



Northeast Utilities System

Public Service of New Hampshire
Northeast Utilities System
Merrimack Station
97 River Road
Bow, New Hampshire 03304

Phone (603) 224-4081
Fax (603) 634-2334

April 29, 2013

Mr. Mike Butler
Staff Engineer
Lowell Regional Wastewater Utility
451 First Street Boulevard (Route 110)
Lowell, Massachusetts 01850

Re: Monthly Self Monitoring Report
March 2013
Merrimack Station
Public Service Company of New Hampshire
Bow, New Hampshire

Dear Mr. Butler:

Public Service Company of New Hampshire (PSNH) is pleased to submit the attached **Self-Monitoring Report (SMR)** for the period March 1, 2013 through March 31, 2013. This SMR is intended to satisfy Conditions 7 and 8 of the Interim Discharge Authorization (IDA) issued to PSNH by the Lowell Regional Wastewater Utility (LRWU), dated October 3, 2012. Softened Stream B Wastewater flow was approximately 112,000 for the monitoring period. Softened Stream B Wastewater was the only approved waste stream discharged to LRWU during the month of March 2013. Wastewater flow was estimated based on the actual number of tanker trucks sent to LRWU in March and tanker capacity.

The attached **SMR Summary Sheet** summarizes the analytical results contained in the attached **Analytical Data Reports** for all required parameters as outlined in Condition 8 of the IDA. The attached **Table 1** compares the results to the LRWU's Local Sewer Discharge Limits. The results indicate that pollutant concentrations were within the limits on the day of sampling. The attached **Table 2** summarizes wastewater shipments to LRWU in the month of March 2013. The analysis of the Softened Stream B sample collected on March 6, 2013, 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 interferences for analysis of certain 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 quantization 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 a draft SOP that was used in conjunction with EPA Method 200.8 to conduct ICP-MS analyses of FGD wastewater. The draft 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, see:

- Standard Operating Procedure for Trace Element Analysis of Flue Gas Desulfurization Wastewaters using Inductively Coupled Plasma/Mass Spectrometry (ICP-MS) Collision/Reaction Cell Procedure. http://water.epa.gov/scitech/wastetech/guide/steam-electric/upload/ICPMS_FGD_Collision-Reaction-Cell-Procedure_draft_03-11-2013.pdf

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.

Sincerely,

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE



Brad Owens, Station Manager

p:\04\jobs\0029300\04.0029307 00\work\sampling and reporting\reports\lowell\monthly reports\2013\final lowell march ltr 042513.docx

Attachments

**TABLE 1
SUMMARY OF SOFTENED STREAM B CONCENTRATIONS
COMPARED TO LOWELL SEWER DISCHARGE LIMITS
MARCH 2013**

Public Service Company of New Hampshire
Merrimack Station
Bow, New Hampshire

| PARAMETER | LOWELL SEWER DISCHARGE LIMITS (mg/L) | SOFTENED STREAM B RESULTS 3/06/2013 (mg/L) |
|-----------|---|--|
| Arsenic | 0.556 | 0.0266 |
| Cadmium | 0.056 | <0.00100 |
| COD | - | 1,500 |
| Lead | 0.857 | <0.00200 |
| Mercury | 0.004 | 0.0000808 |
| pH | 5.0-9.5 | 7.52 |
| Silver | 0.053 | <0.00100 |
| Sodium | - | 58,000 |

CONFIDENTIAL BUSINESS INFORMATION

TABLE 2
SUMMARY OF WASTEWATER SHIPMENTS TO LOWELL REGIONAL WASTEWATER UTILITY
MARCH 2013

Public Service Company of New Hampshire
Merrimack Station
Bow, New Hampshire

| DATE | DAY | TICKET | TRUCKING COMPANY | pH | SOFTENED STREAM A VOLUME (gallons) | SOFTENED STREAM B VOLUME (gallons) | TOTAL DAILY VOLUME (gallons) |
|-----------|-----------|--------|------------------|------|------------------------------------|------------------------------------|------------------------------|
| 3/6/2013 | Wednesday | 1428 | O'Brien | 7.58 | - | 8000 | 8,000 |
| 3/11/2013 | Monday | 1429 | O'Brien | 6.84 | - | 8000 | 16,000 |
| | | 1430 | O'Brien | 6.92 | - | 8000 | |
| 3/12/2013 | Tuesday | 1431 | O'Brien | 6.12 | - | 8000 | 8,000 |
| 3/14/2013 | Thursday | 1433 | O'Brien | 6.52 | - | 8000 | 16,000 |
| | | 1432 | O'Brien | 6.11 | - | 8000 | |
| 3/15/2013 | Friday | 1434 | O'Brien | 6.57 | - | 8000 | 16,000 |
| | | 1435 | O'Brien | 6.57 | - | 8000 | |
| 3/16/2013 | Saturday | 1436 | O'Brien | 6.52 | - | 8000 | 8,000 |
| 3/17/2013 | Sunday | 1437 | O'Brien | 6.49 | - | 8000 | 8,000 |
| 3/22/2013 | Friday | 1439 | O'Brien | 6.84 | - | 8000 | 16,000 |
| | | 1440 | O'Brien | 6.84 | - | 8000 | |
| 3/25/2013 | Monday | 1441 | O'Brien | 7.4 | - | 8000 | 8,000 |
| 3/26/2013 | Tuesday | 1442 | O'Brien | 7.4 | - | 8000 | 8,000 |

| | |
|--|---------------|
| Shipments (Number of Trucks) | 14 |
| Truck Volume (Gallons) | 8,000 |
| Total Stream A Volume Discharged (Gallons) | - |
| Total Stream B Volume Discharged (Gallons) | 112,000 |
| Total Volume Discharged (Gallons) | 112,000 |
| Maximum Daily Flow (gallons per day) | 16,000 |
| Average Daily Flow (gallons per discharge day) | 11,200 |
| PERMITTED FLOW (GPD): | 70,000 |

LOWELL REGIONAL WASTEWATER UTILITY
Industrial Sewer User Self-Monitoring Report Summary Sheet

Facility Information: Company Name Public Service Company of New Hampshire
Facility Address 97 River Road Bow, New Hampshire Permit No. NA (Interim Discharge Authorization)
Facility Contact Brad Owens Telephone (603) 224-4081

-----**Use A Separate Summary Sheet For Each Monitoring Point**-----

Monitoring Report: Monitoring Point End of pretreatment process Submittal Date April 29, 2013
Reporting Period (circle applicable): Baseline Annually Semi-Annually Quarterly Monthly Re-Sample
Reporting Period Start Date March 1, 2013 Reporting Period End Date March 31, 2013

Sample Analysis: Certified Analytical Lab Eastern Analytical, Inc. (EAI)
Authorized Rep. Lorraine Olashaw Certification No. 1012
Analytical Sub-Contractor Eurofins Frontier Global Sciences Certification No. E87575

Sample Collection: Sampler (Lab/Self/Other) Paul Pepler, GZA
Sample Type(s) (circle all that apply): Grab Time Composite Flow Composite

Grab Sampling: Sample Date 3/06/2013 (Softened Stream B) Sample Time 13:10
pH (Standard Units) 7.52 Instantaneous Flow Rate (GPM) N/A

Composite Sampling: Start Date/Time N/A Stop Date/Time N/A

No. Aliquots N/A Aliquot Volume N/A Sample Volume N/A

Flow Data: Sampling Interval Volume (Gal) 8,000 Daily Flow Rate (GPD) 11,200 (Average of discharge days)

Monitoring Period Industrial Wastewater Flow (Gal) 112,000 [] Meter [X] Estimate

Monitoring Period Start Date March 1, 2013 Monitoring Period End Date March 31, 2013

Refer to Self-Monitoring Report Instructions for details on completing this SMR Summary Sheet

LOWELL REGIONAL WASTEWATER UTILITY
Industrial Sewer User Self-Monitoring Report Summary Sheet

Submit All Chains of Custody and Laboratory Result Sheets With SMR Summary Sheet

Analytical Results:

| Parameter | Analysis Date | Result (mg/L) | Parameter | Analysis Date | Result (mg/L) |
|---------------------------------|---------------|---------------|---------------------|---------------|---------------|
| BOD | | | Copper | | |
| COD | 3/11/2013 | 1,500 | Cyanide (Total) | | |
| O & G 413.11/1664 | | | Fluoride | | |
| TSS | | | Lead | 3/14/2013 | <0.00200 |
| TOC * | | | Mercury | 3/12/2013 | 0.0000808 |
| TTO ** 624 / 6260B - 625 / 6270 | | | Molybdenum | | |
| Aluminum | | | Nickel | | |
| Antimony | | | Nitrogen (Kjeldahl) | | |
| Arsenic | 3/14/2013 | 0.0266 | Phenols (Total) | | |
| Barium | | | Selenium | | |
| Beryllium | | | Silver | 3/14/2013 | <0.00100 |
| Cadmium | 3/14/2013 | <0.00100 | Thallium | | |
| Chromium (Hexavalent) | | | Zinc | | |
| Chromium (Total) | | | Sodium | 3/14/2013 | 58,000 |

BOD = Biochemical Oxygen Demand COD = Chemical Oxygen Demand O & G = Oil & Grease TSS = Total Suspended Solids TTO = Total Toxic Organics
*TOC (Total Organic Carbon) = is the amount of carbon bound in an organic compound and is often used as a non-specific indicator of water quality. TOC measures both the total carbon present as well as the inorganic carbon (IC). Subtracting the inorganic carbon from the total carbon yields TOC.
**TTO's = Summation of all quantifiable values greater than 0.01 mg/L for toxic organics listed in 40 CFR 413.02(f). TTO's include PCB's (Poly-Chlorinated Biphenyls), VOC's (Volatile Organic Compounds), SVOC's (Semi-Volatile Organic Compounds). PCB's, VOC's and SVOC's shall be analyzed using EPA Methods 608, 624, and 625, respectively.

Zero Discharge / Self-Monitoring (initial if applicable):

_____ No industrial wastewater from permitted processes has been discharged to sewer during the monitoring period

_____ No sampling has been conducted on permitted sewer discharges during the monitoring period

Certification Statement:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Brad Owens

Printed Name of Authorized Representative



Signature of Authorized Representative

Station Manager

Title

4/26/2013

Date



Eastern Analytical, Inc.

Professional laboratory & drilling services

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 118882
Client Identification: PSNH-MK | 3902
Date Received: 3/7/2013

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

3.26.13
Date

25
of pages (excluding cover letter)



SAMPLE CONDITIONS PAGE

EAI ID#: 118882

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: PSNH-MK | 3902

Temperature upon receipt (°C): 3.7

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) |
|-----------|----------------------|---------------|--------------|---------------|--------------|---|
| 118882.01 | Softened Stream B WW | 3/7/13 | 3/6/13 | 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. Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

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, 20th Edition, 1998 and 22nd Edition, 2012
- 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 | 800.287.0525 | customerservice@eailabs.com



LABORATORY REPORT

EAI ID#: 118882

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

Client Designation: **PSNH-MK | 3902**

Sample ID: Softened Stream B
WW

Lab Sample ID: 118882.01

Matrix: aqueous

Date Sampled: 3/6/13

Date Received: 3/7/13

COD 1500

| Units | Analysis | | Method | Analyst |
|-------|----------|------|--------|---------|
| | Date | Time | | |
| mg/L | 3/11/13 | 9:00 | H8000 | SCW |



QC REPORT

EAI ID#: 118882

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: PSNH-MK | 3902

| Parameter Name | Blank | LCS | LCSD | Units | Date of Analysis | Limits | RPD | Method |
|----------------|-------|------------|----------------------|-------|------------------|----------|-----|--------|
| COD | < 10 | 96 (96 %R) | 100 (100 %R) (4 RPD) | mg/L | 3/11/13 | 85 - 115 | 20 | H8000 |

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.



Frontier Global Sciences

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Phone: 425-686-1996
www.frontiergs.com

25 March 2013

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 Eurofins 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



Frontier Global Sciences

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Phone: 425-686-1996
www.frontiergs.com

ANALYTICAL REPORT FOR SAMPLES

Laboratory: Eurofins Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station 200.8

| Sample ID | Lab ID | Matrix | Date Sampled | Date Received |
|----------------------------|------------|--------|-----------------|-----------------|
| Softened Water Stream B WW | 1303165-01 | Water | 06-Mar-13 13:10 | 09-Mar-13 09:25 |
| Field Bank Hg | 1303165-02 | Water | 06-Mar-13 13:10 | 09-Mar-13 09:25 |

Eurofins Frontier Global Sciences

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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03/25/2013



CASE NARRATIVE

SAMPLE RECEIPT

One (1) water sample and one (1) field blank was received on March 9th, 2013 at Eurofins Frontier Global Sciences (EFGS). The sample was received intact, on-ice within a cooler at 2.6 degrees Celsius.

SAMPLE PREPARATION AND ANALYSIS

Sample preparation and analysis for trace metals was performed in accordance with EPA Method 200.8 with the use of a collision cell.

Sample preparation and analysis for mercury was performed in accordance with EPA Method 1631E.

ANALYTICAL ISSUES

Liquid spikes were prepared for every preparation as a measure of accuracy. All liquid spikes and certified reference material (if applicable) were within the control limits.

As an additional measure of the accuracy of the methods used 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.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences were within the control limits.

Eurofins Frontier Global Sciences

Liz Siska, Project Manager

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CHAIN OF CUSTODY FORMS

FGS Work Order: 1303165 **Sample Receipt Checklist** Frontier Global Sciences

Client: Eastern Analytical Date & Time Received: 3/9/13 0925 Date Logged In: 3/9/13 Date Labeled: 3/9/13
Project: _____ Received By: (S) Logged By: AMB Labeled By: AMB
of Coolers Received: 1 Samples Arrived By: X Shipping Service _____ Courier _____ Hand _____ Other (Specify: _____)
Tracking/Airbill Number(s): US12 X46 519 01 9408 3211
Thermal Preservation: _____ None (Ambient) X Loose Ice _____ Gel/Blue Ice _____ Other (Specify: _____) Thermal Preservation Required: (Y/N)

| Cooler Information: | Y/N | Comments | Thermometer ID: | CF: 10.8 °C | | | |
|--|-----|-----------------|--------------------------|--------------|--------------|---------------|--|
| The coolers do not appear to be tampered with: | Y | | Cooler 1: <u>21.6</u> °C | Cooler 4: °C | Cooler 7: °C | Cooler 10: °C | |
| Custody Seals are present and intact: | N | <u>None cut</u> | Cooler 2: °C | Cooler 5: °C | Cooler 8: °C | Cooler 11: °C | |
| Custody seals signed by: | N/A | | Cooler 3: °C | Cooler 6: °C | Cooler 9: °C | Cooler 12: °C | |

| Chain of Custody: | Y/N | Comments | Sample Condition/Integrity: | Y/N | Comments |
|--------------------------|-----|----------|---|-----|----------|
| Sample ID/Description: | Y | | Sample containers intact: | Y | |
| Date/Time of collection: | Y | | Sample labels are present and legible: | Y | |
| Sampled by: | Y | | Sample ID on container matches COC: | N | |
| Preservation type: | N/A | | Correct sample containers used: | Y | |
| Requested analyses: | Y | | Samples received within holding times: | Y | |
| Required signatures: | Y | | Sample volume sufficient for requested analyses: | Y | |
| Internal CDC required: | N | | Correct preservative used for requested analyses: | N/A | |
| | | | pH of preserved samples verified and recorded: | N/A | |

Client Contacted: _____ Date/Time: _____ Method: _____
Anomalies/Non-conformances (attach additional pages if needed): _____ Discussion/Resolution: _____

Sample 2: The COC lists "Field Blank" and sample label lists "Field Blank!"
Logged into LIMS per SOP. AMB 3/9/13
All outside bags had a small sticker on them: "118882.01 Softened." AMB 3/9/13
The time listed on the COC for sample collection is military; time listed on the sample labels is regular. i.e., COC: "13:10" and label: "1:10p." AMB 3/9/13

FGS Sample Receipt Checklist Revision 2; 07/09/2012

Eurofins Frontier Global Sciences

Liz Siska

Liz Siska, Project Manager

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Frontier Global Sciences

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CHAIN OF CUSTODY FORMS

1303165

Chain of Custody Record & Laboratory Analysis Request:
Air, Water, Sediments, Plant and Animal Tissue,
Hydrocarbon & Other Samples

11720 Northcreek Pkwy N, Suite 400
Bothell, WA 98011
Phone: 425-686-1996
Fax: 425-686-3096
info@FrontierGS.com
http://www.FrontierGS.com

eurofins | Frontier Global Sciences

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1303165

| Client: <u>Eastern Analytical, Inc</u> | | Contact: <u>Jeff Gagne</u> | | Analyses Requested | | FGS PM: <u>117 Sis Ks</u> | | | |
|---|----------------------|---|--------------|--|--------------------|--|-----------------|--------------------------------------|---|
| Address: <u>25 Chenell Drive</u> <u>CONCORD, NH 03301</u> | | Phone: <u>603/225-4591</u> E-mail: <u>jeffg@eastanal.com</u> | | Field Preserved: HNO ₃ HCl BCl Other (%) | | Date: <u>3/7/13</u> | | | |
| Project Name: | | Contract/PO: <u>39999</u> | | Total Metals | | TAT (business days): <u>20 (std)</u> <u>15 (10 5 4 3 2 24 hrs)</u> (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT) | | | |
| Report To: <u>Same as above</u> | | Invoice To: <u>Same</u> | | Sampled By | | Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N (If yes, please contact PM) | | | |
| Address: <u>603/ 603/</u> | | Address: | | Field Filtered (Y/N) | | EDD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N | | | |
| Phone: <u>225-0525</u> Fax: <u>225-4591</u> | | Phone: Fax: | | Field Preserved | | QA <input type="checkbox"/> Standard <input type="checkbox"/> High | | | |
| E-mail: | | E-mail: | | Matrix | | Comments | | | |
| No. | Engraved Bottle ID | Sample ID | # of Bottles | Matrix | Date & Time | Field Filtered (Y/N) | Field Preserved | Total Metals | Comments |
| 1 | <u>B-5484 C-5218</u> | <u>Softened water</u> | <u>2</u> | <u>AQ</u> | <u>3/6/13 1310</u> | <u>PTD</u> | <u>AT</u> | <u>1</u> | <u>Metals include</u> <u>As, Ag, Cd, Na, Pb, Hg</u> <u>200.8 via</u> <u>collision cell</u> |
| 2 | <u>C-5486</u> | <u>Field Back Hg</u> | <u>1</u> | <u>AQ</u> | <u>3/6/13 1310</u> | <u>PTD</u> | <u>AT</u> | <u>1</u> | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| For Laboratory Use Only | | Matrix Codes: | | Relinquished By: | | Received By: | | | |
| COC Seal: <u>None</u> | Comments: | FW: Fresh Water WW: Waste Water SB: Sea and Brackish Water SS: Soil and Sediment TS: Plant and Animal Tissue HC: Hydrocarbons TR: Trap OT: Other | | <u>Chris Johnson</u> | | <u>UPS</u> | | | |
| Cooler Temp: <u>2.6°C</u> | | | | Name: <u>Chris Johnson</u> | | Name: <u>UPS</u> | | | |
| Carrier: <u>UPS</u> | | | | Organization: <u>Eastern Analytical</u> | | Organization: <u>FGS</u> | | | |
| VTSR: <u>0985</u> | <u>710 5285</u> | | | Date & Time: <u>3/7/13 1348</u> | | Date & Time: <u>3/7/13 1530</u> | | | |
| # of Coolers: <u>1</u> | | | | Tracking number: <u>1Z 940 599 01 9408 3211</u> | | Date & Time: <u>3/8/13 0925</u> | | | |
| Sample Disposal: <input type="checkbox"/> Return (shipping fees may apply) <input type="checkbox"/> Standard Disposal - 30 Days after report <input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply) | | | | By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analyses. | | | | Customer Approval: _____ Date: _____ | |

Eurofins Frontier Global Sciences

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Liz Siska

Liz Siska, Project Manager

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03/25/2013



Frontier Global Sciences

11720 North Creek Parkway North, Suite 400
Bothell, WA 98011
Phone: 425-686-1996
www.frontiersgs.com

ANALYTICAL RESULTS

Softened Water Stream B WW

Matrix: Water

Laboratory ID: 1303165-01

| Analyte | Result | MDL | MRL | Units | Dilution | Batch | Sequence | Analyzed | Method | Notes |
|---------|----------|-----|--------|-------|----------|---------|----------|----------|-----------|---------|
| Arsenic | 26.6 | - | 7.50 | µg/L | 50 | F303099 | 3C14010 | 03/14/13 | EPA 200.8 | R-05 |
| Cadmium | ND | - | 1.00 | µg/L | 50 | F303099 | 3C14010 | 03/14/13 | EPA 200.8 | R-05, U |
| Lead | ND | - | 2.00 | µg/L | 50 | F303099 | 3C14010 | 03/14/13 | EPA 200.8 | R-05, U |
| Mercury | 80.8 | - | 5.05 | ng/L | 10 | F303073 | 3C12014 | 03/12/13 | EPA 1631E | |
| Silver | ND | - | 1.00 | µg/L | 50 | F303099 | 3C14010 | 03/14/13 | EPA 200.8 | R-05, U |
| Sodium | 58000000 | - | 200000 | µg/L | 10000 | F303099 | 3C14010 | 03/14/13 | EPA 200.8 | QB-02 |

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ANALYTICAL RESULTS

Field Bank Hg

Matrix: Water

Laboratory ID: 1303165-02

| Analyte | Result | MDL | MRL | Units | Dilution | Batch | Sequence | Analyzed | Method | Notes |
|---------|--------|-----|------|-------|----------|---------|----------|----------|-----------|-------|
| Mercury | ND | - | 0.50 | ng/L | 1 | F303073 | 3C12014 | 03/12/13 | EPA 1631E | U |

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MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1303130-01RE1

Batch: F303073

Sequence: 3C12014

Preparation: BrCl Oxidation

Lab Number: F303073-DUP1

| Analyte | Sample Concentration ng/L | Duplicate Concentration ng/L | MRL | % RPD | RPD Limit | Method | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 59.89 | 61.72 | 5.05 | 3.00 | 24 | EPA 1631E | |

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MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1303165-01

Batch: F303099

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-DUP1

| Analyte | Sample Concentration µg/L | Duplicate Concentration µg/L | MRL | % RPD | RPD Limit | Method | Notes |
|---------|------------------------------|---------------------------------|--------|-------|-----------|-----------|--------------|
| Sodium | 58000000 | 44090000 | 200000 | 27.3 | 20 | EPA 200.8 | QB-02, QR-07 |

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MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1303165-01RE1

Batch: F303099

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-DUP2

| Analyte | Sample Concentration µg/L | Duplicate Concentration µg/L | MRL | % RPD | RPD Limit | Method | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Arsenic | 26.56 | 22.69 | 7.50 | 15.7 | 20 | EPA 200.8 | |
| Silver | ND | ND | 1.00 | ND | 20 | EPA 200.8 | U |
| Cadmium | ND | ND | 1.00 | ND | 20 | EPA 200.8 | |
| Lead | ND | ND | 2.00 | ND | 20 | EPA 200.8 | |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303130-01RE1

Batch: F303073

Sequence: 3C12014

Preparation: BrCl Oxidation

Lab Number: F303073-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 59.89 | 204.00 | 244.6 | 90.5 | 71 - 125 | EPA 1631E | |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 204.00 | 246.7 | 91.6 | 0.846 | 71 - 125 | 24 | EPA 1631E | |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303164-06

Batch: F303073

Sequence: 3C12014

Preparation: BrCl Oxidation

Lab Number: F303073-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 4.25 | 20.400 | 20.54 | 79.9 | 71 - 125 | EPA 1631E | |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 20.400 | 20.45 | 79.4 | 0.443 | 71 - 125 | 24 | EPA 1631E | |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303165-01

Batch: F303099

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Arsenic | ND | 15.225 | 37.75 | 248 | 70 - 130 | EPA 200.8 | QM-02 |
| Silver | ND | 1.5225 | 0.964 | 63.3 | 70 - 130 | EPA 200.8 | QM-05 |
| Cadmium | ND | 0.81200 | 0.918 | 113 | 70 - 130 | EPA 200.8 | |
| Lead | ND | 1.5225 | 1.796 | 118 | 70 - 130 | EPA 200.8 | |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-----------------|
| Arsenic | 15.225 | 44.51 | 292 | 16.4 | 70 - 130 | 20 | EPA 200.8 | QM-02 |
| Silver | 1.5225 | 0.867 | 56.9 | 10.6 | 70 - 130 | 20 | EPA 200.8 | QM-05 |
| Cadmium | 0.81200 | 1.155 | 142 | 22.9 | 70 - 130 | 20 | EPA 200.8 | QM-05, QR-08 |
| Lead | 1.5225 | 1.926 | 127 | 6.99 | 70 - 130 | 20 | EPA 200.8 | |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303165-01RE1

Batch: F303099

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-MS/MSD4

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-----------|
| Arsenic | 26.56 | 1015.0 | 1040 | 99.9 | 70 - 130 | EPA 200.8 | AS |
| Silver | ND | 50.750 | 34.25 | 67.5 | 70 - 130 | EPA 200.8 | AS, QM-05 |
| Cadmium | 0.367 | 101.50 | 66.39 | 65.1 | 70 - 130 | EPA 200.8 | QM-05 |
| Lead | 0.511 | 253.75 | 242.1 | 95.2 | 70 - 130 | EPA 200.8 | AS |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-----------|
| Arsenic | 1015.0 | 1029 | 98.8 | 1.06 | 70 - 130 | 20 | EPA 200.8 | AS |
| Silver | 50.750 | 36.35 | 71.6 | 5.95 | 70 - 130 | 20 | EPA 200.8 | AS, QM-05 |
| Cadmium | 101.50 | 69.95 | 68.6 | 5.21 | 70 - 130 | 20 | EPA 200.8 | QM-05 |
| Lead | 253.75 | 237.0 | 93.2 | 2.14 | 70 - 130 | 20 | EPA 200.8 | AS |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303165-01

Batch: F303099

Sequence: 3C19009

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-MS/MSD5

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Sodium | 58000000 | 5578.4 | 48650000 | -168000 | 70 - 130 | EPA 200.8 | QM-02 |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Sodium | 5578.4 | 50130000 | -141000 | 2.99 | 70 - 130 | 20 | EPA 200.8 | QM-02 |

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1303165-01

Batch: F303099

Sequence: 3C19009

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-MS/MSD6

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Sodium | 58000000 | 101500000 | 151900000 | 92.5 | 70 - 130 | EPA 200.8 | AS |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Sodium | 101500000 | 149100000 | 89.7 | 1.85 | 70 - 130 | 20 | EPA 200.8 | AS |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F303073

Sequence: 3C12014

Preparation: BrCl Oxidation

Lab Number: F303073-BS/BS1

LCS Source: NIST

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679 | 14.99 | 95.6 | 77 - 123 | EPA 1631E | |

| Analyte | Spike Added (ng/L) | LCSD Concentration (ng/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 15.679 | 14.89 | 95.0 | 0.614 | 77 - 123 | 24 | EPA 1631E | |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F303099

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F303099-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Sodium | 5496.0 | 5238 | 95.3 | 85 - 115 | EPA 200.8 | |
| Arsenic | 15.000 | 15.32 | 102 | 85 - 115 | EPA 200.8 | |
| Silver | 1.5000 | 1.525 | 102 | 85 - 115 | EPA 200.8 | |
| Cadmium | 0.80000 | 0.924 | 115 | 85 - 115 | EPA 200.8 | |
| Lead | 1.5000 | 1.475 | 98.3 | 85 - 115 | EPA 200.8 | |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method | Notes |
|---------|--------------------|---------------------------|-----------------|--------|-----------------|-----------|-----------|-------|
| Sodium | 5496.0 | 5320 | 96.8 | 1.54 | 85 - 115 | 20 | EPA 200.8 | |
| Arsenic | 15.000 | 15.16 | 101 | 1.04 | 85 - 115 | 20 | EPA 200.8 | |
| Silver | 1.5000 | 1.526 | 102 | 0.0514 | 85 - 115 | 20 | EPA 200.8 | |
| Cadmium | 0.80000 | 0.916 | 115 | 0.776 | 85 - 115 | 20 | EPA 200.8 | |
| Lead | 1.5000 | 1.491 | 99.4 | 1.10 | 85 - 115 | 20 | EPA 200.8 | |

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PREPARATION BLANKS

Instrument: Hg2600-1

Sequence: 3C12014

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MDL | MRL | Units | Batch | Method | Notes |
|---------------|---------|-------|------|------|-------|---------|-----------|----------|
| F303073-BLK1 | Mercury | 0.22 | 0.08 | 0.50 | ng/L | F303073 | EPA 1631E | U |
| F303073-BLK2 | Mercury | 0.05 | 0.08 | 0.50 | ng/L | F303073 | EPA 1631E | U |
| F303073-BLK3 | Mercury | 0.03 | 0.08 | 0.50 | ng/L | F303073 | EPA 1631E | U |
| F303073-BLK4 | Mercury | 0.08 | 0.08 | 0.50 | ng/L | F303073 | EPA 1631E | QB-04, U |
| F303073-BLK6 | Mercury | 1.49 | 1.65 | 9.90 | ng/L | F303073 | EPA 1631E | QB-08, U |
| F303073-BLK5 | Mercury | 0.06 | 0.09 | 0.52 | ng/L | F303073 | EPA 1631E | QB-06, U |

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PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 3C14010

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found | MDL | MRL | Units | Batch | Method | Notes |
|---------------|---------|---------|-------|-------|-------|---------|-----------|-------|
| F303099-BLK1 | Sodium | 34 | 1 | 20 | µg/L | F303099 | EPA 200.8 | QB-10 |
| F303099-BLK1 | Arsenic | 0.05 | 0.04 | 0.15 | µg/L | F303099 | EPA 200.8 | U |
| F303099-BLK1 | Silver | -0.008 | 0.002 | 0.020 | µg/L | F303099 | EPA 200.8 | U |
| F303099-BLK1 | Cadmium | -0.004 | 0.003 | 0.020 | µg/L | F303099 | EPA 200.8 | U |
| F303099-BLK1 | Lead | -0.0006 | 0.003 | 0.040 | µg/L | F303099 | EPA 200.8 | U |

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Notes and Definitions

- U Analyte included in the analysis, but not detected
- R-05 The sample was diluted due to the presence of high levels of non-target analytes or particulates resulting in elevated reporting limits.
- 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.
- QR-07 The RPD/RSD value for the matrix duplicate/triplicate was outside of acceptance limits. Batch QC acceptable based on MS/MSD and/or LCS/LCSD RPD values within control limits.
- QM-05 The spike recovery was outside acceptance limits for the MS/MSD and or AS/ASD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- 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-10 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. Only report sample results greater than 10 times the contamination value (QB-01), or samples less than the MRL (QB-02).
- QB-08 The blank was preserved to 50% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- QB-06 The blank was preserved to 5% BrCl rather than 1%. The control limit for blanks preserved to greater than 1% BrCl is the preservation percentage multiplied by the MRL.
- 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.
- QB-02 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the sample concentrations are less than 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

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