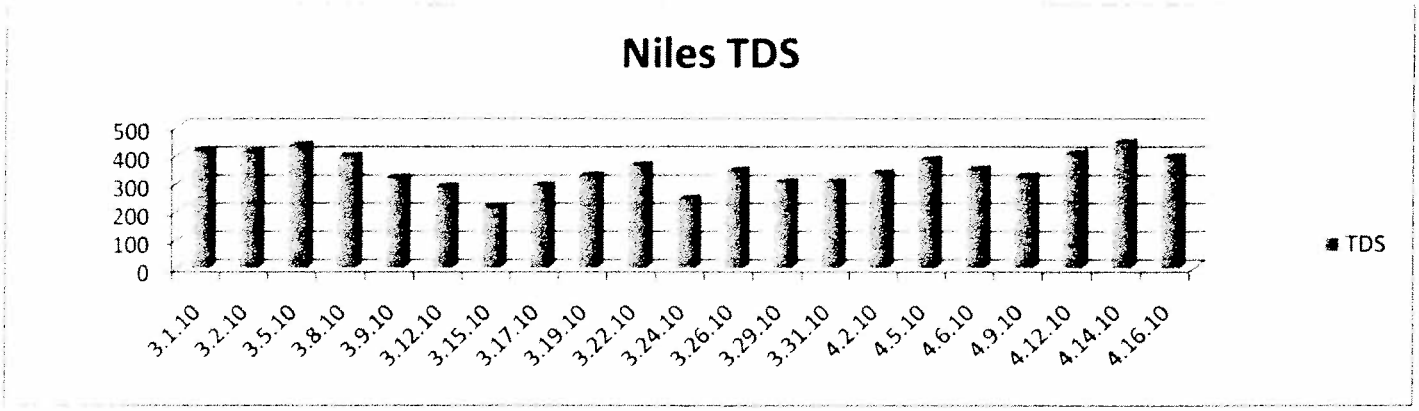


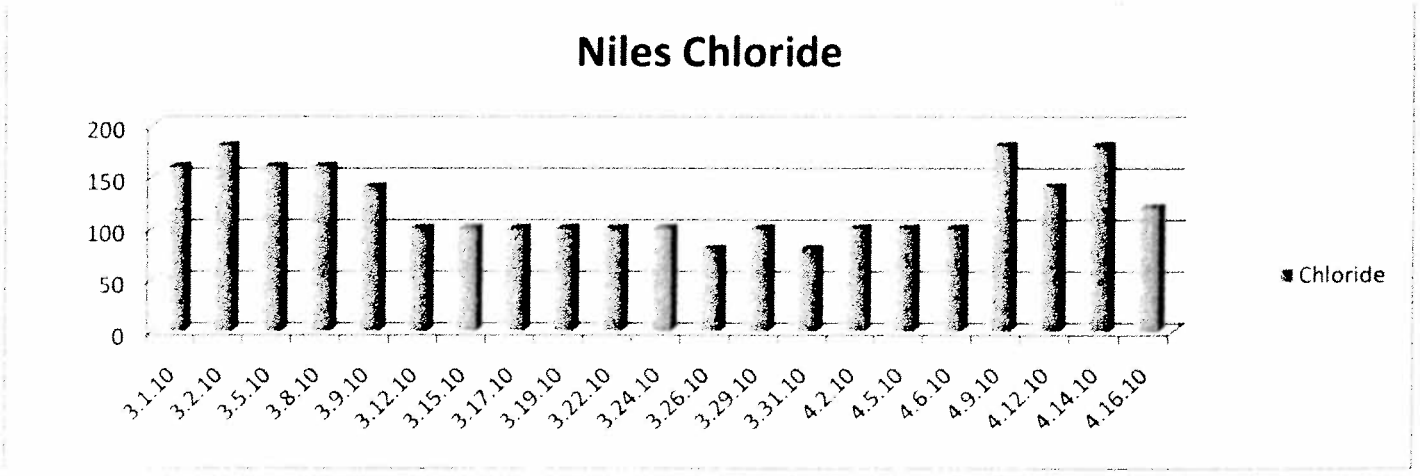




Niles Sampling







Youngstown Sampling

Youngstown's WWTP was asked to provide values that will establish baseline information for future evaluations in watershed modeling. Denise Seman, Lab Manager for Youngstown WWTP, provided the following information from samples obtained on April 6, 2010:

Raw TDS –	851 mg/l	Final TDS –	881 mg/l
Upstream TDS -	431 mg/l	Downstream TDS -	543 mg/l

Conclusion

The 8 week Pilot Study demonstrated that a controlled discharge of brine water into Warren's WWTP did not have adverse water quality impacts to the treatment facility or receiving stream. The Study supports the initial toxicology test that indicated that Warren would be able to accept up to 664,000 gallons per day of brine water at a maximum limit of 50,000 mg/l TDS at 8 MGD daily plant flows. The 8 MGD is set as the low flow limit that can occur in mid-summer at 3:00am.

Warren should be able to begin accepting brine water at the initial rate of 100,000 gallons per day and increase amounts at a controlled rate, while sampling, to determine final ceiling concentration.

Next Steps

The existing Pilot Study equipment should be used as a transitional system while final review, PTI and NPDES modifications are completed. A flow rate of no more than 200,000 gallons per day, over a 16 hour discharge period, will be allowed for the transitional system. Administrative Orders will be assigned to establish operational procedures, local and categorical limits and testing frequencies. Transference to the permanent location will allow for metals precipitation to occur. Sampling protocols should require that all parameters as defined within the Pilot Study will be accomplished on a monthly basis, except for radioactivity, for the first 6 months of operational discharge. Sampling frequencies for all parameters as defined within the Pilot Study, after 6 months will be quarterly for an additional year. Sampling frequencies after that time will be established based on data accumulated and will be set at that time.

Additional WWTP's that wish to provide treatment services will have to first perform a baseline toxicology test, using their effluent flows, to determine ceiling limits. Flow rates will then be allowed at a phased in approach as established by the Pilot Study proportional to their minimum plant flows. Testing of final effluent and farfield toxicology, TDS and Chlorides will be accomplished at least bi-weekly as a control.

Warren looks forward to assisting Ohio in developing this new and potentially viable industry. As such, I am offering my assistance in developing a watershed model to determine total TMDL loading. I wish to thank OEPA for the opportunity to conduct the Pilot Study and look forward to working with OEPA and USEPA on establishing procedures that will impact users in Ohio and hopefully set the model for our neighboring states.

Respectfully Submitted

Thomas A. Angelo

Addenda 1

Sampling Protocol

Samples were collected at each of the described locations following proper sample handling, collecting and preserving techniques outlined in the USEPA manual Methods for Chemical Analysis of Water and Wastes.

Brine Samples: Patriot employees collected Brine samples from storage tanks (frequently referred to as Frac tanks). The tanks had a pumping system that was intended to keep the tanks from settling and provide representative samples. All of the samples collected from the brine tanks were grab samples. The brine or frac tanks were located in front of the WWTP Screen Building and discharged into the plant approximately 6 feet after the raw wastewater sampling location.

Raw Samples: City of Warren Wastewater Operators collected samples of the raw waste stream. Raw composite samples came from the permanently located sampling device that sits outside of the Screen building. The sampler generally collects a 24-hour sample beginning and ending at approximately 7 am daily. During the study we also collected an 8-hour sample at approximately 3 pm to check the total dissolved solids in the time frame that Patriot was discharging to the influent. Grab samples were obtained from the same location at a removable grate just in front of the raw composite sampler. The Brine discharge was located about 6 feet downstream of the raw sampling point.

Final Samples: City of Warren wastewater Operators collected samples of the final effluent. Final composite samples are collected from a permanent sampling device located in a lower level room of the facility near the return activated sludge pumps (RAS). Final composite samples are also collected as a 24-hour sample that runs approximately from 7 am to 7am daily. During the study we also collected an 8-hour sample to represent the 24-hour detention time of the plant. Grab samples of final effluent were collected at the post aeration tanks just before going over the weir to the underground pipe that leads to the outfall.

Upstream River Samples: City of Warren Sewer crew staff collected samples of the upstream Mahoning River. All samples collected from the upstream river were grab samples. The samples were collected at the bridge just inside of the Severstal Steel property.

Downstream River Samples: City of Warren Sewer crew staff collected samples of the downstream Mahoning River. All samples collected representing the downstream river were grab samples collected at the West Park Street Bridge.

Upstream 2 Leavittsburg River samples (further upstream 2): City of Warren Sewer crew staff collected samples of the Leavittsburg further upstream Mahoning River. All samples collected representing the upstream 2 were grab samples collected at the North Leavitt Street Bridge.

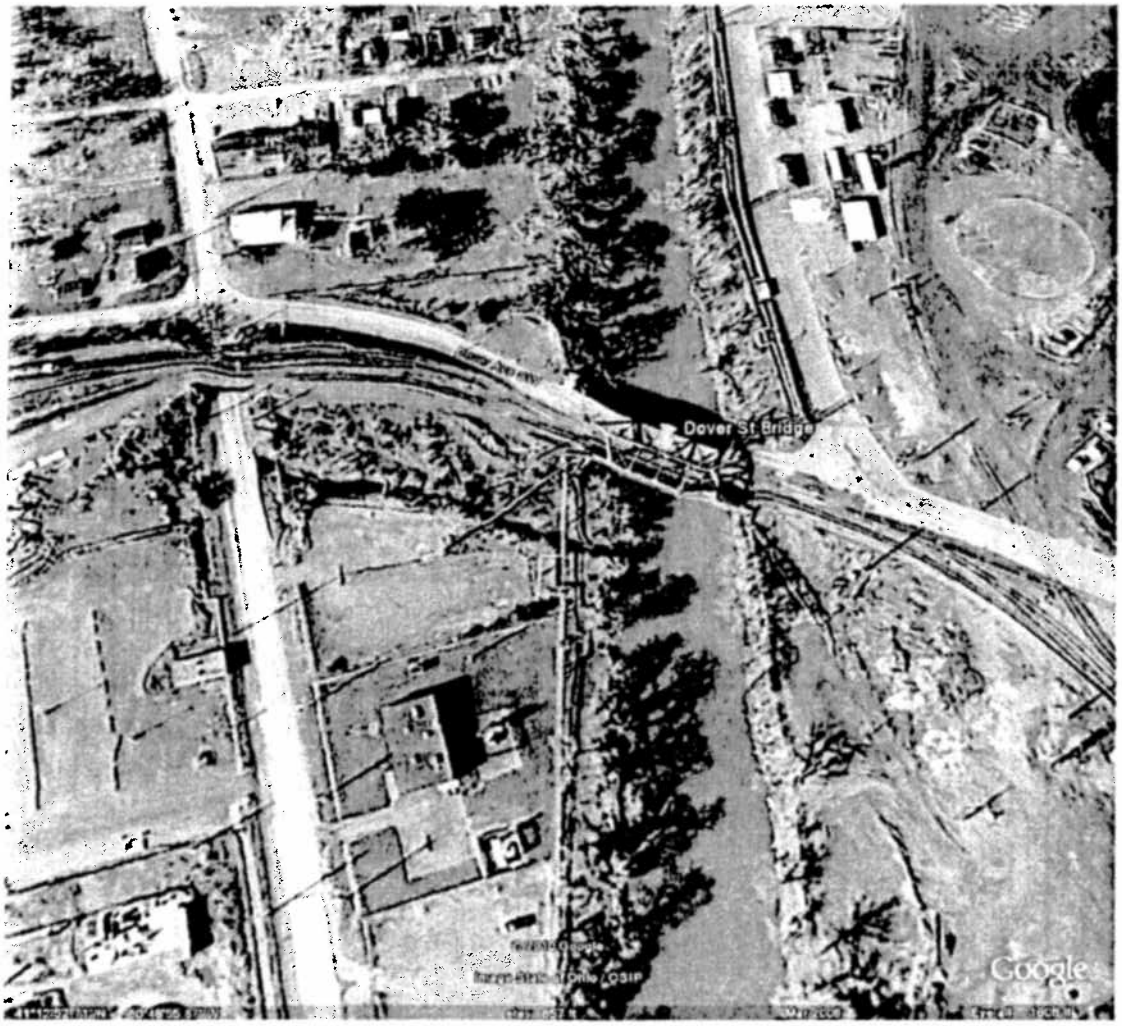
Downstream 2 Niles River samples (further downstream 2): City of Warren Sewer crew staff collected samples of the Niles area further downstream 2 Mahoning River. All samples collected representing the downstream 2 were grab samples collected at the bridge on Belmont Street in Niles.

During the 8-week study the Wastewater treatment plant experienced no observable negative impacts. Microscopic examination of the activated sludge verified that there were plenty of active free-swimming ciliates and stalked ciliates along with other single celled organisms. Our normal testing parameters were all within acceptable ranges. As a matter of fact, during the study the average for final effluent Ammonia-Nitrogen was about 0.4mg/L, which demonstrates that the nitrifiers were alive and active in the activated sludge.

When looking at the Conductivity and Total Dissolved Solids (TDS) there is a potential for the TDS results to be skewed higher than they actually are due to formation of a water-trapping crust. In Standard Methods, the TDS method recommends drying at 180°C but allows for drying at other temperatures. It is thought that drying at 180°C will result in more complete conversion of bicarbonate to carbonate. Since we did not have a drying oven that could be dedicated to the TDS test, we used our Total Suspended Solids (TSS) drying oven, which operates at 105°C. When comparing the measured TDS and calculated TDS it is appropriate for the measured TDS to be up to 20% greater than the calculated TDS (Standard Methods 1030 E).

Addenda 2

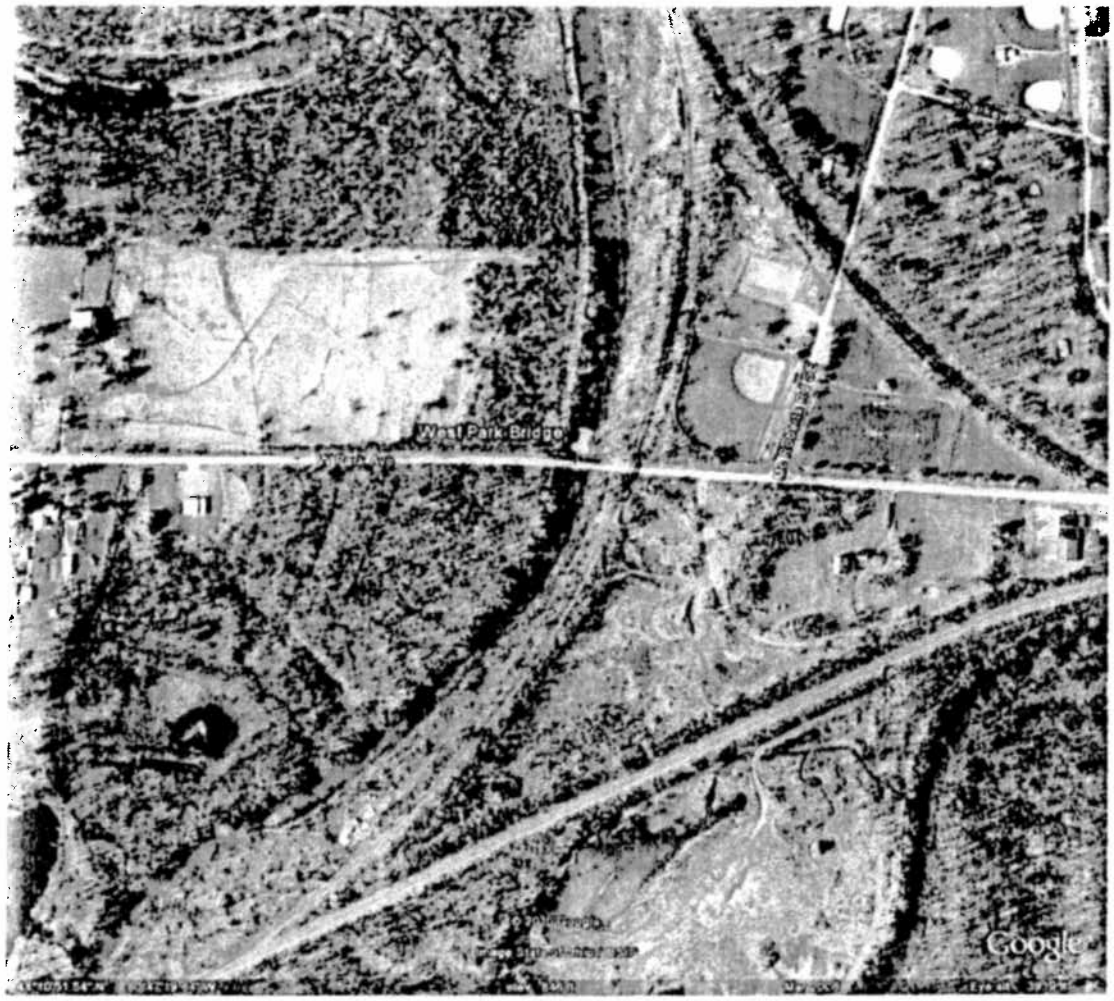
WPC River Sampling Locations
Upstream Mahoning River



Directions to Upstream Sampling Location:

1. Turn right out of WPC plant driveway on to Austintown Warren Road (Main Street) heading northbound 0.9 miles to Dover SW.
2. Turn right onto Sever stal Steel Bridge (private entrance)

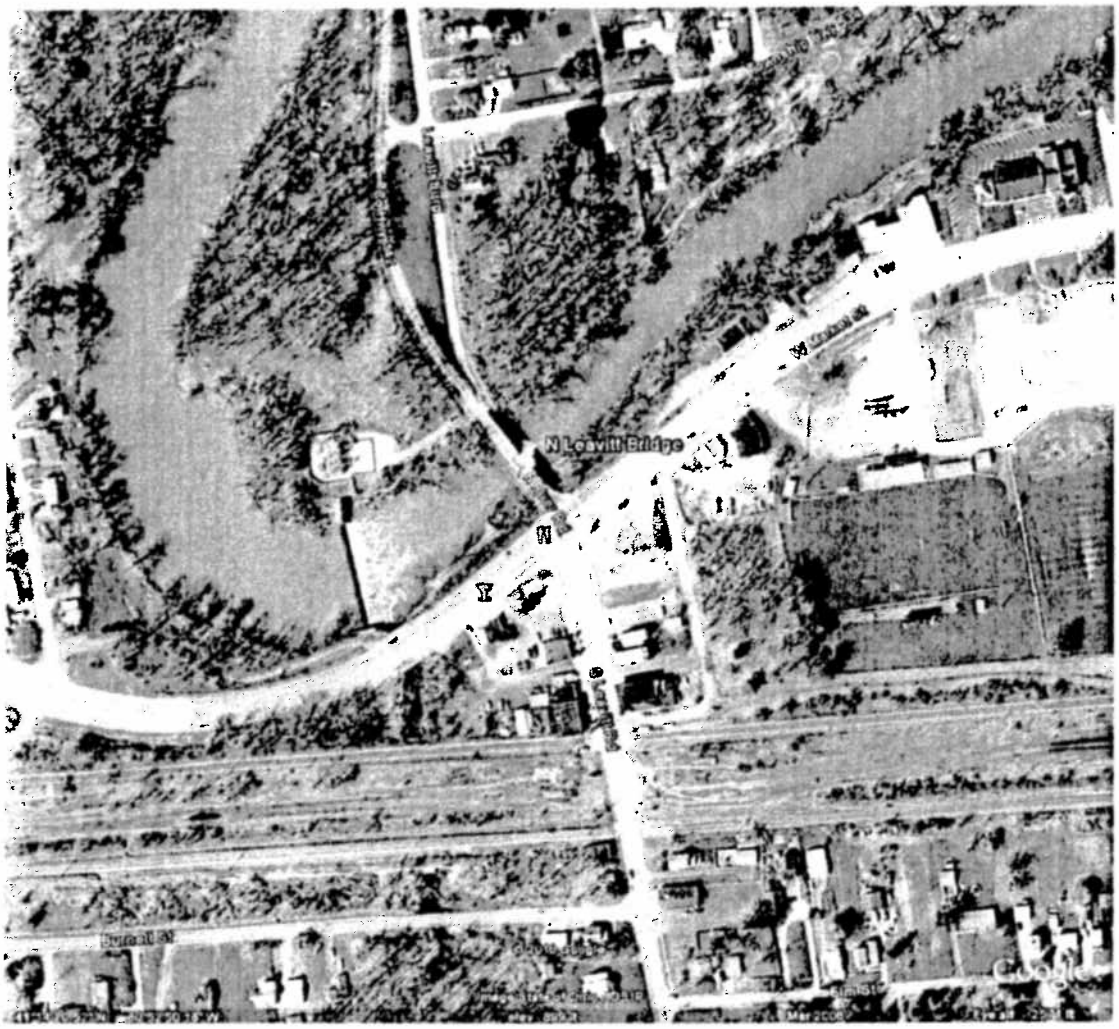
WPC River Sampling Locations
Downstream Mahoning River



Directions to Downstream Sampling Location:

1. Turn left out of WPC Plant driveway heading southbound 1.4 miles to West Park Ave.
2. Turn left onto West Park Street eastbound 0.9 miles to the West Park Street Bridge.

WPC River Sampling Locations
Upstream 2 Leavittsburg Mahoning River



Directions to Upstream 2 Sampling Location:

1. Turn right out of WPC plant onto Austintown-Warren Road northbound 2.2 miles
2. Turn left onto South Ave. SW (route 422) westbound 3.2 miles to North Leavitt Road.
3. Turn right onto North Leavitt Bridge.

WPC River Sampling Locations
Downstream 2 Niles Mahoning River

Directions to Downstream 2 Niles Sampling Location:

1. Turn left out of WPC plant onto Austintown-Warren Road southbound 1.4 miles to West Park Ave.
2. Turn left onto West Park Ave. eastbound 2.1 miles to Main Street (route 46)
3. Turn right onto Main Street (route 46) southbound 0.8 miles to McKees Lane.
4. Turn left onto McKees Lane eastbound 0.7 miles to Belmont.
5. Turn left on Belmont northbound 0.3 miles to bridge.

Addenda 3
Testing Schedule

Warren WWTP Test Study: Oil and Gas Well Production Wastewater
Required Analyses

B - Beginning of eight week test period **T - End of eight week test**
D - Daily **W - End of each Monday-Friday 5 day test period**
A - As needed, or non-routine (e.g., after rain event)

Parameter	001	Influent after return streams	801	901	Sludge[1]
Acute toxicity, *ceriodaphia dubia*	W[3]		W[3]	W[3]	
Acute toxicity, *pimephales promelas*	T[3]		T[3]	T[3]	
Chronic toxicity, *ceriodaphia dubia*	W		W	W	
Chronic toxicity, *pimephales promelas*	T		T	T	
Specific conductivity	D, A[5]	D, A[5]	W, A	W, A	
Total dissolved solids	W, A[4, 5]	W, A[4, 5]	W, A[4]	W, A[4]	
Chlorides	W, A[4]	W, A[4]	W, A[4]	W, A[4]	B, T
Fluorides	T, A	T, A	T, A	T, A	B, T
Sulfates	T, A	T, A	T, A	T, A	
total alkalinity	T, A	T, A	T, A	T, A	
total suspended solids	T, A	T, A	T, A	T, A	
total phosphorus	T, A	T, A	T, A	T, A	
pH	W	W	W	W	
HEM oil and grease	T	T	T	T	
SGT-HEM oil and grease	T	T	T	T	
Metals[2]	T				B, T[6]
Barium, Strontium[8]	W	W			
Low level mercury	T				
Hexavalent chromium	T				
Volatile organic compounds	T				
Base neutral organic compounds	T				
Acid organic compounds, including pesticides and total phenols	T				
MBAS	T				
$CBOD_5$	T				
COD	T				
total organic carbon (TOC)	T				
Total nitrogen	T				
Ammonia-nitrogen	T				
Nitrate/nitrite nitrogen	T				
Total alpha radiation in pCi/l	W, T, B				B, T
Total beta radiation in pCi/l	W, T, B				B, T
Total uranium in pCi/l	T, W, B				~~B~~ T
Total radium in pCi/l (or Ra 226 + Ra 228)	T, W, B				~~B~~ T
Total thorium in pCi/l	T, W, B				~~B~~ T

pCi/l

Warren Test Parameter Table_r1
February 10, 2010

* ADD sample requirements to

Notes:

1. Sludge after dewatering, before processing
2. Metals (for sludge see note 5): aluminum, antimony, silver, ~~barium~~, beryllium, boron, cadmium, chromium, copper, iron, nickel, lead, selenium, ~~strontium~~, zinc
3. Calculated endpoint
4. Conduct analyses on WET test samples
5. To develop a brine specific TDS/specific conductivity ratio
6. Metals regulated by 40 CFR 503
7. Required if there is a significant increase in total alpha or total beta radiation
8. During 100,000 gpd weeks

McCracken, Chuck

From: Donna Kniss <Donna.Kniss@epa.state.oh.us>
Sent: Tuesday, February 09, 2010 9:04 AM
To: Chuck McCracken
Cc: Brian Hall; Rich Blasick; Virginia Wilson
Subject: Re: Oil and gas well wastewater
Attachments: PBT brine rad data.pdf; Attachment B.PDF

Chuck:

Unfortunately, it took more time for me to draft the letter; brine related issues (see below) have taken up a lot of time. The letter is in Central Office DSW for review, and hopefully will be sent out soon.

FYI, I have attached two PDFs of rad results. "PBT brine rad data" is from a sample of treated brine supplied by Pennsylvania Brine Treatment to Youngstown. PBT/Hart is working with D and L Energy and Youngstown to site a brine treatment facility; Youngstown has been conducting toxicity testing to evaluate how much brine they could accept.

Warren is working with Patriot Energy, Stallion, and Wastewater Management, and is beginning an eight week test to determine how much brine they could accept. The data they provided was from a similar type of facility, and is "Attachment B". Unfortunately, the scan they sent me is upside down, so you will have to rotate it.

Donna

Donna J. Kniss
Ohio Environmental Protection Agency
Division of Surface Water
Northeast District Office
2110 East Aurora Road
Twinsburg, Ohio 44087
330-963-1285
fax 330-487-0769

donna.kniss@epa.state.oh.us

>>> Chuck McCracken <Chuck.McCracken@odh.ohio.gov> 2/8/2010 5:09 PM >>>

02.08.2010

Donna:

It's been a little over a month since we last communicated on the NORM issue.

Is OEPA still intending to send a letter seeking ODH assistance with the oil & gas NORM issue?

Please advise.

Charles D. McCracken

Supervisor, Bureau of Radiation Protection
Ohio Department of Health
Ph: 614.466.5136
Fx: 614.466.0381

Microbac Laboratories, Inc.
ERIE DIVISION
1962 WAGER ROAD
ERIE, PA 16509
(814) 825-8533 FAX (814) 825-9254
CHERI BROLASKI, LABORATORY DIRECTOR
http://www.microbac.com E-Mail: erie@microbac.com

STATE CERT ID.
25-067, 10121
C-PA-05

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · CONSUMER PRODUCTS
WATER · AIR · WASTES · FOOD · PHARMACEUTICALS · NUTRACEUTICALS

PRELIMINARY CERTIFICATE OF ANALYSIS

PENNSYLVANIA BRINE TREATMENT
MR. ELTON DELONG, JR. (SPARKY)
5148 US 322
FRANKLIN,PA 16323

Date Reported
Date Received 1/12/2010
Order Number 1001-02981
Invoice No.
Cust # 016369
Sampler Customer

Permit No.
Cust P.O.

SUBJECT: GAS WELL WASTEWATER

TEST	METHOD	RESULT	UNITS	ANALYSIS DATE	TIME	TECH	ACCRED.
008 **GAS WELL WASTEWATER**							
Date Sampled: 1/12/2010				**Time Sampled: 9:45 am**			
.....continued							
pH -Exceeds 15Min Hold Time	SM 4500-H+ B	8.6	Units	1/14/2010	14:30	DS	⌘ ◆
Solids, Dissolved	SM 2540 C	118000	mg/L	1/14/2010	16:00	DS	⌘ ◆
Solids, Suspended	SM 2540 D	<10	mg/L	1/15/2010	10:30	DS	⌘ ◆
BOD5	SM 5210 B	360	mg/L	1/13/2010	14:37	MAB	⌘ ◆
Chloride	SM 4500-Cl-E (Discrete)	101000	mg/L	1/15/2010	12:29	CAP	⌘ ◆
Sulfate	SM 4500-SO4 D	9	mg/L	1/15/2010	15:30	DS	⌘ ◆
Alkalinity As CaCO3	SM 2320 B	110	mg/L	1/26/2010	10:10	BJJ	⌘ ◆
Fluoride,Direct	SM 4500-F C	<1.0	mg/L	1/25/2010	11:05	CP	
009 **GAS WELL WASTEWATER**							
Date Sampled: 1/12/2010				**Time Sampled: 9:45 am**			
Phosphorus,Total	EPA 365.1(DISCRETE)	<0.1	mg/L	1/26/2010	16:33	BJJ	⌘ ◆
COD	HACH 8000	1060	mg/L	1/20/2010	15:05	CP	⌘ ◆
Ammonia Distilled	SM 4500-NH3 B/G DISCRET	87.3	mg N/ L	1/18/2010	16:20	CP	⌘ ◆
Nitrogen, Nitrate + Nitrite	EPA 1979 353.2(DISCRETE	<1	mg/L	1/13/2010	16:40	CAP	⌘
010 **GAS WELL WASTEWATER**							
Date Sampled: 1/12/2010				**Time Sampled: 9:45 am**			
TOC (Total Organic Carbon)	SM 5310 C	218	mg/L	1/15/2010		OST	
011 **GAS WELL WASTEWATER**							
Date Sampled: 1/12/2010				**Time Sampled: 9:45 am**			
Gross Alpha	EPA 900.0	988+/-256	pCi/L	1/28/2010	9:49	OST	
Gross Beta	EPA 900.0	524+/-177	pCi/L	1/28/2010	9:49	OST	
Uranium	ASTM D5174	0.0219+/-0.0035	pCi/L	1/27/2010	9:49	OST	
Radium 226	EPA 903.1	0.397+/-0.396	pCi/L	1/22/2010	9:49	OST	

THE TECH INITIALS "OST" (OUTSIDE TESTING) INDICATE THAT THESE ANALYSES WERE SUB-CONTRACTED TO MICROBAC LABORATORIES, INC./PITTSBURGH DIVISION. (W.O. 1001-00713).

The data and information on this, and other accompanying documents, represent only the sample(s) analyzed and is rendered upon condition that it is not to be reproduced wholly or in part for advertising or other purposes without approval from the laboratory.
USDA-EPA-NIOSH Testing Food Sanitation Consulting Chemical and Microbiological Analyses and Research

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PRELIMINARY CERTIFICATE OF ANALYSIS

PENNSYLVANIA BRINE TREATMENT
MR. ELTON DELONG, JR. (SPARKY)
5148 US 322
FRANKLIN,PA 16323

Date Reported
Date Received 1/12/2010
Order Number 1001-02981
Invoice No.
Cust # 016369
Sampler Customer

Permit No.
Cust P.O.

SUBJECT: GAS WELL WASTEWATER

TEST	METHOD	RESULT	UNITS	ANALYSIS DATE	TIME	TECH	ACCRED.
011 **GAS WELL WASTEWATER**							
Date Sampled: 1/12/2010				**Time Sampled: 9:45 am**			
.....continued							
Radium 228	EPA 904.0	-0.021+/-0.397	pCi/L	1/21/2010	9:49	OST	
Thorium		see below	pCi/L	1/23/2010	9:49	OST	
THORIUM-228 0.876 +/-0.281 pCi/L							
THORIUM-230 0.0969 +/-0.087 pCi/L							
THORIUM-232 0.0125 +/-0.0398 pCi/L							

THE TECH INITIALS "OST" (OUTSIDE TESTING) INDICATE THAT THE RADIUM, THORIUM AND URANIUM ANALYSES WERE SUB-CONTRACTED TO GEL LABORATORIES LLC. (W.O. MILA00502).

The Sampler's Initals 'Customer' means that some or all of the samples were collected by the customer. The verifiability of the final results are therefore limited by the customer's reported values. Microbac Laboratories, Inc. assumes that all sampling instructions are followed, and the data upon which these final results are based, have been accurately supplied by the client.

All samples received in proper condition and results conform to ISO 17025 unless otherwise noted

Accred.

⌘ This symbol at the end of the test line means the test analysis met the requirements of NELAC (PA ID 25-00067)
⁘ This symbol at the end of the test line means the test analysis met the requirements of AIHA (ID 100386)
◆ This symbol at the end of the test line means the test analysis met the requirements of NY ELAP (NY ID 10121)

ABBREVIATIONS:

MG/KG	= Milligram per Kilogram (PPM)	Negative	= Bacteria or target analyte not detected
UG/L	= Micrograms per Liter (PPB)	CFU	= Colony Forming Unit
UG/KG	= Micrograms per Kilogram (PPB)	ND	= Not detected at or below the reporting limit
MG/L	= Milligrams per Liter (PPM)	TIC	= Tentatively Identified Compound
1000 UG	= 1 MG	"<"	= less than (also see "ND")
Positive	= Bacteria or target analyte detected	">"	= Greater than

For any feedback concerning our services, please contact Cheri Brolaski, Laboratory Director at cbrolaski@microbac.com or Jame Nokes, President at president@microbac.com

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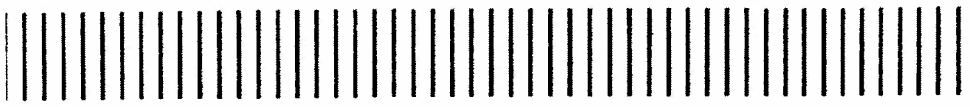
MEMBER ACIL

Eureka Resources, LLC
DEP 11-25-09 RESPONSES

Attachment B



MALCOLM PIRNIE

Table B-1

SUMMARY OF LAB RESULTS OF RADIONUCLIDE IN UNTREATED WATER

Eureka Resources, LLC., Williamsport, PA

POLLUTANT	Result	Uncertainty	Total
	pCi/L		
VARGENSON UNTREATED FLOWBACK			
Gross Alpha	11,620	± 1239	12,859
Gross Beta	3,163	± 526.2	3,689.2
Radium-226	680.6	± 15.32	695.92
Radium-228	59.34	± 11.37	70.71
Seewald Final Report on Untreated Vargenson Flowback			
Gross Alpha	182.8	± 82.98	265.78
Gross Beta	117.4	± 33.50	150.9
OGONTZ 3H- PIT WATER/UNTREATED			
Gross Alpha	1,327	± 521.3	1,848.3
Gross Beta	2,831	± 572.9	3,403.9
Radium-226	30.71	± 3.80	34.51
Radium-228	4.57	± 10.04	14.61
Pi1 8 Flowbark Composite			
Gross Alpha	123.1	± 52.24	175.3
Gross Beta	192.3	± 55.14	247.4
Radium-228	3.77	± 9.43	13.2
Total Uranium	0.19	± 0.006	0.20
TEEL#8 FLOWBACK MIDDLE			
Gross Alpha	3,787	± 387.6	4,174.6
Gross Beta	1,238	± 159.3	1,397.3
Radium-226	158.9	± 5.10	164
Radium-228	10.03	± 1.34	11.37
Total Uranium	0.874	± 0.033	0.91
Thorium-228	1.72	± 0.715	2.44
Thorium-230	0.494	± 0.352	0.85
Thorium-232	0.123	± 0.172	0.30
		MAXIMUM Gross Alpha	**12,859**
		MAXIMUM Gross Beta	**3,689**
		MAXIMUM Radium 226	**695.92**
		MAXIMUM Radium 228	**70.71**
		MAXIMUM Total Uranium	**0.91**
		MAXIMUM Thorium 228	**2.44**
		MAXIMUM Thorium 230	**0.85**
		MAXIMUM Thorium 232	**0.30**

Table B-2
RADIONUCLIDE EMISSIONS FROM UNTREATED WATER
Eureka Resources, LLC., Williamsport, PA

Radionuclide	Concentration		
	Liquid (10^{-12} x Ci/l)[1]	Liquid (Ci/m^3)	Air (Ci/m^3)[2]
Gross Alpha	12,859.00	1.29E-05	1.29E-08
Gross Beta	3,689.20	3.6892E-06	3.69E-09
Radium-226	695.92	6.9592E-07	6.96E-10
Radium-228	70.71	7.071E-08	7.07E-11
Total Uranium	0.91	9.07E-10	9.07E-13
Thorium-228	2.44	2.436E-09	2.44E-12
Thorium-230	0.85	8.46E-10	8.46E-13
Thorium-232	0.30	2.95E-10	2.95E-13

Notes:

(1) Source: laboratory analytical data for gas well water

(2) Based on calculations methodology in Appendix D to 40 CFR Part 61 (attached)

Sample calculations:

Gross Alpha emissions = 1.29 E-05 Ci/m^3 x 10-3 = 1.29E-08 Ci/m^3