

April 12, 2012
File No. 04.0029307.00



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

Re: Supplemental 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 a supplement to the Self-Monitoring Report previously submitted for the period March 1, 2012 through March 31, 2012. The attached **Table 1** summarizes the data contained in the attached **Analytical Data Report** from the **Stream B** sample collected on **March 14, 2012**. The results indicate that pollutant concentrations were within the Local Sewer Discharge Limits.

The analysis on samples collected on March 14, 2012 was performed in accordance with the United States Environmental Protection Agency (EPA) draft Standard Operating Procedure (SOP) for trace metals analysis of flue gas desulfurization (FGD) wastewater. The SOP is described below.

ANALYTICAL DISCUSSION

FGD wastewater requires specialized analytical techniques to overcome matrix interference for certain analysis of trace metals. To assist you in evaluating this issue further, we offer an excerpt below from the EPA web site and a link to their draft SOP for trace metals analysis of FGD wastewater that contains further guidance.

LABORATORY ANALYSIS OF FGD WASTEWATER

Wastewater from FGD systems can contain constituents known to cause matrix interferences. EPA has observed that, during inductively coupled plasma – mass spectrometry (ICP-MS) analysis of FGD wastewater, certain elements commonly present in the wastewater may cause polyatomic interferences that bias the detection and/or quantification of certain elements of interest. These potential interferences may become significant when measuring trace elements at concentrations in the low parts-per-billion range.



As part of a recent sampling effort for the steam electric power generating effluent guidelines rulemaking, EPA developed an SOP that was used in conjunction with EPA Method 200.8 to conduct ICP-MS analyses of FGD wastewater. The SOP describes critical technical and quality assurance procedures that were implemented to mitigate anticipated interferences and generate reliable data for FGD wastewater. EPA regulations at 40 CFR 136.6 already allow the analytical community flexibility to modify approved methods to lower the costs of measurements, overcome matrix interferences, or otherwise improve the analysis. The draft SOP developed for FGD wastewater takes a proactive approach toward looking for and taking steps to mitigate matrix interferences, including using specialized interference check solutions (i.e., a synthetic FGD wastewater matrix). EPA's draft SOP is being made available to laboratories contemplating ICP-MS analysis of FGD wastewater, either for adoption as currently written or to serve as a framework for developing their own laboratory-specific SOPs. For further information please see the following:

- Draft SOP: Inductively Coupled Plasma/Mass Spectrometry for Trace Element Analysis in Flue Gas Desulfurization Wastewaters (30 pp, 174K), http://water.epa.gov/scitech/wastetech/guide/upload/steam_draft_sop.pdf, EPA May 2011.

Considering that specialized analytical techniques are necessary to overcome matrix interference for certain analysis of trace metals in FGD wastewater, we recommend any analysis on FGD wastewater be conducted in accordance with the EPA draft SOP for trace metals analysis of FGD wastewater.

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.

A handwritten signature in black ink, reading 'Ronald A. Breton'.

Ronald A. Breton, P.E.
Principal

A handwritten signature in black ink, reading 'Michael P. North'.

Michael P. North, P.E.
Consultant/Reviewer

RAB/MPN:tmd

P:\04\Jobs\0029300\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Lowell\Stream B\March B supplement\final 29307 STREAM B March Splmnt 041212.docx

Attachments: Table
Analytical Data Report

TABLE 1
 SUMMARY OF RESULTS FOR THE
 STUDY OF THE EFFECTS OF THE
 STUDY ON THE STUDENTS
 (continued)

STUDENT	PRE-TEST SCORE	POST-TEST SCORE
1	75	85
2	78	88
3	80	90
4	82	92
5	85	95
6	88	98
7	90	100
8	92	100
9	95	100
10	98	100
11	100	100
12	100	100
13	100	100
14	100	100
15	100	100
16	100	100
17	100	100
18	100	100
19	100	100
20	100	100
21	100	100
22	100	100
23	100	100
24	100	100
25	100	100
26	100	100
27	100	100
28	100	100
29	100	100
30	100	100
31	100	100
32	100	100
33	100	100
34	100	100
35	100	100
36	100	100
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38	100	100
39	100	100
40	100	100
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42	100	100
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80	100	100
81	100	100
82	100	100
83	100	100
84	100	100
85	100	100
86	100	100
87	100	100
88	100	100
89	100	100
90	100	100
91	100	100
92	100	100
93	100	100
94	100	100
95	100	100
96	100	100
97	100	100
98	100	100
99	100	100
100	100	100

TABLE

TABLE 1
SUMMARY OF STREAM B CONCENTRATIONS
COMPARED TO LOWELL SEWER DISCHARGE LIMITS

Public Service of New Hampshire

Merrimack Station

Bow, New Hampshire

PARAMETER	LOWELL SEWER DISCHARGE LIMITS (mg/L)	STREAM B RESULTS 3/14/2012 (mg/L)
Aluminum	24.69	0.371
Arsenic	0.556	0.0377
Cadmium	0.056	0.00248
Chromium (T)	8.108	0.0532
Copper	3.124	0.0182
Lead	0.857	< 0.00198
Mercury	0.004	0.0000612
Nickel	1.541	0.303
pH	5.0-9.5	6.9
Silver	0.053	< 0.000990
Zinc	4.959	0.0775

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 108420
Client Identification: MK
Date Received: 3/14/2012

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 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

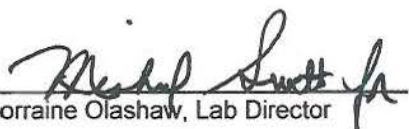
Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

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

4/4/12
Date

25
of pages (excluding cover letter)



SAMPLE CONDITIONS PAGE

EAI ID#: 108420

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

Client Designation: **MK**

Temperature upon receipt (°C): **18.4**

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

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
108420.01	SWWTF	3/14/12	3/14/12	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.

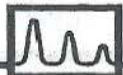
References include:

- 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

eastern analytical, inc.

www.eailabs.com

Phone: (603) 228-0525



LABORATORY REPORT

EAI ID#: 108420

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

Client Designation: **MK**

Sample ID: **SWWTF**

Lab Sample ID: **108420.01**

Matrix: **aqueous**

Date Sampled: **3/14/12**

Date Received: **3/14/12**

Solids Suspended **25000**

Solids Dissolved **180000**

Chloride **75000**

BOD **140**

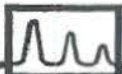
COD **900**

pH **6.9**

Analysis

Units	Date	Time	Method	Analyst
mg/L	3/19/12	13:45	2540D	DLS
mg/L	3/19/12	15:00	2540C	DLS
mg/L	3/19/12	10:30	4500CIE	DLS
mg/L	3/15/12	14:12	5210B	SKC
mg/L	3/20/12	9:00	H8000	KJR
SU	3/14/12	17:05	4500H+B	JL

TDS: Due to sample matrix a constant weight of 0.0005g could not be achieved.



QC REPORT

EAI ID#: 108420

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: MK

Parameter Name	Blank	LCS	LCSD	Units	Date of Analysis	Limits	RPD	Method
Solids Suspended	< 5	96 (96 %R)	100 (100 %R) (4 RPD)	mg/L	3/19/12	90 - 110	20	2540D
Solids Dissolved	< 5	990 (99 %R)	NA	mg/L	3/19/12	85 - 115	20	2540C
Chloride	< 1	27 (106 %R)	26 (106 %R) (0 RPD)	mg/L	3/19/12	90 - 110	20	4500CIE
BOD	< 6	400 (100 %R)	410 (102 %R) (2 RPD)	mg/L	3/15/12	84 - 115	20	5210B
COD	< 10	100 (97 %R)	100 (101 %R) (4 RPD)	mg/L	3/20/12	85 - 115	20	H8000
pH		6.0 (100 %R)	6.0 (100 %R) (0 RPD)	SU	3/14/12	5.95 - 6.07	10	4500H+B

Parameter Name	Duplicate Parent ID	Duplicate Parent	Duplicate	Units	Date of Analysis	RPD	Method
Solids Suspended	108503.03	200	190 (4 RPD)	mg/L	3/19/12	20	2540D
Solids Dissolved	108431.01	270	270 (0 RPD)	mg/L	3/19/12	20	2540C
Chloride		NA	NA	mg/L	3/19/12	20	4500CIE
BOD		NA	NA	mg/L	3/15/12	20	5210B
COD		NA	NA	mg/L	3/20/12	20	H8000
pH	108386.01	8.2	8.2 (0 RPD)	SU	3/14/12	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.
*/I 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

04 April 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, 44

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

Liz Siska
Project Manager



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

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
SWWTF	1203203-01	Water	14-Mar-12 13:05	16-Mar-12 09:40

Frontier Global Sciences, Inc.

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

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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04/04/2012



CASE NARRATIVE

Revised Report 4/4/12- Sample name corrected to SWWTF.

SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on March 16th, 2012. The samples were received intact, on-ice with temperatures measured at 2.2 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 client requested sample SWWTF (1203203-01) be analyzed for Mn via email on 3/15/12.

Samples were received in a cooler of melted ice. There was water in the inner most bag of sample Evaporator (1203203-02)

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.

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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

CHAIN OF CUSTODY FORMS

Work Order: 1203203 Sample Receipt Checklist

Client: Eastern Analy. Date & Time Received: 3-16-12 09:45 Date Logged In: 3-16-12 11:14
Project: Merrimack Station Received By: ALEXA BAHN Logged In By: ALEXA BAHN
SDG: _____ # of Coolers Received: 1 (one) FGS PM: LIZ SISKI

Samples Arrived By: _____ Shipping Service: _____ Courier: _____ Hand: _____ Other (specify): _____
Tracking/Airbill Number(s): 1E X46 599 01 9508 7224

Cooler Information

	Yes	No	NA	Comments
The coolers do not appear to be tampered with:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Custody seals are present and intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Custody seals signed by:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Thermal Preservation: ☒ Loose Ice ☐ Gel/Blue Ice ☐ None (Ambient) ☐ Other (specify): _____
Thermometer ID: 3150 Correction Factor (CF): +0.3 degrees C

Cooler	Temp	Cooler	Temp	Cooler	Temp
Cooler 1:	<u>2.2</u> °C	Cooler 6:	°C	Cooler 11:	°C
Cooler 2:	°C	Cooler 7:	°C	Cooler 12:	°C
Cooler 3:	°C	Cooler 8:	°C	Cooler 13:	°C
Cooler 4:	°C	Cooler 9:	°C	Cooler 14:	°C
Cooler 5:	°C	Cooler 10:	°C	Cooler 15:	°C

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

	Yes	No	NA	Comments
Sample ID/Sample Description:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Date and Time of Sample Collection:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sampled By:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Preservation Type:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Requested Analyses:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Required Signatures:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internal chain of custody required:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Sample Condition/Integrity

	Yes	No	NA	Comments
Sample containers were received intact:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sample labels are present and legible:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sample ID on container matches COC:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Correct sample containers used for requested analyses:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Samples received within holding time:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sample volume sufficient for requested analysis:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Correct preservative used for requested analyses:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH of samples checked and within method requirements:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If pH adjusted by laboratory, noted in logbook:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Anomalies/Non-conformances: * Min added to sample "B-3683 SWWTF" per Client
Cooler was leaking melted ice upon receipt. Inside bottles were
surrounded by melted ice with a bag of half full still frozen ice.
Water was inside innermost bag of sample "B-3564 Evaporator"

Client Communication: _____ Person Contacted: _____ Date/Time: _____ Method: _____
Discussion/Resolution: _____

Frontier Global Sciences, Inc.

Liz Siska

Liz Siska, Project Manager

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ANALYTICAL RESULTS

SWWTF

Matrix: Water

Laboratory ID: 1203203-01

Analyte	Result	MDL	MRL	Units	Dilution	Batch	Sequence	Analyzed	Method	Notes
Aluminum	371	22.0	198	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Arsenic	37.7	2.52	7.43	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Cadmium	2.48	0.205	0.990	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Chromium	53.2	0.45	4.95	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Copper	18.2	0.50	4.95	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Iron	1100	64.4	495	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Lead	ND	0.193	1.98	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	U
Manganese	7180	0.37	4.95	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Mercury	61.2	8.42	50.5	ng/L	100	F203288	2C22016	03/22/12	EPA 1631E	FB-1631
Molybdenum	2000	2.97	29.7	µg/L	50	F203260	2C22001	03/21/12	EPA 200.8 Mod	
Nickel	303	0.40	4.95	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Selenium	587	9.59	29.7	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	
Silver	ND	0.297	0.990	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	U
Zinc	77.5	0.81	9.90	µg/L	5	F203232	2C20001	03/19/12	EPA 200.8 Mod	

Frontier Global Sciences, Inc.

Liz Siska

Liz Siska, Project Manager

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04/04/2012



11720 North Creek Parkway North, Suite 400

Bothell, WA 98011

Ph: 425-686-1996

Fx: 425-686-3096

MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1203203-01

Batch: F203288

Sequence: 2C22016

Preparation: BrCl Oxidation

Lab Number: F203288-DUP1

Analyte	Sample Concentration ng/L	Duplicate Concentration ng/L	MRL	% RPD	RPD Limit	Method	Notes
Mercury	61.16	58.48	50.5	4.48	24	EPA 1631E	

Frontier Global Sciences, Inc.

Liz Siska

Liz Siska, Project Manager

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203203-01

Batch: F203232

Sequence: 2C20001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203232-MS/MSD1

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Aluminum	370.7	1515.2	1853	97.8	70 - 130	EPA 200.8 Mod	
Chromium	53.16	70.707	127.0	104	70 - 130	EPA 200.8 Mod	
Manganese	7181	60.606	7231	82.1	70 - 130	EPA 200.8 Mod	
Iron	1098	5050.5	6090	98.8	70 - 130	EPA 200.8 Mod	
Nickel	302.5	40.404	342.5	98.8	70 - 130	EPA 200.8 Mod	
Copper	18.16	40.404	51.82	83.3	70 - 130	EPA 200.8 Mod	
Arsenic	37.70	151.52	190.4	101	70 - 130	EPA 200.8 Mod	
Selenium	587.1	303.03	929.7	113	70 - 130	EPA 200.8 Mod	
Silver	ND	15.152	10.99	72.5	70 - 130	EPA 200.8 Mod	
Cadmium	2.484	8.0808	9.508	86.9	70 - 130	EPA 200.8 Mod	
Lead	0.763	15.152	15.44	96.8	70 - 130	EPA 200.8 Mod	

Analyte	Spike Added (µg/L)	MSD Concentration (µg/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Aluminum	1515.2	1826	96.1	1.45	70 - 130	20	EPA 200.8 Mod	
Chromium	70.707	128.8	107	1.38	70 - 130	20	EPA 200.8 Mod	
Manganese	60.606	7230	80.4	0.0140	70 - 130	20	EPA 200.8 Mod	
Iron	5050.5	6065	98.3	0.414	70 - 130	20	EPA 200.8 Mod	
Nickel	40.404	337.8	87.2	1.38	70 - 130	20	EPA 200.8 Mod	
Copper	40.404	51.40	82.3	0.807	70 - 130	20	EPA 200.8 Mod	
Arsenic	151.52	192.8	102	1.23	70 - 130	20	EPA 200.8 Mod	
Selenium	303.03	906.3	105	2.55	70 - 130	20	EPA 200.8 Mod	
Silver	15.152	10.75	70.9	2.19	70 - 130	20	EPA 200.8 Mod	
Cadmium	8.0808	9.347	84.9	1.70	70 - 130	20	EPA 200.8 Mod	
Lead	15.152	15.31	96.0	0.815	70 - 130	20	EPA 200.8 Mod	

Frontier Global Sciences, Inc.



Liz Siska, Project Manager

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203203-01

Batch: F203232

Sequence: 2C20001


Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203232-MS/MSD3

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Aluminum	370.7	10000	10270	99.0	70 - 130	EPA 200.8 Mod	AS
Chromium	53.16	1000.0	1137	108	70 - 130	EPA 200.8 Mod	AS
Manganese	7181	1000.0	8207	103	70 - 130	EPA 200.8 Mod	AS
Iron	1098	5000.0	6185	102	70 - 130	EPA 200.8 Mod	AS
Nickel	302.5	1250.0	1433	90.5	70 - 130	EPA 200.8 Mod	AS
Copper	18.16	1250.0	1061	83.4	70 - 130	EPA 200.8 Mod	AS
Zinc	77.52	2500.0	1995	76.7	70 - 130	EPA 200.8 Mod	AS
Arsenic	37.70	1000.0	1073	104	70 - 130	EPA 200.8 Mod	AS
Selenium	587.1	1000.0	1530	94.3	70 - 130	EPA 200.8 Mod	AS
Silver	ND	50.000	36.90	73.8	70 - 130	EPA 200.8 Mod	AS
Cadmium	2.484	100.00	85.31	82.8	70 - 130	EPA 200.8 Mod	AS
Lead	0.763	250.00	250.5	99.9	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
Aluminum	10000	10150	97.8	1.21	70 - 130	20	EPA 200.8 Mod	AS
Chromium	1000.0	1140	109	0.293	70 - 130	20	EPA 200.8 Mod	AS
Manganese	1000.0	8278	110	0.854	70 - 130	20	EPA 200.8 Mod	AS
Iron	5000.0	6243	103	0.937	70 - 130	20	EPA 200.8 Mod	AS
Nickel	1250.0	1441	91.1	0.525	70 - 130	20	EPA 200.8 Mod	AS
Copper	1250.0	1066	83.8	0.496	70 - 130	20	EPA 200.8 Mod	AS
Zinc	2500.0	1990	76.5	0.245	70 - 130	20	EPA 200.8 Mod	AS
Arsenic	1000.0	1094	106	1.93	70 - 130	20	EPA 200.8 Mod	AS
Selenium	1000.0	1554	96.7	1.55	70 - 130	20	EPA 200.8 Mod	AS
Silver	50.000	36.82	73.6	0.222	70 - 130	20	EPA 200.8 Mod	AS
Cadmium	100.00	83.94	81.5	1.62	70 - 130	20	EPA 200.8 Mod	AS
Lead	250.00	250.5	99.9	0.0263	70 - 130	20	EPA 200.8 Mod	AS

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203203-01RE3

Batch: F203260

Sequence: 2C22001


Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203260-MS/MSD3

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Molybdenum	1999	20.200	2041	206	70 - 130	EPA 200.8 Mod	QM-02

Analyte	Spike Added (µg/L)	MSD Concentration (µg/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Molybdenum	20.200	2041	207	0.0141	70 - 130	20	EPA 200.8 Mod	QM-02

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203203-01RE3

Batch: F203260

Sequence: 2C22001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203260-MS/MSD6

Analyte	Sample Concentration (µg/L)	Spike Added (µg/L)	MS Concentration (µg/L)	MS % Recovery	Recovery Limits	Method	Notes
Molybdenum	1999	5000.0	7034	101	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
Molybdenum	5000.0	7124	102	1.28	70 - 130	20	EPA 200.8 Mod	AS

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203203-01

Batch: F203288

Sequence: 2C22016

Preparation: BrCl Oxidation

Lab Number: F203288-MS/MSD1

Analyte	Sample Concentration (ng/L)	Spike Added (ng/L)	MS Concentration (ng/L)	MS % Recovery	Recovery Limits	Method	Notes
Mercury	61.16	255.00	309.6	97.4	71 - 125	EPA 1631E	

Analyte	Spike Added (ng/L)	MSD Concentration (ng/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	255.00	261.1	78.4	17.0	71 - 125	24	EPA 1631E	

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1203194-17

Batch: F203288

Sequence: 2C22016

Preparation: BrCl Oxidation

Lab Number: F203288-MS/MSD2

Analyte	Sample Concentration (ng/L)	Spike Added (ng/L)	MS Concentration (ng/L)	MS % Recovery	Recovery Limits	Method	Notes
Mercury	142800	505000	627200	95.9	71 - 125	EPA 1631E	

Analyte	Spike Added (ng/L)	MSD Concentration (ng/L)	MSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Mercury	505000	632700	97.0	0.879	71 - 125	24	EPA 1631E	

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F203232

Sequence: 2C20001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203232-BS/BSD1

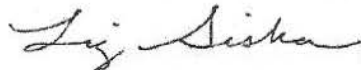
LCS Source: Blank Spike

Analyte	Spike Added (µg/L)	LCS Concentration (µg/L)	LCS % Recovery	Recovery Limits	Method	Notes
Aluminum	150.00	144.4	96.3	85 - 115	EPA 200.8 Mod	
Chromium	7.0000	6.54	93.4	85 - 115	EPA 200.8 Mod	
Manganese	6.0000	5.80	96.7	85 - 115	EPA 200.8 Mod	
Iron	500.00	461.0	92.2	85 - 115	EPA 200.8 Mod	
Nickel	4.0000	3.94	98.5	85 - 115	EPA 200.8 Mod	
Copper	4.0000	4.18	104	85 - 115	EPA 200.8 Mod	
Zinc	10.000	10.17	102	85 - 115	EPA 200.8 Mod	
Arsenic	15.000	14.45	96.3	85 - 115	EPA 200.8 Mod	
Selenium	30.000	29.75	99.2	85 - 115	EPA 200.8 Mod	
Molybdenum	2.0000	1.85	92.6	85 - 115	EPA 200.8 Mod	
Silver	1.5000	1.555	104	85 - 115	EPA 200.8 Mod	
Cadmium	0.80000	0.802	100	85 - 115	EPA 200.8 Mod	
Lead	1.5000	1.565	104	85 - 115	EPA 200.8 Mod	

Analyte	Spike Added (µg/L)	LCSD Concentration (µg/L)	LCSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Aluminum	150.00	142.4	94.9	1.40	85 - 115	20	EPA 200.8 Mod	
Chromium	7.0000	6.44	92.0	1.58	85 - 115	20	EPA 200.8 Mod	
Manganese	6.0000	5.75	95.8	0.920	85 - 115	20	EPA 200.8 Mod	
Iron	500.00	458.0	91.6	0.660	85 - 115	20	EPA 200.8 Mod	
Nickel	4.0000	3.94	98.5	0.00457	85 - 115	20	EPA 200.8 Mod	
Copper	4.0000	4.16	104	0.367	85 - 115	20	EPA 200.8 Mod	
Zinc	10.000	10.32	103	1.47	85 - 115	20	EPA 200.8 Mod	
Arsenic	15.000	14.40	96.0	0.305	85 - 115	20	EPA 200.8 Mod	
Selenium	30.000	28.67	95.6	3.69	85 - 115	20	EPA 200.8 Mod	
Molybdenum	2.0000	1.86	92.8	0.196	85 - 115	20	EPA 200.8 Mod	
Silver	1.5000	1.559	104	0.233	85 - 115	20	EPA 200.8 Mod	
Cadmium	0.80000	0.809	101	0.843	85 - 115	20	EPA 200.8 Mod	
Lead	1.5000	1.539	103	1.70	85 - 115	20	EPA 200.8 Mod	

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F203260

Sequence: 2C22001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203260-BS/BSD1

LCS Source: Blank Spike

Analyte	Spike Added (µg/L)	LCS Concentration (µg/L)	LCS % Recovery	Recovery Limits	Method	Notes
Molybdenum	2.0000	1.82	91.0	85 - 115	EPA 200.8 Mod	

Analyte	Spike Added (µg/L)	LCSD Concentration (µg/L)	LCSD % Recovery	% RPD	Recovery Limits	RPD Limit	Method	Notes
Molybdenum	2.0000	1.86	93.0	2.13	85 - 115	20	EPA 200.8 Mod	

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F203288

Sequence: 2C22016

Preparation: BrCl Oxidation

Lab Number: F203288-BS/BSD1

LCS Source: NIST 1641d

Analyte	Spike Added (ng/L)	LCS Concentration (ng/L)	LCS % Recovery	Recovery Limits	Method	Notes
Mercury	15.679	15.25	97.3	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	15.16	96.7	0.622	80 - 120	24	EPA 1631E	

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PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2C20001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Method	Notes
F203232-BLK1	Aluminum	0.1	4.0	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Chromium	-0.007	0.10	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Manganese	0.002	0.10	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Iron	-0.04	10.0	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Nickel	0.005	0.10	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Copper	0.01	0.10	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Zinc	0.11	0.20	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Arsenic	-0.009	0.15	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Selenium	0.25	0.60	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Molybdenum	0.01	0.06	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Silver	-0.0009	0.020	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Cadmium	0.002	0.020	µg/L	F203232	EPA 200.8 Mo	U
F203232-BLK1	Lead	0.024	0.040	µg/L	F203232	EPA 200.8 Mo	U

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PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2C22001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Method	Notes
F203260-BLK1	Molybdenum	0.01	0.06	µg/L	F203260	EPA 200.8 Mo	U

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

Liz Siska, Project Manager

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PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2C22016

Preparation: BrCl Oxidation

Lab Sample ID	Analyte	Found	MRL	Units	Batch	Method	Notes
F203288-BLK1	Mercury	0.07	0.50	ng/L	F203288	EPA 1631E	U
F203288-BLK2	Mercury	0.06	0.50	ng/L	F203288	EPA 1631E	U
F203288-BLK3	Mercury	0.06	0.50	ng/L	F203288	EPA 1631E	U
F203288-BLK4	Mercury	0.18	0.50	ng/L	F203288	EPA 1631E	U, QB-04

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Notes and Definitions

- U Analyte included in the analysis, but not detected
- 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.
- FB-1631 Required equipment/field/filter blank not submitted by the client. The sample has been analyzed according to 1631E, but does not meet 1631E criteria
- 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

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BOLD FIELDS REQUIRED. PLEASE CIRCLE REQUESTED ANALYSIS.

108420 25

PROJECT MANAGER: Paul Reper
COMPANY: b2m
ADDRESS: 380 Harvey Rd
CITY: Manchester STATE: NH ZIP: 03107
PHONE: 603 232-8717 EXT.:
FAX:
E-MAIL: Paul.Reper@b2m.com
SITE NAME: mk
PROJECT #:
STATE: ☒ NH ☐ MA ☐ ME ☐ VT OTHER:
REGULATORY PROGRAM: NPDES: RGP POTW STORMWATER OR
GWP, OIL FUND, BROWNFIELD OR OTHER:
QUOTE #:
PO #:

DATE NEEDED: Standard TAT

QA/QC	
REPORTING LEVEL	
A	B

REPORTING OPTIONS

PRELIMS: YES OR NO
If YES: FAX OR PDF

ELECTRONIC OPTIONS

No FAX E-MAIL PDF EQUIS

PRESUMPTIVE CERTAINTY

SAMPLER(S): Paul T. Repn / PSNH

RELINQUISHED BY: And P DATE: 3/14/12 TIME: 440pm RECEIVED BY: [Signature]

RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY: _____

RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY: _____

TEMP. 18.4 °C
ICE? (YES) No

METALS: 8 RCRA 13 PP FE, MN PB, CU

OTHER METALS: _____

DISSOLVED METALS FIELD FILTERED?	YES	NO
----------------------------------	-----	----

NOTES: (1E: SPECIAL DETECTION LIMITS, BILLING INFO, IF DIFFERENT)

Al, As, Cd, Cr, Cu, Pb,
Fe, Hg, Mo, Ni, Se, Ag, Zn

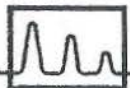
3/16/12 JG add Mn per Paul Pepler.
* per customer

SITE HISTORY: SWWTF

SUSPECTED CONTAMINATION: _____

FIELD READINGS: _____

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professional laboratory services

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(WHITE: ORIGINAL GREEN: PROJECT MANAGER)