

April 27, 2012  
File No. 04.0029307.00



Ms. Amy Daigneault  
Pretreatment Coordinator  
Lowell Regional Wastewater Utility  
451 First St. Blvd. (Rte 110)  
Lowell, Massachusetts 01850

March 2<sup>nd</sup> 2012

Re: Monthly Self Monitoring Report  
March 2012  
Merrimack Station  
Public Service of New Hampshire  
Bow, New Hampshire

380 Harvey Road  
Manchester  
New Hampshire  
03103-3347  
603-623-3600  
FAX 603-624-9463  
www.gza.com

Dear Ms. Daigneault:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the attached Analytical Data Report to replace the report previously submitted on March 31, 2012. As outlined in the attached Analytical Data Report, total suspended solids (TSS) were initially detected at 43 milligrams per liter (mg/L). It is our opinion that dissolved solids interferences resulted in a falsely high positive value of 43 mg/L that was not representative of the treated effluent on that day of sampling. Consistent with Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> Edition, TSS were reanalyzed by Method 2540D which prescribes "For samples high in dissolved solids thoroughly wash the filter to ensure removal of dissolved material." When the sample was rerun using the suggested rinsing technique, TSS was detected at 2 mg/L. The attached Analytical Data Report contains both analytical results. Our contract laboratory plans to use this methodology for all future TSS analyses.

Should you have any questions concerning this report, please do not hesitate to contact me at (603) 232-8744.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

*Ronald A. Breton*  
Ronald A. Breton, P.E.  
Principal

RAB:tmd

04.0029307.00\work\sampling and reporting\reports\lowell\monthly reports\march 2012\final 29307 march rpt irwu 042712.docx

Attachment: Analytical Data Report

10/10/2010

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**ANALYTICAL DATA REPORT**

10/10/2010

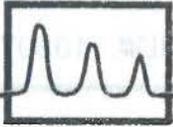
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**eastern analytical**

*professional laboratory services*

Paul Pepler  
GZA GeoEnvironmental, Inc. (NH)  
380 Harvey Road  
Manchester NH 03103



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 108078

Client Identification: Wastewater Analysis

Date Received: 3/2/2012

**Report revision/reissue:** Revision, replaces report dated 3/29/2012

**Revision information:** Per customer request, TSS has been rerun.

Dear Mr. Pepler:

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at [www.eailabs.com](http://www.eailabs.com) for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted

< : "less than" followed by the reporting limit

> : "greater than" followed by the reporting limit

%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

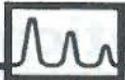
Lorraine Olashaw, Lab Director

4.5.12

Date

29

# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Temperature upon receipt (°C): **21**

Received on ice or cold packs (Yes/No): **Y**

Acceptable temperature range (°C): 0-6

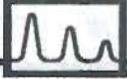
Lab ID	Sample ID	Date	Date	Sample	% Dry	Exceptions/Comments (other than thermal preservation)
		Received	Sampled	Matrix	Weight	
108078.01	Effluent Field Blank B-3621	3/2/12	3/2/12	aqueous		Adheres to Sample Acceptance Policy
108078.02	Final Effluent B-3625, B-3727, B-3722	3/2/12	3/2/12	aqueous		Adheres to Sample Acceptance Policy
108078.03	Final Effluent B-3625, B-3727, B-3722 Rerun	3/2/12	3/2/12	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.

All results contained in this report relate only to the above listed samples.

References include:

- 1) EPA 600/4-79-020, 1983
- 2) Standard Methods for Examination of Water and Wastewater : Inorganics, 19th Edition, 1995; Microbiology, 20th Edition, 1998
- 3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
- 4) Hach Water Analysis Handbook, 2nd edition, 1992



# LABORATORY REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Sample ID: Final Effluent B-3625, B-3727,  
B-3722

Lab Sample ID: 108078.02

Matrix: aqueous

Date Sampled: 3/2/12

Date Received: 3/2/12

Units: ug/l

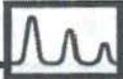
Date of Analysis: 3/7/12

Analyst: BAM

Method: 624

Dilution Factor: 1

Chloromethane	< 5
Vinyl chloride	< 2
Bromomethane	< 2
Chloroethane	< 5
Trichlorofluoromethane	< 5
Acrolein	< 50
Acetone	< 50
1,1-Dichloroethene	< 1
Methylene chloride	< 5
Carbon disulfide	< 5
Acrylonitrile	< 50
Methyl-t-butyl ether(MTBE)	< 10
trans-1,2-Dichloroethene	< 2
Vinyl acetate	< 10
1,1-Dichloroethane	< 2
cis-1,2-Dichloroethene	< 2
2-Butanone(MEK)	< 10
Chloroform	< 2
1,1,1-Trichloroethane	< 2
Carbon tetrachloride	< 2
Benzene	< 1
1,2-Dichloroethane	< 2
Trichloroethene	< 2
1,2-Dichloropropane	< 2
Bromodichloromethane	< 2
2-Chloroethylvinylether	< 2
4-Methyl-2-pentanone(MIBK)	< 10
cis-1,3-Dichloropropene	< 2
Toluene	< 1
trans-1,3-Dichloropropene	< 2
1,1,2-Trichloroethane	< 2
2-Hexanone	< 10
Tetrachloroethene	< 2
Dibromochloromethane	< 2
Chlorobenzene	< 2
Ethylbenzene	< 1
mp-Xylene	< 1
o-Xylene	< 1
Styrene	< 1
Bromoform	< 2
1,1,2,2-Tetrachloroethane	< 2
1,3-Dichlorobenzene	< 1
1,4-Dichlorobenzene	< 1
1,2-Dichlorobenzene	< 1
4-Bromofluorobenzene (surr)	93 %R
1,2-Dichlorobenzene-d4 (surr)	99 %R



# LABORATORY REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

**Sample ID:** Final Effluent B-3625, B-3727,  
B-3722

**Lab Sample ID:** 108078.02

**Matrix:** aqueous

**Date Sampled:** 3/2/12

**Date Received:** 3/2/12

**Units:** ug/l

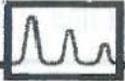
**Date of Analysis:** 3/7/12

**Analyst:** BAM

**Method:** 624

**Dilution Factor:** 1

**Toluene-d8 (surr)** 94 %R



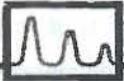
# QC REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
Chloromethane	< 5	20 (99 %R)	20 (101 %R) (2 RPD)	3/7/2012	ug/l	0 - 273	20	624
Vinyl chloride	< 2	20 (102 %R)	21 (106 %R) (4 RPD)	3/7/2012	ug/l	0 - 251	20	624
Bromomethane	< 2	19 (93 %R)	21 (103 %R) (10 RPD)	3/7/2012	ug/l	0 - 242	20	624
Chloroethane	< 5	23 (113 %R)	22 (110 %R) (3 RPD)	3/7/2012	ug/l	14 - 230	20	624
Trichlorofluoromethane	< 5	22 (108 %R)	22 (108 %R) (0 RPD)	3/7/2012	ug/l	17 - 181	20	624
Acrolein	< 50	* < 50 (%R)	* < 50 (%R N/A) (RPD N/A)	3/7/2012	ug/l	40 - 160	20	624
Acetone	< 50	* < 50 (188 %R)	< 50 (114 %R) (49 RPD) !	3/7/2012	ug/l	40 - 160	20	624
1,1-Dichloroethene	< 1	19 (97 %R)	19 (95 %R) (2 RPD)	3/7/2012	ug/l	0 - 234	20	624
Methylene chloride	< 5	22 (110 %R)	22 (108 %R) (2 RPD)	3/7/2012	ug/l	0 - 221	20	624
Carbon disulfide	< 5	17 (85 %R)	17 (83 %R) (2 RPD)	3/7/2012	ug/l	70 - 130	20	624
Acrylonitrile	< 50	< 50 (109 %R)	< 50 (104 %R) (5 RPD)	3/7/2012	ug/l	40 - 160	20	624
Methyl-t-butyl ether(MTBE)	< 10	20 (114 %R)	20 (113 %R) (1 RPD)	3/7/2012	ug/l	70 - 130	20	624
trans-1,2-Dichloroethene	< 2	19 (96 %R)	19 (96 %R) (0 RPD)	3/7/2012	ug/l	54 - 156	20	624
Vinyl acetate	< 10	30 (137 %R)	30 (134 %R) (2 RPD)	3/7/2012	ug/l	40 - 160	20	624
1,1-Dichloroethane	< 2	21 (106 %R)	21 (104 %R) (2 RPD)	3/7/2012	ug/l	59 - 155	20	624
cis-1,2-Dichloroethene	< 2	20 (101 %R)	20 (99 %R) (2 RPD)	3/7/2012	ug/l	70 - 130	20	624
2-Butanone(MEK)	< 10	30 (130 %R)	20 (100 %R) (26 RPD) !	3/7/2012	ug/l	40 - 160	20	624
Chloroform	< 2	21 (104 %R)	21 (104 %R) (0 RPD)	3/7/2012	ug/l	51 - 138	20	624
1,1,1-Trichloroethane	< 2	22 (111 %R)	22 (110 %R) (1 RPD)	3/7/2012	ug/l	52 - 162	20	624
Carbon tetrachloride	< 2	24 (122 %R)	24 (121 %R) (1 RPD)	3/7/2012	ug/l	70 - 140	20	624
Benzene	< 1	20 (100 %R)	20 (100 %R) (0 RPD)	3/7/2012	ug/l	37 - 151	20	624
1,2-Dichloroethane	< 2	22 (111 %R)	22 (110 %R) (1 RPD)	3/7/2012	ug/l	49 - 155	20	624
Trichloroethene	< 2	21 (105 %R)	20 (102 %R) (3 RPD)	3/7/2012	ug/l	71 - 157	20	624
1,2-Dichloropropane	< 2	21 (103 %R)	21 (103 %R) (0 RPD)	3/7/2012	ug/l	0 - 210	20	624
Bromodichloromethane	< 2	22 (110 %R)	22 (110 %R) (0 RPD)	3/7/2012	ug/l	35 - 155	20	624
2-Chloroethylvinylether	< 2	29 (143 %R)	29 (144 %R) (1 RPD)	3/7/2012	ug/l	0 - 305	20	624
4-Methyl-2-pentanone(MIBK)	< 10	20 (107 %R)	20 (105 %R) (2 RPD)	3/7/2012	ug/l	40 - 160	20	624
cis-1,3-Dichloropropene	< 2	23 (115 %R)	23 (115 %R) (0 RPD)	3/7/2012	ug/l	0 - 227	20	624
Toluene	< 1	20 (98 %R)	20 (98 %R) (0 RPD)	3/7/2012	ug/l	47 - 150	20	624
trans-1,3-Dichloropropene	< 2	22 (110 %R)	22 (108 %R) (2 RPD)	3/7/2012	ug/l	17 - 183	20	624
1,1,2-Trichloroethane	< 2	19 (95 %R)	19 (94 %R) (1 RPD)	3/7/2012	ug/l	52 - 150	20	624
2-Hexanone	< 10	20 (120 %R)	20 (101 %R) (17 RPD)	3/7/2012	ug/l	40 - 160	20	624
Tetrachloroethene	< 2	20 (102 %R)	20 (102 %R) (0 RPD)	3/7/2012	ug/l	64 - 148	20	624
Dibromochloromethane	< 2	22 (110 %R)	22 (109 %R) (1 RPD)	3/7/2012	ug/l	53 - 149	20	624
Chlorobenzene	< 2	20 (100 %R)	20 (99 %R) (1 RPD)	3/7/2012	ug/l	37 - 160	20	624
Ethylbenzene	< 1	20 (102 %R)	20 (101 %R) (1 RPD)	3/7/2012	ug/l	37 - 162	20	624
mp-Xylene	< 1	40 (99 %R)	40 (100 %R) (1 RPD)	3/7/2012	ug/l	70 - 130	20	624
o-Xylene	< 1	20 (100 %R)	20 (100 %R) (0 RPD)	3/7/2012	ug/l	70 - 130	20	624
Styrene	< 1	20 (102 %R)	20 (102 %R) (0 RPD)	3/7/2012	ug/l	70 - 130	20	624
Bromoform	< 2	19 (96 %R)	19 (95 %R) (1 RPD)	3/7/2012	ug/l	45 - 169	20	624
1,1,2,2-Tetrachloroethane	< 2	19 (94 %R)	19 (97 %R) (3 RPD)	3/7/2012	ug/l	46 - 157	20	624
1,3-Dichlorobenzene	< 1	20 (102 %R)	21 (106 %R) (4 RPD)	3/7/2012	ug/l	59 - 156	20	624
1,4-Dichlorobenzene	< 1	20 (102 %R)	21 (105 %R) (3 RPD)	3/7/2012	ug/l	18 - 190	20	624
1,2-Dichlorobenzene	< 1	20 (102 %R)	21 (105 %R) (3 RPD)	3/7/2012	ug/l	18 - 190	20	624
4-Bromofluorobenzene (surr)	93 %R	98 %R	99 %R	3/7/2012	% Rec	70 - 130		624



# QC REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
1,2-Dichlorobenzene-d4 (surr)	99 %R	105 %R	103 %R	3/7/2012	% Rec	70 - 130		624
Toluene-d8 (surr)	94 %R	96 %R	96 %R	3/7/2012	% Rec	70 - 130		624

Samples were extracted and analyzed within holding time limits.  
Instrumentation was calibrated in accordance with the method requirements.  
The method blanks were free of contamination at the reporting limits.  
Sample surrogate recoveries met the above stated criteria.  
The associated matrix spikes and/or Laboratory Control Samples met acceptance criteria.  
There were no exceptions in the analyses, unless noted.  
\*! Flagged analyte recoveries deviated from the QA/QC limits. Any impact to data is addressed below.



# LABORATORY REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

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Sample ID:	Final Effluent B-3625, B-3727, B-3722
Lab Sample ID:	108078.02
Matrix:	aqueous
Date Sampled:	3/2/12
Date Received:	3/2/12
Units:	mg/L
Date of Extraction/Prep:	3/12/12
Date of Analysis:	3/12/12
Analyst:	LAS
Method:	1664A
Dilution Factor:	1
Oil & Grease (HEM)	< 5



# QC REPORT

EAI ID#: 108078

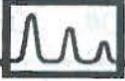
Client: **GZA GeoEnvironmental, Inc. (NH)**

Batch ID: 734574-36453/A031212OG1661

Client Designation: **Wastewater Analysis**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
Oil & Grease (HEM)	< 5	36 (90 %R)	36 (90 %R) (0 RPD)	3/12/2012	mg/L	78 - 114	18	1664A

Samples were extracted and analyzed within holding time limits.  
Instrumentation was calibrated in accordance with the method requirements.  
The method blanks were free of contamination at the reporting limits.  
Sample surrogate recoveries met the above stated criteria.  
The associated matrix spikes and/or Laboratory Control Samples met acceptance criteria.  
There were no exceptions in the analyses, unless noted.  
\*! Flagged analyte recoveries deviated from the QA/QC limits.



# LABORATORY REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Sample ID: Final Effluent  
B-3625, B-3727,  
B-3722

Lab Sample ID: 108078.02

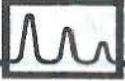
Matrix: aqueous

Date Sampled: 3/2/12

Date Received: 3/2/12

Solids Suspended	43
Solids Dissolved	24000
Chloride	11000
Cyanide Total	0.02
BOD	< 6
COD	170
pH	7.1

Units	Analysis			Analyst
	Date	Time	Method	
mg/L	3/05/12	14:00	2540D	DLS
mg/L	3/05/12	15:00	2540C	DLS
mg/L	3/09/12	11:01	4500CIE	DLS
mg/L	3/06/12	9:30	4500CNE	KJR
mg/L	3/02/12	16:30	5210B	SKC
mg/L	3/05/12	10:25	H8000	KJR
SU	3/02/12	16:00	4500H+B	NZ



# LABORATORY REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

**Sample ID:** Final Effluent  
B-3625, B-3727,  
B-3722 Rerun

**Lab Sample ID:** 108078.03

**Matrix:** aqueous

**Date Sampled:** 3/2/12

**Date Received:** 3/2/12

**Solids Suspended** 2

Units	Analysis			Method	Analyst
	Date	Time			
mg/L	4/03/12	13:30		2540D	DLS

Solids Suspended: The sample was reanalyzed past the hold time at the request of the client, with an additional 1000 mLs of rinse water.



# QC REPORT

EAI ID#: 108078

Client: **GZA GeoEnvironmental, Inc. (NH)**

Client Designation: **Wastewater Analysis**

Parameter Name	Blank	LCS	LCSD	Units	Date of Analysis	Limits	RPD	Method
Solids Suspended	< 5	100 (101 %R)		NA mg/L	3/5/12	90 - 110	20	2540D
Solids Suspended	< 2	92 (92 %R)	93 (93 %R) (1 RPD)	mg/L	4/3/12	90 - 110	20	2540D
Solids Dissolved	< 5	920 (92 %R)		NA mg/L	3/5/12	85 - 115	20	2540C
Chloride	< 1	26 (102 %R)	26 (102 %R) (0 RPD)	mg/L	3/9/12	90 - 110	20	4500CIE
Cyanide Total	< 0.02	0.26 (104 %R)		NA mg/L	3/6/12	85 - 115	20	4500CNE
BOD	< 6	360 (91 %R)	380 (96 %R) (5 RPD)	mg/L	3/2/12	84 - 115	20	5210B
COD	< 10	110 (109 %R)	110 (106 %R) (3 RPD)	mg/L	3/5/12	85 - 115	20	H8000
pH		6.0 (100 %R)	6.0 (99 %R) (1 RPD)	SU	3/2/12	5.95 - 6.07	10	4500H+B

Parameter Name	MS/MSD Parent ID	MS/MSD Parent	Matrix Spike	MSD	Units	Date of Analysis	Limits	RPD	Method
Solids Suspended		NA	NA	NA	mg/L	3/5/12		20	2540D
Solids Suspended		NA	NA	NA	mg/L	4/3/12		20	2540D
Solids Dissolved		NA	NA	NA	mg/L	3/5/12		20	2540C
Chloride		NA	NA	NA	mg/L	3/9/12		20	4500CIE
Cyanide Total	108078.02	0.02	0.29 (109 %R)	0.28 (104 %R) (5 RPD)	mg/L	3/6/12	75-125	20	4500CNE
BOD	108053.01	< 6	44 (110 %R)	NA	mg/L	3/2/12	75-125	20	5210B
COD	108069.07	60	110 (101 %R)	110 (89 %R) (13 RPD)	mg/L	3/5/12	80-120	20	H8000
pH		NA	NA	NA	SU	3/2/12		10	4500H+B

Parameter Name	Duplicate Parent ID	Duplicate Parent	Duplicate	Units	Date of Analysis	RPD	Method
Solids Suspended	108054.01	290	320 (10 RPD)	mg/L	3/5/12	20	2540D
Solids Suspended	108826.01	17	19 (14 RPD)	mg/L	4/3/12	20	2540D
Solids Dissolved	108078.02	24000	21000 (10 RPD)	mg/L	3/5/12	20	2540C
Chloride		NA	NA	mg/L	3/9/12	20	4500CIE
Cyanide Total		NA	NA	mg/L	3/6/12	20	4500CNE
BOD	108053.01	< 6	< 6 (RPD N/A)	mg/L	3/2/12	20	5210B
COD		NA	NA	mg/L	3/5/12	20	H8000
pH	108078.02	7.1	7.1 (0 RPD)	SU	3/2/12	10	4500H+B

Samples were analyzed within holding times unless noted on the sample results page.  
 Instrumentation was calibrated in accordance with the method requirements.  
 The method blanks were free of contamination at the reporting limits.  
 The associated matrix spikes and/or Laboratory Control Samples met the above stated criteria.  
 Exceptions to the above statements are flagged or noted above or on the QC Narrative page.  
 \*!Flagged analyte recoveries deviated from the QA/QC limits.



11720 North Creek Parkway North, Suite 400  
Bothell, WA 98011  
Ph: 425-686-1996  
Fx: 425-686-3096

27 March 2012

Jeff Gagne  
Eastern Analytical, Inc  
25 Chenell Drive  
Concord, NH 03301  
RE: Merrimack Station 200.8

Enclosed are the analytical results for samples received by Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Liz Siska".

Liz Siska  
Project Manager



### ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station 200.8

Sample ID	Lab ID	Matrix	Date Sampled	Date Received
B-3621 Effluent Field Blank	1203055-01	Water	02-Mar-12 11:00	05-Mar-12 08:51
Final Effluent	1203055-02	Water	02-Mar-12 11:00	05-Mar-12 08:51

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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## CASE NARRATIVE

Revised Report 03/26/2012- Client requested Pb be added to the work order.

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on March 15th, 2012. The samples were received intact, on-ice with temperatures measured at 13.2 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with EPA Method 200.8 (modified).

Samples were prepared and analyzed for total mercury in accordance with EPA Method 1631E.

### ANALYTICAL ISSUES

The Zn result for Effluent Field Blank (1203055-01) was greater than the MRL, the sample was re-digested and re-analyzed for confirmation.

As an additional measure of the accuracy of the methods utilized for analysis and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries were within the control limits with the exception of any QC flagged and described in the notes and definitions section of the following report.

A reasonable measure of the precision of the analytical methods utilized for analysis is the relative percent difference (RPD) between matrix spike and matrix spike duplicate recoveries and between laboratory control sample and laboratory control sample duplicate recoveries. All of the relative percent differences were within the control limits with the exception of any QC flagged and described in the notes and definitions section of the following report.

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## CHAIN OF CUSTODY FORMS

FGS Work Order: 1203055, 1203055

### Sample Receipt Checklist

Client: Eastern Analytical Date & Time Received: 3/5/12 0851 Date Logged In: 3/5/12  
 Project: Merrimack Station Received By: Owen Valentine Logged In By: Owen Valentine  
 SDG: \_\_\_\_\_ # of Coolers Received: 1 FGS PM: Liz  
 Samples Arrived By: UPS Shipping Service Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (specify) \_\_\_\_\_  
 Tracking/Airbill Number(s): 1Z x 46 599 13 952 8312

Cooler Information	Yes	No	NA	Comments
The coolers do not appear to be tampered with:	X			
Custody seals are present and intact:		X		
Custody seals signed by:			X	

Thermal Preservation: Loose Ice  Gel/Blue Ice  None (Ambient)  Other (specify) \_\_\_\_\_

Thermometer ID: 3150 Correction Factor (CF): + 0.3 degrees C

Cooler 1:	<u>15.2</u>	°C	Cooler 6:	<del>_____</del>	°C	Cooler 11:	<del>_____</del>	°C
Cooler 2:	<del>_____</del>	°C	Cooler 7:	<del>_____</del>	°C	Cooler 12:	<del>_____</del>	°C
Cooler 3:	<del>_____</del>	°C	Cooler 8:	<del>_____</del>	°C	Cooler 13:	<del>_____</del>	°C
Cooler 4:	<del>_____</del>	°C	Cooler 9:	<del>_____</del>	°C	Cooler 14:	<del>_____</del>	°C
Cooler 5:	<del>_____</del>	°C	Cooler 10:	<del>_____</del>	°C	Cooler 15:	<del>_____</del>	°C

**Chain of Custody**

COC is present and includes the following information for each sample:

	Yes	No	NA	Comments
Sample ID/Sample Description:	X			
Date and Time of Sample Collection:	X			
Sampled By:	X			
Preservation Type:			X	
Requested Analyses:	X			
Required Signatures:	X			
Internal chain of custody required:		X		

**Sample Condition/Integrity**

	Yes	No	NA	Comments
Sample containers were received intact:	X			
Sample labels are present and legible:	X			
Sample ID on container matches COC:	X			
Correct sample containers used for requested analyses:	X			
Samples received within holding time:	X			
Sample volume sufficient for requested analysis:				Less than ideal volume received
Correct preservative used for requested analyses:			X	
pH of samples checked and within method requirements:			X	
if pH adjusted by laboratory, noted in logbook:	X			

Anomalies/Non-conformances:

Client Communication Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Method: \_\_\_\_\_

Discussion/Resolution:

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## ANALYTICAL RESULTS

### B-3621 Effluent Field Blank

Matrix: Water

Laboratory ID: 1203055-01

Analyte	Result	MDL	MRL	Units	Dilution	Batch	Sequence	Analyzed	Method	Notes
Arsenic	ND	0.05	0.15	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Cadmium	ND	0.004	0.020	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	QM-12, U
Chromium	ND	0.009	0.10	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Copper	ND	0.01	0.10	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Iron	ND	1.3	10.0	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Lead	ND	0.004	0.040	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Mercury	ND	0.08	0.50	ng/L	1	F203099	2C08017	03/08/12	EPA 1631E	U
Molybdenum	ND	0.006	0.06	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Nickel	ND	0.008	0.10	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Selenium	ND	0.19	0.60	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Silver	ND	0.006	0.020	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Zinc	0.50	0.02	0.20	µg/L	1	F203108	2C12010	03/09/12	EPA 200.8 Mod	

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## ANALYTICAL RESULTS

### Final Effluent

Matrix: Water

Laboratory ID: 1203055-02

Analyte	Result	MDL	MRL	Units	Dilution	Batch	Sequence	Analyzed	Method	Notes
Arsenic	8.12	1.02	3.00	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	
Cadmium	ND	0.083	0.400	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	QM-12, U
Chromium	ND	0.18	2.00	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Copper	ND	0.20	2.00	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Iron	ND	26.0	200	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Lead	ND	0.078	0.800	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Mercury	17.2	0.83	5.00	ng/L	10	F203099	2C08017	03/08/12	EPA 1631E	
Molybdenum	419	0.12	1.20	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	
Nickel	29.1	0.16	2.00	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	
Selenium	109	3.88	12.0	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	
Silver	ND	0.120	0.400	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U
Zinc	ND	0.33	4.00	µg/L	20	F203108	2C12010	03/09/12	EPA 200.8 Mod	U

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### MATRIX DUPLICATES/TRIPPLICATES

**SOURCE: 1203016-05**

**Batch:** F203099

**Sequence:** 2C08017

**Preparation:** BrCl Oxidation

**Lab Number:** F203099-DUP1

Analyte	Sample Concentration ng/L	Duplicate Concentration ng/L	MRL	% RPD	RPD Limit	Method	Notes
Mercury	2.48	2.44	1.01	1.48	24	EPA 1631E	

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**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD**

**SOURCE: 1203014-01**

Batch: F203099

Sequence: 2C08017

Preparation: BrCl Oxidation

Lab Number: F203099-MS/MSD1

Analyte	Sample Concentration (ng/L)	Spike Added (ng/L)	MS Concentration (ng/L)	MS % Recovery	Recovery Limits	Method	Notes
Mercury	7.38	25.500	32.34	97.9	71 - 125	EPA 1631E	

Analyte	Spike Added (ng/L)	MSD Concentration (ng/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	25.500	32.44	98.3	0.314	71 - 125	24	EPA 1631E	

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**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD**

**SOURCE: 1203055-02**

Batch: F203099

Sequence: 2C08017

Preparation: BrCl Oxidation

Lab Number: F203099-MS/MSD2

Analyte	Sample Concentration (ng/L)	Spike Added (ng/L)	MS Concentration (ng/L)	MS % Recovery	Recovery Limits	Method	Notes
Mercury	17.16	45.450	63.67	102	71 - 125	EPA 1631E	

Analyte	Spike Added (ng/L)	MSD Concentration (ng/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	45.450	61.91	98.4	2.81	71 - 125	24	EPA 1631E	

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**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD**

**SOURCE: 1203016-01**

Batch: F203099

Sequence: 2C08017

Preparation: BrCl Oxidation

Lab Number: F203099-MS/MSD3

Analyte	Sample Concentration (ng/L)	Spike Added (ng/L)	MS Concentration (ng/L)	MS % Recovery	Recovery Limits	Method	Notes
Mercury	19.64	51.000	70.79	100	71 - 125	EPA 1631E	

Analyte	Spike Added (ng/L)	MSD Concentration (ng/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	51.000	72.43	104	2.30	71 - 125	24	EPA 1631E	

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**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD**

**SOURCE: 1203055-02**

**Batch:** F203108

**Sequence:** 2C12010

**Preparation:** Closed Vessel Nitric Oven Digestion

**Lab Number:** F203108-MS/MSD1

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Chromium	0.31	7.0700	7.78	106	70 - 130	EPA 200.8 Mod	
Iron	ND	505.00	522.4	103	70 - 130	EPA 200.8 Mod	
Nickel	29.14	4.0400	30.61	36.6	70 - 130	EPA 200.8 Mod	QM-02
Copper	0.41	4.0400	4.22	94.2	70 - 130	EPA 200.8 Mod	
Zinc	2.75	10.100	18.93	160	70 - 130	EPA 200.8 Mod	QM-07
Arsenic	8.12	15.150	25.50	115	70 - 130	EPA 200.8 Mod	
Selenium	109.3	30.300	136.9	91.2	70 - 130	EPA 200.8 Mod	
Molybdenum	418.6	2.0200	416.5	-105	70 - 130	EPA 200.8 Mod	QM-02
Silver	ND	1.5150	1.450	95.7	70 - 130	EPA 200.8 Mod	
Cadmium	0.379	0.80800	1.335	118	70 - 130	EPA 200.8 Mod	
Lead	ND	1.5150	1.636	108	70 - 130	EPA 200.8 Mod	

Analyte	Spike Added (µg/L)	MSD Concentration (µg/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Chromium	7.0700	7.64	104	1.78	70 - 130	20	EPA 200.8 Mod	
Iron	505.00	521.1	103	0.257	70 - 130	20	EPA 200.8 Mod	
Nickel	4.0400	32.86	92.1	7.07	70 - 130	20	EPA 200.8 Mod	QM-02
Copper	4.0400	4.31	96.6	2.26	70 - 130	20	EPA 200.8 Mod	
Zinc	10.100	11.07	82.4	52.4	70 - 130	20	EPA 200.8 Mod	QM-07, QR-08
Arsenic	15.150	25.03	112	1.87	70 - 130	20	EPA 200.8 Mod	
Selenium	30.300	134.1	82.0	2.07	70 - 130	20	EPA 200.8 Mod	
Molybdenum	2.0200	416.8	-89.3	0.0753	70 - 130	20	EPA 200.8 Mod	QM-02
Silver	1.5150	1.361	89.8	6.34	70 - 130	20	EPA 200.8 Mod	
Cadmium	0.80800	1.278	111	4.34	70 - 130	20	EPA 200.8 Mod	
Lead	1.5150	1.487	98.2	9.53	70 - 130	20	EPA 200.8 Mod	

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## MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

**SOURCE: 1203055-02**

Batch: F203108

Sequence: 2C12010

Preparation: Closed Vessel Nitric Oven Digestion

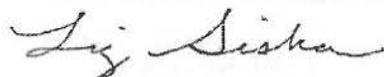
Lab Number: F203108-MS/MSD2

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Chromium	0.31	404.00	425.2	105	70 - 130	EPA 200.8 Mod	AS
Iron	ND	2020.0	2097	104	70 - 130	EPA 200.8 Mod	AS
Nickel	29.14	505.00	530.8	99.3	70 - 130	EPA 200.8 Mod	AS
Copper	0.41	505.00	465.9	92.2	70 - 130	EPA 200.8 Mod	AS
Zinc	2.75	1010.0	898.3	88.7	70 - 130	EPA 200.8 Mod	AS
Arsenic	8.12	404.00	429.4	104	70 - 130	EPA 200.8 Mod	AS
Selenium	109.3	404.00	534.6	105	70 - 130	EPA 200.8 Mod	AS
Molybdenum	418.6	202.00	623.4	101	70 - 130	EPA 200.8 Mod	AS
Silver	ND	20.200	18.02	89.2	70 - 130	EPA 200.8 Mod	AS
Cadmium	0.379	40.400	37.46	91.8	70 - 130	EPA 200.8 Mod	AS
Lead	ND	101.00	98.25	97.3	70 - 130	EPA 200.8 Mod	AS

Analyte	Spike Added (µg/L)	MSD Concentration (µg/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Chromium	404.00	425.2	105	0.00134	70 - 130	20	EPA 200.8 Mod	AS
Iron	2020.0	2093	104	0.171	70 - 130	20	EPA 200.8 Mod	AS
Nickel	505.00	531.3	99.4	0.0878	70 - 130	20	EPA 200.8 Mod	AS
Copper	505.00	469.4	92.9	0.751	70 - 130	20	EPA 200.8 Mod	AS
Zinc	1010.0	898.8	88.7	0.0641	70 - 130	20	EPA 200.8 Mod	AS
Arsenic	404.00	439.2	107	2.27	70 - 130	20	EPA 200.8 Mod	AS
Selenium	404.00	497.7	96.1	7.14	70 - 130	20	EPA 200.8 Mod	AS
Molybdenum	202.00	616.1	97.8	1.18	70 - 130	20	EPA 200.8 Mod	AS
Silver	20.200	17.84	88.3	1.01	70 - 130	20	EPA 200.8 Mod	AS
Cadmium	40.400	37.27	91.3	0.512	70 - 130	20	EPA 200.8 Mod	AS
Lead	101.00	98.44	97.5	0.193	70 - 130	20	EPA 200.8 Mod	AS

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**LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE**

**RECOVERY AND RPD**

**Batch:** F203099

**Sequence:** 2C08017

**Preparation:** BrCl Oxidation

**Lab Number:** F203099-BS/BSD1

**LCS Source:** LCS

Analyte	Spike Added (ng/L)	LCS Concentration (ng/L)	LCS % Recovery	Recovery Limits	Method	Notes
Mercury	15.679	15.62	99.6	80 - 120	EPA 1631E	

Analyte	Spike Added (ng/L)	LCSD Concentration (ng/L)	LCSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	15.679	15.74	100	0.806	80 - 120	24	EPA 1631E	

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**LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE**

**RECOVERY AND RPD**

Batch: F203108

Sequence: 2C12010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203108-BS/BSD1

LCS Source: Blank Spike

Analyte	Spike Added (µg/L)	LCS Concentration (µg/L)	LCS % Recovery	Recovery Limits	Method	Notes
Chromium	7.0000	6.67	95.3	85 - 115	EPA 200.8 Mod	
Iron	500.00	468.9	93.8	85 - 115	EPA 200.8 Mod	
Nickel	4.0000	4.07	102	85 - 115	EPA 200.8 Mod	
Copper	4.0000	4.22	106	85 - 115	EPA 200.8 Mod	
Zinc	10.000	10.42	104	85 - 115	EPA 200.8 Mod	
Arsenic	15.000	14.44	96.3	85 - 115	EPA 200.8 Mod	
Selenium	30.000	29.84	99.5	85 - 115	EPA 200.8 Mod	
Molybdenum	2.0000	1.80	90.0	85 - 115	EPA 200.8 Mod	
Silver	1.5000	1.476	98.4	85 - 115	EPA 200.8 Mod	
Cadmium	0.80000	0.918	115	85 - 115	EPA 200.8 Mod	
Lead	1.5000	1.542	103	85 - 115	EPA 200.8 Mod	

Analyte	Spike Added (µg/L)	LCSD Concentration (µg/L)	LCSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Chromium	7.0000	6.57	93.9	1.48	85 - 115	20	EPA 200.8 Mod	
Iron	500.00	465.2	93.0	0.801	85 - 115	20	EPA 200.8 Mod	
Nickel	4.0000	4.00	99.9	1.86	85 - 115	20	EPA 200.8 Mod	
Copper	4.0000	4.17	104	1.17	85 - 115	20	EPA 200.8 Mod	
Zinc	10.000	10.17	102	2.38	85 - 115	20	EPA 200.8 Mod	
Arsenic	15.000	14.25	95.0	1.37	85 - 115	20	EPA 200.8 Mod	
Selenium	30.000	30.40	101	1.84	85 - 115	20	EPA 200.8 Mod	
Molybdenum	2.0000	1.78	88.8	1.40	85 - 115	20	EPA 200.8 Mod	
Silver	1.5000	1.458	97.2	1.26	85 - 115	20	EPA 200.8 Mod	
Cadmium	0.80000	0.933	117	1.56	85 - 115	20	EPA 200.8 Mod	QM-12
Lead	1.5000	1.522	101	1.31	85 - 115	20	EPA 200.8 Mod	

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### PREPARATION BLANKS

Instrument: ICPMS-3

Sequence: 2C08017

Preparation: BrCl Oxidation

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Method	Notes
F203099-BLK1	Mercury	0.003	0.50	ng/L	F203099	EPA 1631E	U
F203099-BLK2	Mercury	0.009	0.50	ng/L	F203099	EPA 1631E	U
F203099-BLK3	Mercury	0.05	0.50	ng/L	F203099	EPA 1631E	U
F203099-BLK4	Mercury	0.03	0.50	ng/L	F203099	EPA 1631E	QB-04, U

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## PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2C12010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Method	Notes
F203108-BLK1	Chromium	-0.01	0.10	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Iron	-0.1	10.0	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Nickel	0.01	0.10	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Copper	0.008	0.10	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Zinc	0.08	0.20	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Arsenic	-0.06	0.15	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Selenium	0.03	0.60	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Molybdenum	0.007	0.06	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Silver	-0.003	0.020	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Cadmium	-0.0003	0.020	µg/L	F203108	EPA 200.8 Moc	U
F203108-BLK1	Lead	0.005	0.040	µg/L	F203108	EPA 200.8 Moc	U

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## Notes and Definitions

- U Analyte included in the analysis, but not detected
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QM-12 Initial or continuing calibration verification and/or blank spike/blank spike duplicate recoveries above upper control limits. All reported sample concentrations were below the reporting limit.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QM-02 The MS and/or MSD recoveries outside acceptance limits, due to spike concentration less than 1 times the sample concentration. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QB-04 The blank was preserved to 2% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- AS This MS and/or MSD is an analytical spike and/or an analytical spike duplicate.
- DET Analyte Detected
- MDL Minimum Detection Limit
- MRL Minimum Reporting Limit
- ND Analyte Not Detected at or above the reporting limit
- wet Sample results reported on a wet weight basis
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- RSD Relative Standard Deviation

Frontier Global Sciences, Inc.



Liz Siska, Project Manager

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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